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A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

ENVIRONMENTAL STATEMENT
VOLUME 3C: TECHNICAL APPENDICES

July 2019



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Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement
Appendix 8.1: Schedule of Surveys and Weather Conditions

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Date	survey type	Extent	Timing (where applicable)	weather conditions	notes	Company
05/07/2016	Barn Owl Type 1 & 2	Survey area 15				Mott McDonald
05/07/2016	Barn Owl Type 1 & 2	survey area 14				Mott McDonald
14/07/2016	Barn Owl Type 1 & 2	survey area 13				Mott McDonald
14/07/2016	Barn Owl Type 1 & 2	survey area 12				Mott McDonald
14/07/2016	Barn Owl Type 1 & 2	survey area 11				Mott McDonald
14/07/2016	Barn Owl Type 1 & 2	survey area 10				Mott McDonald
12/07/2016	Barn Owl Type 1 & 2	survey area 9				Mott McDonald
12/07/2016	Barn Owl Type 1 & 2	survey area 8				Mott McDonald
08/07/2016	Barn Owl Type 1 & 2	survey area 7				Mott McDonald
13/07/2016	Barn Owl Type 1 & 2	survey area 6				Mott McDonald
13/07/2016	Barn Owl Type 1 & 2	survey area 5				Mott McDonald
06/07/2016	Barn Owl Type 1 & 2	survey area 4				Mott McDonald
06/07/2016	Barn Owl Type 1 & 2	survey area 3				Mott McDonald
06/07/2016	Barn Owl Type 1 & 2	survey area 2				Mott McDonald
06/07/2016	Barn Owl Type 1 & 2	survey area 1				Mott McDonald
25/04/16	Bat transects	Transect 1	Aborted	Cloudy, 9°C	Too cold to survey	Mott McDonald
25/04/16	Bat transects	Transect 2	Aborted	Cloudy, 9°C	Too cold to survey	Mott McDonald
20/04/16	Bat transects	Transect 3	Aborted	Dry, 70% cloud cover	Unable to access land	Mott McDonald
19/04/16	Bat transects	Transect 6	Dusk	Dry, 0 % cloud cover	no access to 4 fields on eastern side of transect	Mott McDonald
20/04/16	Bat transects	Transect 7	Dusk	Dry, 0 % cloud cover		Mott McDonald
18/04/16	Bat transects	Transect 8	Dusk	Dry, 50% cloud cover		Mott McDonald
18/04/16	Bat transects	Transect 9	Dusk	Dry, 50% cloud cover		Mott McDonald
19/04/16	Bat transects	Transect 10	Dusk	Dry, 50% cloud cover		Mott McDonald
21/04/16	Bat transects	Transect 11	Dusk	Light drizzle during the last 20 minutes of the survey, 100% cloud cover		Mott McDonald
03/05/16	Bat transects	Transect 1	Dusk	Dry	Temperature dropped to 6 degrees	Mott McDonald
03/05/16	Bat transects	Transect 2	Dusk	Dry	Temperature dropped to 6 degrees	Mott McDonald
04/05/16	Bat transects	Transect 3	Dusk	Dry	Temperature dropped to 5 degrees	Mott McDonald
04/05/16	Bat transects	Transect 4	Dusk	Dry	Temperature dropped to 5 degrees, Access restrictions to D,E,F,G,H,I,K,M,N,O	Mott McDonald
05/05/16	Bat transects	Transect 5	Dusk & Dawn	Dry	Temperature down to 6 degrees	Mott McDonald
05/05/16	Bat transects	Transect 6	Dusk & Dawn	Dry	Temperature down to 6 degrees	Mott McDonald
18/05/16	Bat transects	Transect 7	Dusk & Dawn	Dry		Mott McDonald
12/05/16	Bat transects	Transect 8	Dusk & Dawn	Dry	No access into fields F,G,H due to cows	Mott McDonald
18/05/16	Bat transects	Transect 9	Dusk & Dawn	Dry	Cows with calves in one of the fields.	Mott McDonald
16/05/16	Bat transects	Transect 10	Dusk & Dawn	Dry		Mott McDonald
23/05/16	Bat transects	Transect 11	Dusk & Dawn	Dry	No access into 4 fields due to cows. Temperature dropped to 6 degrees on dawn survey.	Mott McDonald

11/05/16	Bat transects	Transect 12	Dusk & Dawn	Dry		Mott McDonald
12/05/16	Bat transects	Transect 13	Dusk & Dawn	Dry		Mott McDonald
16/05/16	Bat transects	Transect 14	Dusk & Dawn	Dry	Temperature dropped to 6 degrees	Mott McDonald
11/05/16	Bat transects	Transect 15	Dusk & Dawn	Dry	Bullocks in a field at dawn, field avoided at dawn	Mott McDonald
07/06/16	Bat transects	Transect 1	Dusk & Dawn	Dry		Mott McDonald
07/06/16	Bat transects	Transect 2	Dusk & Dawn	Dry		Mott McDonald
13/06/16	Bat transects	Transect 3	Dusk & Dawn	Light rain		Mott McDonald
13/06/16	Bat transects	Transect 4	Dusk & Dawn	Light rain		Mott McDonald
01/06/16	Bat transects	Transect 5	Dusk & Dawn	Dry		Mott McDonald
01/06/16	Bat transects	Transect 6	Dusk & Dawn	Dry	Restricted access to two fields due to cows	Mott McDonald
14/06/15	Bat transects	Transect 7	Dusk & Dawn	Light drizzle during the last 20 minutes of the dusk survey, 100% cloud cover. Heavy drizzle during the dawn, got heavier and then returned to drizzle. 100% cloud cover.	Rain got quite heavy early on in the survey so we cancelled the survey at 03:23. On return to the car a bat was heard so we re-started the survey. No further bats were heard. This was not an optimal survey and I suspect the bat that was heard was returning to its roost due to the bad weather.	Mott McDonald
06/06/16	Bat transects	Transect 8	Dusk & Dawn	Dry		Mott McDonald
06/06/16	Bat transects	Transect 9	Dusk & Dawn	Dry, 100% cloud, lightning in the distance	We did not enter three fields due to cows with calves. The southern half of one field was not surveyed due to numerous cows and a young bull.	Mott McDonald
20/06/16	Bat transects	Transect 10	Dusk & Dawn	Dry		Mott McDonald
21/06/16	Bat transects	Transect 11	Dusk & Dawn	Dry through dusk, Drizzle from 45 minutes into the dawn	Dawn survey aborted approximately 45 minutes in due to bullocks in field - no access back into the area. Partial transect completed at dawn.	Mott McDonald
28/06/16	Bat transects	Transect 12	Dusk & Dawn	Dry	Could not access 5 fields	Mott McDonald
27/06/16	Bat transects	Transect 13	Dusk & Dawn	Dry		Mott McDonald
02/06/16	Bat transects	Transect 14	Dusk & Dawn	Dry	Temperature dropped to 9 degrees at dawn. Restricted access only to 3 fields	Mott McDonald
02/06/16	Bat transects	Transect 15	Dusk & Dawn	Dry		Mott McDonald
05/07/16	Bat transects	Transect 1	Dawn	Dry		Mott McDonald

11/07/16	Bat transects	Transect 2	Dusk & Dawn (Dawn Aborted)	Dry, overcast	GS & RJ Dusk - Young bullocks in field E caused issues, Avoided field for second loop. CE & BS Dawn - Bullocks had entered field A (entrance to transect) by the start of the dawn survey so was aborted.	Mott McDonald
18/07/16	Bat transects	Transect 3	Dusk & Dawn	Dry	CH & BS Dusk, BF & RT Dawn.	Mott McDonald
04/04/16	Bat transects	Transect 4	Dusk & Dawn	Dry		Mott McDonald
05/07/16	Bat transects	Transect 5	Dusk & Dawn	Dry	Temperature dropped to 6 degrees on the dawn survey and no bats were heard or seen.	Mott McDonald
13/07/16	Bat transects	Transect 6	Dusk & Dawn	Rain from time to time throughout, becoming heavier toward end. Bats throughout.	CE & BS Dawn	Mott McDonald
19/07/16	Bat transects	Transect 7	Dusk & Dawn	Dry		Mott McDonald
28/07/2016	Bat transects	Transect 8	Dusk & Dawn	Dry	BS & RT Dusk, BF & RJ Dawn	Mott McDonald
14/07/16	Bat transects	Transect 9	Dusk & Dawn	Light drizzle throughout the surve yat dawn	Avoided lower fields due to cows with calves CE & BS Dawn survey	Mott McDonald
21/07/16	Bat transects	Transect 10	Dusk & Dawn	Dry	CH & BS Dusk, BF & RT Dawn.	Mott McDonald
05/07/16	Bat transects	Transect 11	Dusk & Dawn	Dry		Mott McDonald
26/07/16	Bat transects	Transect 12	Dusk & Dawn	Dry, Cloudy	CH & FCM Dusk, BF & RT Dawn.	Mott McDonald
19/07/16	Bat transects	Transect 13	Dusk	Dry		Mott McDonald
26/07/16	Bat transects	Transect 14	Dusk & Dawn (Dawn Aborted)	Dry for most of the dusk, drizzled for roughly the last 10 minutes. Dawn was aborted due to the rain.	BS & RT Dusk, CH & FCM Dawn	Mott McDonald
29/07/16	Bat transects	Transect 15	Dusk & Dawn	Dry	CH & FCM Dusk, BF & RT Dawn.	Mott McDonald
09/08/16	Bat transects	Transect 1	Dusk & Dawn	Dry		Mott McDonald
23/08/16	Bat transects	Transect 2	Dusk	Dry	Ground very boggy, unable to access field to south safely, cows in field.	Mott McDonald
31/08/16	Bat transects	Transect 3	Dusk & Dawn	Dry	CH did dusk BF did dawn	Mott McDonald
02/08/16	Bat transects	Transect 4	Dusk & Dawn			Mott McDonald
22/08/16	Bat transects	Transect 5	Dusk to Dawn	Rain for dusk		Mott McDonald
03/08/16	Bat transects	Transect 6	Dusk & Dawn	Dry		Mott McDonald
24/08/16	Bat transects	Transect 7	Dusk to Dawn	Dry		Mott McDonald
10/08/2016	Bat transects	Transect 8	Dusk & Dawn	Dry		Mott McDonald
16/08/16	Bat transects	Transect 9	Dusk & Dawn	Dry		Mott McDonald
17/08/16	Bat transects	Transect 10	Dusk & Dawn	Dry		Mott McDonald
04/08/16	Bat transects	Transect 11	Dusk to Dawn	Dry		Mott McDonald
08/08/16	Bat transects	Transect 12	Dusk & Dawn	Dry		Mott McDonald
04/08/16	Bat transects	Transect 13	Dusk & Dawn	Foggy for dawn.	Dusk undertaken by BS & OS-R, Dawn undertaken by GS & AB.	Mott McDonald
24/08/16	Bat transects	Transect 14	Dusk to Dawn	Dry		Mott McDonald

23/08/16	Bat transects	Transect 15	Dusk to Dawn	Dry	MA lead survey dusk, CE for dawn	Mott McDonald
12/09/16	Bat transects	Transect 1	Dusk	overcast, breezy, weather deteriorated	Rain started and wind increased so that survey was terminated after 1hr 52 mins	Mott McDonald
01/09/16	Bat transects	Transect 2	Dusk & Dawn			Mott McDonald
14/09/16	Bat transects	Transect 3	Dusk	Dry		Mott McDonald
07/09/16	Bat transects	Transect 4	Dusk	Dry		Mott McDonald
05/09/16	Bat transects	Transect 5	Dusk	Dry		Mott McDonald
06/09/16	Bat transects	Transect 6	Dawn	Dry	Restructed access due to cows	Mott McDonald
09/09/16	Bat transects	Transect 7	Dusk & Dawn	Dry	CE & BS Dawn, CH & KL Dusk	Mott McDonald
13/09/2016	Bat transects	Transect 8	Dusk	Dry		Mott McDonald
08/09/16	Bat transects	Transect 9	Dawn	Dry	Restricted access due to cows	Mott McDonald
01/09/16	Bat transects	Transect 11	Dusk & Dawn	Dry		Mott McDonald
19/09/16	Bat transects	Transect 12	Dusk	Dry		Mott McDonald
09/09/2016	Bat transects	Transect 13	Dawn	Dry		Mott McDonald
28/09/16	Bat transects	Transect 14	Dawn	Dry	Dusk aborted due to rain	Mott McDonald
08/09/16	Bat transects	Transect 15	Dawn	Rain	Dawn aborted due to rain	Mott McDonald
04/10/16	Bat transects	Transect 1	Aborted	Dry	Survey aborted due to issues with cattle	Mott McDonald
03/10/16	Bat transects	Transect 2	Dusk & Dawn	Dry	Southern fields too boggy to enter	Mott McDonald
03/10/16	Bat transects	Transect 3	Dusk & Dawn	Dry		Mott McDonald
11/10/16	Bat transects	Transect 4	Dusk & Dawn	Dry		Mott McDonald
04/10/16	Bat transects	Transect 5	Dusk & Dawn	Dry		Mott McDonald
05/10/16	Bat transects	Transect 6	Dawn	Dry		Mott McDonald
04/10/16	Bat transects	Transect 7	Dusk & Dawn	Dry		Mott McDonald
19/10/2016	Bat transects	Transect 8	Dawn	Some drizzle		Mott McDonald
12/10/16	Bat transects	Transect 9	Dusk & Dawn	Dry	No access to Mr Reynolds land	Mott McDonald
03/10/16	Bat transects	Transect 11	Dusk & Dawn	Dry	Access only to the Thomas' and Mr Evans land	Mott McDonald
11/10/16	Bat transects	Transect 12	Dusk & Dawn	Dry		Mott McDonald
10/10/2016	Bat transects	Transect 13	Dusk & Dawn	Dry		Mott McDonald
17/10/16	Bat transects	Transect 14	Dusk & Dawn	Some light rain		Mott McDonald
17/10/16	Bat transects	Transect 15	Dusk & Dawn	Some light rain and strong winds during dawn		Mott McDonald
23/05/16	Bat transects	Transect 1	Dusk & Dawn	Dry	N/A	Mott McDonald
25/05/16	Bat transects	Transect 2	Dusk	Dry	Cattle in field A - restricted access	Mott McDonald
24/05/16	Bat transects	Transect 3	Dusk & Dawn	Dry	Temperature dropped to 6 degrees on dawn survey	Mott McDonald
24/05/16	Bat transects	Transect 4	Dusk & Dawn	Dry		Mott McDonald
15/06/16	Bat transects	Transect 1	Dawn	Intermittent drizzle		Mott McDonald
22/06/16	Bat transects	Transect 2	Dusk	Dry		Mott McDonald
14/06/16	Bat transects	Transect 5	Dusk	Intermittent drizzle		Mott McDonald
23/06/16	Bat transects	Transect 6	Dusk	Misty	Heavy rain started at 2355. 2.5hrs of survey completed successfully	Mott McDonald

29/06/16	Bat transects	Transect 7	Dusk	Dry		Mott McDonald
23/06/16	Bat transects	Transect 8	Dawn	Dry		Mott McDonald
22/06/16	Bat transects	Transect 9	Dawn	Dry		Mott McDonald
30/06/16	Bat transects	Transect 10	Dusk	Windy/drizzle		Mott McDonald
30/06/16	Bat transects	Transect 14	Dusk	Drizzle for first 10 mins. Gusty winds	Gusty winds in places	Mott McDonald
29/06/16	Bat transects	Transect 15	Dusk	Dry		Mott McDonald
25/07/16	Bat transects	Transect 1	Dusk & Dawn	Dry		Mott McDonald
27/07/16	Bat transects	Transect 2	Aborted	Rain	Dawn aborted due to heavy rain and wind. Dusk was carried out on a different transect because bullocks had moved to entrance field and extra statics placed here instead.	Mott McDonald
12/07/16	Bat transects	Transect 8	Dusk & Dawn (Dawn Aborted)	Dry, clear sky becoming overcast with drizzle off and on.	CE & BS Dawn - Transect loop completed but equipment failure	Mott McDonald
24/08/2016	Bat transects	Transect 1	Dawn	Dry		Mott McDonald
24/08/16	Bat transects	Transect 3	Dusk	Dry		Mott McDonald
10/08/16	Bat transects	Transect 5	Dawn	Dry		Mott McDonald
17/08/2016	Bat transects	Transect 6	Dusk	Rain	Cows in several fields, inc. A, unable to access.	Mott McDonald
10/08/16	Bat transects	Transect 7	Dusk	Dry	Cows in the field to the west	Mott McDonald
02/08/16	Bat transects	Transect 9	Dusk	Wet, windy, foggy later on.	Very wet, drizzle, becoming heavy from time to time. Wind picked up as well but many bats still heard so continued.	Mott McDonald
03/08/16	Bat transects	Transect 10	Dawn	Dry, overcast	Limited access to Transect 10 (front fields only nearest road) as requested by LO.	Mott McDonald
15/08/16	Bat transects	Transect 11	Dusk			Mott McDonald
15/08/2016	Bat transects	Transect 13	Dusk			Mott McDonald
09/08/16	Bat transects	Transect 14	Dusk	Dry		Mott McDonald
09/08/16	Bat transects	Transect 15	Dawn	Dry	Cows in the far west field	Mott McDonald
15/09/16	Bat transects	Transect 7	Dusk	Dry		Mott McDonald
29/09/16	Bat transects	Transect 15	Dusk	Dry		Mott McDonald
18/10/2016	Bat transects	Transect 6	Dusk	Dry		Mott McDonald
19/10/16	Bat transects	Transect 8	Dusk	Some drizzle		Mott McDonald
04/09-22/09/2016	Bat emmergence survey	Transect 13 - Mr Perkins - Cottage				Mott McDonald
05/08-27/09/2016	Bat emmergence survey	Transect 13 - Mr Perkins - Cowshed				Mott McDonald
20/09/2016	Bat emmergence survey	Transect 13 - Mr Perkins - House				Mott McDonald
30/08/2016	Bat emmergence survey	Transect 13 - Sir Eric Howells - Chapel				Mott McDonald
23/08-21/09/2016	Bat emmergence survey	Transect 15 - Sir Eric Howells - House				Mott McDonald
11/08-12/08/2016	Bat emmergence survey	Transect 3 - Mr & Mrs Peet - Barn				Mott McDonald
11/08-12/08/2016	Bat emmergence survey	Transect 3 - Mr & Mrs Peet - House				Mott McDonald
25/08/2016	Bat emmergence survey	Transect 4 - Mr & Mrs Hart - White Cottage				Mott McDonald
20/09/2016	Bat emmergence survey	Transect 4 - Mrs Capes - Barn (Building D)				Mott McDonald
02/08-31/08/2016	Bat emmergence survey	Transect 4 - Mrs Capes - Cottage (Building A)				Mott McDonald
27/09/2016	Bat emmergence survey	Transect 4 - Mrs Capes - House (Building C)				Mott McDonald

27/09/2016	Bat emmergence survey	Transect 4 - Mrs Capes - Workshop (Building B)				Mott McDonald
31/08/2016	Bat emmergence survey	Transect 5 - Mr Marden - House				Mott McDonald
08/08/2016	Bat emmergence survey	Transect 6 - Mrs Rhian Thomas - House				Mott McDonald
04/08/2016	Bat emmergence survey	Transect 6 - Mrs Rhian Thomas - Milking Shed (Building C)				Mott McDonald
10/08-22/09/2016	Bat emmergence survey	Transect 8 - Mr David Hughes - House				Mott McDonald
23/09/2016	Bat emmergence survey	Transect 8 - Mr Smiley - Ffynnon Vestry				Mott McDonald
25/08-15/09/2016	Bat emmergence survey	Transect 8 - Rev Hugh George - Ffynnon Chapel				Mott McDonald
18/08-24/08/2016	Bat emmergence survey	Transect 9 - Mr P Hughes - House				Mott McDonald
07/09-28/09/2016	Bat emmergence survey	Transect 9 - Mrs Caddy-Walker - House				Mott McDonald
06/09/2016	1st Bat emmergence survey	Transect 8 House B - Yellow house	Dusk	Dry	N/A	Mott McDonald
10/08/2016	1st Bat emmergence survey	Transect 8 House C	Dusk	Dry	N/A	Mott McDonald
30/08/2016	1st Bat emmergence survey	Transect 8 Ffynnon Vestry - Pink house	Dusk	Dry	Restricted visibility	Mott McDonald
25/08/2016	1st Bat emmergence survey	Transect 8 Fynon Chapel	Dawn	Dry	N/A	Mott McDonald
11/08/2016	1st Bat emmergence survey	Transect 3 Main house & Stable	Dusk	Dry	Not enough people on house - changed for dawn	Mott McDonald
11/08/2016	1st Bat emmergence survey	Transect 3 Barn	Dusk	Dry	N/A	Mott McDonald
23/08/2016	1st Bat emmergence survey	Transect 13 Cottage (plus stable and lean-to)	Dawn	Dry	Only 1 batlogger available	Mott McDonald
30/08/2016	1st Bat emmergence survey	Transect 13 Farmhouse	Dusk	Dry	N/A	Mott McDonald
05/08/2016	1st Bat emmergence survey	Transect 13 Cow shed	Dawn	Dry, foggy	Works being done to the roof	Mott McDonald
16/08/2016	1st Bat emmergence survey	Transect 4 Building D (barn)	Dusk	Dry, clear sky	N/A	Mott McDonald
1608/16	1st Bat emmergence survey	Transect 4 Building C (Main house)	Dusk	Dry, clear sky	N/A	Mott McDonald
02/08/2016	1st Bat emmergence survey	Transect 4 Building A (South of main house)	Dusk	Light drizzle throughout survey, light rain in the last 10 minutes	2 surveyors - need an extra 1 for the next survey	Mott McDonald
31/08/2016	1st Bat emmergence survey	Transect 4 Building B (Workshop/garage)	Dusk	Dry	N/A	Mott McDonald
08/08/2016	1st Bat emmergence survey	Transect 6 Main Farmhouse	Dusk	Dry	N/A	Mott McDonald
04/08/2016	1st Bat emmergence survey	Transect 6 Long Milking Shed	Dusk	Dry	N/A	Mott McDonald
04/08/2016	1st Bat emmergence survey	Transect 6 Front Barn	Dawn	Dry	N/A	Mott McDonald
17/08/2016	1st Bat emmergence survey	Transect 9 Stone house & garage	Dawn	Dry, windy at times	N/A	Mott McDonald
31/08/2016	1st Bat emmergence survey	Transect 9 House	Dusk	Dry	N/A	Mott McDonald
16/08/2016	1st Bat emmergence survey	Transect 4 House (B)	Dawn	Dry	N/A	Mott McDonald
16/08/2016	1st Bat emmergence survey	Transect 4 Barn (South)	Dawn	Dry, clear sky until 5.30 then fog rolled in briefly.	N/A	Mott McDonald
25/08/2016	1st Bat emmergence survey	Transect 4 Stone barns to west of property (painted white)	Dawn	Dry	N/A	Mott McDonald
23/08/2016	1st Bat emmergence survey	Transect 15 House (lived in by his sister)	Dawn	Dry	N/A	Mott McDonald
07/09/2016	1st Bat emmergence survey	Transect 9 Llanddewi velfrey village	Dusk	Dry	N/A	Mott McDonald
30/08/2016	1st Bat emmergence survey	Bethel Cottage	Dusk	Dry	N/A	Mott McDonald
31/08/2016	1st Bat emmergence survey	Transect 5 Trefagnor Cottage	Dusk	Dry	Restricted visibility in places	Mott McDonald
22/08/2016	1st Bat emmergence survey	Transect 9 House (A)	Dusk	Raining, windy	Mr Hughes not told by sister-in-law (don't get on) wasn't particularly happy but let us stay, Completed 1.5 hr survey but had to cut short of the 2hrs 15m. Bats heard throughout.	Mott McDonald

31/08/2016	1st Bat emmergence survey	Transect 9 Barn (D)	Dawn	Intermittent drizzle	No visibility to the north and western facing elevations of the property for the last 30 minutes - had to move due to cow milking	Mott McDonald
31/08/2016	1st Bat emmergence survey	Transect 9 Barn (H)	Dawn	Intermittent drizzle		Mott McDonald
24/08/2016	1st Bat emmergence survey	Transect 13 Bethel Chapel	Dawn	Dry, clear skies	Visibility of roof difficult due to height and closeness to building.	Mott McDonald
19/09/2016	2nd Bat emmergence survey	Transect 8 House B - Yellow house	Dusk	Dry	N/A	Mott McDonald
26/08/2016	2nd Bat emmergence survey	Transect 8 House C	Dawn	Dry	N/A	Mott McDonald
06/09/2016	2nd Bat emmergence survey	Transect 8 Ffynnon Vestry - Pink house	Dusk	Dry	N/A	Mott McDonald
31/08/2016	2nd Bat emmergence survey	Transect 8 Fynon Chapel	Dawn	Drizzle	Drizzle throughout survey with potential early return so the number of bats observed returning may not be underestimated	Mott McDonald
12/08/2016	2nd Bat emmergence survey	Transect 3 Main house & Stable	Dawn	Dry, foggy	dusk/dawn used as there are temporal access limitations	Mott McDonald
12/08/2016	2nd Bat emmergence survey	Transect 3 Barn	Dawn	Dry, foggy	Only used 1 person for survey as more surveyors were required on the house, dusk/dawn used as there are temporal access limitations	Mott McDonald
14/09/2016	2nd Bat emmergence survey	Transect 13 Cottage (plus stable and lean-to)	Dawn	Dry	N/A	Mott McDonald
20/09/2016	2nd Bat emmergence survey	Transect 13 Farmhouse	Dusk	Dry	N/A	Mott McDonald
20/09/2016	2nd Bat emmergence survey	Transect 13 Cow shed	Dusk	Dry	N/A	Mott McDonald
20/09/2016	2nd Bat emmergence survey	Transect 4 Building D (barn)	Dawn	Dry	N/A	Mott McDonald
13/09/2016	2nd Bat emmergence survey	Transect 4 Building C (Main house)	Dusk	Dry	N/A	Mott McDonald
31/08/2016	2nd Bat emmergence survey	Transect 4 Building A (South of main house)	Dusk		N/A	Mott McDonald
20/09/2016	2nd Bat emmergence survey	Transect 4 Building B (Workshop/garage)	Dawn	Dry	N/A	Mott McDonald
24/08/2016	2nd Bat emmergence survey	Transect 9 Stone house & garage	Dusk	Dry, becoming overcast for a time, slight to moderate breeze.	N/A	Mott McDonald
14/09/2016	2nd Bat emmergence survey	Transect 9 House	Dawn	Dry	N/A	Mott McDonald
14/09/2016	2nd Bat emmergence survey	Transect 4 House (B)	Dusk	Dry	N/A	Mott McDonald
14/09/2016	2nd Bat emmergence survey	Transect 4 Stone barns to west of property (painted white)	Dusk	Dry	N/A	Mott McDonald
13/09/2016	2nd Bat emmergence survey	Transect 15 House (lived in by his sister)	Dawn	Heavy rain for around 5 minutes during the survey and intermittent light rain	N/A	Mott McDonald
21/09/2016	2nd Bat emmergence survey	Transect 9 Llanddewi velfrey village	Dusk		N/A	Mott McDonald
08/09/2016	2nd Bat emmergence survey	Transect 5 Trefagnor Cottage	Dusk	Windy and drizzly for first 30 mins	Too windy and drizzly for bats for first 30 mins of survey	Mott McDonald
18/08/2016	2nd Bat emmergence survey	Transect 9 House (A)	Dusk	Overcast	Hard to cover all aspects of the building	Mott McDonald

05/09/2016	2nd Bat emmergence survey	Transect 9 Barn (D)	Dusk	Light drizzle throughout	Late survey start time	Mott McDonald
15/09/2016	2nd Bat emmergence survey	Transect 9 Barn (H)	Dawn	Dry	N/A	Mott McDonald
30/08/2016	2nd Bat emmergence survey	Transect 13 Bethel Chapel	Dusk	Dry	N/A	Mott McDonald
26/09/2016	3rd Bat emmergence survey	Transect 8 House B - Yellow house	Dusk - ABORTED	Light Rain	Rain increased during the survey and so bats may not have emerged	Mott McDonald
22/09/2016	3rd Bat emmergence survey	Transect 8 House C	Dusk	Dry		Mott McDonald
23/09/2016	3rd Bat emmergence survey	Transect 8 Ffynnon Vestry - Pink house	Dawn	Dry	Couldn't get around back of building	Mott McDonald
15/09/2016	3rd Bat emmergence survey	Transect 8 Fynon Chapel	Dusk	Dry		Mott McDonald
22/09/2016	3rd Bat emmergence survey	Transect 13 Cottage (plus stable and lean-to)	Dusk	Dry	N/A	Mott McDonald
27/09/2016	3rd Bat emmergence survey	Transect 13 Farmhouse	Dusk	Dry	N/A	Mott McDonald
27/09/2016	3rd Bat emmergence survey	Transect 13 Cow shed	Dusk	Dry	N/A	Mott McDonald
27/09/2016	3rd Bat emmergence survey	Transect 4 Building D (barn)	Dawn	Drizzle throughout	N/A	Mott McDonald
27/09/2016	3rd Bat emmergence survey	Transect 4 Building C (Main house)	Dawn	Drizzle throughout	N/A	Mott McDonald
20/09/2016	3rd Bat emmergence survey	Transect 4 Building A (South of main house)	Dawn	Dry	Temperature dropped to 7 degrees	Mott McDonald
27/09/2016	3rd Bat emmergence survey	Transect 4 Building B (Workshop/garage)	Dawn	Drizzle throughout		Mott McDonald
21/09/2016	3rd Bat emmergence survey	Transect 9 Stone house & garage	Dawn	Dry	N/A	Mott McDonald
21/09/2016	3rd Bat emmergence survey	Transect 15 House (lived in by his sister)	Dusk	Dry	N/A	Mott McDonald
28/09/2016	3rd Bat emmergence survey	Transect 9 Llanddewi velfrey village	Dawn	Dry	N/A	Mott McDonald
21/09/2016	3rd Bat emmergence survey	Transect 5 Trefagnor Cottage	Dawn	Dry	N/A	Mott McDonald
05/09/2016	3rd Bat emmergence survey	Transect 9 House (A)	Dusk	Light drizzle throughout	Rain	Mott McDonald
13/09/2016	3rd Bat emmergence survey	Transect 9 Barn (H)	Dusk	Dry	N/A	Mott McDonald
15/09/2016	3rd Bat emmergence survey	Transect 13 Bethel Chapel	Dawn	Dry	N/A	Mott McDonald
29/09/2016	Repeat Bat emmergence survey	Transect 8 House B - Yellow house	Dusk	Dry	Poor weather conditions in a previous survey so survey repeated	Mott McDonald
29/09/2016	Repeat Bat emmergence survey	Transect 5 Trefagnor Cottage	Dusk	Dry	Poor weather conditions in a previous survey so survey repeated	Mott McDonald
01/04-30/04/2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/05-31/05//2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/06-30/06/2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/07-31/07/2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/08-31/08/2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/09-30/09/2016	Bat static monitoring	Transect 1-15				Mott McDonald
01/10-31/10/2016	Bat static monitoring	Transect 1-15				Mott McDonald
26/04/16	Bat static monitoring	Transect 1				Mott McDonald
26/04/16	Bat static monitoring	Transect 2				Mott McDonald
26/04/16	Bat static monitoring	Transect 3				Mott McDonald
26/04/16	Bat static monitoring	Transect 4				Mott McDonald
19/04/16	Bat static monitoring	Transect 8				Mott McDonald
19/04/16	Bat static monitoring	Transect 9				Mott McDonald
18/04/16	Bat static monitoring	Transect 11				Mott McDonald
18/04/16	Bat static monitoring	Transect 12				Mott McDonald

26/05/16	Bat static monitoring	Transect 1				Mott McDonald
26/05/16	Bat static monitoring	Transect 2				Mott McDonald
18/05/16	Bat static monitoring	Transect 3			No. 3 went out 19/05/15	Mott McDonald
26/05/16	Bat static monitoring	Transect 4			Data issues - put back out on 03/06/16 in same location	Mott McDonald
04/05/16	Bat static monitoring	Transect 5				Mott McDonald
04/05/16	Bat static monitoring	Transect 6				Mott McDonald
04/05/16	Bat static monitoring	Transect 7				Mott McDonald
18/05/16	Bat static monitoring	Transect 8				Mott McDonald
18/05/16	Bat static monitoring	Transect 9				Mott McDonald
05/05/16	Bat static monitoring	Transect 10				Mott McDonald
18/05/16	Bat static monitoring	Transect 11				Mott McDonald
11/05/16	Bat static monitoring	Transect 12				Mott McDonald
11/05/16	Bat static monitoring	Transect 13				Mott McDonald
11/05/16	Bat static monitoring	Transect 14				Mott McDonald
11/05/16	Bat static monitoring	Transect 15				Mott McDonald
15/06/16	Bat static monitoring	Transect 1				Mott McDonald
15/06/16	Bat static monitoring	Transect 2				Mott McDonald
03/06/2016 + 24/06/2016	Bat static monitoring	Transect 4				Mott McDonald
09/06/16	Bat static monitoring	Transect 5				Mott McDonald
03/06/16	Bat static monitoring	Transect 6				Mott McDonald
09/06/16	Bat static monitoring	Transect 7				Mott McDonald
23/06/16	Bat static monitoring	Transect 8				Mott McDonald
22/06/16	Bat static monitoring	Transect 9				Mott McDonald
09/06/16	Bat static monitoring	Transect 10				Mott McDonald
22/06/16	Bat static monitoring	Transect 11				Mott McDonald
30/06/16	Bat static monitoring	Transect 12				Mott McDonald
09/06/16	Bat static monitoring	Transect 13				Mott McDonald
03/06/16	Bat static monitoring	Transect 14				Mott McDonald
03/06/16	Bat static monitoring	Transect 15				Mott McDonald
06/07/16	Bat static monitoring	Transect 1				Mott McDonald
14/07/2016 & 28/07/16	Bat static monitoring	Transect 2				Mott McDonald
06/07/16	Bat static monitoring	Transect 3				Mott McDonald
20/07/16	Bat static monitoring	Transect 4				Mott McDonald
06/07/16	Bat static monitoring	Transect 5				Mott McDonald
14/07/2016	Bat static monitoring	Transect 6				Mott McDonald
14/07/16	Bat static monitoring	Transect 7				Mott McDonald
14/07/16	Bat static monitoring	Transect 8			Static 1 did not record	Mott McDonald
20/07/16	Bat static monitoring	Transect 9				Mott McDonald
20/07/16	Bat static monitoring	Transect 10				Mott McDonald
06/07/16	Bat static monitoring	Transect 11				Mott McDonald
28/07/16	Bat static monitoring	Transect 12				Mott McDonald
20/07/16	Bat static monitoring	Transect 13				Mott McDonald
28/07/16	Bat static monitoring	Transect 14				Mott McDonald
28/07/16	Bat static monitoring	Transect 15				Mott McDonald
04/08/16	Bat static monitoring	Transect 1				Mott McDonald

10/08/2016	Bat static monitoring	Transect 2				Mott McDonald
04/08/16	Bat static monitoring	Transect 3				Mott McDonald
17/08/16	Bat static monitoring	Transect 4				Mott McDonald
04/08/16	Bat static monitoring	Transect 5				Mott McDonald
10/08/2016	Bat static monitoring	Transect 6				Mott McDonald
11/08/16	Bat static monitoring	Transect 7				Mott McDonald
10/08/16	Bat static monitoring	Transect 8				Mott McDonald
17/08/16	Bat static monitoring	Transect 9				Mott McDonald
17/08/16	Bat static monitoring	Transect 10				Mott McDonald
04/08/16	Bat static monitoring	Transect 11				Mott McDonald
24/08/16	Bat static monitoring	Transect 12				Mott McDonald
17/08/16	Bat static monitoring	Transect 13				Mott McDonald
24/08/16	Bat static monitoring	Transect 14				Mott McDonald
24/08/16	Bat static monitoring	Transect 15				Mott McDonald
15/09/16	Bat static monitoring	Transect 1			One static could not be collected in from Transect 9 due to access constraints	Mott McDonald
15/09/2016	Bat static monitoring	Transect 2				Mott McDonald
15/09/16	Bat static monitoring	Transect 3				Mott McDonald
07/09/16	Bat static monitoring	Transect 4				Mott McDonald
01/09/16	Bat static monitoring	Transect 5				Mott McDonald
01/09/2016	Bat static monitoring	Transect 6				Mott McDonald
01/09/16	Bat static monitoring	Transect 7				Mott McDonald
01/09/16	Bat static monitoring	Transect 8				Mott McDonald
07/09/16	Bat static monitoring	Transect 9				Mott McDonald
07/09/16	Bat static monitoring	Transect 10				Mott McDonald
23/09/16	Bat static monitoring	Transect 11				Mott McDonald
15/09/16	Bat static monitoring	Transect 12				Mott McDonald
07/09/16	Bat static monitoring	Transect 13				Mott McDonald
22/09/16	Bat static monitoring	Transect 14				Mott McDonald
22/09/16	Bat static monitoring	Transect 15				Mott McDonald
13/10/16	Bat static monitoring	Transect 1				Mott McDonald
06/10/2016	Bat static monitoring	Transect 2				Mott McDonald
12/10/16	Bat static monitoring	Transect 3				Mott McDonald
06/10/16	Bat static monitoring	Transect 4				Mott McDonald
29/09/16	Bat static monitoring	Transect 5				Mott McDonald
29/09/2016	Bat static monitoring	Transect 6				Mott McDonald
29/09/2016	Bat static monitoring	Transect 7				Mott McDonald
29/09/16	Bat static monitoring	Transect 8				Mott McDonald
06/10/16	Bat static monitoring	Transect 9				Mott McDonald
19/10/16	Bat static monitoring	Transect 11				Mott McDonald
12/10/16	Bat static monitoring	Transect 12				Mott McDonald
06/10/16	Bat static monitoring	Transect 13				Mott McDonald
12/10/16	Bat static monitoring	Transect 14				Mott McDonald
19/10/16	Bat static monitoring	Transect 15				Mott McDonald
26/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 1				Mott McDonald
26/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 2				Mott McDonald
14/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 8				Mott McDonald

14/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 9				Mott McDonald
13/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 10				Mott McDonald
13/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 11				Mott McDonald
12/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 12				Mott McDonald
12/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 13				Mott McDonald
11/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 14				Mott McDonald
11/04/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 15				Mott McDonald
17/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 1				Mott McDonald
17/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 2				Mott McDonald
18/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 3				Mott McDonald
19/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
18/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 5				Mott McDonald
17/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 6				Mott McDonald
20/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 7				Mott McDonald
25/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 9				Mott McDonald
25-26/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 10				Mott McDonald
26/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 11				Mott McDonald
26/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 12				Mott McDonald
27/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 13				Mott McDonald
27/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 14				Mott McDonald
27/05/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 15				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 1				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 2				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 3				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 5				Mott McDonald
07-10/06/16 & 15/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 6				Mott McDonald
07-10/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 7				Mott McDonald
07-10/06/16 & 15/06/16	Breeding Bird Transect Survey Stage 1 and 2	Transect 8				Mott McDonald
16/06/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 9				Mott McDonald
16/06/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 13				Mott McDonald
16/06/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 11				Mott McDonald
16/06/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 12				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 4				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 3				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 3				Mott McDonald
05/07/2016	Breeding Bird Transect Survey Stage 1 and 2	Transect 3				Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 1			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 1			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 1			None	Mott McDonald
25/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald
25/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald
25/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald

26/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald
26/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald
26/04/2016	Dormouse Tube Survey set up	Transect 2			None	Mott McDonald
27/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
28/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
28/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
28/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 3			No access for initial check	Mott McDonald
05/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
04/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
10/05/2016	Dormouse Tube Survey set up	Transect 3			Field no. taken from GPS.	Mott McDonald
06/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
06/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
06/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
06/05/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 3			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 5			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 5			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 5			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 6			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
21/04/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 7			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			Cows	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			PRoW	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald

13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 8			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
13/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 9			No access for initial check	Mott McDonald
19/04/2016	Dormouse Tube Survey set up	Transect 9			No access for initial check	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			No access for initial or subsequent c	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			No access from top of hill due to lan	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			Boundary too boggy	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			No access for initial check	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
14/04/2016	Dormouse Tube Survey set up	Transect 9			None	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 9			Land owner restricted access	Mott McDonald
11/05/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 13			Land owner restricted access	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
11/05/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
11/05/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/05/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/05/2016	Dormouse Tube Survey set up	Transect 13			None	Mott McDonald
12/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
11/05/2016	Dormouse Tube Survey set up	Transect 15			Cows in field restricting access.	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
12/04/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
13/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
20/04/2016	Dormouse Tube Survey set up	Transect 15			Cows in field restricting access.	Mott McDonald

10/05/2016	Dormouse Tube Survey set up	Transect 15			None	Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 1				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 1				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 1				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 2				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
23-25/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
23-25/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
13/07/2016	Dormouse Tube Check	Transect 3				Mott McDonald
13/07/2016	Dormouse Tube Check	Transect 3				Mott McDonald
13/07/2016	Dormouse Tube Check	Transect 3				Mott McDonald
23-25/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
23-25/05/2016	Dormouse Tube Check	Transect 3				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 5				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 5				Mott McDonald
25/05/2016	Dormouse Tube Check	Transect 5				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
24-25/05/16	Dormouse Tube Check	Transect 6				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald

26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/05/2016	Dormouse Tube Check	Transect 7				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 8				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
01/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
02/06/2016	Dormouse Tube Check	Transect 9				Mott McDonald
15/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
15/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
15/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
15/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
15/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
27/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
27/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
27/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
14/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
14/07/2016	Dormouse Tube Check	Transect 9				Mott McDonald
12/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
28/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
28/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
28/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
29/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
28-29/07/16	Dormouse Tube Check	Transect 13				Mott McDonald
13/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
12/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
12/07/2016	Dormouse Tube Check	Transect 13				Mott McDonald
12/07/2016	Dormouse Tube Check	Transect 15				Mott McDonald
30/06/2016	Dormouse Tube Check	Transect 15				Mott McDonald
30/06/2016	Dormouse Tube Check	Transect 15				Mott McDonald
30/06/2016	Dormouse Tube Check	Transect 15				Mott McDonald
30/06/2016	Dormouse Tube Check	Transect 15				Mott McDonald
30/06/2016	Dormouse Tube Check	Transect 15				Mott McDonald
12/07/2016	Dormouse Tube Check	Transect 15				Mott McDonald
15/11/2016	Dormouse Tube Check	Transect 1				Mott McDonald
15/11/2016	Dormouse Tube Check	Transect 1				Mott McDonald

15/11/2016	Dormouse Tube Check	Transect 1				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 2				Mott McDonald
26/10/16 & 24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 3				Mott McDonald
27/10/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
26/10/2016 & 24/11/16	Dormouse Tube Check	Transect 3				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
15/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
15/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
15/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 3				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 5				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 5				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 5				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
25/11/2016	Dormouse Tube Check	Transect 6				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
25/10/2016	Dormouse Tube Check	Transect 7				Mott McDonald
24/11/2016	Dormouse Tube Check	Transect 7				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald

23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 8				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
26/10/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
16/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 9				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
23/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
17/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
18/11/2016	Dormouse Tube Check	Transect 13				Mott McDonald
18/11/2016	Dormouse Tube Check	Transect 15				Mott McDonald
18/11/2016	Dormouse Tube Check	Transect 15				Mott McDonald
18/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald
22/11/2016	Dormouse Tube Check	Transect 1Transect 5				Mott McDonald

18-24/02/2016	Extended phase 1 habitat survey	Transect 1-15				Mott McDonald
12/05/2016	eDNA testing for Great Crested Newts					Mott McDonald
24-25/05/16	Great Crested Newt Survey	Pond 1				Mott McDonald
15-16/06/16	Great Crested Newt Survey	Pond 1		14°C	duck weed covering surface too dense to undertake torching	Mott McDonald
29-30/06/16	Great Crested Newt Survey	Pond 1		12 - 14°C	duck weed covering surface too dense to undertake torching	Mott McDonald
26/07/2016	Otter and Water Vole survey	1			Ditch mainly dry throughout, some running and pooling water but limited. No evidence of otters or water voles found.	Mott McDonald
26/07/2016	Otter and Water Vole survey	2			No evidence of otters or water voles. Stream banks were heavily poached by cattle with some leeching of cattle waste into the stream.	Mott McDonald
26/07/2016	Otter and Water Vole survey	3			Unsafe to check water way in Transect 3 apart from pond. No evidence of otter or water voles in pond area (Mrs Peet).	Mott McDonald
26/07/2016	Otter and Water Vole survey	4			No evidence of otter or water voles however some good habitat. Transect 4 Field B, C, D, E, part of G.	Mott McDonald
28/07/2016	Otter and Water Vole survey	4			No evidence of otter or water voles however some good habitat. Transect 4 Field G, H.	Mott McDonald
29/07/2016	Otter and Water Vole survey	4			Mammal paths around the lake, no footprints. Transect 4 FJ (Lake). No evidence of otter or water voles.	Mott McDonald
03/08/2016	Otter and Water Vole survey	4			Some foot prints found, likely fox however. Lake is heavily silted up. Good terrestrial habitat. No evidence of otter or water voles.	Mott McDonald
04/08/2016	Otter and Water Vole survey	7			No evidence of otter or water vole however some good habitat.	Mott McDonald
27/07/2016	Otter and Water Vole survey	10			Part complete, access issues due to cattle. No evidence of otters or water voles.	Mott McDonald
27/07/2016	Otter and Water Vole survey	11			Same land checked as Transect 10, stream on boundary. No evidence of otters or water voles.	Mott McDonald
28/07/2016	Otter and Water Vole survey	13			No evidence of otters or water voles.	Mott McDonald

30/06/2016	Otter and Water Vole survey	15			No evidence of otters or water voles however habitat suitable for commuting and resting due to woodland boundaries.	Mott McDonald
06/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.Wasps nest along water course	Mott McDonald
06-07/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
28/09/2016	Otter and Water Vole survey				Unsafe to check water way in Transect 3 apart from pond. No evidence of otters or water voles in pond area (Mrs Peet).Pond is very disturbed.	Mott McDonald
w/c 05/09/16	Otter and Water Vole survey				No evidence of otters or water voles.Field B, C, D, E, G, H, J and M. possible holt, resting place in deep recess (marked on	Mott McDonald
	Otter and Water Vole survey					Mott McDonald
	Otter and Water Vole survey					Mott McDonald
	Otter and Water Vole survey					Mott McDonald
27/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
08/09/2016	Otter and Water Vole survey				Possible holt or resting place in Field H. Possible footprint but not conclusive.	Mott McDonald
29/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
15/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
15/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
16/09/2016	Otter and Water Vole survey				Possible holt or resting place in Field H. Possible footprint but not conclusive.	Mott McDonald
08/09/2016	Otter and Water Vole survey				No evidence of otters or water voles.	Mott McDonald
09/06/2016	First Reptile Survey	Transect 1				Mott McDonald
15/06/2016	First Reptile Survey	Transect 2				Mott McDonald
09/06/2016	First Reptile Survey	Transect 3				Mott McDonald
09/06/2016	First Reptile Survey	Transect 4				Mott McDonald
09/06/2016	First Reptile Survey	Transect 5				Mott McDonald
12/09/2016	First Reptile Survey	Transect 6				Mott McDonald
22/08/2016	First Reptile Survey	Transect 7				Mott McDonald
22/08/2016	First Reptile Survey	Transect 8				Mott McDonald
22/08/2016	First Reptile Survey	Transect 9				Mott McDonald
25/08/2016	First Reptile Survey	Transect 10				Mott McDonald
23/08/2016	First Reptile Survey	Transect 11				Mott McDonald
25/08/2016	First Reptile Survey	Transect 12				Mott McDonald
23/08/2016	First Reptile Survey	Transect 13				Mott McDonald

23/08/2016	First Reptile Survey	Transect 14				Mott McDonald
22/08/2016	First Reptile Survey	Transect 15				Mott McDonald
15/06/2016	Second Reptile Survey	Transect 1				Mott McDonald
16/06/2016	Second Reptile Survey	Transect 2				Mott McDonald
15/06/2016	Second Reptile Survey	Transect 3				Mott McDonald
15/06/2016	Second Reptile Survey	Transect 4				Mott McDonald
15/06/2016	Second Reptile Survey	Transect 5				Mott McDonald
14/09/2016	Second Reptile Survey	Transect 6				Mott McDonald
24/08/2016	Second Reptile Survey	Transect 7				Mott McDonald
24/08/2016	Second Reptile Survey	Transect 8				Mott McDonald
24/08/2016	Second Reptile Survey	Transect 9				Mott McDonald
31/08/2016	Second Reptile Survey	Transect 11				Mott McDonald
31/08/2016	Second Reptile Survey	Transect 12				Mott McDonald
31/08/2016	Second Reptile Survey	Transect 13				Mott McDonald
25/08/2016	Second Reptile Survey	Transect 14				Mott McDonald
23/08/2016	Second Reptile Survey	Transect 15				Mott McDonald
16/06/2016	Third Reptile Survey	Transect 1				Mott McDonald
21/06/2016	Third Reptile Survey	Transect 2				Mott McDonald
16/06/2016	Third Reptile Survey	Transect 3				Mott McDonald
16/06/2016	Third Reptile Survey	Transect 4				Mott McDonald
16/06/2016	Third Reptile Survey	Transect 5				Mott McDonald
16/09/2016	Third Reptile Survey	Transect 6				Mott McDonald
26/08/2016	Third Reptile Survey	Transect 7				Mott McDonald
26/08/2016	Third Reptile Survey	Transect 8				Mott McDonald
26/08/2016	Third Reptile Survey	Transect 9				Mott McDonald
01/09/2016	Third Reptile Survey	Transect 11				Mott McDonald
01/09/2016	Third Reptile Survey	Transect 12				Mott McDonald
02/09/2016	Third Reptile Survey	Transect 13				Mott McDonald
31/08/2016	Third Reptile Survey	Transect 14				Mott McDonald
31/08/2016	Third Reptile Survey	Transect 15				Mott McDonald
21/06/2016	Fourth Reptile Survey	Transect 1				Mott McDonald
24/06/2016	Fourth Reptile Survey	Transect 2				Mott McDonald
21/06/2016	Fourth Reptile Survey	Transect 3				Mott McDonald
21/06/2016	Fourth Reptile Survey	Transect 4				Mott McDonald
21/06/2016	Fourth Reptile Survey	Transect 5				Mott McDonald
21/09/2016	Fourth Reptile Survey	Transect 6				Mott McDonald
01/09/2016	Fourth Reptile Survey	Transect 7				Mott McDonald
31/08/2016	Fourth Reptile Survey	Transect 8				Mott McDonald
01/09/2016	Fourth Reptile Survey	Transect 9				Mott McDonald
08/09/2016	Fourth Reptile Survey	Transect 11				Mott McDonald
09/09/2016	Fourth Reptile Survey	Transect 12				Mott McDonald
08/09/2016	Fourth Reptile Survey	Transect 13				Mott McDonald
08/09/2016	Fourth Reptile Survey	Transect 14				Mott McDonald
02/09/2016	Fourth Reptile Survey	Transect 15				Mott McDonald
24/06/2016	Fifth Reptile Survey	Transect 1				Mott McDonald
29/06/2016	Fifth Reptile Survey	Transect 2				Mott McDonald
24/06/2016	Fifth Reptile Survey	Transect 3				Mott McDonald
24/06/2016	Fifth Reptile Survey	Transect 4				Mott McDonald

24/06/2016	Fifth Reptile Survey	Transect 5				Mott McDonald
23/09/2016	Fifth Reptile Survey	Transect 6				Mott McDonald
07/09/2016	Fifth Reptile Survey	Transect 7				Mott McDonald
05/09/2016	Fifth Reptile Survey	Transect 8				Mott McDonald
08/09/2016	Fifth Reptile Survey	Transect 15				Mott McDonald
29/06/2016	Sixth Reptile Survey	Transect 1				Mott McDonald
26/07/2016	Sixth Reptile Survey	Transect 2				Mott McDonald
29/06/2016	Sixth Reptile Survey	Transect 3				Mott McDonald
29/06/2016	Sixth Reptile Survey	Transect 4				Mott McDonald
29/06/2016	Sixth Reptile Survey	Transect 5				Mott McDonald
30/06/2016	Seventh Reptile Survey	Transect 1				Mott McDonald
30/06/2016	Seventh Reptile Survey	Transect 2				Mott McDonald
30/06/2016	Seventh Reptile Survey	Transect 3				Mott McDonald
30/06/2016	Seventh Reptile Survey	Transect 4				Mott McDonald
30/06/2016	Seventh Reptile Survey	Transect 5				Mott McDonald
12/07/2016	Eigth Reptie Survey	Transect 1				Mott McDonald
26/07/2016	Eigth Reptie Survey	Transect 3				Mott McDonald
26/07/2016	Eigth Reptie Survey	Transect 4				Mott McDonald
12/07/2016	Eigth Reptie Survey	Transect 5				Mott McDonald
26/07/2017	Ninth Reptile Survey	Transect 1				Mott McDonald
27/07/2016	Ninth Reptile Survey	Transect 3				Mott McDonald
27/07/2016	Ninth Reptile Survey	Transect 4				Mott McDonald
27/07/2016	Ninth Reptile Survey	Transect 5				Mott McDonald
27/06/2016	Tenth Reptile Survey	Transect 1				Mott McDonald
29/07/2016	Tenth Reptile Survey	Transect 4				Mott McDonald
29/07/2016	Tenth Reptile Survey	Transect 5				Mott McDonald
11/05/2017	GCN bottle trapping	Waterbody 1		13°C dry	With torching and egg search	Arup
11/05/2017	GCN bottle trapping	Waterbody 2		13°C dry	With torching and egg search	Arup
11/05/2017	GCN bottle trapping	Waterbody 3		13°C dry	With torching and egg search	Arup
11/05/2017	GCN bottle trapping	Waterbody 4		13°C dry	With torching and egg search	Arup
18/05/2017	GCN bottle trapping	Waterbody 1		15°C dry	With torching and egg search	Arup
18/05/2017	GCN bottle trapping	Waterbody 2		15°C dry	With torching and egg search	Arup
18/05/2017	GCN bottle trapping	Waterbody 3		15°C dry	No access to survey - cows in field	Arup
18/05/2017	GCN bottle trapping	Waterbody 4		15°C dry	With torching and egg search	Arup
01/06/2017	GCN bottle trapping	Waterbody 1		16°C dry	With torching and egg search	Arup
01/06/2017	GCN bottle trapping	Waterbody 2		16°C dry	With torching and egg search	Arup
01/06/2017	GCN bottle trapping	Waterbody 3		16°C dry	With torching and egg search	Arup
01/06/2017	GCN bottle trapping	Waterbody 4		16°C dry	With torching and egg search	Arup
06/06/2017	GCN bottle trapping	Waterbody 1		13°C dry	with torching and netting	Arup
06/06/2017	GCN bottle trapping	Waterbody 2		13°C dry	with torching and netting	Arup
06/06/2017	GCN bottle trapping	Waterbody 3		13°C dry	with torching and netting	Arup
06/06/2017	GCN bottle trapping	Waterbody 4		13°C dry	with torching and netting	Arup
23/06/2017	Static monitoring	Location 1		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 2		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 3		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 4		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 5		18°C light drizzle		Arup

23/06/2017	Static monitoring	Location 6		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 7		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 8		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 9		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 10		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 11		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 12		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 13		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 14		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 15		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 16		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 17		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 18		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 19		18°C light drizzle		Arup
23/06/2017	Static monitoring	Location 20		18°C light drizzle		Arup
18/07/2017	Static monitoring	Location 1		29°C dry		Arup
18/07/2017	Static monitoring	Location 2		29°C dry		Arup
18/07/2017	Static monitoring	Location 3		29°C dry		Arup
18/07/2017	Static monitoring	Location 4		29°C dry		Arup
18/07/2017	Static monitoring	Location 5		29°C dry		Arup
18/07/2017	Static monitoring	Location 6		29°C dry		Arup
18/07/2017	Static monitoring	Location 7		29°C dry		Arup
18/07/2017	Static monitoring	Location 8		29°C dry		Arup
18/07/2017	Static monitoring	Location 9		29°C dry		Arup
18/07/2017	Static monitoring	Location 10		29°C dry		Arup
18/07/2017	Static monitoring	Location 11		29°C dry		Arup
18/07/2017	Static monitoring	Location 12		29°C dry		Arup
18/07/2017	Static monitoring	Location 13		29°C dry		Arup
18/07/2017	Static monitoring	Location 14		29°C dry		Arup
18/07/2017	Static monitoring	Location 15		29°C dry		Arup
18/07/2017	Static monitoring	Location 16		29°C dry		Arup
18/07/2017	Static monitoring	Location 17		29°C dry		Arup
18/07/2017	Static monitoring	Location 18		29°C dry		Arup
18/07/2017	Static monitoring	Location 19		29°C dry		Arup
18/07/2017	Static monitoring	Locaation 20		29°C dry		Arup
18/07/2017	Static monitoring	Location 21		29°C dry		Arup
15/08/2017	Static monitoring	Location 1		19°C sunny		Arup
15/08/2017	Static monitoring	Location 2		19°C sunny		Arup
15/08/2017	Static monitoring	Location 3		19°C sunny		Arup
15/08/2017	Static monitoring	Location 4		19°C sunny		Arup
15/08/2017	Static monitoring	Location 5		19°C sunny		Arup
15/08/2017	Static monitoring	Location 6		19°C sunny		Arup
15/08/2017	Static monitoring	Location 7		19°C sunny		Arup
15/08/2017	Static monitoring	Location 8		19°C sunny		Arup
15/08/2017	Static monitoring	Location 9		19°C sunny		Arup
15/08/2017	Static monitoring	Location 10		19°C sunny		Arup
15/08/2017	Static monitoring	Location 11		19°C sunny		Arup
15/08/2017	Static monitoring	Location 12		19°C sunny		Arup

15/08/2017	Static monitoring	Location 13		19°C sunny		Arup
15/08/2017	Static monitoring	Location 14		19°C sunny		Arup
15/08/2017	Static monitoring	Location 15		19°C sunny		Arup
15/08/2017	Static monitoring	Location 16		19°C sunny		Arup
15/08/2017	Static monitoring	Location 17		19°C sunny		Arup
15/08/2017	Static monitoring	Location 18		19°C sunny		Arup
15/08/2017	Static monitoring	Location 19		19°C sunny		Arup
15/08/2017	Static monitoring	Location 20		19°C sunny		Arup
15/08/2017	Static monitoring	Location 21		19°C sunny		Arup
18/09/2017	Crossing point	Location 8		13°C dry		Arup
14/09/2017	Static monitoring	Location 1		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 2		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 3		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 4		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 5		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 6		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 7		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 8		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 9		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 10		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 11		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 12		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 13		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 14		16°C light drizzle		Arup
14/09/2017	Static monitoring	Location 15		16°C light drizzle		Arup
19/10/2017	Static monitoring	Location 1		13°C dry		Arup
19/10/2017	Static monitoring	Location 2		13°C dry	Couldn't reach this location due to bullocks in field	Arup
19/10/2017	Static monitoring	Location 3		13°C dry		Arup
19/10/2017	Static monitoring	Location 4		13°C dry		Arup
19/10/2017	Static monitoring	Location 5		13°C dry		Arup
19/10/2017	Static monitoring	Location 6		13°C dry		Arup
19/10/2017	Static monitoring	Location 7		13°C dry		Arup
19/10/2017	Static monitoring	Location 8		13°C dry		Arup
19/10/2017	Static monitoring	Location 9		13°C dry		Arup
19/10/2017	Static monitoring	Location 10		13°C dry		Arup
19/10/2017	Static monitoring	Location 11		13°C dry		Arup
19/10/2017	Static monitoring	Location 12		13°C dry		Arup
19/10/2017	Static monitoring	Location 13		13°C dry		Arup
19/10/2017	Static monitoring	Location 14		13°C dry		Arup
19/10/2017	Static monitoring	Location 15		13°C dry		Arup
23/10/2017	Extended Phase 1	Whole route		14°C light rain	Reconnaissance of existing phase 1 plans, and updating where necessary	Arup

01/11/2017	Badger survey			13°C partly cloudy	checked all recorded setts within 50m of the proposed route, and recorded any additional setts/signs of badger activity	Arup
02/11/2017	Badger survey			11°C partly cloudy	checked all recorded setts within 50m of the proposed route, and recorded any additional setts/signs of badger activity	Arup
01/11/2017	Dormouse nut search			13°C		Arup
02/11/2017	Dormouse nut search			11°C partly cloudy		Arup
13/07/2017	Emergence survey	B1		Dry 1/3 cloud cover		Thomson
02/08/2017	Emergence survey	B1		Heavy rain 1/3 cloud cover		Thomson
14/07/2017	Re-entry survey	B2		Dry 1/3 cloud cover		Thomson
03/08/2017	Emergence survey	B2		Light rain, 2/3 cloud cover		Thomson
14/07/2017	Re-entry survey	B3		Dry 1/3 cloud cover		Thomson
03/08/2017	Emergence survey	B3		Light rain, 2/3 cloud cover		Thomson
13/07/2017	Emergence survey	B4		Dry, 2/3 cloud cover		Thomson
02/08/2017	Emergence survey	B4		Heavy rain 1/3 cloud cover		Thomson
06/07/2017	Emergence survey	B5		Dry, 3/3 cloud cover		Thomson
28/07/2017	Re-entry survey	B5		Dry, 3/3 cloud cover		Thomson
12/07/2017	Re-entry survey	B6		Dry 1/3 cloud cover		Thomson
26/07/2017	Emergence survey	B6		Dry 1/3 cloud cover		Thomson
19/07/2017	Re-entry survey	B7		Dry 1/3 cloud cover		Thomson
18/07/2017	Emergence survey	B8		Dry, 3/3 cloud cover		Thomson
04/08/2017	Re-entry survey	B8		Heavy rain, 3/3 cloud cover		Thomson
10/07/2017	Emergence survey	B9		Light rain, 1/3 cloud cover		Thomson
01/08/2017	Re-entry survey	B9		Heavy rain, 1/3 cloud cover		Thomson
11/07/2017	Re-entry survey	B10		Light rain, 2/3 cloud cover		Thomson
25/07/2017	Emergence survey	B10		Dry, 2/3 cloud cover		Thomson
05/07/2017	Re-entry survey	B11		Dry, 2/3 cloud cover		Thomson
01/08/2017	Emergence survey	B11		Dry, 3/3 cloud cover		Thomson
17/07/2017	Emergence survey	B12		Dry, 1/3 cloud cover		Thomson
17/07/2017	Emergence survey	B13		Dry, 2/3 cloud cover		Thomson
02/08/2017	Re-entry survey	B13		Dry, 3/3 cloud cover		Thomson
22/08/2017	Emergence survey	B13		Light rain, 2/3 cloud cover		Thomson
18/07/2017	Re-entry survey	B14		Dry 1/3 cloud cover		Thomson
01/08/2017	Emergence survey	B14		Dry 1/3 cloud cover		Thomson
18/07/2017	Re-entry survey	B15		Dry, 2/3 cloud cover		Thomson
02/08/2017	Re-entry survey	B15		Light rain, 3/3 cloud cover		Thomson
18/07/2017	Re-entry survey	B16		Dry 1/3 cloud cover		Thomson
17/07/2017	Emergence survey	B17		Dry, 2/3 cloud cover		Thomson
12/07/2017	Emergence survey	B18		Dry 1/3 cloud cover		Thomson
13/07/2017	Re-entry survey	B19		Dry 1/3 cloud cover		Thomson
31/07/2017	Emergence survey	B19		Heavy rain, 1/3 cloud cover		Thomson
06/07/2017	Re-entry survey	B20		Dry, 2/3 cloud cover		Thomson
25/07/2017	Re-entry survey	B20		Dry 1/3 cloud cover		Thomson

12/07/2017	Re-entry survey	B21		Dry 1/3 cloud cover		Thomson
07/07/2017	Re-entry survey	B22		Dry 1/3 cloud cover		Thomson
31/07/2017	Emergence survey	B22		Heavy rain, 1/3 cloud cover		Thomson
21/08/2017	Emergence survey	B22		Dry, 3/3 cloud cover		Thomson
25/07/2017	Re-entry survey	B23		Dry 1/3 cloud cover		Thomson
09/08/2017	Emergence survey	B23		Dry 1/3 cloud cover		Thomson
06/07/2017	Re-entry survey	B24		Dry, 2/3 cloud cover		Thomson
25/07/2017	Emergence survey	B24		Dry, 2/3 cloud cover		Thomson
10/08/2017	Re-entry survey	B24		Dry 1/3 cloud cover		Thomson
11/07/2017	Re-entry survey	B25		Light rain, 3/3 cloud cover		Thomson
26/07/2017	Emergence survey	B25		Dry 1/3 cloud cover		Thomson
10/08/2017	Re-entry survey	B25		Dry 1/3 cloud cover		Thomson
11/07/2017	Re-entry survey	B26		Light rain, 3/3 cloud cover		Thomson
10/07/2017	Emergence survey	B27		Heavy rain, 1/3 cloud cover		Thomson
24/07/2017	Emergence survey	B27		Dry 1/3 cloud cover		Thomson
11/08/2017	Re-entry survey	B27		Dry 1/3 cloud cover		Thomson
03/07/2017	Emergence survey	B28		Light rain, 3/3 cloud cover		Thomson
28/07/2017	Re-entry survey	B28		Dry, 2/3 cloud cover		Thomson
11/08/2017	Re-entry survey	B28		Dry, 2/3 cloud cover		Thomson
03/07/2017	Emergence survey	B29		Light rain, 3/3 cloud cover		Thomson
20/07/2017	Re-entry survey	B29		Dry, 3/3 cloud cover		Thomson
04/07/2017	Re-entry survey	B30		Dry, 3/3 cloud cover		Thomson
20/07/2017	Re-entry survey	B30		Dry, 3/3 cloud cover		Thomson
03/08/2017	Emergence survey	B30		Light rain, 3/3 cloud cover		Thomson
04/07/2017	Re-entry survey	B31		Dry, 3/3 cloud cover		Thomson
04/07/2017	Emergence survey	B32		Dry, 2/3 cloud cover		Thomson
04/07/2017	Emergence survey	B33		Dry, 2/3 cloud cover		Thomson
07/07/2017	Re-entry survey	B34		Dry, 3/3 cloud cover		Thomson
26/07/2017	Emergence survey	B34		Dry, 1/3 cloud cover		Thomson
20/07/2017	Re-entry survey	B35		Dry, 3/3 cloud cover		Thomson
13/07/2017	Re-entry survey	B36		Dry, 1/3 cloud cover		Thomson
27/07/2017	Emergence survey	B36		Dry, 1/3 cloud cover		Thomson
12/07/2017	Emergence survey	B37		Dry, 1/3 cloud cover		Thomson
12/07/2017	Re-entry survey	B38		Dry, 1/3 cloud cover		Thomson
27/07/2017	Re-entry survey	B38		Dry, 1/3 cloud cover		Thomson
10/08/2017	Emergence survey	B38		Dry, 1/3 cloud cover		Thomson
24/07/2017	Emergence survey	T1		Dry, 1/3 cloud cover		Thomson
21/08/2017	Emergence survey	T1		Dry, 3/3 cloud cover		Thomson
19/07/2017	Re-entry survey	T7		Dry, 2/3 cloud cover		Thomson
09/08/2017	Emergence survey	T7		Dry, 1/3 cloud cover		Thomson
28/07/2017	Emergence survey	T14		Dry, 1/3 cloud cover		Thomson
04/08/2017	Re-entry survey	T14		Light rain, 2/3 cloud cover		Thomson
22/08/2017	Re-entry survey	T14		Dry, 2/3 cloud cover		Thomson
09/07/2017	Emergence survey	T19		Heavy rain, 3/3 cloud cover		Thomson
03/08/2017	Re-entry survey	T19		Heavy rain, 3/3 cloud cover		Thomson
10/07/2017	Emergence survey	T21		Light rain, 2/3 cloud cover		Thomson
03/08/2017	Re-entry survey	T21		Heavy rain, 3/3 cloud cover		Thomson
23/08/2017	Re-entry survey	T21		Light rain, 3/3 cloud cover		Thomson

19/07/2017	Emergence survey	T22		Heavy rain, 3/3 cloud cover	Thomson
03/08/2017	Re-entry survey	T22		Heavy rain, 3/3 cloud cover	Thomson
23/08/2017	Re-entry survey	T22		Light rain, 3/3 cloud cover	Thomson
19/07/2017	Emergence survey	T23		Light rain, 3/3 cloud cover	Thomson
03/08/2017	Re-entry survey	T23		Heavy rain, 3/3 cloud cover	Thomson
19/07/2017	Emergence survey	T24		Light rain, 3/3 cloud cover	Thomson
03/08/2017	Re-entry survey	T24		Heavy rain, 3/3 cloud cover	Thomson

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement
Appendix 8.2: Preliminary Ecological Appraisal

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.



Welsh Government
Llywodraeth Cymru

Preliminary Ecological Appraisal
A40 Llanddewi Velfry to Penblewin Road Improvement Scheme

March 2016

Welsh Government

Mott MacDonald

Welsh Government
Llywodraeth Cymru

Preliminary Ecological Appraisal
A40 Llanddewi Velfry to Penblewin
Road Improvement Scheme

March 2016

Welsh Government

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	18 March 2016	G Starr / J Brown	J Bates	E C Probert	First Issue

Information class: Standard

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Executive Summary

Mott MacDonald Limited have been commissioned by Arcadis on behalf of the Welsh Government, to undertake a Preliminary Ecological Appraisal (PEA) of the A40 Llanddewi Velfry to Penblewin, in order to facilitate the road improvements along the A40. The site lies within the County of Pembrokeshire and is located at Ordnance Survey Grid Reference SN 13876 16905.

The purpose of this PEA report is to provide an initial assessment of the ecological importance of the habitats in the areas relevant to the proposed works and the potential for these areas to support protected ecological features and species. This report presents the results of these findings and are summarised below.

Biological records indicate that protected species of birds, mammals including bats, otters, badgers, hedgehogs and polecats, reptiles, amphibians and invertebrates are present within 2km of the site.

Habitats identified during the survey suggest the potential to support birds, badgers, otters, dormice, bats, polecats, hedgehogs, reptiles, great crested newts and invertebrates.

Designated sites present within the defined search area of the site include five Special Areas of Conservation (SAC) which are designated for their otter populations and three SACs which are designated for their bat populations. Based on the works potential to impact on otters and bats, an Assessment of Implications on European Sites (DMRB, HD44/09) screening exercise should be undertaken.

Based on the results of the desk study and site walkover, appropriate construction activities in relation to species have been provided within the recommendations of the report. Further surveys are also recommended for the following species; birds, badgers, otters, dormice, bats, reptiles, great crested newts and invasive species.

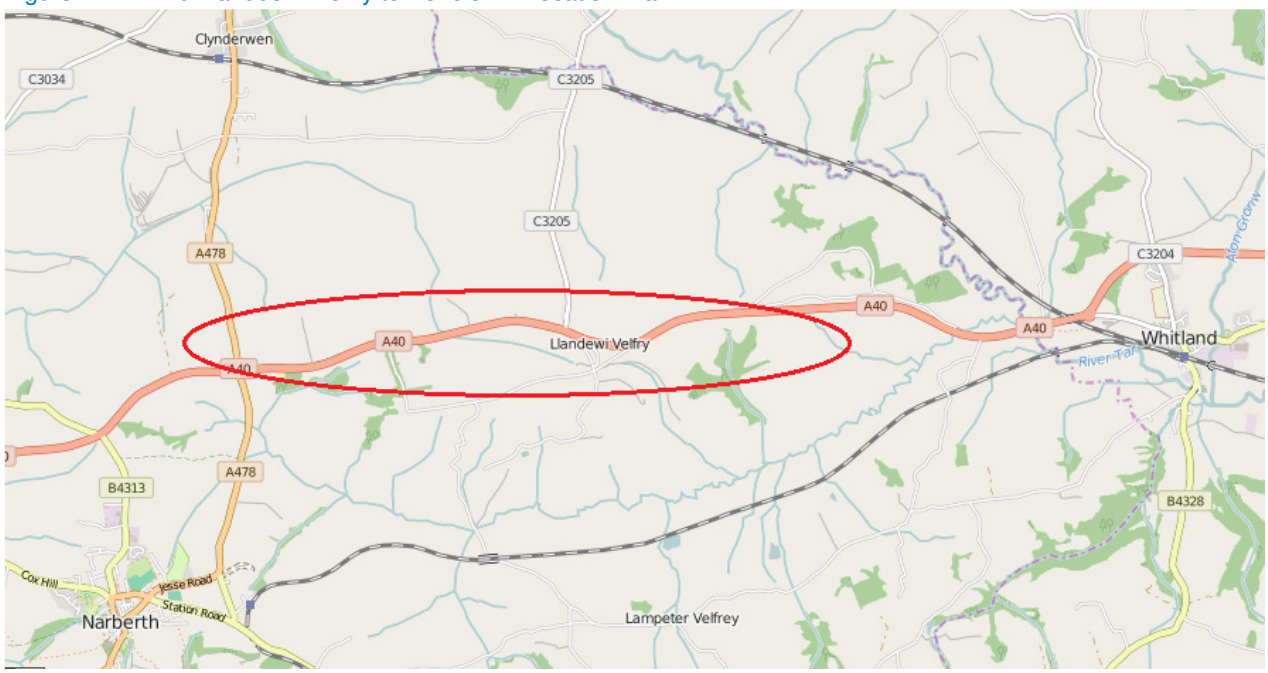
1 Introduction

1.1 Background

Mott MacDonald Limited has been commissioned by Arcadis on behalf of the Welsh Government (WG) to undertake a Preliminary Ecological Appraisal (PEA) for the proposed A40 Llanddewi Velfry to Penblewin road improvement scheme, located in south-west Wales in the County of Pembrokeshire. The purpose of the appraisal is to undertake a review of the current habitats (and their potential to support protected species), in order to facilitate the road improvements. The preferred route was announced in February 2010 and identifies a 2.5km bypass to the north of the village of Llanddewi Velfrey and a 2.5km section of on line and off line improvement west of Ffynnon Wood, where the bypass would re-join the existing trunk road at Penblewin roundabout. The route lies within a rural setting with surrounding agricultural land, sections of woodland and an occasional residential property. The proposed route layout is provided within Appendix A.

The location plan of the site is provided in Figure 1.1 below.

Figure 1.1: A40 Llanddewi Velfry to Penblewin Location Plan



Source: OpenStreetMap contributors, CC-BY-SA

1.2 Scope of the Report

The purpose of this report is to provide an initial appraisal of the ecological importance of the habitats in the areas relevant to the proposed works at the site and the potential for these areas to support protected ecological features and species.

This PEA report follows the National Planning Policy Framework in relation to Biodiversity and Conservation. All relevant areas within the red line site boundary surrounding the section of the A40 were assessed and where visible habitats and features immediately outside of the boundary were surveyed.

The aims of this assessment are to:

- Identify and assess the nature conservation value of the habitats and species near and adjacent to the site; and
- Provide recommendations on mitigation and compensation measures and, as appropriate, for more detailed ecological investigations and inform an Ecological Impact Assessment.

The structure of this report is as follows:

- Section 1 – Introduction including background to the report;
- Section 2 – Results, interpretation and assessment; and
- Section 3 – Conclusion and recommendations.

1.3 Methodology

The site has been assessed using the following methodologies in line with guidance provided in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines on Preliminary Ecological Appraisal (2013) and Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11.

- A review of the existing designated sites, habitats and protected and notable species records within 2.0km of the site. Identify the Special Areas of Conservation (SAC) designated for otters within 25.0km and bats within 30.0km of the site;
- A review of the information regarding local and national species, and action plan habitats and areas of protected status from the Multi-Agency Geographic Information for the Countryside (MAGIC) (http://magic.defra.gov.uk/), the Joint Nature Conservation Committee (JNCC) (http://jncc.defra.gov.uk/) websites and the West Wales Biodiversity Information Centre (WWBIC); Pembrokeshire Local Biodiversity Action Plan (LBAP); Trunk Road Estate Biodiversity Action Plan (TREBAP) and
- A survey based on the Extended Phase 1 Habitat Survey Guidelines (JNCC 2010) to provide further details on the possible presence of protected or notable species.

1.4 Legislative Context and Policy Framework

The proposals must comply with the following international, European and national nature conservation legislation relevant to ecological assessment listed below:

- European Community (EC) Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive, 1992) as amended (92/43/EEC);
- EC Directive on the Conservation of Wild Birds (Birds Directive, 1979) as amended (79/409/EEC);
- Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979); and
- Convention on Biological Diversity (1992).

The key piece of national legislation is the Wildlife and Countryside Act 1981 (WCA) which consolidates (and amends) existing national legislation in order to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Birds Directive in the UK. It is complemented by The Conservation of Habitats and Species Regulations 2010 (as amended) which consolidates all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations1994.

These regulations transposed the Habitats Directive listed above into National Law. The Regulations provide for the designation and protection of 'European Sites' known as Special Protection Areas (SPA) for Birds and Special Areas of Conservation and the protection of 'European Protected Species'. Under the Regulations, Competent Authorities have a general duty in the exercise of any of their functions to have regard to the EC Habitats Directive. The Habitats Regulations define a "Competent Authority", as a Minister, a government office, a statutory undertaker or public body. Appendix B outlines species specific legislation.

Under Section 40(1) of the Natural Environment and Rural Communities (NERC) Act 2006 public bodies, including Local Authorities are required 'to have regard to the conservation of biodiversity in Wales' when carrying out their normal functions. Under Section 42 of the Act a list of species of 'principal importance to the conservation of biodiversity in Wales' (commonly known as Section 42 species and habitats) was drawn up which acts as an aid to guide public bodies in implementing their duty. The Local Authority must consider the impact of the proposed works on protected habitats and species.

Planning Policy Wales outlines the land use planning policy for Wales set out by the Welsh Government. It provides a framework for the effective preparation of Local Planning Authorities' development plans. This is supplemented by twenty one topic based Technical Advice Notes (TAN). In particular TAN 5 - Nature Conservation and Planning provides advice about how the land use planning system should underwrite the protection and enhancement of biodiversity and geological conservation.

The Countryside Rights of Way Act 2000 (CRoW) increases measures for the management and protection for Sites of Special Scientific Interest (SSSI) and allows the relevant authorities to have regard to conserving and enhancing Areas of Outstanding Natural Beauty (AONB) when performing their duties.

1.5 Limitations

Ecological surveys are limited to factors which affect the presence of plants and animals such as time of year, migration patterns and behaviour. With a single visit it is possible that certain species may have been overlooked or under-recorded as optimal survey periods vary from species to species. The PEA as presented is therefore unlikely to give a full and complete assessment of the biodiversity of the site.

In addition the biological records obtained from third parties do not necessarily represent a full and complete species list for the area. These are mostly given by individuals on an ad-hoc basis often meaning there may be areas of deficiency in the data; however the data can be used to give an indication of the species that may be present in the vicinity of the site. Biological records within Pembrokeshire are under

recorded due to the isolation of the area from the rest of the UK and low amount of infrastructure development in the region.

Furthermore areas of the site were inaccessible which limits habitat classification, species identification and the assessment for potential protected species within the area.

2 Results, Interpretation and Assessment

2.1 Results

2.1.1 Desk Study

A desk study was undertaken to identify key species and habitats near and adjacent to the site. The results are presented in the following sections.

2.1.1.1 Designated Sites

Statutory Designated Sites

No statutory designated sites were recorded within 2.0km of the site. There are five Special Areas of Conservation (SAC) designated for otter within 25.0km and three SAC designated for bats within 30.0km of the site (http://magic.defra.gov.uk/). A list of the sites is provided within Table 2.1.

Table 2.1: Statutory Designated Sites

Name	Status	Key species	Details	Approx. Distance
Cleddua Rivers/ Afonydd Cleddau	SAC	Annex II primary species: brook lamprey (*Lampetra planeri*), river lamprey (*Lampetra fluviatilis*), bullhead (*Cottus gobio*) & otter (*Lutra lutra*) Annex II non primary species: Sea lamprey (*Petromyzon marinus*).	The Eastern and Western Cleddau Rivers flow through a largely lowland landscape, eventually joining and flowing into Milford Haven, which is part of the Pembrokeshire Marine cSAC. These slow-flowing rivers have a diversity of bank-side habitats, and good water quality ensures good stocks of otter prey species. The otter population on these rivers has shown excellent signs of recovery during the last 10–20 years.	2.2km W
Pembrokeshire Marine/ Sir Benfro Forol	SAC	Annex II primary species: grey seal (*Halichoerus grypus)* & shore dock (*Rumex rupestris*) Annex II non primary species: sea lamprey, river lamprey allis shad (*Alosa alosa*), twaite shad (*Alosa fallax*) & otter.	Pembrokeshire Marine includes the Daugleddau estuary, a ria estuary in south-west Wales, formed in the upper reaches of one of the best examples of a ria in the UK. Associated with the wide range of environmental conditions, particularly seabed substrates, tidal streams and salinity gradients, there is a wide diversity of communities and species. Pembrokeshire Marine in south-west Wales includes Milford Haven, one of the best examples of a ria in the UK, and the wide, shallow, predominantly sandy embayment of St Brides Bay. The wide range of environmental conditions, particularly seabed substrates, tidal streams and salinity gradients, supports high community and species diversity.	6.5km SWW
Carmarthen Bay and Estuaries/ Bae Caerfyrddin ac Aberoedd	SAC	Annex II primary species: twaite shad. Annex II non primary species: sea lamprey, river lamprey, allis shad & otter.	Carmarthen Bay and Estuaries on the south coast of Wales includes the sandbank of Helwick Bank, a linear shallow subtidal sandbank that is unusual in being highly exposed to wave and tidal action. The animal communities found in and on the bank reflect these conditions, being tolerant of high levels of disturbance. Carmarthen Bay and Estuaries provides an example of a large estuarine site on the south coast of Wales,	9.1km E

Name	Status	Key species	Details	Approx. Distance
			encompassing the estuaries of the Rivers Loughor, Tâf and Tywi (coastal plain estuaries) and the Gwendraeth (a bar-built estuary). These four estuaries form a single functional unit around the Burry Inlet, with important interchanges of sediment and biota.	
Pembrokeshire Bat Sites and Bosherton Lake/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton	SAC	Annex II primary species: greater horseshoe bat (*Rhinolophus ferrumequinum*). Annex II non primary species: lesser horseshoe bat (*Rhinolophus hipposideros*) & otter.	Bosherston Lakes are an outstanding shallow marl lake system created at intervals in the late 18th and mid 19th centuries by damming a limestone river valley. They are fed in part by a series of calcium-rich springs and are isolated from the sea by a small sand dune ridge. Underpinned by a series of eight Sites of Special Scientific Interest (SSSI's). Greater and lesser horseshoe bats are among at least ten species of bat utilising the woodlands surrounding Bosherton Lake and swampy lakeside margins as feeding flyways connected to important summer, winter and intermediate roost sites.	9.1km SWW
North Pembrokeshire Woodlands/ Coedydd Gogledd Sir Benfro	SAC	Annex II primary species: barbastelle (*Barbastella barbastellus*).	The only known breeding site for barbastelle bats in west Wales. The population at Pengelli Forest uses a large number of different roosting sites, both inside and outside the SSSI boundaries.	20.0km NNW
River Teifi/ Afon Teifi	SAC	Annex II primary species: brook lamprey, river lamprey, Atlantic salmon (*Salmo salar*), bullhead, otter, floating water-plantain (*Luronium natans*). Annex II non primary species: sea lamprey	The Teifi in west Wales holds otter throughout much of its catchment. The river has suitable resting and breeding sites along its length. Evidence from surveys and sightings suggest the tidal reach is being increasingly used by otters.	21.7km NNE
Limestone Coast of South West Wales/ Arfordir Calchfaen De Orllewin Cymru	SAC	Annex II primary species: greater horseshoe bat, early gentian (*Gentianella anglica*). Annex II non primary species: petalwort (*Petalophyllum ralfsii*).	The extensive cliffs off south-west Wales represent hard calcareous cliffs in the south-west of the UK. The nature of the rock and the warm south-facing slopes have resulted in the occurrence of a sequence of important species-rich plant communities. Greater horseshoe bats are known to feed regularly over the grassland. The coastal caves support one of the most important greater horseshoe bat winter roosts in the UK.	30.0km SW

Source: Natural Resources Wales

Non-Statutory Designated Sites

Whitland Cutting Regionally Important Geological and Geomorphological Site (RIGS) is located within 2.0km of the site. This site is designated for its geological interest.

2.1.1.2 Protected or Notable Species Records

The protected species information obtained from the West Wales Biodiversity Information Centre (WWBIC) for the section of the A40 is included in Appendix C and a summary of the species found within 2.0km are listed in the following sections. Species-specific legislation can be found in Appendix B.

Birds

There are multiple records of protected and notable bird species within 2.0km of the proposed route. Species records include the following WCA Schedule 1 birds; hobby *(Falco subbuteo),* red kite *(Milvus milvus),* redwing *(Turdus iliacus),* fieldfare *(Turdus pilaris)* and barn owl *(Tyto alba).*

A list of bird species records can be found in Appendix C.

Mammals

There are multiple records of protected and notable mammal species within 2.0km of the proposed route.

Protected mammal species records include; greater horseshoe bat *(Rhinolophus ferrumequinum),* lesser horseshoe bat (*Rhinolophus hipposideros),* whiskered bat *(Myotis mystacinus),* brown long-eared bat *(Plecotus auritus),* noctule bat *(Nyctalus noctula),* Natterer's bat *(Myotis nattereri),* soprano pipistrelle *(Pipistrellus pygmaeus),* common pipistrelle *(Pipistrellus pipistrellus),* as well as records of otter *(Lutra lutra)* and badgers *(Meles meles).*

Other notable species recorded locally include European hedgehog *(Erinaceus europaeus)* and polecat *(Mustela putorius).*

Reptiles and Amphibians

There are several records of protected and notable reptile and amphibian species within 2.0km of the A40.

Species recorded were common frogs *(Rana temporaria),* grass snakes *(Natrix natrix),* slow-worms *(Anguis fragilis)* and common lizards *(Zootoca vivipara).*

Great crested newt (*Triturus cristatus*) has been recorded within the wider area (5.0km of the search area) as per communications with Natural Resources Wales 2016.

Invertebrates

There are two records of brown hairstreak butterflies *(Thecla betulae)*, a protected invertebrate species, within 2.0km of the A40 Llanddewi Velfry to Penblewin.

Flora

A 2.0km data search for protected and notable plant species found a single record of Carolina hornwort *(Phaeoceros carolinianus),* as well as multiple records of locally important species, shown in Table 2.2.

Table 2.2: Locally Important Species Recorded

Species	Scientific Name
Pointed Lattice-moss	*Dialytrichia mucronata*
Short-leaved Pocket-moss	*Fissidens incurvus*
Spreading Earth-moss	*Aphanorhegma patens*
Park Yoke-moss	*Zygodon rupestris*
Fragrant Crestwort	*Lophocolea fragrans*
Straw Bristle-moss	*Orthotrichum stramineum*

Source: WWBIC Records Data

Invasive Species

There are no records of invasive species within 2.0km of the A40 Llanddewi Velfry to Penblewin.

2.1.2 Site Visit

The ecological features within the redline site boundary were inspected by undertaking a walkover survey by suitably experienced ecologists between 18th – 24th February 2016. Weather at the time of the walkover varied from light rain and wind to dry with sun, temperatures were between 5-12 degrees centigrade. All habitats were mapped according to the Extended Phase 1 Habitat Survey methodology (JNCC 2010) with particular attention paid to the site's potential to support protected species. The presence of any invasive plant species was also noted. The Extended Phase 1 Habitat Map is provided in Appendix D with associated target notes and photographs in Appendix E. Target notes are referred to as TN1, TN2 etc. in the following section.

2.1.2.1 Protected or Notable Species

Birds

Thirty one species of birds were recorded during the survey listed in Table 2.3 below. Two species were listed as Schedule 1 species under the WCA. Four species were listed as Red and six were listed as Amber under the Birds of Conservation Concern (BoCC).

Table 2.3: Bird Species

Common Name	Scientific Name	Conservation Status
Wren	*Troglodytes troglodytes*	
Magpie	*Pica pica*	
Grey heron	*Ardea cinerea*	
Nuthatch	*Sitta europaea*	
Buzzard	*Buteo buteo*	
Jackdaw	*Corvus monedula*	
Fieldfare	*Turdus pilaris*	WCA/ Red list
Rock Dove	*Columba livia*	
Meadow pipit	*Anthus pratensis*	Amber list
Rook	*Corvus frugilegus*	
Wigeon	*Anas Penelope*	Amber list
Pied wagtail	*Motacilla alba*	
Goldcrest	*Regulus regulus*	
Blue tit	*Cyanistes caeruleus*	
Siskin	*Spinus spinus*	
Pheasant	*Phasianus colchicus*	
Great Tit	*Parus major*	
Bulfinch	*Pyrrhula pyrrhula*	Amber list
Willow warbler	*Phylloscopus trochilus*	Amber list
Red kite	*Milvus milvus*	WCA/ LBAP
Jack Snipe	*Lymnocryptes minimus*	
Snipe	*Gallinago gallinago*	Amber list
Starling	*Sturnus vulgaris*	Red list/ NERC
Treecreeper	*Certhia familiaris*	
Woodpigeon	*Columba palumbus*	
Dunnock	*Prunella modularis*	Amber list/ NERC
Sparrow hawk (TN28)	*Accipiter nisus*	
Marsh Tit	*Poecile palustris*	Red list/ NERC
Chaffinch	*Fringilla coelebs*	
House sparrow	*Passer domesticus*	Red list/ NERC
Song thrush	*Turdus philomelos*	Red list / NERC

WCA = Listed on Schedule 1 of the Wildlife and Countryside Act (1981, as amended); Pembrokeshire BAP = LBAP; Red = Included in Birds of Conservation Concern (BoCC) Red List; Amber = Included in BoCC Amber List, NERC = Section 42 species of principal importance under the NERC Act in Wales UK.

Mammals

One dead badger (TN8) was identified during the site walkover, located along the A40 near the east bound truck stop. Additional evidence of the presence of badger was recorded throughout the site.

Evidence included setts, latrines and runs with badger hair. (TN2, TN4, TN12 & TN17). No further protected or notable mammal species were recorded during the site walkover.

Reptiles and Amphibians

No protected or notable reptile or amphibians were recorded during the site walkover.

Invertebrates

No protected or notable invertebrates were recorded during the site walkover.

Flora

Bluebells (*Hyacinthoides non-scripta*) were recorded throughout the woodland habitat, bluebells are listed as a TREBAP species. No further protected or notable flora species were recorded during the site walkover.

Invasive Species

One stand of Japanese knotweed (*Fallopia japonica*) (TN24) was recorded along a bridal way in Llanddewi Velfrey. Rhododendron (*Rhododendron ferrugineum*) was recorded within an area of broadleaved woodland and as a hedge along a residential house (TN6, & TN11).

2.1.2.2 Habitats

Broad-leaved semi-natural woodland (A.1.1.1)

The site contained several areas of broad-leaved woodland. The majority of these woodlands located along the northern section of the A40 were situated along the riparian areas of various streams that ran down steep embankments. At the base of the steep sections of this habitat the woodlands were dominated by wet woodland species (TN23) associated with areas of marshy grassland. The woodlands were dominated by ash (*Fraxinus excelsior*) with various mixtures of oak (*Quercus* sp.), silver birch (*Betula pendula*), hazel (*Corylus avellana*), willow (*Salix* sp.), holly (*Llex aquifolium*), alder (*Alnus glutinosa*). Ground flora species varied with bramble (*Rubus fruticosus*), ground ivy (*Glechoma hederacea*), primrose (*Primula vulgaris*), wild garlic (*Allium ursinum*), bluebells (*Hyacinthoides non-scripta*), wood avens (*Geum urbanum*), hard fern (*Blechnum spicant*), bracken (*Pteridium aquilinum*) and hogweed (*Heracleum sphondylium*).

Two main types of broad-leaved woodland were observed along the southern section of the A40. The habitat structures for the woodlands were similar to the one described above. The woodland along the road leading to Henllan Farm was dominated by beech (*Fagus sylvatica*) with oak, hazel, ash, holly and rhododendron (*Rhododendron ponticum*). Ground flora species included hard fern bracken, ground ivy, bramble, wood sedge (*Carex sylvatica*), hairy-brome (*Bromopsis ramosa*) and ribwort plantain (*Plantago lanceolata*).

Coniferous plantation woodland (A.1.2.2)

Some areas of plantation woodland were observed within the site and comprised of larch (*Larix decidua*) and /or Scots pine (*Pinus sylvestris*).

Mixed semi-natural woodland (A.1.3.1)

Mixed woodland was observed within the site containing a mixture of species noted above for broad-leaved and coniferous woodlands.

Dense continuous scrub (A.2.1)

Areas of dense continuous scrub on site generally comprised of bramble, gorse (*Ulex europaeus)* and associated species from the adjacent habitats.

Scattered scrub (A.2.2)

Scattered scrub on site comprised of bramble, gorse or species noted above for broad-leaved woodland.

Broad-leaved parkland scattered trees (A.3.1)

Scattered trees throughout the site largely comprised of oak within fields and around farmhouses, other species included those noted for broad-leaved woodland.

Coniferous parkland scattered trees (A.3.2)

Yew (*Taxus* baccata) was observed growing in graveyards or church grounds.

Mixed parkland scattered trees (A.3.3)

A small area of parkland trees that comprised of ash and larch was located within the designated truck and car rest spot and roundabout.

Improved grassland (B.4.)

The farm fields was dominated by improved grassland, species included Yorkshire fog (*Holcus lanatus*), soft rush (*Juncus effuses*), thistle (*Cirsium* sp.) buttercup (*Ranunculus* sp.) and ribwort plantain.

Marsh / marshy grassland (B.5)

Marshy grassland was observed in wet fields and at the ends of steep hills. Species comprised of the above for improved grassland, however, soft rush was the dominant species.

Open water (G.1)

Several ponds and lakes were observed. Species associated with open water included long leaved pond weed (*Potamogeton crispus*), watermilfoil (*Myriophyllum aquaticum*), white waterlily (*Nymphaea alba*), bulrush (*Typha latifolia*), water starwort (*Callitriche stagnalis*), water dock (*Rumex hydrolapathum*) and watercress (*Nasturtium officinale*).

Running water (G.2)

Several fast flowing streams were observed throughout the site.

Amenity Grassland (J.1.2)

Amenity grassland was observed along the various road side verges and road islands, species included Yorkshire fog, buttercup and ribwort plantain.

Species poor intact hedge (J.2.1.2)

Field boundaries comprised of species poor hedges that generally comprised of one or two woody species and up to four species along the hedge. Main species varied, hedges contained the following, hazel, hawthorn (*Crataegus monogyna*), gorse, bramble, holly or ash.

Species poor hedge and trees (J.2.3.2)

Field boundaries comprised of species poor hedges with trees that generally comprised of one or two woody species and up to four species along the hedge. The main species varied and hedges contained the following; hazel, hawthorn, gorse, bramble, holly, oak, willow or ash.

Buildings (J.3.6)

Several farm and residential buildings were observed.

2.2 Interpretation

2.2.1 Designated Sites

Five SAC sites were recorded for otter within 25.0km of the site. The closest otter site, Cleddau Rivers/ Afonydd Cleddau SAC is located 2.2km away. Several streams on site flow into the SAC. As such further assessment is required to evaluate whether the proposed works will have an impact on the key designated features or their management for the SAC.

Three statutory designated sites were recorded for bats within 30.0km of the site. The closest bat site, Pembrokeshire Bat Sites and Bosherton Lake/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton SAC is located 9.1km away. Further assessment is required to assess whether the proposed works will have an impact on any key designated features or their management.

2.2.2 Protected or Notable Species

Birds

Two WCA Schedule 1 species, fieldfare and red kite were observed during the survey. The woodlands, hedges, scrub, marshy grasslands and to a lesser extent the improved grassland provide nesting and foraging opportunities for a number of protected and common birds throughout the year. The site contained farm buildings that may be suitable to support barn owls.

Mammals

Badger setts and evidence of badger were recorded throughout the site. The site contains suitable habitat for sett excavations with preference to the woodlands and hedgerow habitat and foraging to support this species.

No evidence of otters was observed during the site walkover. The streams throughout the site were all fast flowing and generally shallow (TN1, TN13, TN14, TN15, TN18, TN22, TN26 & TN27). The streams are considered suitable commuting habitat for otters, some connect to large ponds / lakes that may contain suitable food resources for otters.

No evidence of dormice was observed during the site walkover. Areas of suitable habitat for dormice include woodland, scrub and hedgerows. These habitats were observed to contain suitable feed species for dormouse, these included hazel, oak, bramble and hawthorn.

No evidence of bats was observed during the site walkover. The surrounding farm, residential building and areas of woodland and hedgerows with mature trees all have potential to support roosting bats (TN19 & TN20). The woodlands and field edges provide suitable foraging habitat for bat species. The hedgerows on site provide important commuting habitat for bats and will connect roosting habitat such as buildings with foraging habitats like woodlands.

No evidence of polecats was observed during the site walkover. Various areas of suitable habitat such as woodlands, streams and marshy grassland are considered suitable to support this species.

No evidence of hedgehogs was observed during the site walkover. Various areas of suitable habitat such as woodlands, hedgerows, grasslands and suburban gardens are considered suitable to support this species.

Reptiles and Amphibians

No evidence of reptiles or amphibians was observed during the site walkover. The marshy, unmanaged grassland, ruderal and field edges (hedgerows) are considered suitable foraging areas for reptiles (TN10). The mature woodland and hedgerows contain suitable features to support hibernating reptiles. Several rubbish piles (TN16) from farm and residential properties were observed to contain suitable feature to support hibernating reptiles.

No evidence of great crested newt was observed during the site walkover. Several ponds were considered suitable to support this species (TN3, TN7, TN9, TN21 & TN25).

Invertebrates

No evidence of notable invertebrates was observed during the site walkover. Due to surveys being undertaken in winter and recent flailing of hedgerows, no blackthorn (*Prunus spimosa*) the primary food plant for brown hairstreak was recorded. This food plant may be on site and as such the hedgerows may be suitable to support this species.

Flora

Bluebells is listed under the trunk road estate biodiversity action plan TREBAP.

Invasive Species

Japanese knotweed and rhododendron was observed during the site walkover. Due to the walkover occurring in winter any potential annual invasive species such as Himalayan balsam (*Impatiens glandulifera*) could not be identified.

2.2.3 Habitats

Broad-leaved semi-natural woodland

This habitat falls within the classification of lowland mixed deciduous and wet woodland under the Pembrokeshire Local Biodiversity Action Plan (LBAP).

Mixed semi-natural woodland

This habitat falls within the classification of lowland mixed deciduous woodland under the Pembrokeshire LBAP.

Marsh / marshy grassland

This habitat falls within the classification of rush pastures under the Pembrokeshire LBAP.

Intact native species poor hedge

Important hedgerows are protected under the Hedgerows Regulations (1997).

Hedge and trees – species poor

Important hedgerows are protected under the Hedgerows Regulations (1997).

Standing open water

This habitat falls within the classification of ponds under the Pembrokeshire LBAP.

Running water

This habitat falls within the classification of rivers under the Pembrokeshire LBAP.

2.3 Assessment

The proposed road improvements may have impacts on designated sites, protected or notable species and habitats as indicated in the summary Table 2.4 below:

Table 2.4: Assessment Summary

Feature	Location	Level of Protection	Assessment
Designated Sites			
Cleddau Rivers/ Afonydd Cleddau (SAC)	2.2km W	EC Habitats Directive	AIES Screening required.
Pembrokeshire Bat Sites and Bosherton Lake/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton (SAC)	Approximately 9.1km SWW	EC Habitats Directive.	AIES Screening required.
Protected and / or notable species			
Breeding birds	Within various habitats on site	All breeding birds are fully protected under the Conservation of Habitats and Species Regulations 2010 and the WCA. A number of species are listed as priority species on the Pembrokeshire LBAP priority species.	The site contains known habitat to support this species group.
Badger	Within various habitats on site	Fully protected under the Protection of Badgers Act 1992.	The site contains known habitat to support this species.
Otter	Along the streams	Otters are fully protected under the Conservation of Habitats and Species Regulations 2010 and the WCA. Otters are listed under Section 42 species of principal importance under the NERC Act in	The streams and ponds / lakes offers suitable habitat for otters.

Feature	Location	Level of Protection	Assessment
		Wales.	
Dormice	Within the woodland, scrub and hedgerow habitat.	Dormice are fully protected under the Conservation of Habitats and Species Regulations 2010 and the WCA. Dormice are listed under Section 42 species of principal importance under the NERC Act in Wales.	The site contains known habitat to support this species.
Bats	Trees/buildings	Bat species and their roosts are fully protected under the Conservation of Habitats and Species Regulations 2010 and the WCA Various bat species are also listed under Section 42 species of principal importance under the NERC Act in Wales.	Buildings/trees have suitable cracks/crevices or holes to support roosting bats.
Polecat	Within various habitats on site.	Polecats are listed under Section 42 species of principal importance under the NERC Act in Wales.	The site contains known habitat to support this species.
Hedgehogs	Within various habitats on site.	Hedgehogs are listed under Section 42 species of principal importance under the NERC Act in Wales.	The site contains known habitat to support this species.
Reptiles	Within the areas of marshy grassland, scrub and along the field boundaries.	Reptiles are afforded varying degrees of protection under WCA. All reptiles are listed under Section 42 species of principal importance under the NERC Act in Wales.	The site contains known habitat to support this species group.
Amphibians	Within ponds and standing water.	Great crested newts are fully protected under the Conservation of Habitats and Species Regulations 2010 and the WCA. Great crested newts, common toad and Natterjack toad are listed under Section 42 species of principal importance under the NERC Act in Wales UK.	The site contains known habitat to support this species group.
Invertebrates	Within various habitats on site.	Brown hairstreak is listed under Section 42 species of principal importance under the NERC Act in Wales UK.	The site has the potential to contain the food plant for this species.
Invasive species	Japanese knotweed & rhododendron was recorded on site.	These plant is listed on Schedule 9 of the Wildlife and Countryside Act in England and Wales.	The site contains potential habitat to support invasive species.
Bluebells	Within the woodland habitat.	Bluebells is a TREBAP species.	The woodland contains potential habitat to support this species.
Notable Habitats			
Marsh / marshy grassland	At various locations in the site.	Rush pastures are a Pembrokeshire BAP priority habitat.	Potential for polecats, breeding birds and reptiles.
Broad-leaved semi-natural woodland	At various locations in the site.	Lowland mixed deciduous and wet woodland is a Pembrokeshire BAP priority habitat.	Potential for badgers, polecats, dormice, hedgehogs, bats and breeding birds.

Feature	Location	Level of Protection	Assessment
Mixed semi-natural woodland	At various locations in the site.	Lowland mixed deciduous woodland is a Pembrokeshire BAP priority habitat.	Potential for badgers, polecats, dormice, hedgehogs, bats and breeding birds.
Intact native species poor hedge	At various locations in the site.	Hedgerow Regulations 1997 Traditional field boundaries are a Pembrokeshire BAP priority habitat.	Potential for badgers, polecats, dormice, hedgehogs, bats, reptiles and breeding birds.
Hedge and trees – species poor	At various locations in the site.	Hedgerow Regulations 1997 Traditional field boundaries are a Pembrokeshire BAP priority habitat.	Potential for badgers, polecats, dormice, hedgehogs, bats, reptiles and breeding birds.
Standing open water	Within the ponds / lakes.	Ponds are a Pembrokeshire BAP priority habitat.	Potential for great crested newts and breeding birds.
Running water	Along the streams.	Rivers are a Pembrokeshire BAP priority habitat.	Potential for polecats and otters.

3 Conclusions & Recommendations

3.1 Conclusions

A PEA was undertaken to assess the potential impact on protected and notable habitats and species relating to the proposed works along the A40 Llanddewi Velfry to Penblewin. The section of road is located in south-west Wales in the County of Pembrokeshire and contained habitats which are generally of medium ecological value. The site is deemed to have suitable habitats to support birds, badgers, otters, dormice, bats, polecats, hedgehogs, reptiles, great crested newts and invertebrates. Based on the proposed works, appropriate construction activities have been recommended below. Further surveys are also recommended in relation to ecological species.

3.2 Recommendations

The following recommendations are relevant to the habitats and species present or likely to be present on site. Table 3.1 contains a summary of these recommendations.

3.2.1 Designated Sites

There are five SACs with otters as qualifying features and three SACs with bats as qualifying features within the search area of the site, Cleddau Rivers/ Afonydd Cleddau SAC designated for otters and Pembrokeshire Bat Sites and Bosherton Lake/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton SAC designated for bats. These sites will require an AIES screening and further consultation before works proceed. The AIES will look to identify if there are any environmental impacts of the proposed works that are likely to affect the key features of the designated sites associated with the SACs.

3.2.2 Protected or Notable Species

Birds

The habitats on site provide potential nesting and foraging opportunities for a number of protected and common bird species. Several farm buildings have the potential to support barn owls. Dedicated breeding bird surveys are therefore considered necessary to determine fully the value of the site for breeding birds. These surveys are to be undertaken between April and June.

Mammals

Evidence of badgers was recorded throughout the site. A dedicated badger survey should be undertaken to confirm the number, size and distribution of the setts throughout the local area. The optimal time to undertake this survey is between mid-February and late April.

The proposed works would have the potential to result in adverse impacts on badgers, both from direct and indirect impacts on badger setts and the potential loss of suitable foraging habitat, fragmentation and isolation of habitats. A more detailed assessment in the form of badger bait marking should be undertaken to help determine fully the likely impacts of the proposals on badgers and to determine mitigation

requirements and any licence requirements. Optimal time for undertaking badger surveys as it coincides with a peak in territorial activity and a period when vegetation cover is at a minimum (mid-February to late April).

The streams on site contain suitable habitat for otters. The proposed works has the potential to result in the fragmentation and isolation of habitats that may support this species. A dedicated otter survey in areas of suitable habitat should be undertaken to confirm the presence / absence of otters along the streams. This survey can be undertaken at any time in the year.

Areas of suitable habitat for dormice on site include woodland, scrub and hedgerows. The proposed works has the potential to result in loss of large proportions of hedgerow and woodland that may fragment and isolate habitats that may support this species. A dedicated dormouse survey should be undertaken in suitable habitat to confirm the presence / absence of dormice throughout the site. This survey can be undertaken between April and October.

The surrounding farms, residential buildings and areas of woodland and hedgerows with mature trees all have potential to support roosting bats. The proposed works has the potential to result in loss of large proportions of hedgerow and woodland that may fragment and isolate habitats that may support this species. Bat activity surveys are required to determine how bats use the site and to make a full assessment of potential impacts.

As there are features that have potential to be accessed by bats it is recommended that a licenced bat worker undertakes an external and internal inspection of the buildings, including roof voids and an inspection of the trees. An asbestos survey will need to be provided prior to roof voids being accessed. Further to this inspection bat activity surveys may be required to further assess the potential of the buildings for roosting bats. These can be undertaken in the bat active season between March and October.

The WWBIC held several records of polecats and hedgehogs. There is suitable habitat at the site and connectivity in-between to indicate the likely presence of these species. Any vegetation clearance works should be carried out in a careful manner with caution exercised as to the potential presence of polecats and hedgehogs.

Reptiles and Amphibians

The marshy, unmanaged grassland, ruderal and field edges (hedgerows) are considered suitable foraging areas for reptiles. It is therefore recommended that reptile presence / absence surveys are undertaken on site in order to assess potential impacts on this species group and to determine mitigation requirements associated with proposed works. These surveys can be undertaken between March and October.

Several ponds were considered suitable to support great crested newts. The site hosts a mosaic of different terrestrial habitat types which are suitable for amphibians. Amphibians may also use the network of linear corridors within and around the site to move between water bodies.

Development of the site could potentially lead to the loss and fragmentation of suitable habitats. Great crested newt eDNA surveys should be undertaken as early as possible (according to the eDNA restrictions). If great crested newts are found to be present then a population size class survey should be undertaken between March and June to confirm the presence or absence of protected amphibians within the site and surrounding local area. This will enable an assessment of impacts to be made and determination of any mitigation and licensing requirements in respect of the proposed works.

Invertebrates

Blackthorn, the food species for brown hairstreak was not initially recorded on site. As blackthorn is common throughout the UK the potential removal of this species is not considered to have an adverse impact on brown hairstreak within the area. No further surveys are recommended.

Invasive Species

Japanese knotweed and rhododendron were observed on site. Due to the surveys been undertaken outside of the suitable flowering period of plants further surveys may be required to determine the presence of invasive species in the works area. These surveys are to be undertaken between May to September.

3.2.3 Habitats

Hedgerows TREBAP & LBAP habitats

The hedgerows within the site comprise of species-poor hedges, some have the potential to be classified as important hedgerows under the Hedgerows Regulations 1997. The Ecological Impact Assessment will incorporate a full assessment of potential impacts to hedgerows and LBAP habitats resulting from the works.

3.3 Summary

A summary of the findings is presented in Table 3.1

Table 3.1: Summary Table

Feature	Approximate location	Recommendations
Designated Sites along the proposed pipeline		
Cleddau Rivers/ Afonydd Cleddau (SAC)	2.2km W	EC Habitats Directive. AIES Screening required.
Pembrokeshire Bat Sites and Bosherton Lake/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton (SAC)	Approximately 9.1km SWW	EC Habitats Directive. AIES Screening required.

Feature	Approximate location	Recommendations
Protected and / or notable species		
Breeding birds	Within various habitats on site.	Breeding bird surveys undertaken between April and June. These surveys will be undertaken in accordance with the British Trust for Ornithology, Breeding Bird Survey Methodology (BTO/JNCC/RSPB, 1994)
Badger	Within various habitats on site.	Badger sett and badger bait making survey undertaken in spring or autumn. These surveys will be undertaken in the accordance with the DMRB guidance Volume 10, Section 4, Part 2.
Otter	Along the streams.	Presence / absence survey undertaken at any time in the year. These surveys will be undertaken in the accordance with the DMRB guidance Volume 10, Section 4, Part 4.
Dormice	Within the woodland, scrub and hedgerow habitat.	Presence / absence survey undertaken between April and October. The dormice surveys will be undertaken in accordance with the Dormouse Conservation Handbook (English Nature 2006) and DMRB guidance Volume 10, Section 4, Part 5.
Bats	Trees/buildings.	External / internal building surveys and activity (transects and emergent) survey undertaken throughout the site. All surveys will be undertaken following the Bat Conservation Trusts' (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) (2016) and DMRB guidance Volume 10, Section 4, Part 3. .
Polecat	Within various habitats on site.	Any vegetation clearance works should be carried out in a careful manner with caution exercised as to the potential presence of polecats
Hedgehogs	Within various habitats on site.	Any vegetation clearance works should be carried out in a careful manner with caution exercised as to the potential presence of hedgehogs.
Reptiles	Within the areas of marshy grassland, scrub and along the field boundaries.	Reptile presence/absence surveys will be undertaken between march and October in accordance with the current best practice guidelines and DMRB guidance Volume 10, Section 4, Part 7.
Amphibians	Within ponds and standing water.	eDNA and if required populations surveys are to be carried out between March and June. Surveys will be undertaken in accordance with the current standard survey guidelines (English Nature [2001] Great Crested Newt Mitigation Guidelines) and DMRB guidance Volume 10, Section 4, Part 6.
Invertebrates	Within various habitats on site.	No further surveys are required.
Invasive species	Within disturbed habitat on site.	Further surveys may be required to determine the presence of invasive species in the works area. These surveys are to be undertaken between May to September.
Bluebells	Within the woodland habitat on site.	The Ecological Impact Assessment will incorporate a full assessment of potential impacts to hedgerows TREBAP and LBAP habitats resulting from the works.
Habitats		
Marsh / marshy grassland	At various locations on site.	The Ecological Impact Assessment will incorporate a full

Feature	Approximate location	Recommendations
Broad-leaved semi-natural woodland		assessment of potential impacts to hedgerows and LBAP habitats resulting from the works.
Mixed semi-natural woodland		
Intact native species poor hedge		
Hedge and trees – species poor		
Standing open water	Within the ponds / lakes.	
Running water	Along the streams.	

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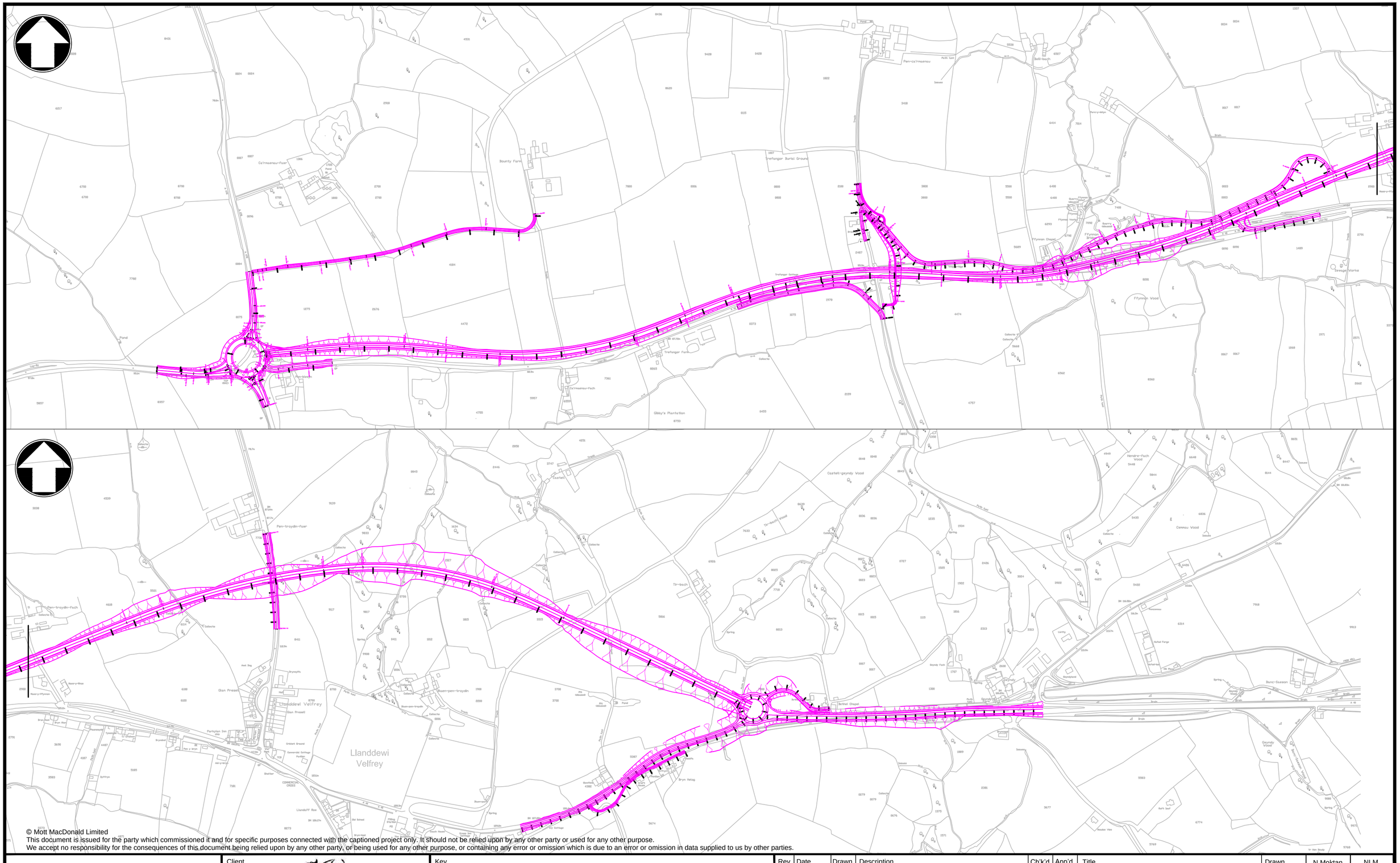
Appendix A. Proposed Alignment



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Key

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	02.12.15	NM	General Arrangement	DF	JS
P2	17.12.15	RJ	Geotechnical Information added	DF	JS
P3	11.01.16	NM	General Update	DF	JS

Title
A40 Llanddewi Velfrey - Penblewin Pembrokeshire Improvement Scheme
General Arrangement

Drawn	N Moktan	NLM
Checked	D Francis	DF
Approved	J Sansom	JS

Scale at A2
1:5000

Drawing Number
358432-MMD-00-XX-DR-C-0008

Security	Status	Rev
STD	PRE	P3

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Appendix B. Species-Specific Legislation

The following information in this appendix relates to species assessed within this document as being potentially affected by the proposed works and is a summary version of the full legislative text only. The relevant acts referred to in this appendix should be referred to for the full legislative text.

Breeding Birds

All breeding birds are protected under the Wildlife and Countryside Act (WCA) 1981 (as amended) which prohibits the intentional killing, injuring or taking of any wild bird (and) the taking, damaging or destroying eggs or of the nest (whilst being built or in use). Schedule 1 bird species are afforded greater protection under the WCA. It is an offence to disturb Schedule 1 birds or the dependants in the vicinity of their nest site.

Bats

All bat species are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitat and Species Regulations 2010. This means it is illegal to intentionally or deliberately kill, injure, disturb or capture these species or damage, destroy or obstruct access to any structure, breeding or resting place used by them.

Otters

Otter are a European Protected species and are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and the Conservation of Habitats and Species Regulations 2010 (as amended). It is an offence to:

- Intentionally or deliberately kill;
- Injure or take an otter;
- Intentionally or deliberately damage;
- Destroy or obstruct access to any structure or place used for shelter or protection by an otter; and
- To intentionally or deliberately disturb an otter while it is occupying a structure or place which it uses for that purpose.

Badgers

Badgers and their setts are protected under the Protection of Badgers Act 1992. This makes it an offence to:

- Directly or indirectly kill, injure or take badgers;
- Cruelly ill-treat a badger;
- Dig for badger;
- Intentionally or recklessly damage or destroy a badger sett, or obstruct access to it;
- Cause a dog to enter a badger sett; and
- Disturb a badger when it is occupying a sett.

Polecat

The polecat is partially protected under Schedule 6 of the Wildlife and Countryside Act 1981. It is also listed under Schedule 4 of the Conservation of Habitats and Species Regulations 2010.

Hedgehog

The hedgehog is partially protected under Schedule 6 of the Wildlife and Countryside Act 1981. It is also listed under Schedule 4 of the Conservation of Habitats and Species Regulations 2010.

Reptiles

Reptiles have varying degrees of protection under the Wildlife and Countryside Act 1981 (as amended). The four wide spread species of reptiles that are protected under Schedule 5 are common lizard (Zootoca *vivipara*), slow-worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and adder (*Vipera berus*). This means it is prohibited to intentionally kill, injure or trade these species.

Invertebrates

Brown hairstreaks are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). They are protected only from sale.

Great Crested Newt

Great crested newts (GCN) are fully protected under the Conservation of Habitat and Species Regulations 2010 (as amended) and the WCA. This means that is an offence to intentionally or recklessly kill, injure or take GCN. In addition the following are also in breach of the legislation: To possess or control any live or dead specimen or anything derived from a GCN; to intentionally or recklessly damage, destroy or obstruct access to any structure or place used as shelter or protection by a GCN; to intentionally or recklessly disturb a GCN while it is occupying a structure or place, which it uses for that purpose. The legislation applies to all life stages of great crested newts.

Appendix C. Protected Species Records

Summary of species Records within 2.0km of the site

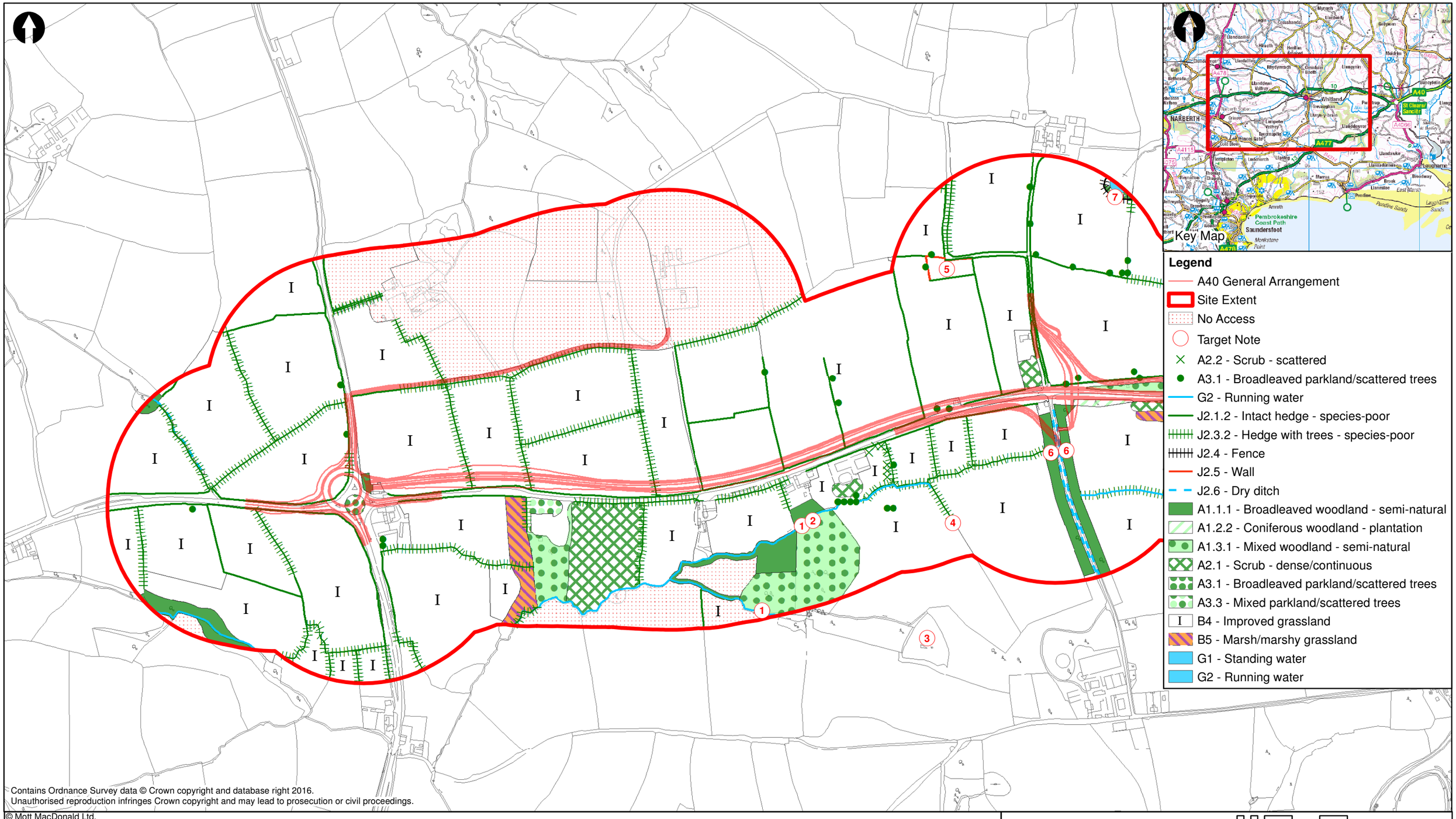
Table C.1: Species Records (for up to 2.0km from the site) received from WWBIC

Species	Number of records	Protection	Closest record in km
Birds			
Hobby *(Falco subbuteo)*	1	WCA1.1	0.6km NE
Red kite *(Milvus milvus)*	6	BDir1 & WCA1.1	1.0km
Redwing *(Turdus iliacus)*	5	WCA1.1	1.2km
Fieldfare *(Turdus pilaris)*	1	WCA1.1	1.2km
Barn owl *(Tyto alba)*	1	WCA1.1	1.2km
Mammals			
Bats			
Whiskered bat *(Myotis mystacinus)*	1	EPS, HDir & WCA5	1.2km S
Natterer's bat *(Myotis nattereri)*	1	EPS, HDir & WCA5	1.2km S
Noctule bat *(Nyctalus noctula)*	2	EPS, HDir, WCA5 & S42	0.3km S
Common pipistrelle *(Pipistrellus pipistrellus)*	3	EPS, HDir, WCA5 & S42	0.6km S
Soprano pipistrelle *(Pipistrellus pygmaeus)*	3	EPS, HDir & S42	0.3km S
Brown long-eared bat *(Plecotus auritus)*	3	EPS, HDir, WCA5 & S42	0.9km S
Greater horseshoe bat *(Rhinolophus ferrumequinum)*	1	EPS, HDir, WCA5 & S42	1.2km S
Lesser horseshoe bat *(Rhinolophus hipposideros)*	1	EPS, HDir, WCA5 & S42	1.2km S
Other Mammals			
Otter *(Lutra lutra)*	1	EPS, HDir, WCA5 & S42	0.9km SW
Eurasian badger *(Meles meles)*	22	BA	0.1km S
Polecat *(Mustela putorius)*	2	HDir & S42	0.1km SE (near Penblewin roundabout)
West European hedgehog *(Erinaceus europaeus)*	7	S42	0.1km N
Eurasian water shrew *(Neomys fodiens)*	1	Bern	1.1km E
Reptiles and Amphibians			
Slow-worm *(Anguis fragilis)*	1	WCA5 & S42	0.2km S
Grass snake *(Natrix natrix)*	1	WCA5 & S42	0.2km S
Common frog *(Rana temporaria)*	1	HDir & WCA5	1.4km N
Common lizard *(Zootoca*	1	WCA5 & S42	0.2km S

Species	Number of records	Protection	Closest record in km
vivipara)			
Invertebrates			
Brown hairstreak *(Thecla betulae)*	2	WCA5 & S42	1.4km N
Flora			
Carolina hornwort *(Phaeoceros carolinianus)*	1	RD1	1.9km

Source: WWBIC Records Data

Appendix D. Phase 1 Habitat Map



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ARCADIS Design & Consultancy for natural and built assets

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	18/03/16	CH	First Issue	JB	DF

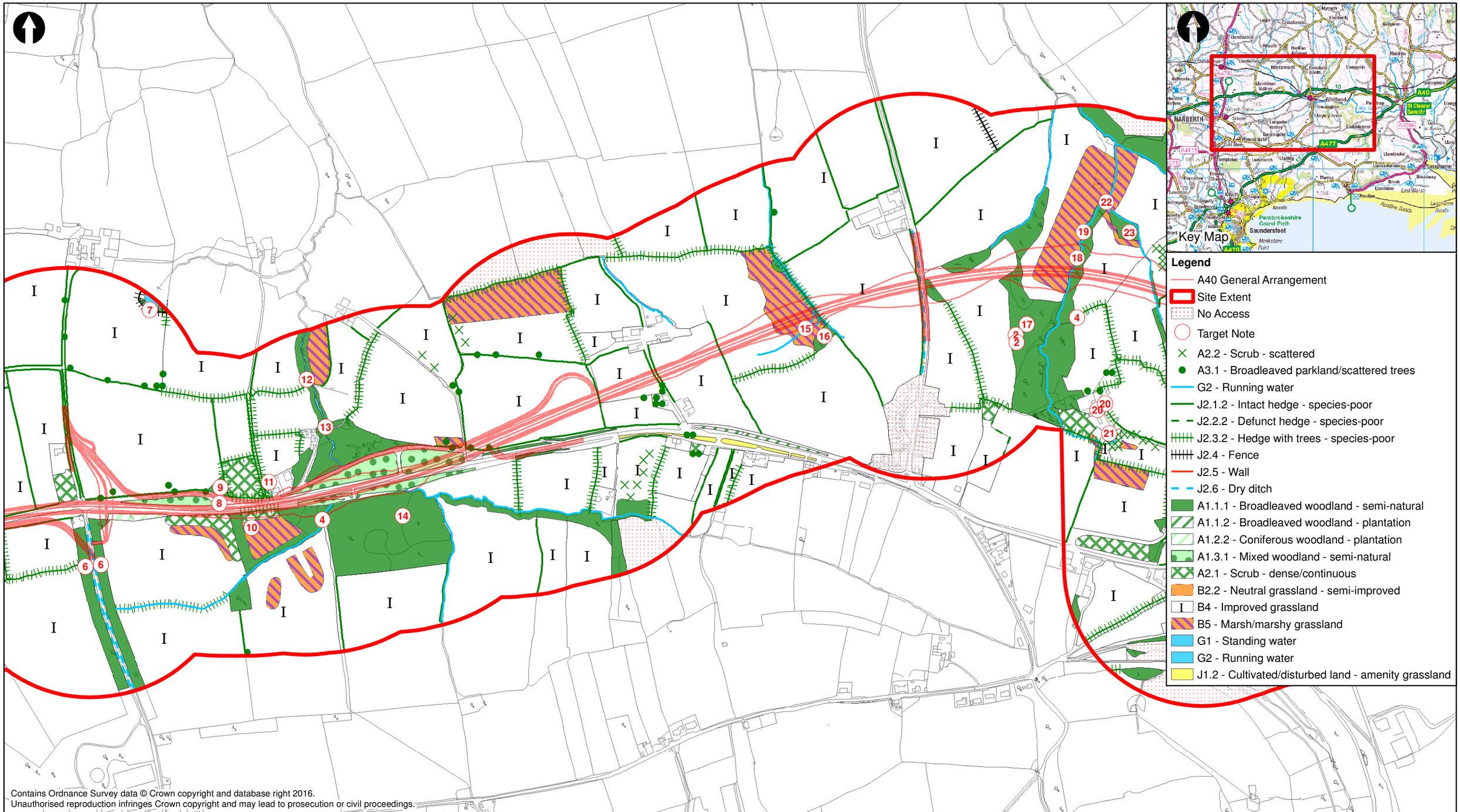
Title

A40 Llandewi Velfry to Penblewin Phase 1 Habitat Map

Drawn	CH
Checked	JB
Approved	DF
Scale at A3	1:6,500

Drawing No.
MMD-358432-00-XX-DR-C-0067

Status	Rev
INF	P1



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Title

A40 Llandewi Velfry to Penblewin Phase 1 Habitat Map

Drawn	CH
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Approved	DF
Scale at A3	1:6,500

Drawing No.
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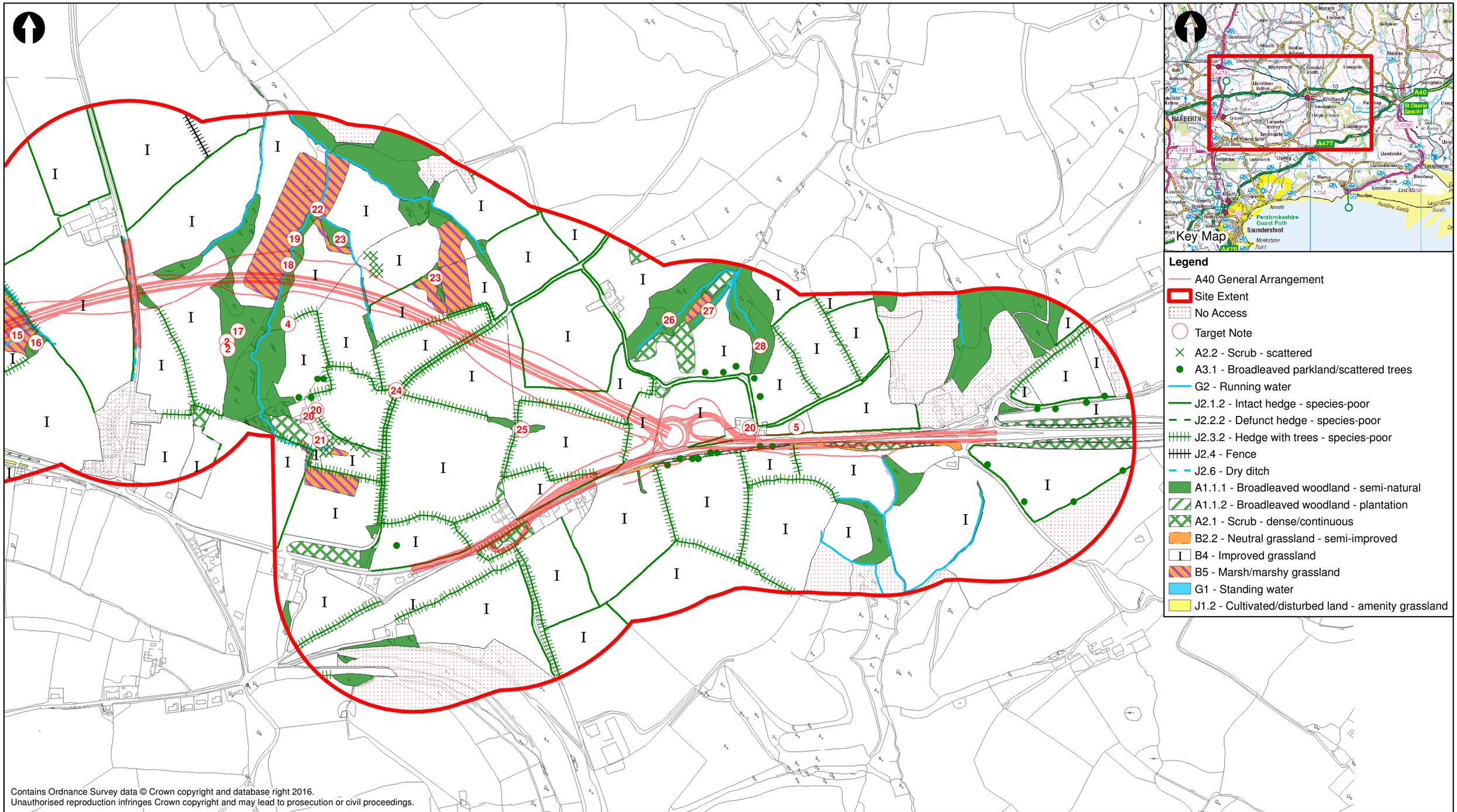
Status	Rev
INF	P1



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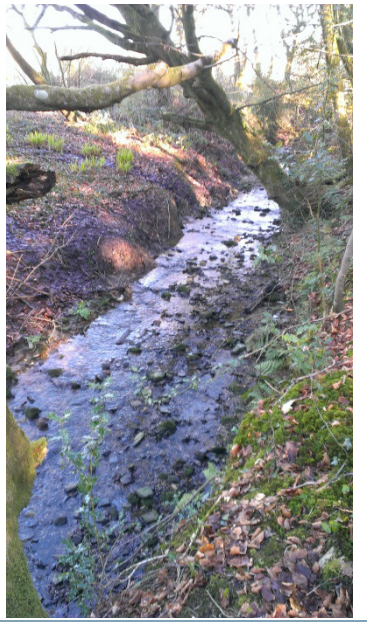
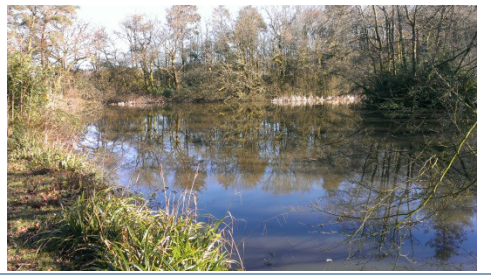
Title
A40 Llandewi Velfry to Penblewin Phase 1 Habitat Map

Drawn	CH
Checked	JB
Approved	DF
Scale at A3	1:6,500

Drawing No.
MMD-358432-00-XX-DR-C-0069

Status	Rev
INF	P1

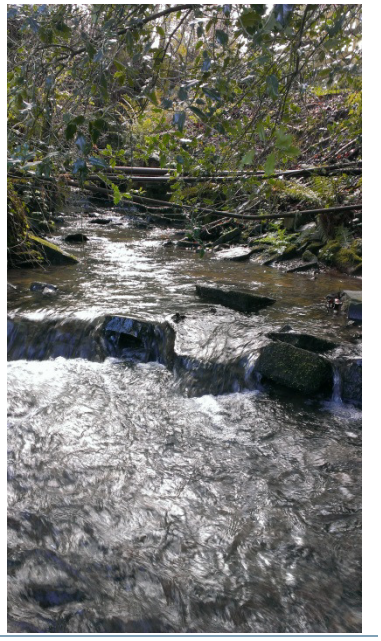
Appendix E. Target Notes

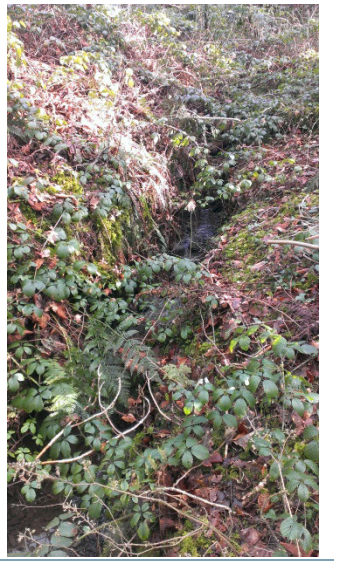
Target Note	Description	Photo
1	Fast flowing stream 1.0m wide and 0.2m deep within woodland. Rock base with hard banks. Not suitable for water vole, good commuting corridor for otters to the large pond/ lake.	
2	Badger latrine	n/a
3	Pond number 5 is a large pond/ lake surrounded by mixed semi-natural woodland, improved grassland fields and mature hedges.	

Target Note	Description	Photo
4	Badger hair indicating badger runs.	 
5	Cemetery	n/a
6	Rhododendron and bamboo growing within woodland.	

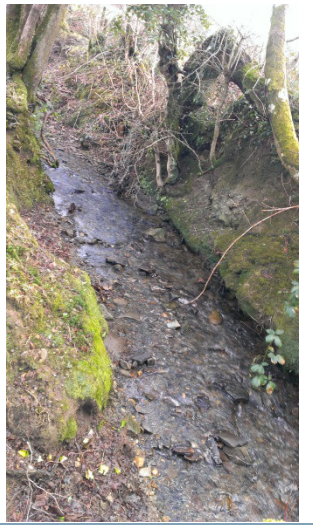
Target Note	Description	Photo
		
7	Pond number 3 surrounded by dense scrub and is adjacent to improved grassland. Adjacent to a small stream with a hedge with mature trees.	
8	Dead badger	

Target Note	Description	Photo
9	Pond number 4 is created from a drainage system. It is surrounded by small wooded area adjacent to dense scrub and flows back into these areas.	
10	Field of overgrown marshy grassland with scrub along a road edge. Area has potential to support reptiles.	
11	Rhododendron hedge.	

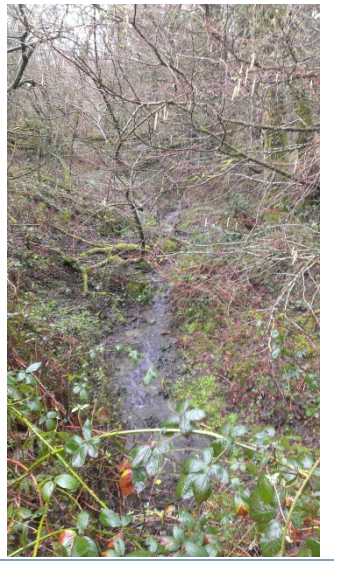
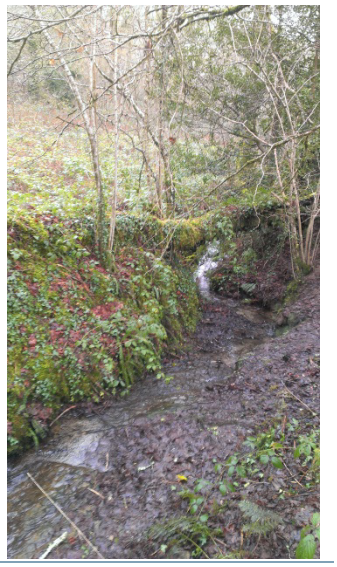
Target Note	Description	Photo
12	Badger sett that is active but hasn't been used in a while with a single entrance. Likely to be an outlier sett. Well used mammal tracks run along the stream edge.	
13	A fast flowing river with 1.5m steep banks, 1.5m wide and 0.2m deep with a rocky bed. Located within a woodland and is fully shaded. Good commuting corridor for otters.	

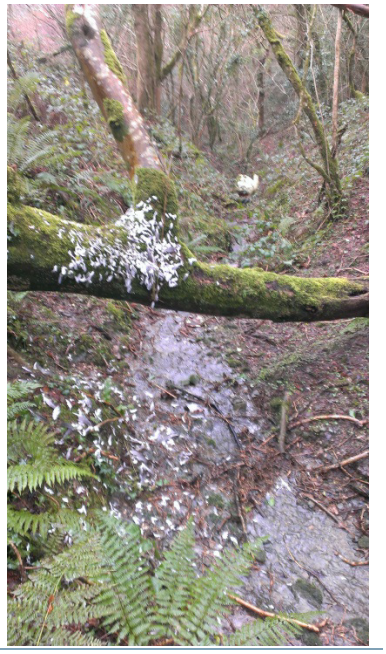
Target Note	Description	Photo
14	Small fast flowing stream, likely to be dry during dry weather. 0.5m wide and 0.1m deep. Surrounded by vegetation including bramble. Low suitability for otters and is not suitable for water voles.	
15	Wet and fast flowing ditch from an underground pipe originating from a farmers field. It is not suitable for water vole and has low suitability for otter.	
16	Spoil/ old tip which provides hibernacula for reptiles particularly for common lizards. Suitable habitat adjacent comprises of marshy grassland.	

Target Note	Description	Photo
17	Two fresh badger latrines and three holes. Two holes are suitable for badger but had small spoil piles. Fresh digging from the night before. Rabbit droppings in the entrances as well as a rabbit skull. Area also had rabbit warrens. Badger may have been investigating or could be outlier setts.	n/a
18	Shallow fast flowing ditch shaded by bramble, a hedge and woodland. Not suitable for water vole.	
19	An oak tree with wood pecker holes and dead wood offering suitable features for bats.	

Target Note	Description	Photo
20	Buildings with confirmed brown long-eared and pipistrelle roosts	 
21	Pond number 1 with scrub located around the pond boundary located in an agricultural field and adjacent to a riparian stream.	
22	Flowing stream, rock base 1m wide, fast flowing with otter suitability. Not suitable for water vole.	

Target Note	Description	Photo
23	Wet broad leaved woodland.	 
24	Japanese knotweed stand	n/a
25	Pond number 2 is within an area of woodland with lots of fallen wood and tree stumps offering suitable hibernation habitat for GCNs.	

Target Note	Description	Photo
26	Fast flowing stream, likely to be dry when the weather is dryer. 0.5m wide and 0.1m deep. Located within an ancient broad leaved woodland. Suitable habitat for commuting otters but unlikely to support a food source (fish).	
27	Stream similar as stream within TN8. It is located within broad leaved woodland adjacent to an improved grassland field, marshy grassland and dense continuous scrub.	

Target Note	Description	Photo
28	A sparrow hawk kill was found within broad leaved woodland.	

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement
Appendix 8.3: National Vegetation Classification Survey

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

1. Plant Community C – Grassland T4

Common name	Scientific name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Constancy value
Creeping buttercup	*Ranunculus repens*	8	6	7	7	7	III
Common speedwell	*Veronica officinalis*	7					IV
Ragwort	*Jacobaea vulgaris*	7					IV
Bramble	*Rubus fruticosus*	6				6	II
Ribwort plantain	*Plantago lanceolata*		7	6	6	8	II
Birds foot trefoil	*Lotus corniculatus*		7	7	7	6	II
Dandelion	*Taraxacum officinale*		6		5	5	II
Meadow buttercup	*Ranunculus acris*		7		7		III
Rough meadow grass	*Poa trivialis*		8				IV
Sweet vernal grass	*Anthoxanthum odoratum*		8		8		IV
Yorkshire fog	*Holcus lanatus*		8	8		8	IV
Red fescue	*Festuca rubra*		8	7		8	IV
Hogweed	*Heracleum mantegazzianum*		5		6	7	II
Perennial rye grass	*Lolium perenne*		6		8	8	III
False oat grass	*Arrhenatherum elatius*		8		8		IV
Rose bay willow herb	*Chamerion angustifolium*		5				II
Sticky mouse ear	*Cerastium glomeratum*		5		5		II
Creeping bent	*Agrostis stolonifera*		5	5		5	II
Selfheal	*Prunella vulgaris*			7	6		II
Red clover	*Trifolium pratense*			6	7		II
Field scabious	*Knautia arvensis*			5	7		II
White clover	*Trifolium repens*			5			II

Smooth meadow grass	*Poa pratensis*			5		8	III
Cleavers	*Galium aparine*			5			II
Annual meadow grass	*Poa annua*				6	7	II
Meadow foxtail	*Alopecurus pratensis*				7	7	III
Cocksfoot grass	*Dactylis glomerata*					8	IV
Common knapweed	*Centaurea nigra*	4	4	4	4		I
Crested dog's tail	*Cynosurus cristatus*				7		IV
Curly leaved doc	*Rumex crispus*		4			4	I
Tufted hair grass	*Deschampsia cespitosa*		4	4		4	I
Common sorrel	*Rumex acetosa*		5		5		II
Yellow rattle	*Rhinanthus minor*	7		5		5	II
yarrow	*Achillea millefolium*	4	4	4		4	I
Common mouse ear	*Cerastium fontanum*				7		III
silverweed	*Argentina anserina*				6		II
Greater stitchwort	*Stellaria holostea*				6		II
Rough hawksbit	*Leontodon hispidus*				5		II

1. Plant Community C – Marshy Grassland T4

Common name	Scientific name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Constancy value
Selfheal	*Prunella vulgaris*	6	6			6	II
Bramble	*Rubus fruiticosus*	5	4		4	4	I
Meadow Buttercup	*Ranunculus acris*	7	7	7		7	III
Creeping Buttercup	*Ranunculus repens*	7	7	7	7	7	III
Yorkshire Fog	*Holcus lanatus*	6	5	6	5	5	II
Ribwort Plantain	*Plantago lanceolata*	8	8	8	8	8	IV
Bird's foot Trefoil	*Lotus corniculatus*	4	5	4			II
Red Fescue	*Festuca rubra*	6	6	6	6	6	II
Creeping Bent	*Agrostis stolonifera*	5	6	5	5	5	II
Field Scabious	*Knautia arvensis*	4	4		4		I
Dandelion	*Taraxacum*	6	6	6	6	6	II
Sticky Mouse Ear	*Cerastium glomeratum*		5	7		7	III
Red Clover	*Trifolium pratense*	8	6	6	6	7	III
White Clover	*Trifolium repens*	7	7	7	7	8	III
Knapweed	*Centaurea*	4		4		4	I
Smooth Meadowgrass	*Poa pratensis*	6	6	6	6	6	II
Annual Meadowgrass	*Poa annua*	8	8	8	8	8	IV
Crested Dog's Tail	*Cynosurus cristatus*	4		6	4	4	II
False Oat Grass	Arrhenatherum elatius	5	5	7	3	3	II
Yellow Rattle	*Rhinanthus minor*	4	4		3	3	I
Garlic Mustard	*Alliaria petiolata*	4		4			I
Colts Foot	*Tussilago*			4	4	4	I
Ground Elder	*Aegopodium podagraria*	4	7	7	4	4	II
Perrenial Rye Grass	*Lolium perenne*	8	9	8	9	9	V
Yarrow	*Achillea millefolium*	4	4		4	4	I
Common Sorrel	*Rumex acetosa*	4	4				I

Tufted Hair Grass	*Deschampsia cespitosa*	6	6	6	7	6	II
Curly Dock	*Rumex crispus*	4	4				I
Broad Leaved Dock	*Rumex obtusifolius*			4	4		I
Ragwort	*Jacobaea vulgaris*	4				4	I
Creeping Thistle	*Cirsium arvense*	4	6		6	6	II
Hogweed	*Heracleum mantegazzianum*		4		4		I
Nettle	*Urtica dioca*		7	7	7	7	III
Evening Flowering Primrose	*Oenothera biennis*	4					I
Soft Rush	*Juncus effusus*			8	9	9	V
Compact rush	*Juncus conglomeratus*			8	9	9	V
Rosebay Willowherb	*Chamerion angustifolium*		5	6	5		III
Pignut	*Conopodium majus*			4			I
Cow Parsley	*Anthriscus sylvestris*	5				5	II
Greater Stitchwort	*Stellaria holostea*			4			I

1. Plant Community B – woodland T10

Common name	Scientific name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Constancy value
Male fern	*Dryopteris filix-mas*	8	-	-	8	7	IV
Female fern	*Athyrium filix-femina*	7	-	-	7	-	IV
red campion	*Silene dioica*	6	-	-	-	-	I
Meadow buttercup	*Ranunculus acris*	6	-	-	6	-	II
bramble	*Rubus fruticosus*	7	-	7	7	4	II
Wild garlic	*Allium ursinum*	6	5	-	-	5	II
Water mint	*Mentha aquatica*	5	-	-	-	-	I
Wood avens	*Geum urbanum*	8	8	8	8	8	V
Cleavers	*Galium aparine*	5	4	5	5	4	II
Holly	*Ilex aquifolium*	4	-	-	-	-	I
Annual meadow grass	*Poa annua*	5	5	5	5	5	II
Ivy	*Glechoma hederacea*	7	7	7	3	3	II
Birds foot trefoil	*Lotus corniculatus*	-	6	-	-	-	I
Smooth meadow grass	*Poa pratensis*	-	4	-	-	-	I
Herb Robert	*Geranium robertianum*	-	-	7	-	5	III
Common haircap	*Polytrichum commune var. commune*	7	7	7	7	7	III
Reindeer lichen	*Cladonia rangiferina*	4	-	-	4	4	I
Handsome wollywort	*Trichocolea tomentella*	7	7	7	7	7	III
Brooklime	*Veronica beccabunga*	4	-	-	-	-	I
Creeping buttercup	*Circaea lutetiana*	3	-	-	-	-	I
Rose bay willow herb	*Chamerion angustifolium*	3	-	-	-	-	I

Enchanters nightshade	*Circaea lutetiana*	8	8	8	8	9	V
Woody nightshade	*Solanum dulcamara*	8	7	7	7	8	IV
bluebell	*Hyacinthoides non-scripta*	-	-	4	-	-	I
Marsh forklet-moss	*Dichodontium palustre*	-	-	4	4	4	I
Lesser fringe moss	*Racomitrium affine*	-	5	5	6	6	II
Rough stalked feather moss	*Brachythecium rutabulum*	-	-	6	5	7	III
Matted feather moss	*Brachythecium populeum*	-	-	3	4	3	I
Creeping finger moss	*Amblystegium serpens*	-	-	3	4	4	I
Common liverwort	*Marchantia polymorpha*	-	5	-	5	5	II
Greasewort	*Aneura pinguis*						
Overleaf Pellia	*Pellia epiphylla*	-	-	-	5	5	II
Endive Pellia	*Pellia endivifolia*	-	-	-	6	6	II

1. Plant community A – transect woodland T13

Common name	Scientific name	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Constancy value
bramble	*Rubus fruticosus*	7	7	7	8	7	V
Cocksfoot grass	*Dactylis glomerata*	6	-	-	-	6	II
Birds foot trefoil	*Lotus corniculatus*	6	-	-	-	-	I
Greater plantain	*Plantago major*	7	-	7	-	7	III
Compact rush	*Juncus conglomeratus*	9		5	5	5	III
Creeping thistle	*Cirsium arvense*	4	-	-	-	-	I
False oat grass	*Arrhenatherum elatius*	6	-	-	-	4	I
Rose bay willow herb	*Chamerion angustifolium*	7	-	5	-	5	II
Ground elder	*Aegopodium podagraria*	7	7	7	7	-	III
Yorkshire fog	*Holcus lanatus*	7	-	-	-	-	I
Sweet vernal grass	*Anthoxanthum odoratum*	4	4	-	-	-	I
Red fescue	*Festuca rubra*	4	-	-	-	4	I
Crested dog's tail	*Cynosurus cristatus*	4	-	-	-	4	I
Red clover	*Trifolium pratense*	5	-	-	-	-	I
Rough hawksbit	*Leontodon hispidus*	4	-	-	-	-	I
Lesser celandine	*Ficaria verna*	4	-	4	-	4	I
Hogweed	*Heracleum mantegazzianum*	4	-	-	-	4	I
Annual meadow grass	*Poa annua*	4	-	-	-	4	I
Smooth meadow grass	*Poa pratensis*	4	-	-	-	4	I
Meadow foxtail	*Alopecurus pratensis*	3	-	-	-	-	I
Timothy grass	*Phleum pratense*	3	-	-	-	-	I

Hard fern	*Blechnum occidentale*		7	7		7	III
Creeping ivy	*Glechoma hederacea*	-	8	8	8	9	V
Male fern	*Dryopteris filix-mas*	-	4	6		6	II
foxglove	*Digitalis purpurea*		4	4	-	-	I
Herb Robert	*Geranium robertianum*	-	7	7	7	-	III
Garlic mustard	*Alliaria petiolata*	-	4	-	-	-	I
Female fern	*Athyrium filix-femina*	-	-	4	-	-	I
bluebell	*Hyacinthoides non-scripta*	-	-	4	-	-	I
Reindeer lichen	*Cladonia rangiferina*	-	4	4	5	4	I
Soft rush	*Juncus effusus*	-	-	-	-	4	I
Wood avens	*Geum urbanum*	4	4	4	4	4	I
Common haircap	*Polytrichum commune var. commune*	-	5	5	-	6	II
Marsh forklet-moss	*Dichodontium palustre*	-	-	4	4	4	I
Lesser fringe moss	*Racomitrium affine*	-	5	5	5	5	II
Rough stalked feather moss	*Brachythecium rutabulum*	-	-	6	5	6	II
Matted feather moss	*Brachythecium populeum*	-	-	3	4	3	I
Creeping finger moss	*Amblystegium serpens*	-	-	3	4	4	I
Handsome wollywort	*Trichocolea tomentella*	-	3	3	4	4	I
Common liverwort	*Marchantia polymorpha*	-	5	-	5	5	II

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.4: Amphibian Survey Information

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Pond no.	Date	Result	X	Y
Pond 1	21/04/2016	Positive	212177	217058
Pond 2	21/04/2016	Negative	213418	217247
Pond 3	21/04/2016	Negative	213057	216387
Pond 4	21/04/2016	Negative	213428	216403
Pond 5	21/04/2016	Negative	213263	217359
Pond 6	21/04/2016	Negative	213743	216921
Pond 7	21/04/2016	Negative	215140	216960
Pond 8	21/04/2016	Negative	215448	217001
Pond 9	21/04/2016	Negative	215523	216994
Pond 10	04/05/2016	Negative	212650	216551

DNA Analysis Report - Commercial in Confidence

Customer:	Mott MacDonald
Address:	Fitzalan House Fitzalan Road Cardiff CF24 0EL
Contact:	Jason Brown
Email:	jason.brown@mottmac.com
Tel:	02920478994
Report date:	12-May-2016
Order Number:	GCN16-0049
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.

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DNA Analysis Report - Commercial in Confidence

CustomerReference	Fera Reference	GCN Detection	GCN Score	Inhibition	Degradation
3 Thomas	S16-002962	Negative	0	No	No
5 Reynolds	S16-002963	Negative	0	No	No
-	S16-002964	Negative	0	No	No
4 Peet	S16-002965	Positive	1	n/a	n/a
1 Lewis	S16-002967	Negative	0	No	No
2 R. Thomas	S16-002968	Negative	0	No	No

The results indicate that eDNA for great crested newts was detected in one of the samples and in the remaining samples eDNA was not detected (as detailed in the table above). 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.

Issuing officer: Steven Bryce
Tel: 01904 462 324
Email: e-dna@fera.co.uk

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Feature	Date of Survey	Lead Survey	Plus 1	Surveys undertaken	Temperatur	Conditions	Notes	Results
Pond 1	24-25/05/16	GS	MA & CE	Bottle, Torch, egg search & netting				No GCN, common newts present.
Pond 1	15-16/06/16	GS	BS	Bottle, egg search & netting	14°C		duck weed covering surface too dense to undertake torching	No GCN, 3 juvenile commons found during netting
Pond 1	29-30/06/16	GS	RH	Bottle, egg search & netting	12 - 14°C		duck weed covering surface too dense to undertake torching	1 common juvenile, 3 eggs (2 probable GCN)
Unable to undertake full amount of surveys due to land owner restriction as they had customers in the B&B.								

A40 Great Crested Newt Surveys 2017

Waterbody Number	Survey 1 – 11/05/17				Survey 2 – 18/05/17				Survey 3 – 1/06/17				Survey 4 – 6/06/17			
	Bottle	**Torch**	**Egg**	**Net**	**Bottle**	**Torch**	**Egg**	**Net**	**Bottle**	**Torch**	**Egg**	**Net**	**Bottle**	**Torch**	**Egg**	**Net**
1	0	0	0	n/a	6mLh 2fLh	2Lh	0	n/a	0	0	0	n/a	0	0	n/a	0
2	1mLh	0	0	n/a	0	2Lh	0	n/a	2mLh 2fLh	1Lh	0	n/a	1fLh	0	n/a	0
3	>50 Rt(i)	>50 Rt(i)	0	n/a	NA	NA	NA	NA	>100Rt (i)	0	0	n/a	0	0	n/a	0
4	14mLh 1fLh	0	0	n/a	6mLh 3fLh	0	0	n/a	2mLh	1Lh	0	n/a	1fLh	0	n/a	0

Key: Lv - *Lissotriton vulgaris* (Smooth newt); Lh – *Lissotriton helveticus* (Palmate newt); Rt – *Rana temporaria* (Common frog); Bb – *Bufo bufo* (Common toad); (i) – immature/larvae; m – male; f – female
n/a = Survey methodology not used.
NA = No access

Waterbody 1 - Caermaenau Fawr B&B

Waterbody 2 - Caermaenau Fach

Waterbody 3 - Pencaermanau Farm

Waterbody 4 – School for Dogs

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.5: Bat Survey Information

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

A40 dropping analysis

Sample nu	Site	Date sample taken	Surveyor	Notes	Date sent for DNA analysis	Date returned
MM028a	A40 T7 21	?	Dave Blakemore	?	05/10/2016	
MM029a	A40 T7 26	?	Dave Blakemore	?	05/10/2016	
MM030a	A40 T3 Mrs Peet Barn	28/09/2016	Mush Ahmed	Mrs Peet Barn	05/10/2016	
MM031a	A40 T3 Mrs Peet Barn	29/09/2016	Mush Ahmed	Mrs Peet Barn	05/10/2016	
MM032a	A40 T15 41	?	Chelsea Edwards	Eric Howells sister	05/10/2016	

Species identified by DNA analysis
BLE
BLE
Unsuccessful
Soprano pip
Common pip

Transect, Landowner & Building	Surveyor	Surveyor Position	Date	Time	Species	Emergence/Re-entry point (If known)	Addition species/Notes
T13 - Mr Perkins - Cottage	RG	SE	14/09/2016	06:55	P.pyg	Circling and entered building between sofit & slate	
T13 - Mr Perkins - Cottage	BMorris	SW	22/09/2016	19:21	Unknown	from cowshed gable, west	no recordings, not the building being surveyed
T13 - Mr Perkins - Cottage	BMorris	SW	22/09/2016	19:40	Unknown	from cowshed gable, west	no recordings, not the building being surveyed
T13 - Mr Perkins - Cottage	NH	NW	22/09/2016	19:45	Unknown	seen not heard, emerged from side building attached to stables	
T13 - Mr Perkins - Cowshed	MG	NE	05/08/2016	05:32	P.pyg	re-entry under gable	
T13 - Mr Perkins - Cowshed	BM	SE	20/09/2016	19:56	P.pip	Emergence - Flew north	
T13 - Mr Perkins - Cowshed	BM	SE	20/09/2016	19:57	P.pip	Emergence - Flew south	
T13 - Mr Perkins - Cowshed	BM	SE	20/09/2016	20:01	P.pip	Emergence - Flew north	
T13 - Mr Perkins - Cowshed	BM	SE	20/09/2016	20:05	P.pip	Emergence - Flew north	
T13 - Mr Perkins - Cowshed	BM	SE	20/09/2016	20:11	P.pyg	Emerfence -Flew east	
T13 - Mr Perkins - House	NH	SE	20/09/2016	19:26	Unknown	seen not heard, ~2ft below drain pipe	
T13 - Mr Perkins - Cowshed	GS	W	27/09/2016	19:30	Pip sp.	appeared to fly out of window in fully roofed part of barn, flew north	
T13 - Mr Perkins - Cowshed	GS	W	27/09/2016	19:40	Unknown	climbed out from between roof tiles and flew toward courtyard	
T13 - Sir Eric Howells - Chapel	JG	SE	30/08/2016	20:34	P.pip	from northeast corner, flying east	
T15 - Sir Eric Howells - House	MA	SW	23/08/2016	06:07	P.pyg	circled east side of house several times, lands on south side just below apex before finally appears to go under tiles	
T15 - Sir Eric Howells - House	TD	N	23/08/2016	04:19	Myotis sp.	possible re-entry - flight to house roof	
T15 - Sir Eric Howells - House	TD	N	23/08/2016	04:28	Myotis sp.	possible re-entry - flight to house	
T15 - Sir Eric Howells - House	AD	S	13/09/2016	06:23	Unknown	seen not heard, flying towards left chinmney	
T15 - Sir Eric Howells - House	AD	S	13/09/2016	06:25	P.pyg	roosting behaviour, flying towards left chinmney	
T15 - Sir Eric Howells - House	AD	S	13/09/2016	06:28	P.pyg	roosting behaviour, flying towards left chinmney	
T15 - Sir Eric Howells - House	AD	S	13/09/2016	06:45	P.pyg	roosting behaviour to left hand chimney	
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:07	Unknown	re-entry seen not hear to house under soffit western gable end	possible BLE
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:22	P.pyg	6 bats circled western gable end before re-entry	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:23	P.pyg	2 bats from west re-entry	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:24	P.pyg	6:24-6:26 numerous bats seen emerging/re-entering	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:28	P.pyg	flew around front garden not calling then into roost	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:29	P.pyg	one bat re-entry	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:31	P.pyg	circled from west before re-entry	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	LB	NW	13/09/2016	06:53	P.pyg	flew from north before re-entry	roost appears to be lifted roof tile on western gable end to right of apex
T15 - Sir Eric Howells - House	CE	NW	21/09/2016	19:21	Pip sp.	from roof tile near apex on west facing gable end	
T15 - Sir Eric Howells - House	CE	NW	21/09/2016	19:26	Pip sp.	from roof tile near apex on west facing gable end, flew off to north	
T15 - Sir Eric Howells - House	CE	NW	21/09/2016	19:30	Pip sp.	possible from south roof tiles	
T8 - Mr David Hughes - House	CE	SW	10/08/2016	20:58	P.pyg	emergence from roost	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	20:59	P.pyg	emergence towards woodland to east	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	21:00	P.pyg	emergence towards woodland to east	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	21:02	P.pyg	emergence towards woodland to east (2 bats)	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	21:04	P.pyg	emergence towards woodland to east	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	21:11	P.pyg	emergence towards woodland to east	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	CE	SW	10/08/2016	21:20	P.pyg	seen not heard, emergence from roost	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	KL	SE	10/08/2016	20:49	P.pyg	possible emergence - right back of house	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	KL	SE	10/08/2016	20:52	P.pyg	possible emergence - right back of house	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	KL	SE	10/08/2016	20:54	P.pyg	possible emergence - right back of house	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	KL	SE	10/08/2016	20:55	P.pyg	possible emergence - right back of house	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	KL	SE	10/08/2016	20:55	P.pyg	possible emergence - right back of house	roost at apex on eastern gable end, gaps in stones
T8 - Mr David Hughes - House	FB	E	26/08/2016	07:09	P.pyg	re-entry to left side of gable end	no orientation given
T8 - Mr David Hughes - House	BM	NW	22/09/2016	19:28	Pip sp.	emergence, flew north	
T8 - Mr David Hughes - House	BM	NW	22/09/2016	19:36	P.pyg	emergence seen not heard	
T8 - Mr David Hughes - House	MA	E	22/09/2016	19:19	P.pyg	emergence from under tile, flew into woodland	
T8 - Mr David Hughes - House	MA	E	22/09/2016	19:28	P.pyg	flew from north side of house, rising in elevation as if emerged from that side of building	
T8 - Mr Smiley - Ffynnon Vestry	MA	E	23/09/2016	06:39	P.pyg	re-entry from north, 8m. Close against north wall of house, flew off south	
T8 - Mr Smiley - Ffynnon Vestry	MA	E	23/09/2016	06:41	P.pyg	circled then flew under tiles at lower end (east) on northern edge of roof	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:05	P.aur	possible re-entry - flying around for a couple of minutes, too dark to see clearly	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:10	P.aur	possible re-entry - flying around the building for 14 mins, too dark to see clearly - several BLE flying around building, likely early return due to rain. BLEs flying very close to building, particularly the soffit boards in the corner of the building where there's a hole with significant staining. Flying close to the hole then away again.	Spip, BLE, Noc
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:26	P.aur	possible re-entry - flying around building close to corner with hole in soffit board. Continuous. Multiple (at least 10 at times) swarming the building	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:40	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:42	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:43	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:45	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	

T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:48	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:48	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:49	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:50	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:51	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:53	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:54	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:55	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	05:58	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	06:01	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	06:08	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	06:13	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	CH	NW	31/08/2016	06:17	P.aur	re-entry to hole in soffit board in corner of building - 15-20 bats swarming. Many landing on hole then coming back out again. Some disapearing behind the gutter above the hole. Couldn't confirm whether they could get into roof from there	
T8 - Rev Hugh George - Ffynnon Chapel	KL	SE	31/08/2016	05:34	P.aur	possible re-entry - circled around, may have gone into centre of the facia	
T8 - Rev Hugh George - Ffynnon Chapel	KL	SE	31/08/2016	06:11	P.pyg	re-entry went up and down to left hand corner (2 bats)	
T8 - Rev Hugh George - Ffynnon Chapel	KL	SE	31/08/2016	06:13	P.pyg	possible re-entry - circled around edge of building, may have entered	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:02	P.aur	emergence from northwest corner of building (2 bats)	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:03	P.aur	emergence from northwest corner of building	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:06	P.aur	emergence from northwest corner of building	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:13	P.aur	no information - assumed fron northwest corner of building	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:16	P.aur	emergence from northwest corner of building then flew east	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:17	P.aur	emergence immediately started foraging	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:19	P.aur	flew east	
T8 - Rev Hugh George - Ffynnon Chapel	BF	NW	15/09/2016	20:21	P.aur	emergence then foraging along northern wall of building	
T8 - Rev Hugh George - Ffynnon Chapel	DW	SE	15/09/2016	20:06:00	P.pyg	emergence from roof	
T8 - Rev Hugh George - Ffynnon Chapel	DW	SE	15/09/2016	20:11:00	P.pyg	re-entry to roof	
T9 - Mr P Hughes - House	CH	NW	18/08/2016	20:37:00	P.pyg	Emeregence from under soffit box in corner	
T9 - Mr P Hughes - House	CH	NW	18/08/2016	20:38:00	P.pyg	Potential emergence	
T9 - Mr P Hughes - House	CH	NW	19/08/2016	20:42:00	P.pyg	Emeregence from under soffit box in corner	
T9 - Mr P Hughes - House	BW	SE	05/09/2016	20:17:00	P.pip	possible emergence from chimney on eastern side	
T9 - Mr W Hughes - House	KL	SW	17/08/2016	05:35:00	P.pip	possible re-entry - went uder the light on the side wall	
T9 - Mr W Hughes - House	CE	N	24/08/2016	20:44	P.pip	emergence from roof tiles above northern gable end over doorway	
T9 - Mr W Hughes - House	GS	NW	24/08/2016	20:50	Unknown	emergence seen not heard, bat flew west	
T9 - Mrs Caddy-Walker - House	KL	NE	07/09/2016	20:05	P.pip	emergence from hole in soffit at apex of roof, flew behind along hedge row	
T9 - Mrs Caddy-Walker - House	KL	NE	07/09/2016	20:26	P.pip	emergence from hole in soffit at apex of roof	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:24	P.aur	emergence seen not heard from gable end, one bat flew east, one bat flew west	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:25	P.aur	emergence seen not heard from gable end, flew south	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:26	P.aur	emergence seen not heard from gable end, flew south	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:27	P.aur	emergence seen not heard from gable end apex, flew south	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:30	P.aur	emergence seen not heard from under soffit of gable end, further to west than previous emergence	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:30	P.aur	emergence seen not heard from gable end apex, flew south	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:32	P.aur	emergence seen not heard from gable end, one bat flew south one bat flew west	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:33	P.aur	emergence, flew south from gable end apex	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:35	P.aur	re-entry seen not heard - flew into building under soffit of gable end apex	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:36	P.aur	emergence from gable end apex, then passed around north of house 3 times	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:36	P.aur	emergence from gable end apex, flew northeast	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:38	P.aur	emergence from gable end apex, flew northeast	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:41	P.aur	emergence, flew southeast	
T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:46	P.aur	emergence seen not heard from gable end apex, one flew west, one flew south	

T9 - Mrs Caddy-Walker - House	LB	N	07/09/2016	20:48	P.aur	emergence from gable end apex, flew south	
T9 - Mrs Caddy-Walker - House	BM	W	21/09/2016	19:47	P.pip	emergence, east, 8 meters	
T9 - Mrs Caddy-Walker - House	BM	W	21/09/2016	19:50	P.pip	emergence, west, 6 meters	
T9 - Mrs Caddy-Walker - House	BM	W	21/09/2016	19:51	Pip sp.	emergence, south, 8 meters	
T9 - Mrs Caddy-Walker - House	BM	W	21/09/2016	19:56	P.aur	emergence, south, 8 meters	
T9 - Mrs Caddy-Walker - House	BM	W	21/09/2016	20:02	P.pyg	emergence, west, 6 meters	
T9 - Mrs Caddy-Walker - House	NH	SE	21/09/2016	19:48	Unknown	emergence seen not heard from gable end, 2nd storey (2 bats)	
T9 - Mrs Caddy-Walker - House	NH	SE	21/09/2016	19:52	P.pip	emergence from gable end	
T9 - Mrs Caddy-Walker - House	RG	NE	28/09/2016	06:20	Unknown	emergence seen not heard, from top of apex on northern gable end	
T9 - Mrs Caddy-Walker - House	RG	NE	28/09/2016	06:33	P.aur	emergence , from top of apex on northern gable end (2 bats)	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:03	Pip sp.	hole under apex on gable end	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:03	Pip sp.	on west edge, flew off to Stewards Pond	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:10	Pip sp.	from ridge til	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:11	Pip sp.	hole under apex on gable end	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:12	Pip sp.	hole under apex on gable end	
T4 - Mrs Capes - Cottage (Building A)	CE	SW	02/08/2016	21:18	Pip sp.	hole under apex on gable end	
T6 - Mrs Rhian Thomas - Milking Shed (Building C)	MG	SW	04/08/2016	21:08	P.pyg	North to south from roof tile	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:08	Pip sp.	flew off to north	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:11	Pip sp.	flew off to north	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:28	Pip sp.	flew west to east along south elevation of house after emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:29	P.pyg	very close to building	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:30	P.pyg	flew off to northeast	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:31	P.pyg	flew off to northeast	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:32	P.pyg	over south elevation to west	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:33	P.pyg	flew off to northeast	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:34	P.pyg	flew over south elevation to west (2 bats)	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:34	P.pyg	flew northwest	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:35	P.pyg	flew northwest	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:36	P.pyg	flew northwest	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:36	P.pyg	emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:37	P.pyg	emergence (2 bats)	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:38	P.pyg	possible emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:38	P.pyg	emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:39	P.pyg	emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:40	P.pyg	flew off to west (3 bats)	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:41	P.pyg	flew off to southeast (2 bats)	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:41	P.pyg	emergence	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:42	P.pyg	emergence (2 bats)	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:43	P.pyg	flew off to southeast	
T6 - Mrs Rhian Thomas - House	CE	SW	08/08/2016	21:45	P.pyg	flew off to northeast	
T3 - Mr & Mrs Peet - House	BS	W	11/08/2016	20:59	P.pyg	emergence	
T3 - Mr & Mrs Peet - House	BS	W	11/08/2016	21:01	Unknown	emergence from door or window	
T3 - Mr & Mrs Peet - House	BS	W	11/08/2016	21:03	P.pip	emergence from doorway	
T3 - Mr & Mrs Peet - House	CE	S	11/08/2016	21:03	Pip sp.	from end of extension where fascia meets the main house	
T3 - Mr & Mrs Peet - House	CE	S	11/08/2016	21:08	Pip sp.	flew off to southeast	
T3 - Mr & Mrs Peet - Barn	MA	SE	11/08/2016	20:30	Unknown	bat emerged and returned before survey	
T3 - Mr & Mrs Peet - Barn	MA	SE	11/08/2016	20:52	Unknown	re-emerged then flew off & entered trees by wall	
T3 - Mr & Mrs Peet - Barn	MA	SE	11/08/2016	21:05	Unknown	re-entry	
T3 - Mr & Mrs Peet - Barn	MA	SE	12/08/2016	05:39	Myotis sp.	re-entry under tiles on west side of barn	
T3 - Mr & Mrs Peet - Barn	MA	SE	12/08/2016	05:45	P.pip	re-entry under tile towards west end of roof	2 more animals in vicinity
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	05:41	Pip sp.	re-entry	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	05:42	Pip sp.	probable re-entry at under ridge tiles on west side	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	05:51	Pip sp.	re-entry under apex ridge tile	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	05:52	Pip sp.	probable re-entry at west side of northern gable end	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	05:52	Pip sp.	re-entry	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	06:02	Pip sp.	re-entry	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	06:03	Pip sp.	re-entry	
T3 - Mr & Mrs Peet - House	CE	NE	12/08/2016	06:04	Pip sp.	re-entry	
T4 - Mr & Mrs Hart - White Cottage	JS	NE	25/08/2016	05:02	P.pip	came out of building door	
T4 - Mr & Mrs Hart - White Cottage	JS	NE	25/08/2016	05:05	P.pyg	re-entry to building window 3	
T4 - Mr & Mrs Hart - White Cottage	JS	NE	25/08/2016	05:36	Unknown	possible bat flew into doorway	
T4 - Mr & Mrs Hart - White Cottage	JS	NE	25/08/2016	05:18	Unknown	re-entry between 5:18 & 5:26	
T4 - Mrs Capes - Cottage (Building A)	RT	NW	31/08/2016	20:21	P.pyg	from southwest corner of house (4 bats)	
T4 - Mrs Capes - Cottage (Building A)	RT	NW	31/08/2016	20:25	P.pyg	seen emerging from separate building	
T4 - Mrs Capes - Cottage (Building A)	RT	NW	31/08/2016	20:34	P.pyg	from southwest corner of house	
T4 - Mrs Capes - Cottage (Building A)	RT	NW	31/08/2016	20:38	P.pyg	from southern end of house	
T4 - Mrs Capes - Cottage (Building A)	RT	NW	31/08/2016	20:40	P.pyg	from southern end of house	
T5 - Mr Marden - House	CH	SE	31/08/2016	20:30	Unknown	potential emergence from other side of building	
T5 - Mr Marden - House	KL	NW	31/08/2016	20:24	P.pyg	from join between building and extension, out to trees behind	
T4 - Mrs Capes - Barn (Building D)	GS	S	20/09/2016	05:45	Unknown	bat appeared to fly out of building, west	
T4 - Mrs Capes - Barn (Building D)	GS	S	20/09/2016	06:34	Unknown	possible bat flew from west, appeared to fly into building	
T4 - Mrs Capes - Workshop (Building B)	AC	W	27/09/2016	06:20	Unknown	from house to field	Not clear if this is emergence
T4 - Mrs Capes - House (Building C)	CE	S	27/09/2016	06:53	Pip sp.	re-entry under roof tile behind drain ow west edge of s elevation	
T4 - Mrs Capes - House (Building C)	CE	S	27/09/2016	06:57	P.pyg	re-entry under roof tile behind drain ow west edge of s elevation	
T8 - Rev Hugh George - Ffynnon Chapel	CE	NW	25/08/2016	05:42	P.aur	re-entry into soffit board on the NW corner of the building	

T8 - Rev Hugh George - Ffynnon Chapel	CE	NW	25/08/2016	05:47	P.aur	re-entry into soffit board on the NW corner of the building, 30 re-entries until 05:53	
T8 - Rev Hugh George - Ffynnon Chapel	CE	NW	25/08/2016	06:00	Pip sp.	re-entry into soffit board on the NW corner of the building	
T8 - Rev Hugh George - Ffynnon Chapel	CE	NW	25/08/2016	06:01	Pip.sp	re-entry into soffit board on the NW corner of the building	
T8 - Rev Hugh George - Ffynnon Chapel	CE	NW	25/08/2016	06:04	Myotis sp.	Re-entry into soffit on southern section of western elevation	

Tree ID	Tree Tag	Tree Species	X	Y	Photo number	Safe to Climb	Feature No.	Feature Location	External Details	Internal Deatails	Evidence	Feature Potential	Tree Potential	Further survey?	Recommendations
T2		Hybrid black	212056	216603	P2	Yes	a	W 4m	Callus role on bottom limb	Too shallow	No	Negligible	Negligible	No	N/a
T3		Ash	212638	216620	P3	Yes	a	S 5m	callus role near base	40cm deep, horizontal	No	Moderate	Moderate	yes	dusk/dawn
T4		Ash	212416	216613	P4	Yes	a	W 9m	hazard beam	Not possible to inspect with endscope	No	Moderate	Moderate	yes	dusk/dawn
T5		P oak	212665	216584	P5	Yes	a	S 7m	split cut limb near main stem, fairly open	n/a	No	Low	Low	No	N/a
T6		Willow	211883	216761	P6	Yes	a	W 1.5m	trunk cavity in lighting strike.	extends up 25cm	No	Moderate	Moderate	yes	dusk/dawn
T7	769	Ash	212039	216711	P7	Yes	a	E 9m	vertical callus role on main stem	Not possible to inspect with endscope, likely to extend 20cm	No	Moderate	Moderate	yes	dusk/dawn
T8		Ash	212188	216865	P8	Yes	a	S 1.5m	limb cavity near base,	extends 45cm along limb, crumbly imside	No	Moderate	Moderate	yes	dusk/dawn
T9	770	Sycamore	212183	216867	P9	Yes	a	N 1.5m	Callus role, extends along fence line	N/A	No	Moderate	Moderate	Yes	dusk/dawn
T10	771	Oak	212304	216952	P10	Yes	a	W 5m	Hazard beam	shallow approx 7m deep	No	Low	Low	No	N/A
T10	771	Oak	212304	216952		Yes	b	W 4m	Callus role	Very shallow very narrow	No	Negligible	Low	No	N/A
T10	771	Oak	212304	216952		Yes	c	S 4m	Callus role	Extends in 15cm, crumbly wood inside	No	Low	Low	No	N/A
T11		Ash	212542	216778	P11	Yes	a	S 9m	Hazard beam	Very shallow, no cavity	No	Negligible	Negligible	No	N/A
T12		Ash	212555	216666	P12	Yes	a	N 7m	callus role, extending vertically	extends down but damp and rotten wood, with standing deadwood inside but not offering any shelter	No	Negligible	Negligible	No	N/A
T13	772	Ash	212528	216903	P13	Yes	a	E 9m	Trunk cavity, main stem, old pruned limb that has had growth	Numerous droppings at the base, big bat, extends upwards approximately 30th, smooth inside	Yes	Confirmed BLE	Confirmed	Yes	3/4? surveys
T14	774	Ash	212536	216795	P14	Yes	a	S 1.75m	Trunk cavity, large callus role, with rotten hole inside	Extends up 60cm, fairly clean and smooth.	No	High	High	Yes	3 surveys
T15	773	Ash	212537	216797	P15	Yes	a	N 0.5m	number of entrances near the base,	fairly large and open inside, though cluttered around as reduces roost opportunity	No	Moderate	Moderate	Yes	2 surveys (can be done same time with T13)
T16	775	Oak	212776	216869	P16	Yes	a	E 4m	Callus role, near main stem	Extends along limb approx. 10m, tight cavity	No	Low	Low	No	N/A
T17		Oak	212768	216916	P17	Yes	a	E 4.5m	Callus role of main stem	Too shallow, 7m deep, exposed	No	Negligible	Negligible	No	N/A
T18		Beech	213326	216817	P18	Yes	a	W 24m	Callus role base of Victoria split in limb	Too shallow, open and wet	No	Negligible	Negligible	No	N/A
T19	792	Ash	213321	216742	P19	No	a	W 5m	Callus roll at bend in stem. Used binoculars and torch - could go back along stem.		N/A	Moderate	Moderate	Yes	2 surveys
T20	808	Beech	213332	216695	P20	N/A	a	W 2m	Goes up. Can't see end. Endoscope required	N/A	N/A	Moderate	Moderate	Yes	N/A
T21	793	Beech	213305	216700	P21	N/A	a	W 1.5m	4m from road. Droppings and urine present. Extends up. Endoscope required	Extends up 30cm. 2 BLE present	Yes	Confirmed BLE	Confirmed	Yes	TBC
T22	794	Oak	213292	216714	P22	Yes	a	N 15m	WPH.	Nesting material at base. Extends upwards at least 30cm and 15cm back.	No	High	High	Yes	3 surveys
T23	799	Oak	Unknown	Unknown	P23	Yes	a	W 10m	WPH. Located in dead limb. Can be seen from the road.	Cobwebs present. Extends back 10cm, quite tight space.	No.	Moderate	Moderate	Yes	2 surveys
T24	797	Beech	Unknown	Unknown	p24	No	A	E 2-4M	Callus roll up main stem. Tagged on fence	Unsafe to climb. Observed from field. Extends up, but do not know how far.	no	Moderate	Moderate	yes	2 surveys.
T25	796	Beech	Unknown	Unknown	p25	No	a	E	callus roll length of tree.	unsafe to climb. Observed from field. Callus roll may offer shelter.	no	Moderate	Moderate	yes	2 surveys.
T26	795	Ash	Unknown	Unknown	P26	Yes	A	E 6M	WPH X 3	1=neg. two others connected which were endoscoped. Extends up at least 40cm. Clean and dry. Dropping sample take	yes	Confirmed BLE	Confirmed.	yes	3 surveys.
T27	798	Ash	Unknown	Unknown	P27	N/A	a	N 1m	Callus roll just below tag	Torched from ground. Extends in 20cm. Dirty	No	Low	Low	yes	1 survey
T28	789	Alder	213625	216760	P28	No	a	NE 5m	Open at the top, caused by break	Unsafe to climb	No	Moderate	Moderate	Yes	2 survey
T29	790	Horse chestnut	213730	216758	P29	Yes	a	W 6m	Dead limb with crack	Extends 5cm towards tree with nest inside. Extends 40cm away from the tree, dry and clean	No	Moderate	Moderate	Yes	2 surveys
T30	1	Ash	213755	217001	P30	No	A	S 8M	Trunk cavity with loose bark at edge.	unsafe to climb. Next to stile.	no	High	High	yes	3 surveys
T31	5	Ash	216222	216905	P31	Yes	a	NW 15m	Callus roll at base of fork	Unsafe to climb	no	High	High	yes	3 surveys
T32	13	Ash	216203	216881	P32	N/A	a	S 1m	Trunk cavity. Endoscope required	Extends up 40cm. Relatively dry, fairly clean	No	Moderate	Moderate	yes	2 surveys
T33	4	Ash	216205	216878	P33	N/A	a	SW 1m	Trunk cavity. Endoscope required	Extends up 50cm. Butterfly inside. Slightly wet in areas, however some areas also dry.	no	Moderate	Moderate	yes	2 surveys
T34	11	Sycamore	216166	216877	P34	N/A	a	S 1m	Trunk cavity near base, leading up and out to the left, but up inside the tree to the right. Need to endoscope.	Extends up 60cm. Mostly dry and clean	No	High	High	yes	3 surveys
T35	3	Ash	216175	216859	P35	N/A	a	S 2m	Trunk cavity. Endoscope required	extends 15cm. Dry. But cluttered with holly tree near entrance.	no	low	low	yes	1 survey
T36	15	Ash	Unknown	Unknown	P36	N/A	a	SW 1m	Trunk cavity. Endoscope required	Extends up 20cm. Dry, not very clean	No	Moderate	Moderate	yes	2 surveys
T37	16	Ash	216164	216873	P37	Yes	a	E	Cavity on stem at fork.	doesn't go up. Extends down 10cm. Wet with mud at bottom. No shelter.	no	Negligible	Negligible	no	N/A
T38	2	Oak	216069	216879	P38	Yes	a	s	callus roll on hazard beam. 6m.	needs to be climbed	N/A	Moderate	Moderate	yes	N/A
T39	9	Ash	216068	216884	P39	N/A	a	s	trunk cavity at 0-1.5m	endoscoped. Goes up at least 1m. Slightly dirty, but dry and provides shelter.	no	High	High	yes	3 surveys.

Bat roost potential classification

- Negligible
- Low
- Moderate
- High
- Confirmed



Bat Survey

A40 Llandewi Velfrey to Penblewin Highway Improvements

For

Ove Arup & Partners Ltd

Project No.: AARU120/002

October 2017

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Project Number	Report No.
AARU120/002	001

Revision No.	Date of Issue	Author	Reviewer	Approver
001	20/10/17	Jonathan Reeves	Verity Dickie	Liz Bedford

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1. Summary and Main Recommendations

1.1 Summary

1.1.1 The Welsh Government is proposing improvements to the existing A40 road in Pembrokeshire, including a new bypass around Llandewi Velfrey. The location of the scheme is shown on Figure 1.

1.1.2 Bat surveys carried out for the scheme in 2016 identified confirmed roosts or possible roosts in twelve structures within the zone of influence of the development.

1.1.3 Thomson Ecology were commissioned by Ove Arup & Partners Ltd to carry out emergence and re-entry surveys of 38 buildings and nine trees within the zone of influence of the development, following good practice guidelines (Collins ed., 2016). Surveys were carried out in July and August 2017.

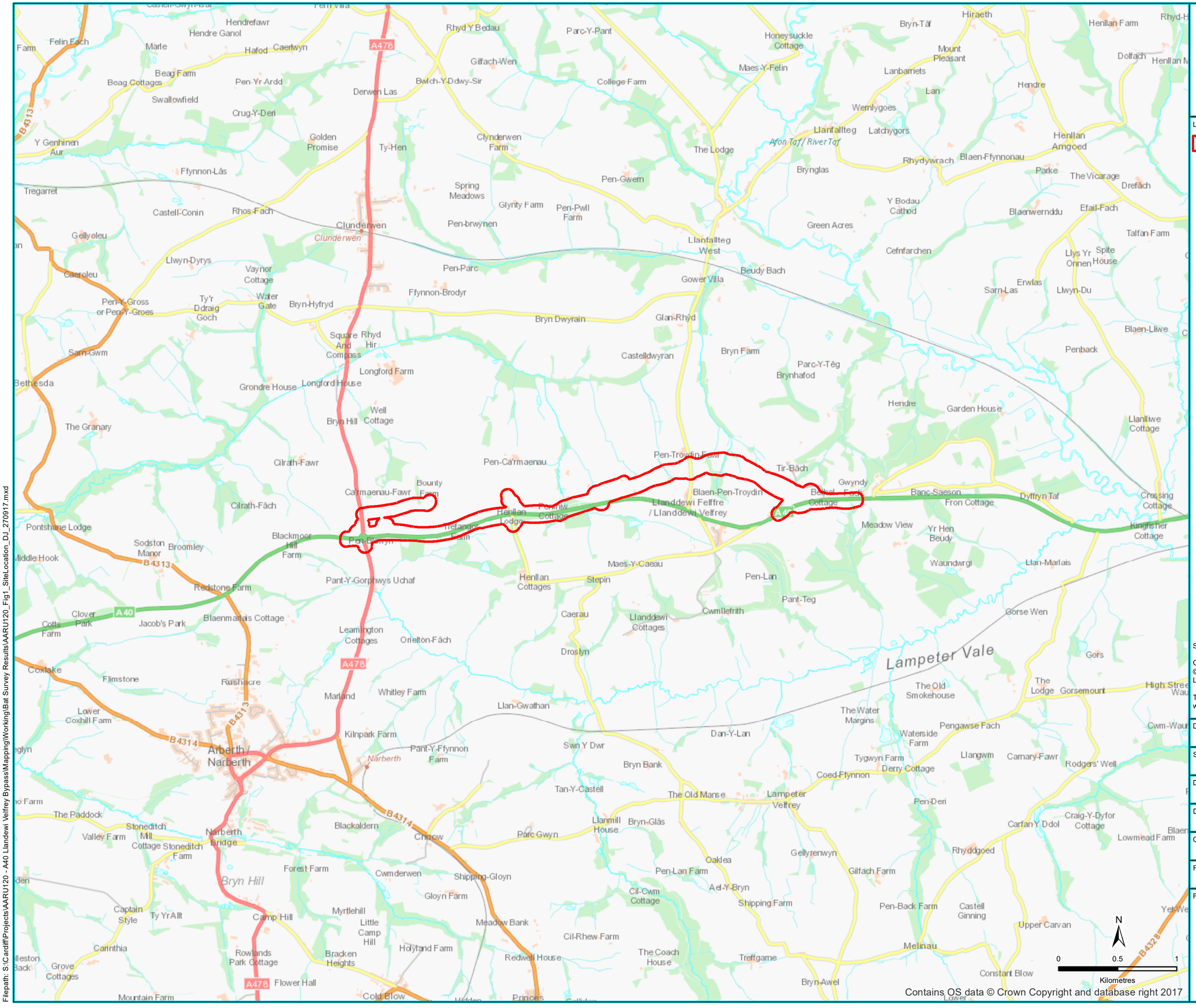
1.1.4 Ten buildings were confirmed as bat roosts and three buildings were possible, though unconfirmed bat roosts. Common pipistrelle, soprano pipistrelle and a species of myotis bat were recorded occupying bat roosts. No roosts were recorded in any of the nine trees surveyed. A number of buildings could not be comprehensively surveyed due to access restrictions primarily caused by dense vegetation, and thus could not be confirmed as not supporting bat roosts. Survey results are shown on Figures 2a-m and Figures 3a-c and photographs of roosting features are shown on Figures 4a-e.

1.1.5 All British bats are fully protected by European and UK legislation. Without mitigation and licensing, the proposed development would contravene legislation with respect to bats, if any of the buildings supporting bat roosts were affected by the development.

1.2 Main Recommendations

1.2.1 The main recommendations are set out below:

- A European Protected Species Licence would be required from Natural Resources Wales should the ten buildings confirmed as bat roosts identified during these surveys, and three from the 2016 surveys be affected by the development.
- Further survey visits would be required to the three unconfirmed roosts, and to the structures where survey effort was limited, to confirm the presence or likely absence of bat roosts from these buildings.



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Legend

50m Zone of Influence

Site Grid Reference: 214,043 216,945

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Legend

Surveyor Location

Bat Access / Egress Points

Roost feature unknown

Bat Survey Results

Possible Roost

Roost Likely Absent

Limited / No Access

50m zone of Influence

Site Grid Reference: 212,085 216,609

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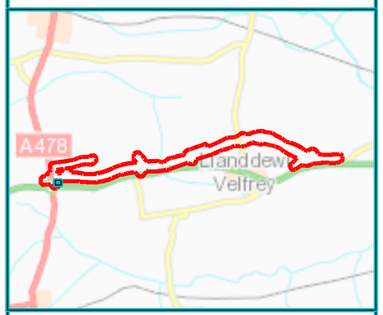

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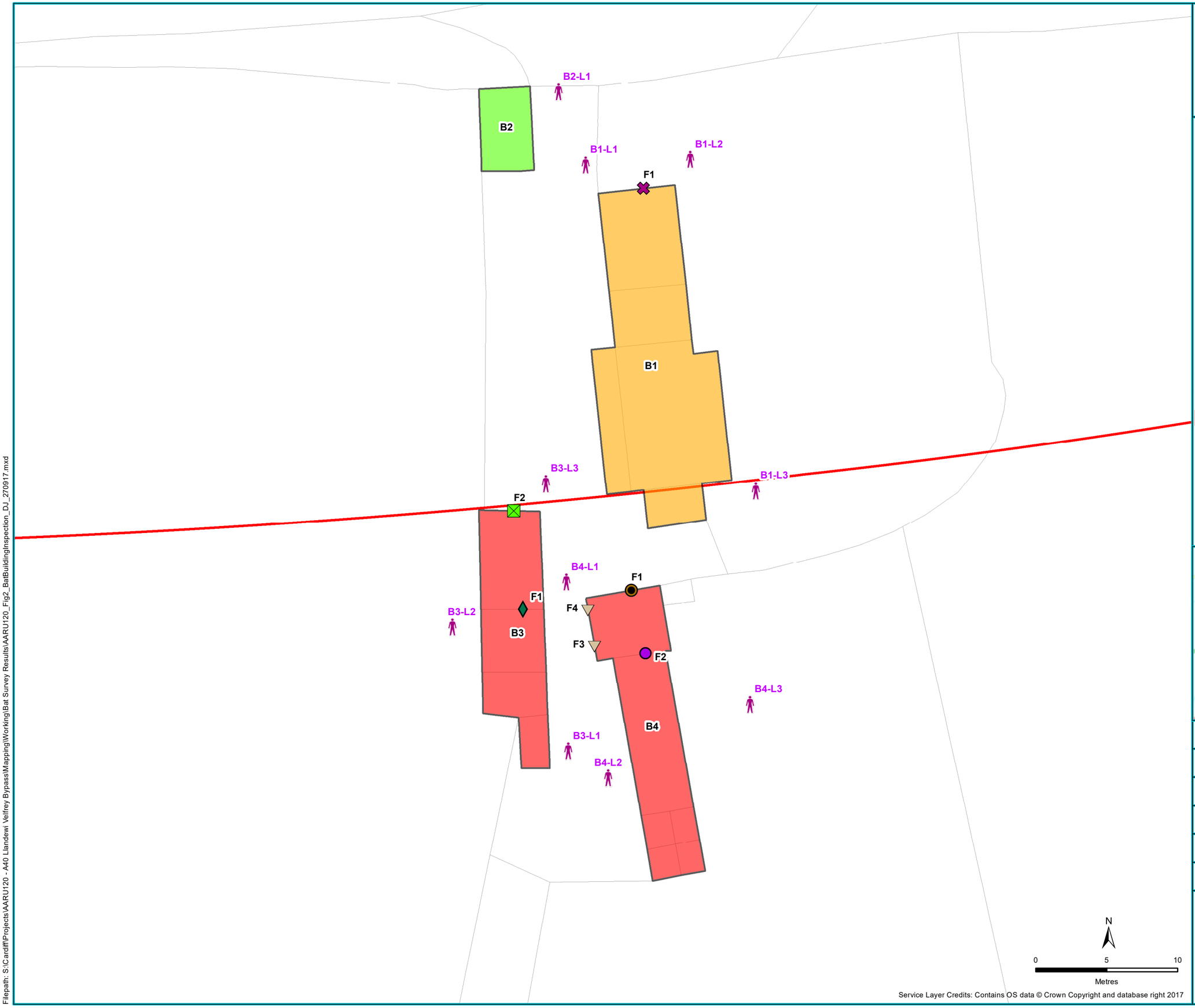
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

- Apex of building above garage door
- Gap under apex of roof tiles
- Holes in stonework mortar
- Gap in apex of two joining roof edges
- Gap between roof tile and fascia boarding
- Gap(s) between soffit/fascia and wall

Bat Survey Results

- Confirmed Roost
- Possible Roost
- Roost Likely Absent
- 50m zone of Influence

Site Grid Reference: 212,650 216,618

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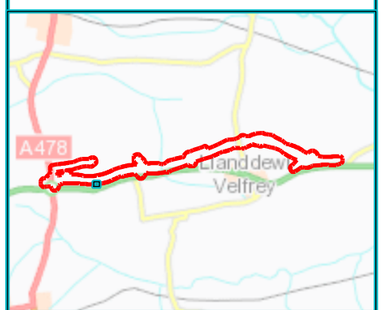

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DJ	NS
Date 27/09/2017	Date 27/09/2017

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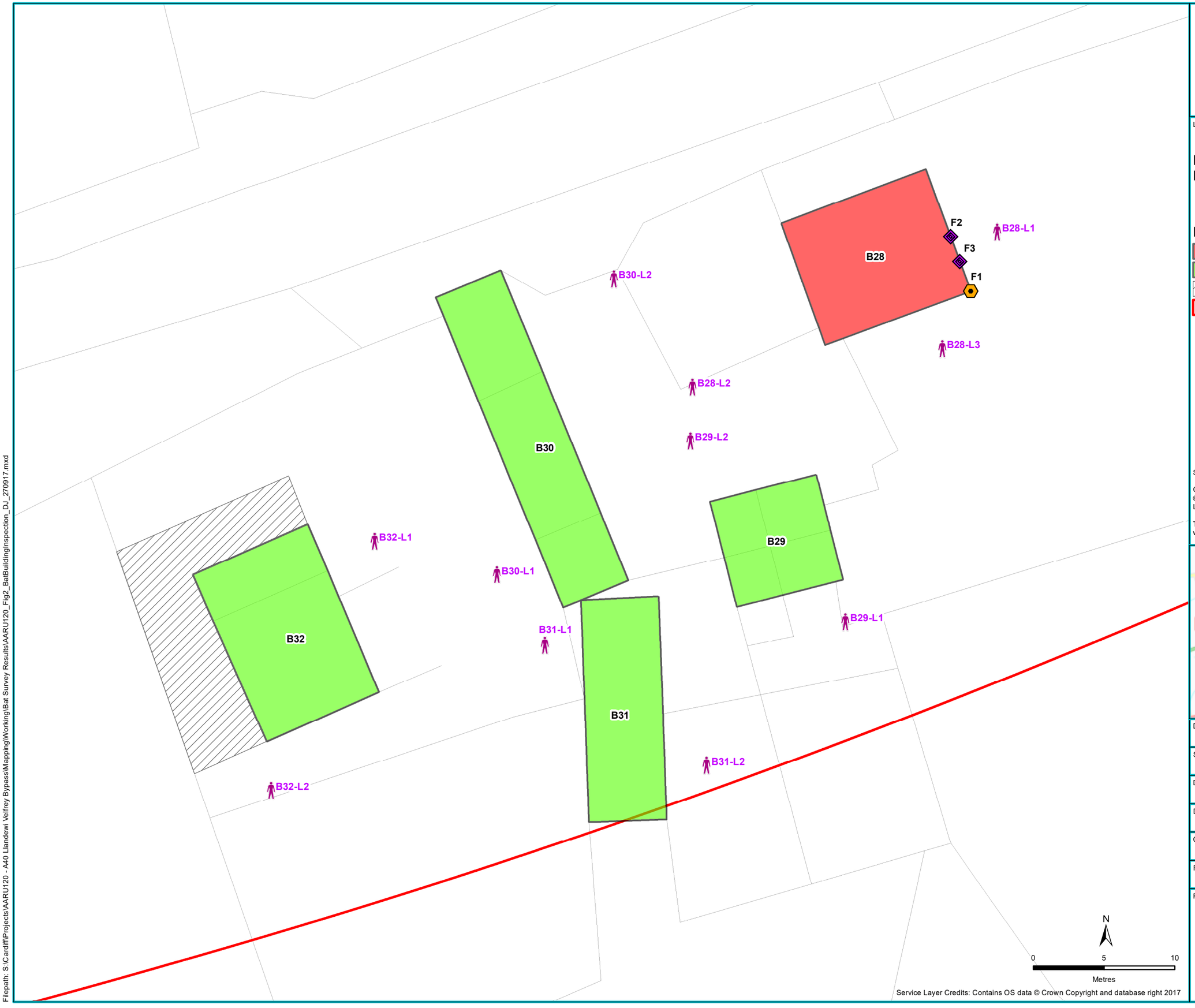
Figure Number
2b

Figure Title

Bat Survey Results - Buildings



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Legend

- Surveyor Location

Bat Access / Egress Points

- Hole under roof gable
- Gap under eaves

Bat Survey Results

- Confirmed Roost
- Roost Likely Absent
- Limited / No Access
- 50m zone of Influence

Site Grid Reference: 212,826 216,679

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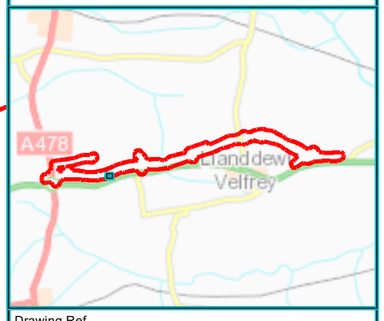

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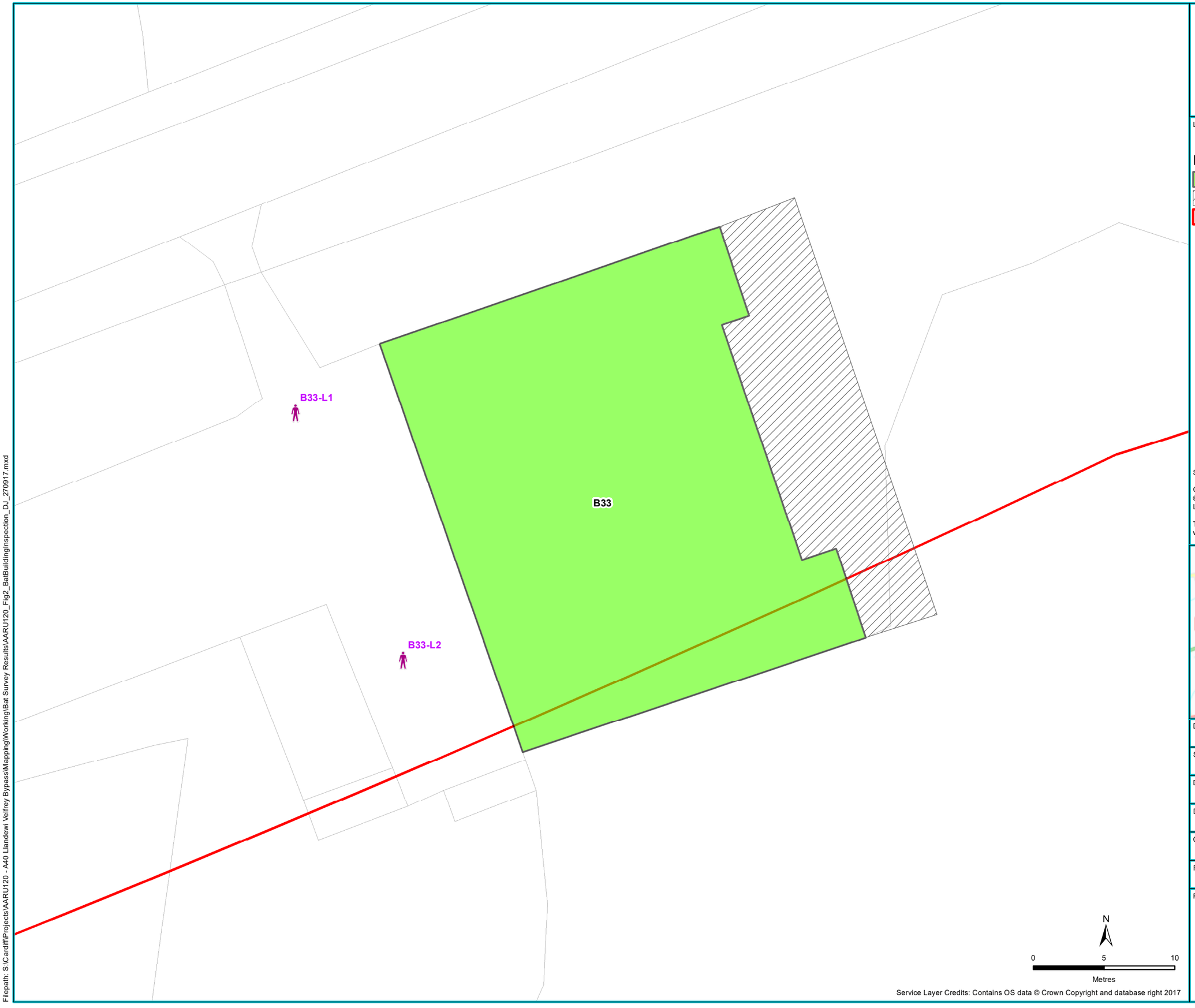
Figure Title	Bat Survey Results - Buildings



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Surveyor Location

Bat Survey Results

- Roost Likely Absent
- Limited / No Access
- 50m zone of Influence

Site Grid Reference: 212,940 216,715

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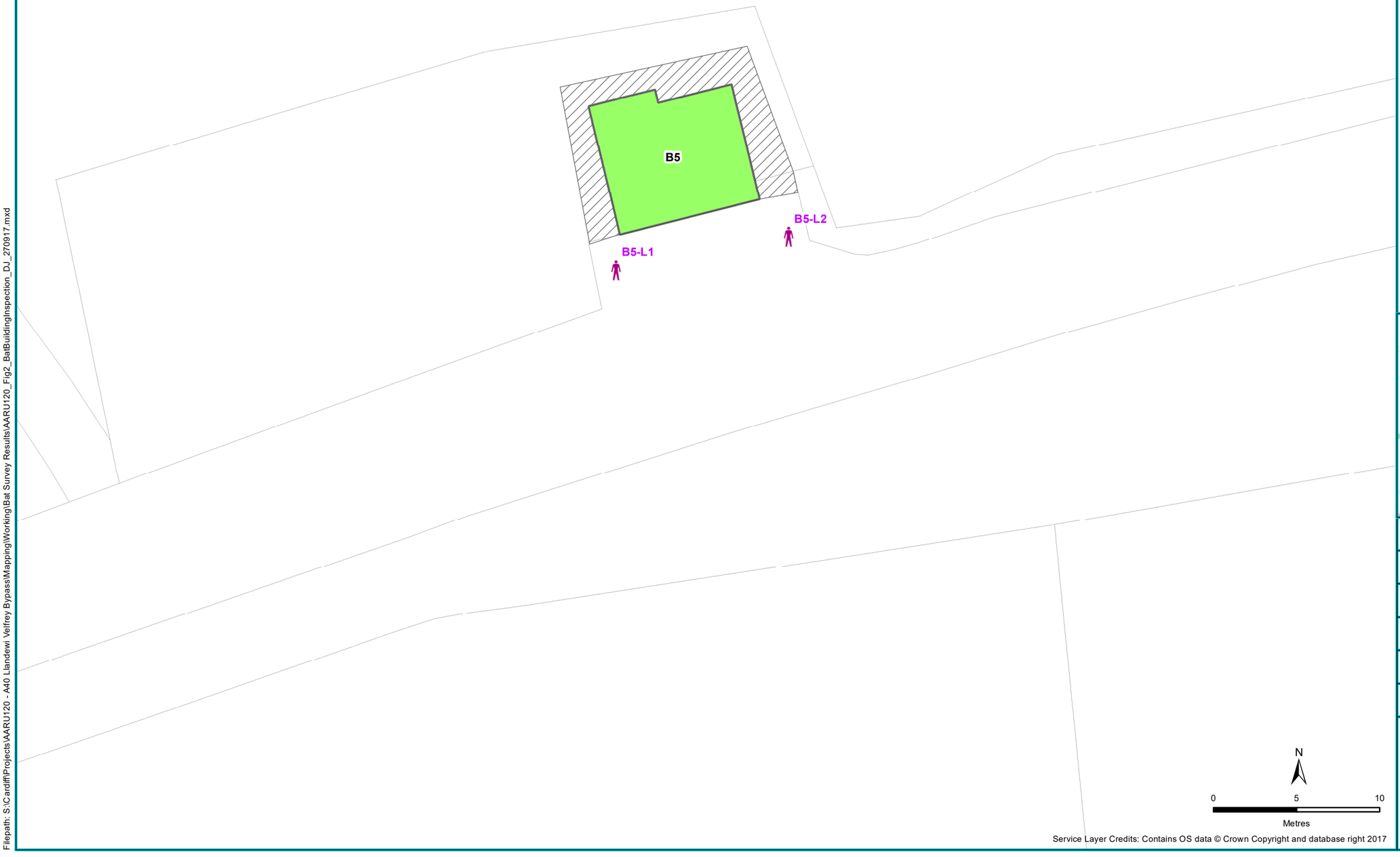
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

Limited / No Access

50m zone of Influence

Site Grid Reference: 213,111 216,818

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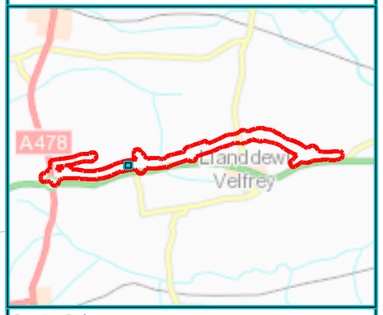

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Date	Date
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Client
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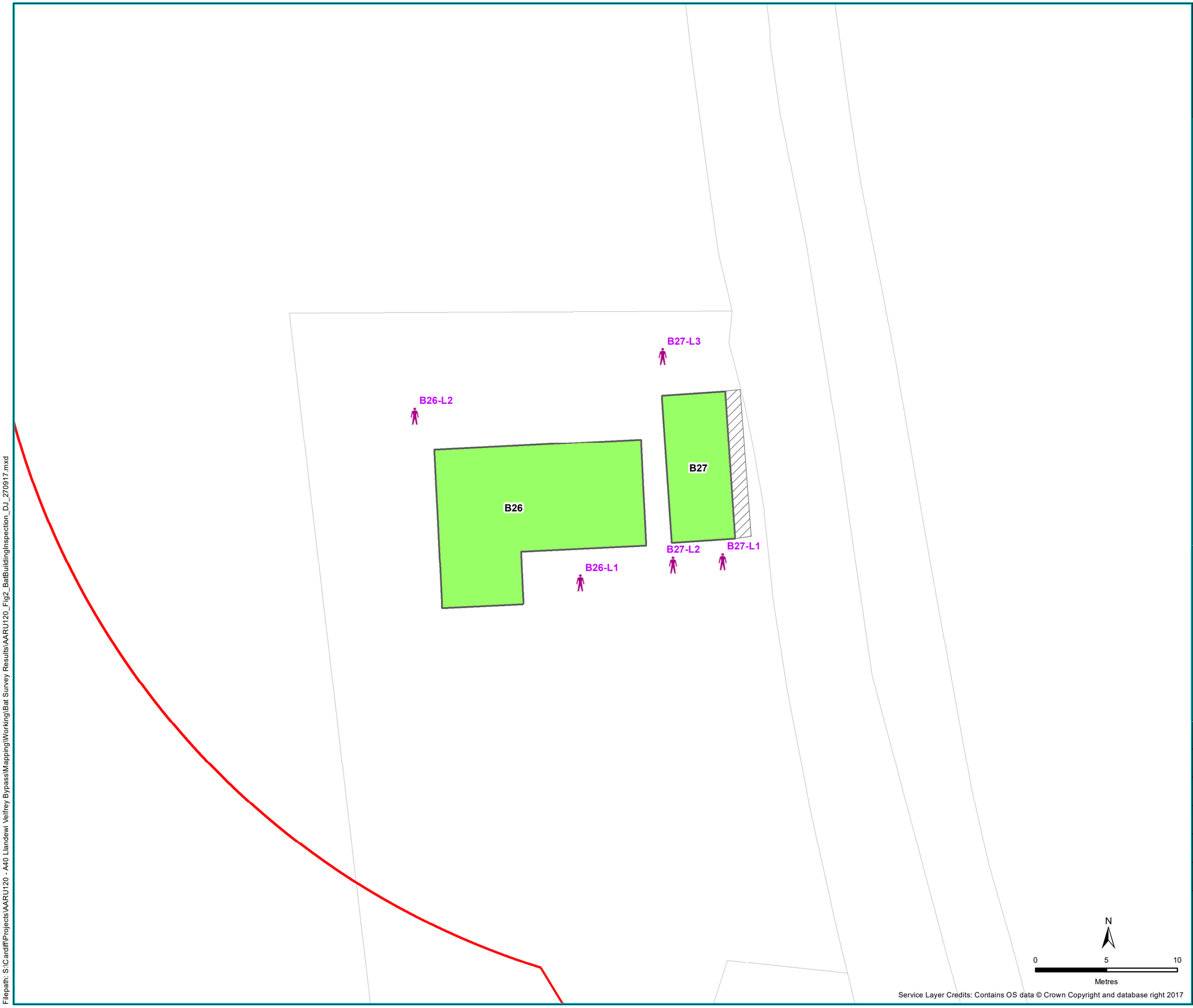
Figure Number
2e

Figure Title

Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

Limited / No Access

50m zone of Influence

Site Grid Reference: 213,240 216,942

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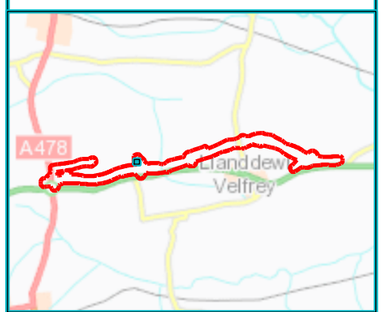

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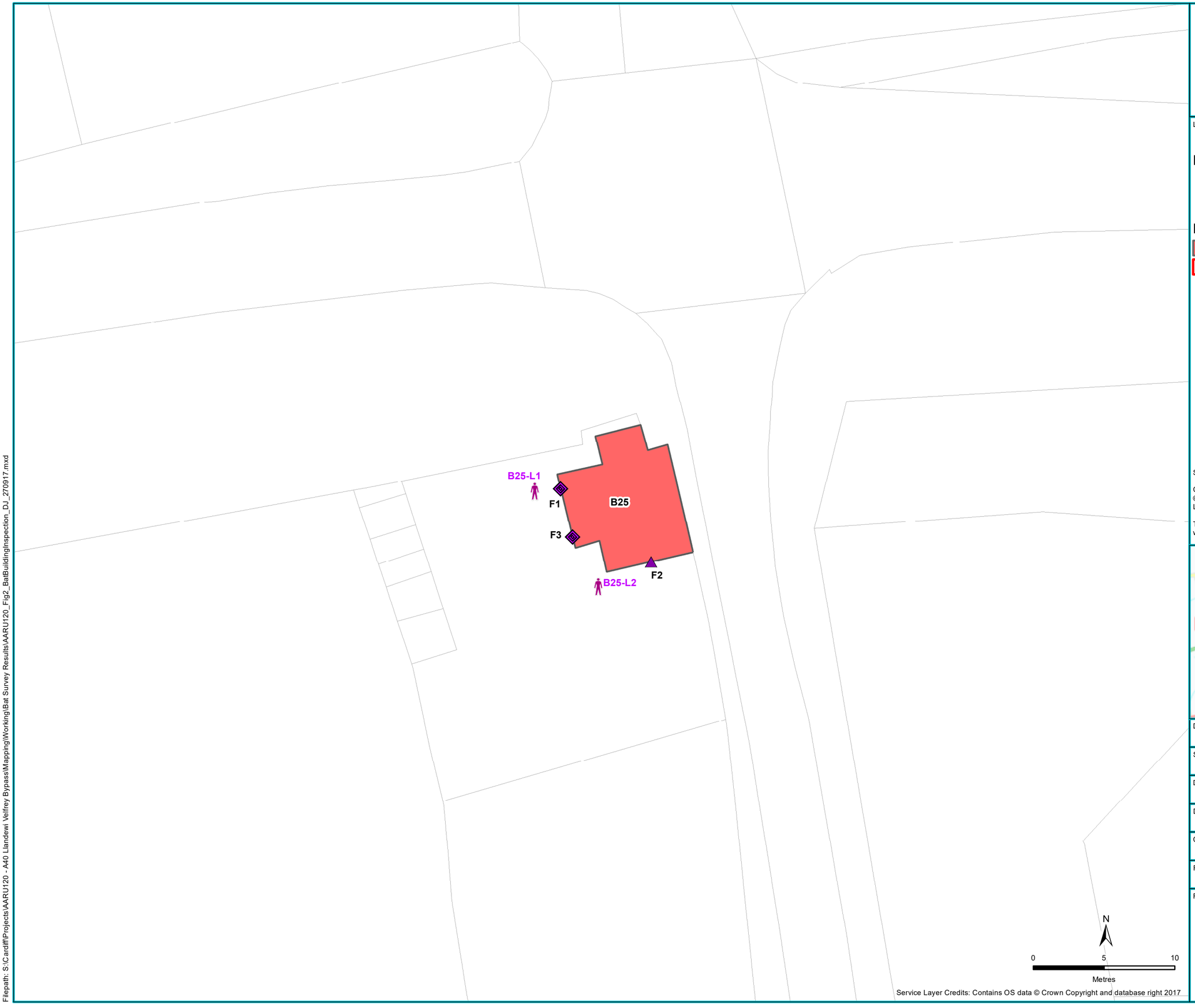
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

Gap under eaves

Broken piece of wood under soffit box

Bat Survey Results

Confirmed Roost

50m zone of Influence

Site Grid Reference: 213,273 216,824

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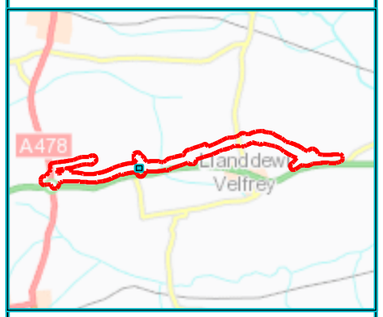

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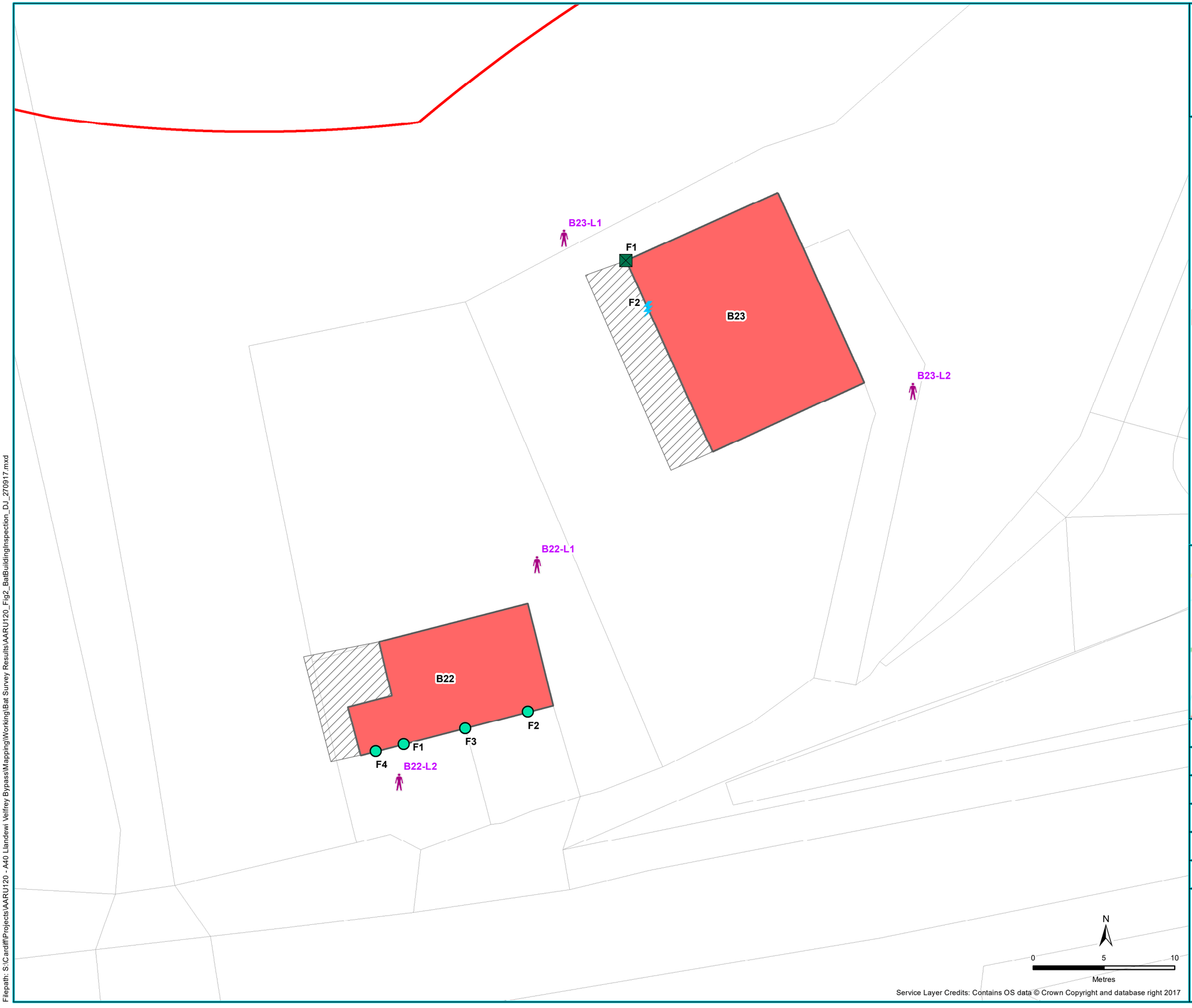
Client	Ove Arup & Partners Ltd
Figure Number	2g
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

- Gap(s) between stone wall and guttering
- Space between fascia board and stonework
- Crack in window frame

Bat Survey Results

- Confirmed Roost
- Limited / No Access
- 50m zone of Influence

Site Grid Reference: 213,638 216,885

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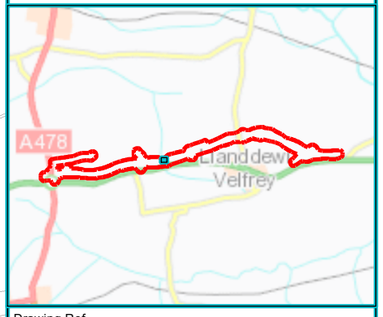

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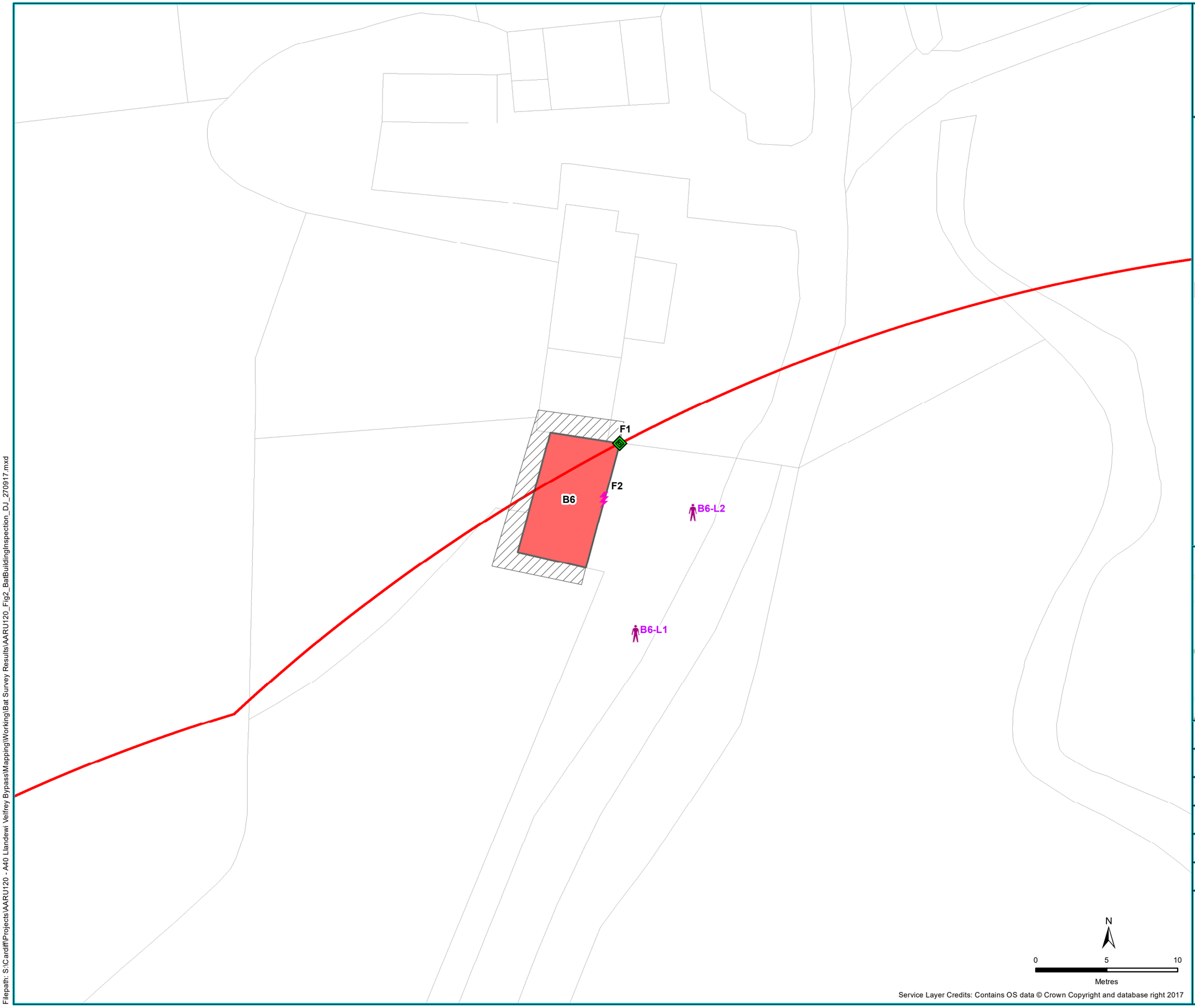
Client	Ove Arup & Partners Ltd
Figure Number	2h
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

Hole under eaves

Crack/Split(s) in wall

Bat Survey Results

Confirmed Roost

Limited / No Access

50m zone of Influence

Site Grid Reference: 213,695 216,950

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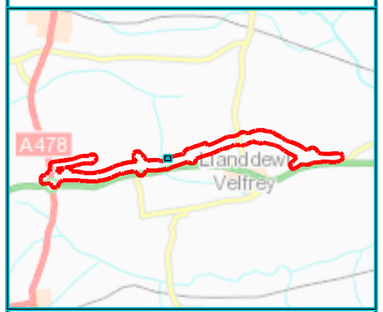

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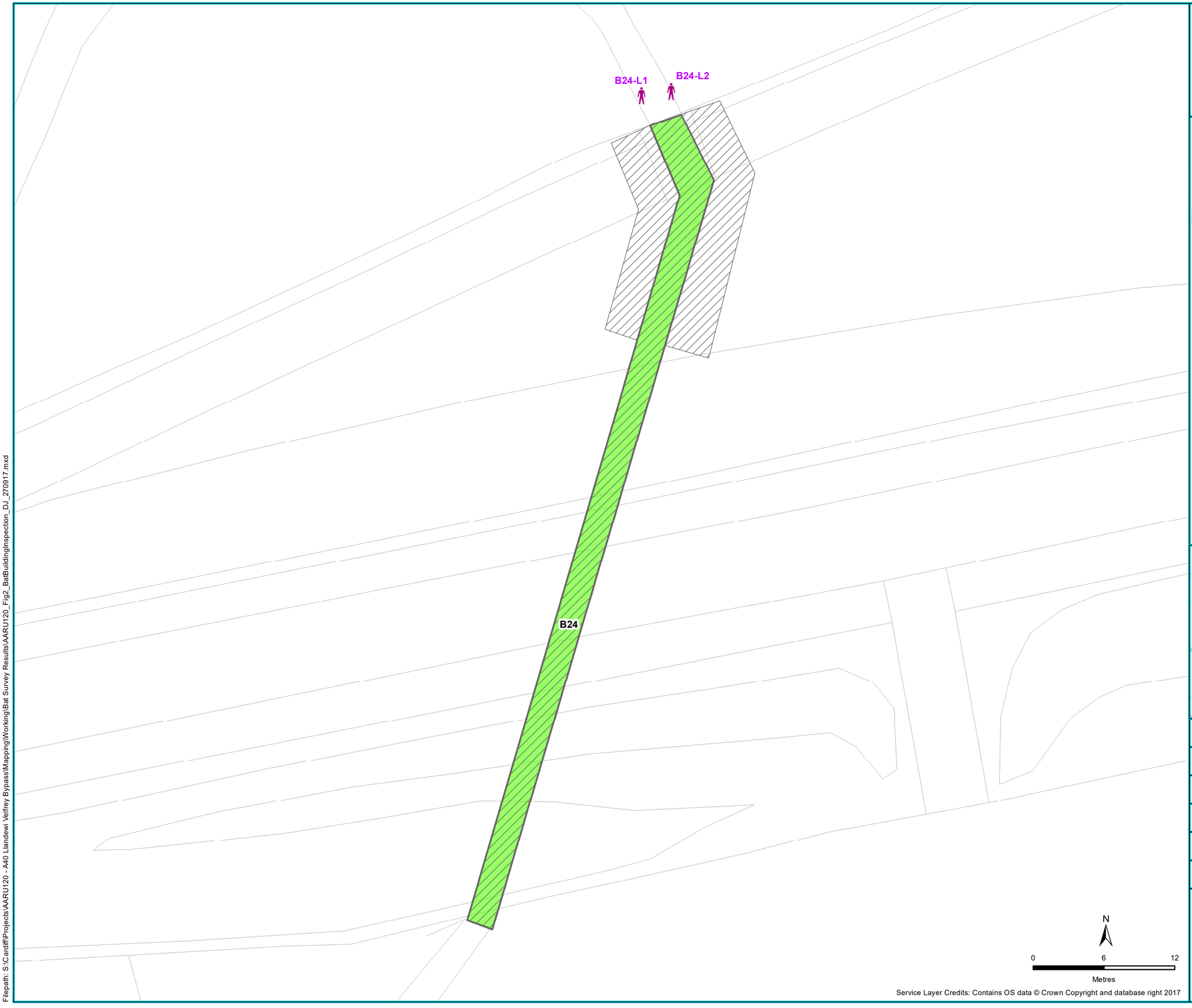
Figure Number	2i
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

Limited / No Access

50m zone of Influence

Site Grid Reference: 213,739 216,881

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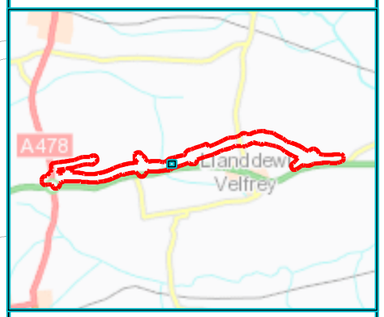

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Scale at A3
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Drawn	Checked
DJ	NS
Date	Date
27/09/2017	27/09/2017

Client
Ove Arup & Partners Ltd

Figure Number
2j

Figure Title

Bat Survey Results - Buildings

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Metres

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Legend

Surveyor Location

Bat Access / Egress Points

- Gap at apex of roof
- Gap under fascia board
- Crack/Split(s) in chimney

Bat Survey Results

- Confirmed Roost
- Roost Likely Absent
- Limited / No Access
- 50m zone of Influence

Site Grid Reference: 214,273 217,154

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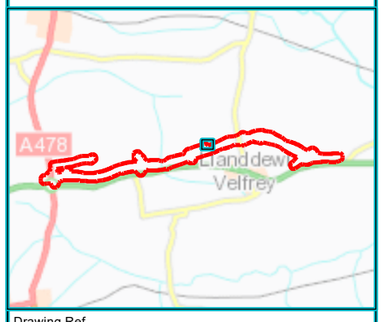

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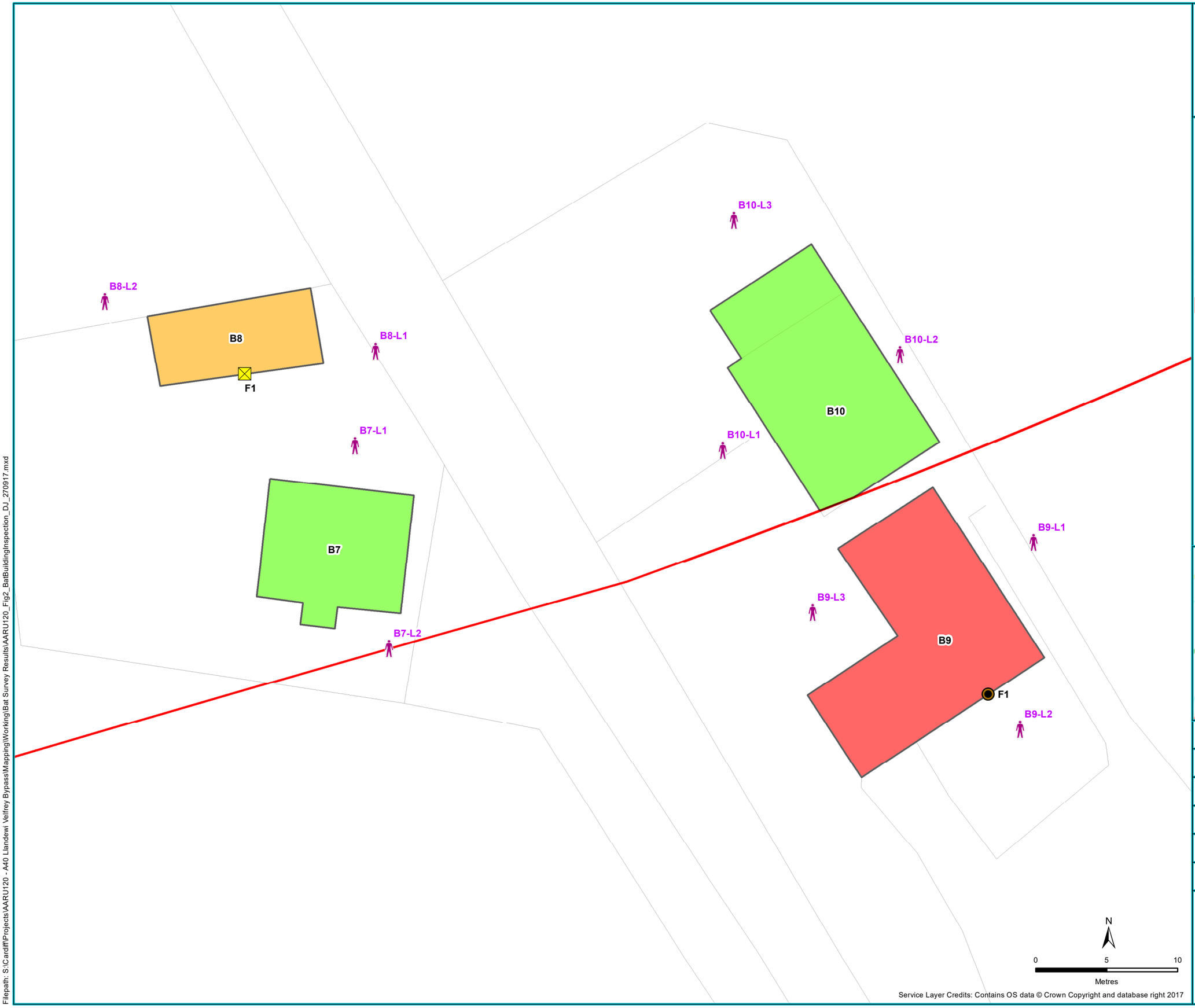
Client	Ove Arup & Partners Ltd
Figure Number	2k
Figure Title	Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

Gap between wall and metal roof

Gap under apex of roof tiles

Bat Survey Results

Confirmed Roost

Possible Roost

Roost Likely Absent

50m zone of Influence

Site Grid Reference: 214,350 217,032

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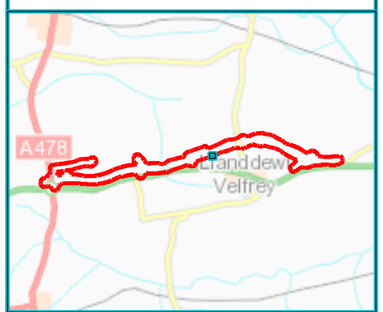

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Scale at A3
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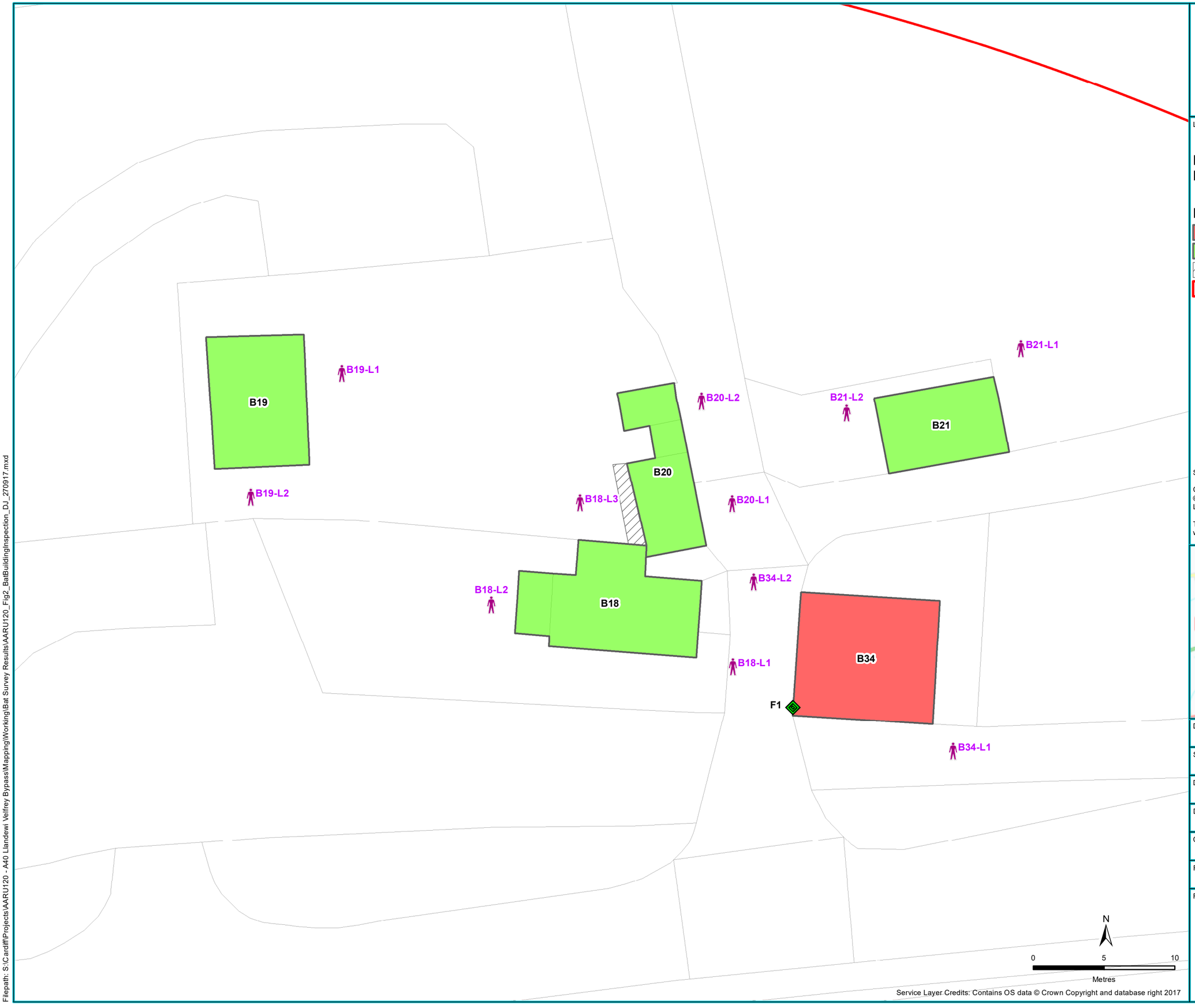
DJ	NS
Date 27/09/2017	Date 27/09/2017

Client
Ove Arup & Partners Ltd

Figure Number
2l

Figure Title

Bat Survey Results - Buildings



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Legend

Surveyor Location

Bat Access / Egress Points

Hole under eaves

Bat Survey Results

Confirmed Roost

Roost Likely Absent

Limited / No Access

50m zone of Influence

Site Grid Reference: 215,913 216,994

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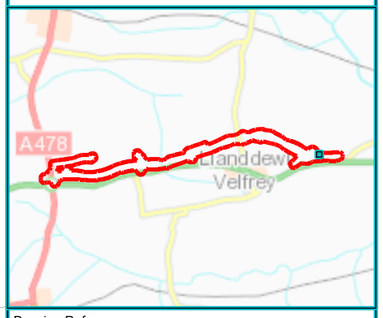

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Figure Number	2m
Figure Title	Bat Survey Results - Buildings

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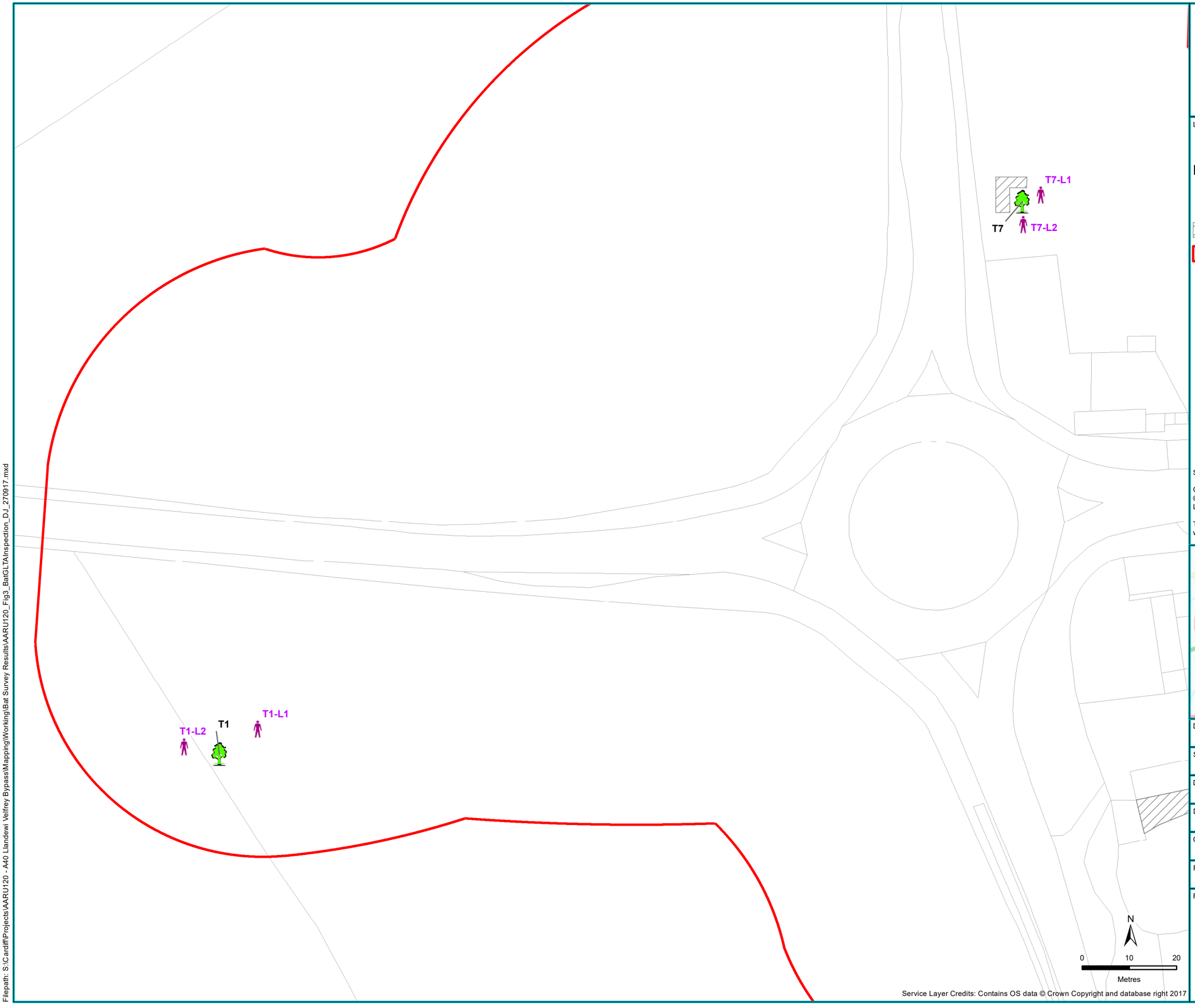

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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

Limited / No Access

50m Zone of influence

Site Grid Reference: 211,950 216,647

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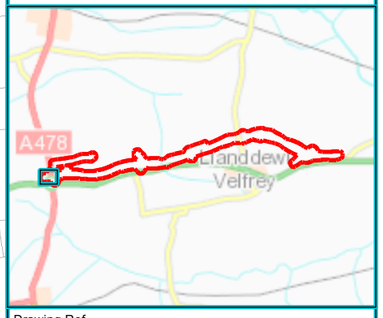

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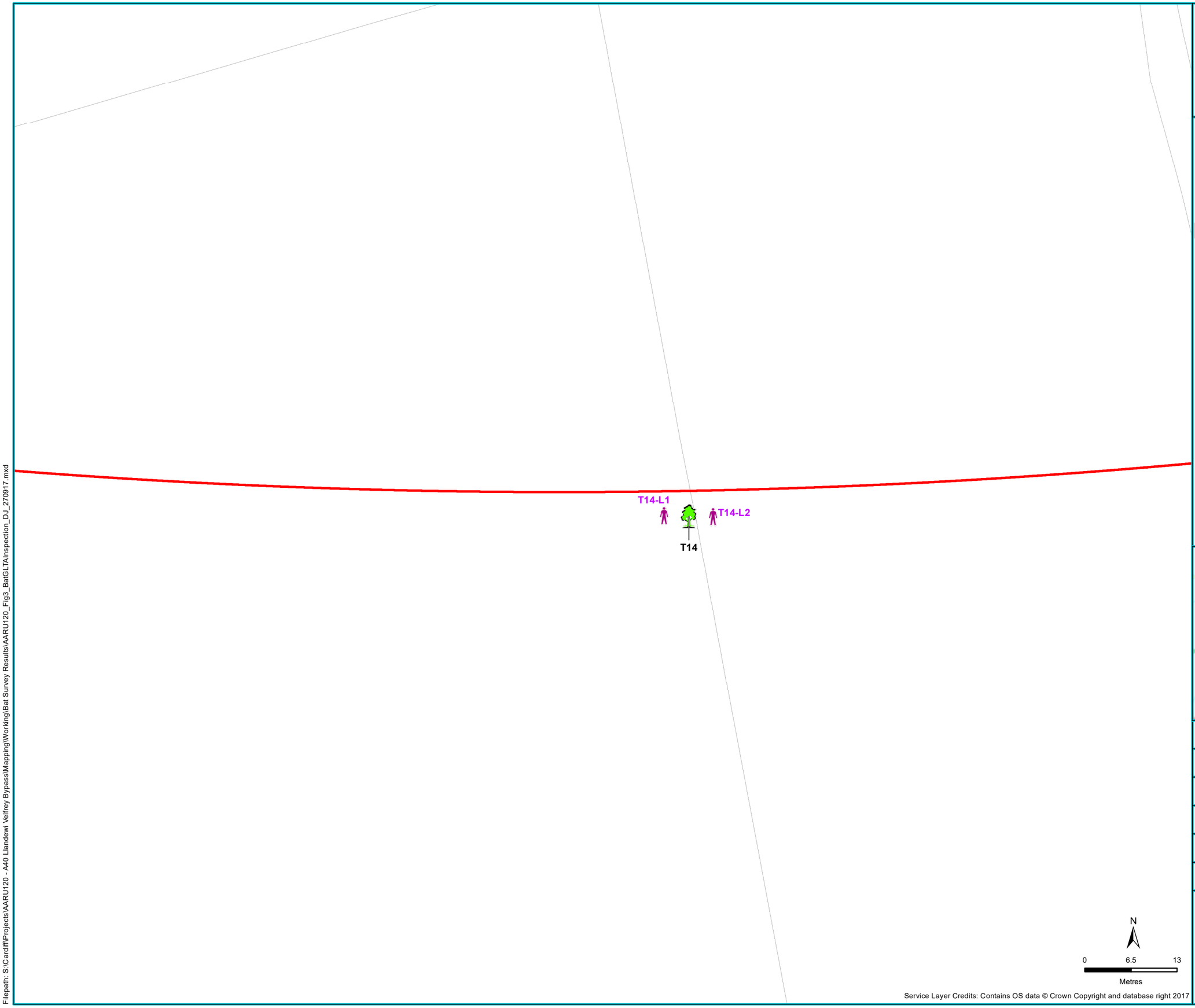
Client	Ove Arup & Partners Ltd
Figure Number	3a
Figure Title	Bat Survey Results - Trees



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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

50m Zone of Influence

Site Grid Reference: 212,539 216,734

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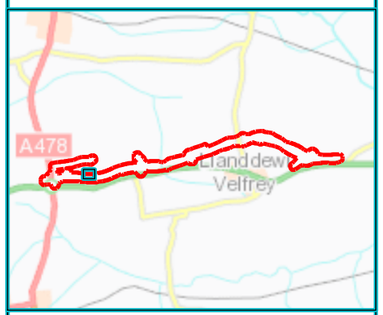

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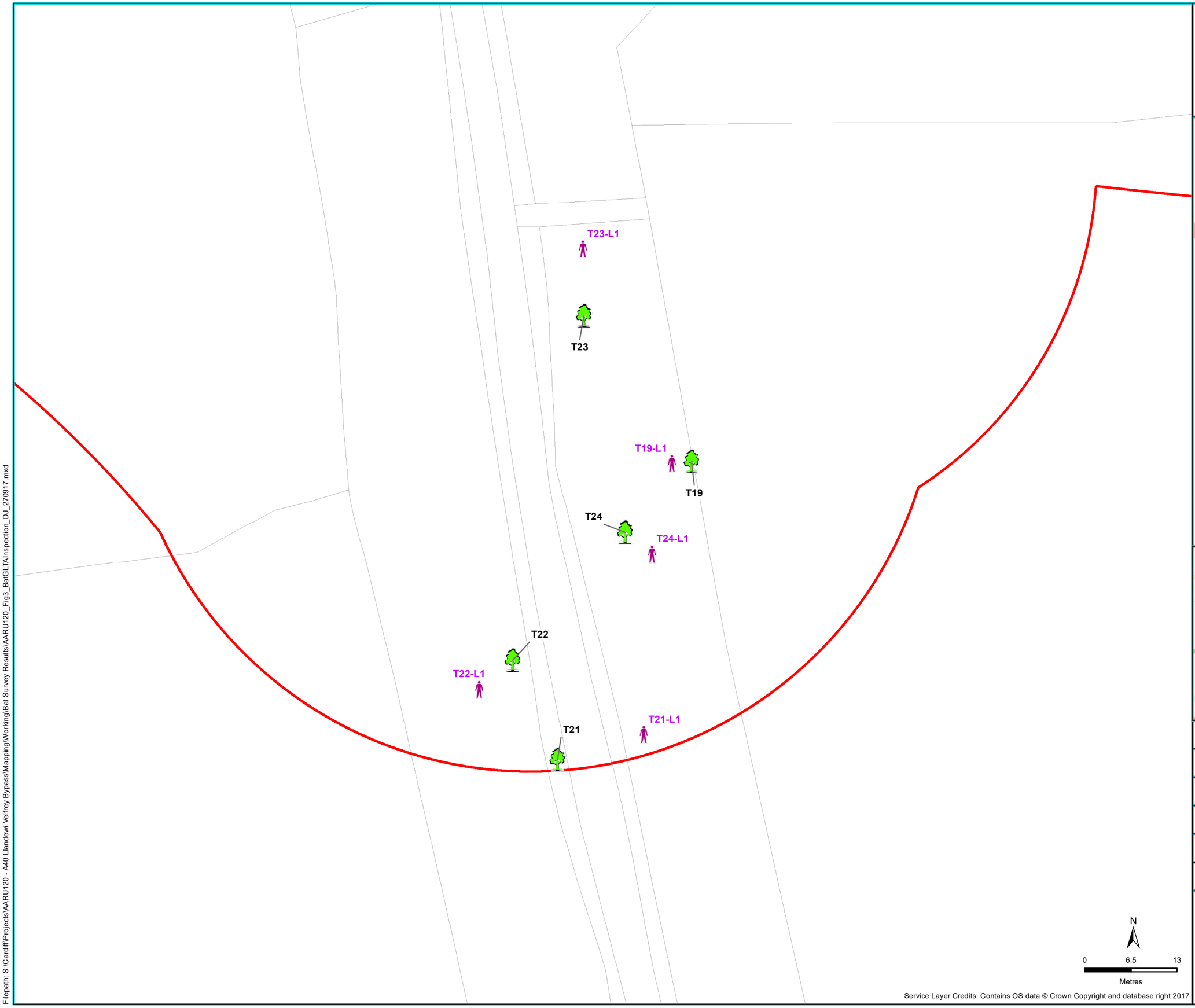
Client
Ove Arup & Partners Ltd

Figure Number
3b

Figure Title

Bat Survey Results - Trees



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Legend

Surveyor Location

Bat Survey Results

Roost Likely Absent

50m Zone of Influence

Site Grid Reference: 213,305 216,736

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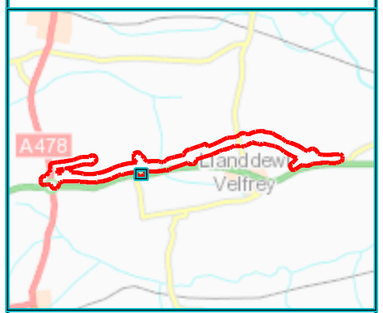

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Drawn	Checked
DJ	NS
Date	Date
27/09/2017	27/09/2017

Client
Ove Arup & Partners Ltd

Figure Number
3c

Figure Title

Bat Survey Results - Trees



Photograph 1:
B1 - Possible bat roost (unknown species) in gap between roof tile and fascia boarding.



Photograph 2:
B3 - Soprano pipistrelle roost in gap in apex of two joining roof edges.



Photograph 3:
B3 - Soprano pipistrelle roost in apex of building above garage door.



Photograph 4:
B4 - Soprano pipistrelle roost in gap under apex of roof tiles.



Photograph 5:
B4 - Soprano pipistrelle roost in gap between wooden fascia and wall.



Photograph 6:
B4 - Soprano pipistrelle roost in holes in stonework/mortar.

Client: Ove Arup & Partners Ltd		Drawing Ref: AARU120/24572/1	thomson ecology
Figure Number: 4a		Scale at A4: Not applicable	
Figure Title: Photographs of the Site		Drawn: DJ / Checked: NS	www.thomsonecology.com enquiries@thomsonecology.com
		Date: 12/10/2017 / Date: 12/10/2017	

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Photograph 7:
B4 - Soprano pipistrelle and myotis bat roost in holes in stonework/mortar.



Photograph 8:
B6 - Soprano pipistrelle roost in hole under roof edge.



Photograph 9:
B6 - Soprano pipistrelle roost in cracks in wall of house above vegetation.



Photograph 10:
B8 - Possible soprano pipistrelle roost in gap between wall and corrugated metal roof.



Photograph 11:
B9 - Common pipistrelle roost in gap under apex roof tile.



Photograph 12:
B11 - Common and soprano pipistrelle roost in gap at apex of roof.

Client: Ove Arup & Partners Ltd		Drawing Ref: AARU120/24573/1	thomson ecology
Figure Number: 4b		Scale at A4: Not applicable	
Figure Title: Photographs of the Site	Drawn: DJ	Checked: NS	www.thomsonecology.com enquiries@thomsonecology.com
	Date: 12/10/2017	Date: 12/10/2017	

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Photograph 13:
B11 - Soprano pipistrelle roost in gap under fascia board.



Photograph 14:
B11 - Soprano pipistrelle roost in cracks in stonework of chimney.



Photograph 15:
B22 - Soprano pipistrelle roost in gaps between stone wall and guttering.



Photograph 16:
B22 - Soprano pipistrelle roost in gaps between stone wall and guttering.



Photograph 17:
B22 - Soprano pipistrelle roost in gaps between stone wall and guttering.



Photograph 18:
B23 - Soprano pipistrelle roost in space between fascia board and stonework.

Client: Ove Arup & Partners Ltd		Drawing Ref: AARU120/24574/1	thomson ecology
Figure Number: 4c		Scale at A4: Not applicable	
Figure Title: Photographs of the Site	Drawn: DJ	Checked: NS	www.thomsonecology.com enquiries@thomsonecology.com
	Date: 12/10/2017	Date: 12/10/2017	

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Photograph 19:
B23 - Soprano pipistrelle roost in crack in window frame.



Photograph 20:
B25 - Soprano pipistrelle roost in gap under eaves on east side of building.



Photograph 21:
B25 - Soprano pipistrelle roost behind broken piece of wood under soffit box.



Photograph 22:
B25 - Soprano pipistrelle roost in gap under eaves on east side of building.



Photograph 23:
B28 - Soprano pipistrelle roost in hole under roof gable.



Photograph 24:
B28 - Soprano pipistrelle roost in gap under eaves on east face of building.

Client: Ove Arup & Partners Ltd		Drawing Ref: AARU120/24575/1	thomson ecology
Figure Number: 4d		Scale at A4: Not applicable	
Figure Title: Photographs of the Site		Drawn: DJ / Checked: NS	www.thomsonecology.com enquiries@thomsonecology.com
		Date: 12/10/2017 / Date: 12/10/2017	

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Photograph 25:
B28 - Soprano pippistrelle roost in gap under eaves on west face of building.



Photograph 26:
B34 - Soprano pippistrelle roost in hole under eaves.



Photograph 27:
B38 - Possible soprano pippistrelle roost on south side of building.

Client: Ove Arup & Partners Ltd		Drawing Ref: AARU120/24576/1	thomson ecology
Figure Number: 4e		Scale at A4: Not applicable	
Figure Title: Photographs of the Site		Drawn: DJ / Checked: NS	www.thomsonecology.com enquiries@thomsonecology.com
		Date: 12/10/2017 / Date: 12/10/2017	

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2. Introduction

2.1 Development Background

2.1.1 The Welsh Government is proposing improvements to the existing A40 road in Pembrokeshire, including the construction of a new bypass around the village of Llandewi Velfrey. The scheme will extend from Penblewin roundabout (Grid Reference: SN120166) in the west to a point approximately 0.6km to the east of Llandewi Velfrey (Grid Reference: SN157169), and include a new section of road through agricultural land to the north of Llandewi Velfrey. The scheme is approximately 4.5km in length. These proposals are hereafter referred to as 'the development'. The location of the development, including a 50m buffer around the development footprint (the zone of influence of the development), is shown on Figure 1.

2.1.2 Design and construction of the development is being carried out by Carillion Civil Engineering Ltd, which has contracted Ove Arup & Partners Ltd (hereafter Arup) to provide a range of services including ecology surveys and production of selected chapters of the Environmental Statement.

2.2 Ecology Background

2.2.1 Bat surveys were carried out for the scheme in 2016 by another consultant. Information relating to these previous surveys, which was provided to Thomson Ecology prior to the commencement of the 2017 surveys for those structures which were surveyed, is summarised in Table 1.

Table 1. 2016 bat survey information.

Structure ID	Initial Bat Potential Assessment	Previous Survey Results
B1	High	Re-entry by soprano pipistrelle in September
B2	High	Possible re-entry in September
B3	High	Possible emergence in September
B4	High	Six pipistrelles emerged in early August, eight soprano pipistrelle emerged 31st August
B5	High	Soprano pipistrelle emergence 31st August
B6	High	Soprano pipistrelle re-entry in August
B7	Moderate	No evidence of bats recorded
B9	High	Common pipistrelle emergence
B11	High	Soprano pipistrelle emergence in August, common pipistrelle possible emergence in September
B18	Moderate	No evidence of bats recorded
B22	High	Access prevented survey in 2016
B23	High	Brown long-eared, pipistrelle and myotis re-entry recorded. 15-20 brown long eared bats swarming at dawn
B34	High	Common pipistrelle emerged

Structure ID	Initial Bat Potential Assessment	Previous Survey Results
B35	Moderate	No evidence of bats recorded
B36	High	Pipistrelle species re-entering building
B37	Low	No evidence of bats recorded
T21	Confirmed	Confirmed roost

2.3 The Brief and Objectives

2.3.1 Thomson Ecology was commissioned by Arup on 28th June 2017 to undertake bat emergence/re-entry surveys for 38 buildings and nine trees and provide a report following the survey work. The level of survey effort required by ARUP at each structure is detailed in Appendix 1.

2.3.2 During the first visit to each structure, the assessment of the level of roosting potential of each structure, and the number of ecologists required to view all potential roost features at each structure was reassessed. The revised number of visits, and number of surveyors required at each building is also detailed in Appendix 1.

2.4 Limitations

2.4.1 A number of limitations were encountered during the surveys, which are described in Table 2.

Table 2. Survey limitations.

Structure ID	Description of Limitation
B1	Visit 2 - dusk survey finished approximately 20 minutes early due to heavy rain.
B4	Visit 2 - dusk survey finished approximately 20 minutes early due to heavy rain.
B5	Trees obstructed view of the north, east and west sides of the building.
B6	Survey carried out from track as access not granted to private land.
B8	Visit 2 - moderate to heavy showers during dawn survey.
B9	Visit 2 – dawn completed in heavy rain.
B13	Part of southern side of building obscured by dense vegetation. Not a significant limitation.
B14	No access to the northern side of the building.
B19	Visit 2 – dusk survey finished approximately 30 minutes early due to sustained heavy rain.
B20	Access not granted to the back of the building.
B22	Limited view of the west side of the building due to the proximity of a hedgerow.
B23	Dense vegetation obstructing view of the back of the building.
B24	The north end of the culvert was surveyed from the top of a steep sided slope, making visibility of, and access to, the culvert entrance difficult. The south

Structure ID	Description of Limitation
	entrance to the culvert was located in dense vegetation and could not be safely located or accessed.
B27	Dense vegetation along the eastern side of the building obstructing view. Visit 1 – dusk survey finished 15 minutes early due to onset of heavy rain.
B32	North and west sides of the building inaccessible due to dense vegetation.
B33	North, east and south sides of the chapel inaccessible due to dense vegetation.
B38	Limited visibility of south of building due to trees and dense vegetation.
T7	View of the west side of the tree blocked by dense vegetation.
T19 and T21 – T24	Visit 1 – dusk survey finished 30 minutes early due to onset of heavy rain Visit 2 – occasional heavy showers, however conditions under the canopy stayed relatively dry.
T25	Tree could not be located.

2.4.2 A number of limitations described in Table 2 are weather related. In most cases these were dusk surveys which were ended early due to heavy rain (detail of the timing and finish time of surveys are provided in the table). This is not considered to be a significant limitation as the period of time when bats are likely to emerge from roosts was surveyed during suitable conditions. The surveys which were ended early were only ended following sustained heavy rain and following a minimum period of 15 minutes without recording any bat activity. Other surveys were subjected to light rain. This is not considered a significant limitation as bats were still active during and following these showers.

2.4.3 A number of buildings were subject to obscured views or lack of access granted from landowners to some parts of the buildings. B6, B22 and B23 were recorded as roosts despite this, and B5 was recorded as a roost during the 2016 surveys. B38 was recorded as a possible roost because a bat was observed flying towards an area of limited visibility and the echolocating suddenly stopped, but it could not be clearly seen where the bat went when it stopped echolocating. B13 had a small amount of the southern side of the building obscured by vegetation, but due to low levels of bat activity in the vicinity and surveyor locations either side of the vegetation bats would have been observed or heard if present and this is not thought to be significant. B14, B20, B24, B27, B32 and B33 could not be comprehensively surveyed, although the latter two were assessed as having low potential.

2.4.4 Both sides of T7 could not be accessed due to dense vegetation obstructing the west side of the tree. T25 could not be located despite use of sub-metre accurate GPS devices using the GPS coordinates previously recorded.

2.4.5 During Visit 1, the number of surveyors required at each building was reassessed. It was determined that the number of surveyors at B3, B10, B13, B28, B36 and B38 should be increased for subsequent visits, and therefore the number of surveyors covering these buildings during Visit 1 was less than that required to adequately survey all potential roosting features.

B3, B28 and B38 were recorded as roosts despite this, although B10, B13 and B36 were not recorded as roosts.

2.4.6 During Visit 1, the level of potential for each building was reassessed; this was completed for all buildings but was pertinent for buildings where the initial assessment carried out in 2016 had been done using Google Earth and Street View. It was determined that the level of potential of buildings B12, B20, B21, B26, B29, B31 and B32 should be decreased and the number of survey visits adjusted accordingly. It was determined that the level of potential for B15 should be increased and the number of survey visits adjusted accordingly.

2.4.1 This report is based on the development boundary and layout shown on Figure 2. Subsequent changes to either may result in a requirement to reassess, the potential impacts of the development, and the requirements for avoidance, mitigation and enhancement.

2.5 Surveyors

2.5.1 Surveys were carried out by Karen Akehurst MSc GradCIEEM, Janine Burnham MRes ACIEEM, Joanne Conway BSc, Jonathan Reeves BSc MCIEEM, Andrew Selman BSc, Lyndsey McBean BSc, Elizabeth Hankard BSc, Freya McCarthy BSc, Lisa Handscomb BSc, Mari Roberts BSc, Matthew Kirby BSc and Benjamin Greep BSc.

3. Methodology

3.1 Emergence/ Re-entry Surveys

3.1.1 Emergence/re-entry surveys were carried out to ascertain the presence or likely absence of roosting bats within 38 buildings and nine trees which had previously been identified as having potential to support roosting bats.

3.1.2 Three survey visits were undertaken for structures and trees with high potential for roosting bats, two survey visits were undertaken for structures and trees with moderate potential and one survey visit was undertaken for structures with low potential. Survey visits were not undertaken for trees assessed as having low potential for roosting bats. Where a survey visit had been carried out for any of the structures or trees in autumn 2016 however, the number of survey visits for that structure or tree was often reduced by one (the initial requirement for the number of visits to each structure or tree was provided by the client). Where multiple survey visits were carried out at a structure or tree, these visits were spaced a minimum of two weeks apart, and comprised a mixture of dusk and dawn visits. Surveys were undertaken in July and August 2017. This level of survey effort follows good practice guidelines (Collins ed., 2016) for low, moderate, and high potential structures and trees.

3.1.3 As recommended in the good practice guidelines (Collins ed., 2016) the emergence surveys began 15 minutes before sunset and ended 120 minutes after sunset. The re-entry surveys began 120 minutes before sunrise and ended 15 minutes after sunrise. Weather conditions including cloud cover, wind, precipitation, the air temperature at 1m were recorded by the lead surveyor at the start and end of each survey, Table 3 below summarises the suitability of weather conditions for bat surveys. The weather conditions and suitability status for each of the 2017 surveys are given in Appendix 2. Any limitations that could affect bat behaviour were recorded. The GPS location of each surveyor was recorded and a photograph was taken of their survey view.

Table 3: Guidance on weather conditions (adapted from met office data on the beaufort scale and BCT Guidance for Onshore Wind Turbine survey),

Conditions	Temperature (°C)	Precipitation	Beaufort windforce scale
Optimal	> 10	Dry	0 to 3 (calm to slight wind)
Suitable	10	Dry	3- 4 (slight to moderate winds
Suitable	10	Dry to light showers/drizzle	3- 4 (slight to moderate winds
Sub-optimal	< 10	Moderate Rainfall	5 to 7 (fresh to strong winds)
Unsuitable	<10	Heavy rainfall	> 7 (near gale)

3.1.4 A desk based assessment of each building and tree was carried out by Arup prior to the commencement of the surveys to give an indication of the number of surveyors that would be

required at each structure. Prior to the first survey commencing, a field based scoping exercise during daylight hours was undertaken by Thomson Ecology to determine suitable survey locations for the surveyors to be positioned, and reassess the level of roosting potential for bats and the number of surveyors required, based on the locations and visibility of access points/Potential Roost Feature (PRF). Each surveyor location was given a unique identifier number. The survey locations and number of surveyors was selected to ensure that all access points/PRF could be viewed by the surveyors without obstruction, wherever access allowed. A 1080 HD infrared night vision camera with an external infrared light source was used at least once during either the second or third survey visit for each structure in addition to the surveyors, however this was not used as a substitute for a surveyor.

3.1.5 During the emergence surveys, access points/PRFs were watched continuously by the ecologists, whilst during the re-entry surveys bats were tracked back to any access points/PRFs within the view of the ecologists.

3.1.6 Bat activity, including species, number of passes, observations of any emergences or return to roost, direction of flight paths, habitat and number of bats was recorded by each ecologist using a Batbox duet frequency division bat detector connected to an MP3 player or an Elekon Bat Logger M with an inbuilt recorder.

3.2 Data Analysis

3.2.1 All bat calls were recorded and these were analysed using Adobe Audition (for duet surveys) and Bat Explorer (for Bat Logger surveys). Please note that a pass was defined as an unbroken stream of echolocation calls, heard as a series of 'clicks, slaps, ticks or warbles' on a bat detector as the bat passes in and out of the detector's range. All recordings of roosting bats were analysed, whereas incidental records of bat activity were analysed and collated only for a select list of species comprising greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), barbastelle (*Barbastella barbastellus*) and myotis bats (*Myotis* sp.).

3.3 Survey Dates and Weather Conditions

3.3.1 The surveys commenced on 3rd July 2017 and were completed on 23rd August 2017. The dates and weather conditions recorded during each survey are given in full in Appendix 2.

4. Results

4.1 Emergence/Re-entry Surveys

4.1.1 Of the 38 buildings surveyed, ten buildings were confirmed as bat roosts and three buildings were possible, though unconfirmed bat roosts, due to low light conditions at the time the bat was observed causing uncertainty over whether bats emerged or re-entered roosts. No roosts were recorded in any of the nine trees surveyed.

4.1.2 Three species were identified using bat roosts; common pipistrelle, soprano pipistrelle and a species of myotis bat. In addition one of the unconfirmed roosts (B1) was an unknown species of bat which was not picked up by the bat detector. The confirmed and unconfirmed roosts are summarised in Table 4 and given in full in Appendix 3. The survey results for buildings and trees, including structure/tree location, surveyor locations and the locations and type of bat access/egress points for roosts, are shown on Figures 2a-m and Figures 3a-c respectively. Photographs of each roost feature are shown on Figures 4a-e.

Table 4. Summary of bat roosts.

Building ID	Feature ID and Description of Roost Feature	Species	Peak no. of bats	Figure Reference
B1	F1 - Gap between roof tile and fascia boarding	Unknown - not detected	1*	Figure 2b, Photograph 1 on Figure 4a.
B3	F1 - Gap in apex of two joining roof edges	Common pipistrelle	1	Figure 2b, Photograph 2 on Figure 4a.
	F2 - Apex of building above garage door	Common pipistrelle	3	Figure 2b, Photograph 3 on Figure 4a.
B4	F1 - Gap under apex of roof tiles	Soprano pipistrelle	3	Figure 2b, Photograph 4 on Figure 4a.
	F2 - Gap between wooden fascia and wall	Soprano pipistrelle	2	Figure 2b, Photograph 5 on Figure 4a.
	F3 - Holes in stonework/mortar	Soprano pipistrelle	2	Figure 2b, Photograph 6 on Figure 4a.
	F4 - Holes in stonework/mortar	Soprano pipistrelle Myotis Species	1 3	Figure 2b, Photograph 7 on Figure 4b.
B6	F1 - Hole under roof edge	Soprano pipistrelle	10	Figure 2i, Photograph 8 on Figure 4b.
	F2 - Cracks in wall of house above vegetation	Soprano pipistrelle	1	Figure 2i, Photograph 9 on Figure 4b.
B8	F1 - Gap between wall and corrugated metal roof	Soprano pipistrelle	1*	Figure 2l, Photograph 10 on Figure 4b.

Building ID	Feature ID and Description of Roost Feature	Species	Peak no. of bats	Figure Reference
B9	F1 - Gap under apex roof tile	Common pipistrelle	2	Figure 2l, Photograph 11 on Figure 4b.
B11	F1 - Gap at apex of roof	Soprano pipistrelle Common pipistrelle	2 2	Figure 2k, Photograph 12 on Figure 4b.
	F2 - Gap under fascia board	Soprano pipistrelle	2	Figure 2k, Photograph 13 on Figure 4c.
	F3 - Crack in stonework of chimney	Soprano pipistrelle	1	Figure 2k, Photograph 14 on Figure 4c.
B22	F1 - Gaps between stone wall and guttering	Soprano pipistrelle	4	Figure 2h, Photograph 15 on Figure 4c.
	F2 - Gaps between stone wall and guttering	Soprano pipistrelle	1	Figure 2h, Photograph 16 on Figure 4c.
	F3 - Gaps between stone wall and guttering	Soprano pipistrelle	1	Figure 2h, Photograph 17 on Figure 4c.
	F4 - Gaps between stone wall and guttering	Soprano pipistrelle	1	Figure 2h, Photograph 15 on Figure 4c.
B23	F1 - Space between fascia board and stonework	Soprano pipistrelle	22	Figure 2x, Photograph 18 on Figure 4c.
	F2 - Crack in window frame	Soprano pipistrelle	1	Figure 2h, Photograph 19 on Figure 4d.
B25	F1 - Gap under eaves on west side of building	Soprano pipistrelle	33	Figure 2g, Photograph 20 on Figure 4d.
	F2 - Broken piece of wood under soffit box	Soprano pipistrelle	34	Figure 2g, Photograph 21 on Figure 4d.
	F3 - Gap under eaves on west side of building	Soprano pipistrelle	1	Figure 2g, Photograph 22 on Figure 4d.
B28	F1 - Hole under roof gable	Soprano pipistrelle	3	Figure 2c, Photograph 23 on Figure 4d.
	F2 - Gap under eaves on east face of building	Soprano pipistrelle	8	Figure 2c, Photograph 24 on Figure 4d.
	F3 - Gap under eaves on east face of building	Soprano pipistrelle	1	Figure 2c, Photograph 25 on Figure 4e.
B34	F1 - Hole under eaves	Soprano pipistrelle	13	Figure 2m, Photograph 26 on Figure 4e.

Building ID	Feature ID and Description of Roost Feature	Species	Peak no. of bats	Figure Reference
B38	F1 - Roost feature unknown, on south side of building	Soprano pipistrelle	1*	Figure 2a, Photograph 27 on Figure 4e.
* Possible, unconfirmed roost				

4.1.3 In addition to the roosts identified in this year's survey, the previous surveys in 2016 identified bat roosts in buildings B5 and B36, and in tree T21. (see Table 1).

4.2 Incidental Bat Activity

4.2.1 In addition to the bat roosts described in Section 4.1, greater horseshoe, barbastelle and myotis bats were recorded within the detection range of the bat detectors during the surveys. The details of these incidental records are given in full in Appendix 3.

4.3 Limitations

4.3.1 As discussed in Section 2.4, structures B14, B20, B24, B27, B32, B33, B38 and T7 could not be comprehensively surveyed due to lack of access to all sides of these structures. This may have prevented bat roosts from being identified in these structures. This is discussed further in Section 6.

5. Legal Considerations

5.1.1 The content of the legislation section is the legislation considerations that we know are relevant based on these bat surveys.

5.1.2 Ten buildings were identified as confirmed bat roosts and three buildings were identified as possible bat roosts, as set out in Table 4 (Section 4.1). In addition, two buildings and one tree were identified as confirmed roosts during the 2016 surveys (see Table 1, Section 2.2).

5.1.3 British bats receive comprehensive protection under the Conservation of Habitats and Species Regulations 2010, and some additional but limited protection under the Wildlife and Countryside Act 1981 (as amended). Taken together the legislation makes it an offence to:

- Deliberately capture, injure or kill a bat;
- Deliberately disturb a bat in such a way as to be likely:
    i. to impair its ability to survive, to breed or reproduce, or to rear or nurture its young; or
    ii. to impair its ability to hibernate or migrate; or
    iii. to affect significantly the local distribution or abundance of the species to which they belong;
- Damage or destroy a breeding site or resting place of a bat; and
- Keep, transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

5.1.4 A roost is any structure or place used by bats for shelter or protection. Bats may re-use the same roosts year after year and they tend to move between roost sites within a year, therefore once a roost is identified, it is protected whether bats are present or not. Development affecting bats is governed by a licensing procedure administered by Natural Resources Wales.

5.1.5 Common pipistrelle, soprano pipistrelle and one species of myotis bat (Bechstien's bat, *Myotis bechsteinii*), are listed as species of principal importance for the purpose of maintaining and enhancing biodiversity in Wales under Section 7 of the Environment (Wales) Act 2015. This Act places a duty on all public bodies to take all reasonable steps to maintain and enhance these species and to encourage others to do the same.

5.1.6 Without mitigation and licensing, the proposed development would contravene the legislation set out above with respect to bats, should any of the buildings supporting bat roosts be affected by the development. Recommendations are given in Section 6.

6. Recommendations

6.1 Mitigation

6.1.1 If any of the twelve buildings and one tree supporting bat roosts (ten roosts identified 2017 and three identified in 2016) are to be affected by the development, it is recommended that a European Protected Species Licence (EPSL), supported by an appropriate mitigation strategy, is obtained from Natural Resources Wales.

6.2 Further Survey

6.2.1 Three buildings (B1, B8 and B38) were identified as possible, though unconfirmed, bat roosts. If these buildings are to be affected by the development then additional survey visits would be recommended to confirm the presence or likely absence of bat roosts. Additionally, further survey visits may be required for B14, B20, B24, B27, B32, B33 and T7 to confirm the absence of bat roosts, should these structures be impacted by the development, due to limited access preventing full assessment of these structures and tree.

7. Conclusion

7.1.1 Due to the presence of confirmed bat roosts in ten buildings, an EPSL is likely to be required from Natural Resources Wales, and appropriate mitigation measures implemented in order for the development to proceed in compliance with legislation with regards to bats.

7.1.2 Possible bat roosts are present in three buildings, and further survey would be required to confirm the presence or likely absence of bat roosts in these buildings, and in the structures where survey was restricted by limited access.

8. References

8.1.1 BCT (ed.) (2012) Surveying Proposed Onshore Wind Turbine Developments. Bat Conservation Trust, London.

8.1.2 Collins, J (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn), Bat Conservation Trust, London.

8.1.3 HM Government (2010) *The Conservation of Habitats and Species Regulations.*

8.1.4 HM Government (2016) *The Environment (Wales) Act*

Appendix 1 - Number of Survey Visits and Surveyors

Building ID	Number of Surveys Completed in 2016	Initial Bat Potential Assessment	Number of Survey Visits	Number of Surveyors	Revised Bat Potential Assessment (after Visit 1)	Revised Number of Survey Visits (after Visit 1)	Revised Number of Surveyors (after Visit 1)
B1	1	High	2	3	High	2	3
B2	1	High	2	2	High	2	1
B3	1	High	2	2	High	2	3
B4	2	High	2	3	High	2	3
B5	1	High	2	2	High	2	2
B6	1	High	2	2	High	2	2
B7	1	Moderate	1	2	Moderate	1	2
B8	0	Moderate	2	2	Moderate	2	2
B9	1	High	2	3	High	2	3
B10	0	Moderate	2	2	Moderate	2	3
B11	2	High	2	4	High	2	4
B12	0	High	3	2	Low	1	2
B13	0	High	3	3	High	3	4
B14	0	Moderate	2	2	Moderate	2	2
B15	0	Low	1	2	Moderate	2	2
B16	0	Low	1	2	Low	1	2

Building ID	Number of Surveys Completed in 2016	Initial Bat Potential Assessment	Number of Survey Visits	Number of Surveyors	Revised Bat Potential Assessment (after Visit 1)	Revised Number of Survey Visits (after Visit 1)	Revised Number of Surveyors (after Visit 1)
B17	0	Low	1	2	Low	1	2
B18	1	Moderate	1	3	Moderate	1	3
B19	0	Low	2	2	Low	2	2
B20	0	High	3	2	Moderate	2	2
B21	0	Moderate	2	2	Low	1	2
B22	0	High	3	2	High	3	2
B23	1	High	2	2	High	2	2
B24	0	High	3	2	High	3	2
B25	0	High	3	2	High	3	2
B26	0	High	3	2	Low	1	2
B27	0	Moderate	3	3	Moderate	3	3
B28	0	High	3	2	High	3	3
B29	0	High	3	2	Moderate	2	2
B30	0	High	3	2	High	3	2
B31	0	High	3	2	Low	1	2
B32	0	Moderate	2	2	Low	1	2
B33	0	Low	1	2	Low	1	2
B34	1	High	2	2	High	2	2
B35	1	Moderate	1	2	Moderate	1	2

Building ID	Number of Surveys Completed in 2016	Initial Bat Potential Assessment	Number of Survey Visits	Number of Surveyors	Revised Bat Potential Assessment (after Visit 1)	Revised Number of Survey Visits (after Visit 1)	Revised Number of Surveyors (after Visit 1)
B36	1	High	2	4	High	2	6
B37	1	Low	1	3	Low	1	3
B38	0	High	3	2	High	3	6
T1	1	Moderate	2	2	Moderate	2	2
T7	1	Moderate	2	2	Moderate	2	2
T14	1	High	3	2	High	3	2
T19	1	Moderate	2	2	Moderate	2	2
T21	1	Confirmed	3	2	Confirmed	3	2
T22	1	High	3	2	High	3	2
T23	1	Moderate	2	2	Moderate	2	2
T24	1	Moderate	2	2	Moderate	2	2
T25	1	Moderate	2	2	N/A	N/A	N/A

Appendix 2 – Survey Dates and Weather Conditions

Structure ID	Visit No.	Survey Date	Survey Times			Temperature (°C)		Wind (Beaufort Scale)	Cloud Cover			Rain			Suitability
			Sunset/ Sunrise	Start Time	End Time	Start	End		One Third	Two Thirds	Three Thirds	Dry	Light Rain	Heavy Rain	
B1	1	13/07/2017	21:33	21:18	23:33	16	15	2	x			x			Optimal
	2	02/08/2017	21:05	20:50	22:47	17	18	4	x					x	Sub-optimal
B2	1	14/07/2017	05:16	03:16	05:16	15	11	2	x			x			Optimal
	2	03/08/2017	21:03	20:48	23:03	16	15	3		x			x		Sub-optimal
B3	1	14/07/2017	05:16	03:16	05:16	15	13	1	x			x			Optimal
	2	03/08/2017	21:03	20:48	23:03	17	15	3			x		x		Sub-optimal
B4	1	13/07/2017	21:33	21:18	23:33	17	14	3		x		x			Suitable
	2	02/08/2017	21:05	20:50	22:47	17	17	4	x					x	Sub-optimal
B5	1	06/07/2017	21:36	21:23	23:36	19	18	1			x	x			Optimal
	2	28/07/2017	05:35	03:35	05:35	16	14	2			x	x			Optimal
B6	1	12/07/2017	05:13	03:13	05:13	16	13	2	x			x			Optimal
	2	26/07/2017	21:16	21:01	23:16	18	17	3	x			x			Suitable
B7	1	19/07/2017	05:22	03:22	05:22	16	18	5	x			x			Suitable
B8	1	18/07/2017	21:28	21:13	23:28	22	20	1			x	x			Optimal
	2	04/08/2017	05:46	03:46	05:46	18	17	2			x			x	Sub-optimal
B9	1	10/07/2017	21:36	21:21	23:23	18	13	4		x			x		Sub-optimal

Structure ID	Visit No.	Survey Date	Survey Times			Temperature (°C)		Wind (Beaufort Scale)	Cloud Cover			Rain			Suitability
			Sunset/ Sunrise	Start Time	End Time	Start	End		One Third	Two Thirds	Three Thirds	Dry	Light Rain	Heavy Rain	
	2	01/08/2017	05:41	03:41	05:41	15	13	2	x					x	Sub-optimal
B10	1	11/07/2017	05:12	03:12	05:12	14	12	3			x		x		Sub-optimal
	2	25/07/2017	21:17	21:02	23:17	23	19	2		x		x			Optimal
B11	1	05/07/2017	05:07	03:07	05:07	13	13	0		x		x			Optimal
	2	01/08/2017	21:06	20:51	23:06	17	17	1			x	x			Optimal
B12	1	17/07/2017	21:29	21:14	23:29	16	15	0	x			x			Optimal
B13	1	17/07/2017	21:29	21:14	23:29	23	17	1		x		x			Optimal
	2	02/08/2017	05:43	03:43	05:43	18	17	0			x	x			Optimal
	3	22/08/2017	20:29	20:14	22:29	20	19	3		x			x		Sub-optimal
B14	1	18/07/2017	05:20	03:20	05:20	15	17	0	x			x			Optimal
	2	01/08/2017	21:06	20:51	23:06	16	15	0	x			x			Optimal
B15	1	18/07/2017	05:20	03:20	05:20	17	15	1		x		x			Optimal
	2	02/08/2017	04:43	03:43	05:43	18	18	4			x		x		Sub-optimal
B16	1	18/07/2017	05:20	03:20	05:20	16	15	2	x			x			Optimal
B17	1	17/07/2017	21:29	21:14	23:29	19	16	2		x		x			Optimal
B18	1	12/07/2017	21:33	21:18	23:33	17	13	1	x			x			Optimal
B19	1	13/07/2017	05:14	03:14	05:14	12	10	2	x			x			Optimal
	2	31/07/2017	21:08	20:53	22:39	16	15	0	x					x	Sub-optimal
B20	1	06/07/2017	05:08	03:08	05:08	15	15	1		x		x			Optimal

Structure ID	Visit No.	Survey Date	Survey Times			Temperature (°C)		Wind (Beaufort Scale)	Cloud Cover			Rain			Suitability
			Sunset/ Sunrise	Start Time	End Time	Start	End		One Third	Two Thirds	Three Thirds	Dry	Light Rain	Heavy Rain	
	2	25/07/2017	05:28	03:28	05:28	16	14	1	x			x			Optimal
B21	1	12/07/2017	05:13	03:13	05:13	14	13	2	x			x			Optimal
B22	1	07/07/2017	05:09	03:09	05:09	16	14	0	x			x			Optimal
	2	31/07/2017	21:08	20:53	22:30	18	17	1	x					x	Sub-optimal
	3	21/08/2017	20:31	20:16	22:31	21	20	1			x	x			Optimal
B23	1	25/07/2017	05:28	03:28	05:28	14	11	1	x			x			Optimal
	2	09/08/2017	20:52	20:37	22:52	15	11	1	x			x			Optimal
B24	1	06/07/2017	05:08	03:08	05:08	16	15	0		x		x			Optimal
	2	25/07/2017	21:17	21:02	23:17	20	19	1		x		x			Optimal
	3	10/08/2017	05:55	03:55	05:55	15	12	0	x			x			Optimal
B25	1	11/07/2017	05:12	03:12	05:12	16	15	2			x		x		Suitable
	2	26/07/2017	21:16	21:01	23:16	15	13	4	x			x			Suitable
	3	10/08/2017	05:55	03:55	05:55	12	12	3	x			x			Suitable
B26	1	11/07/2017	05:12	03:12	05:12	14	12	2			x		x		Suitable
B27	1	10/07/2017	21:36	21:21	23:23	15	14	2	x					x	Sub-optimal
	2	24/07/2017	21:19	21:04	23:19	20	16	1	x			x			Optimal
	3	11/08/2017	05:57	03:57	05:57	13	12	1	x			x			Optimal
B28	1	03/07/2017	21:39	21:24	23:39	23	15	0			x		x		Suitable
	2	28/07/2017	05:35	03:35	05:35	16	15	1		x		x			Optimal

Structure ID	Visit No.	Survey Date	Survey Times			Temperature (°C)		Wind (Beaufort Scale)	Cloud Cover			Rain			Suitability
			Sunset/ Sunrise	Start Time	End Time	Start	End		One Third	Two Thirds	Three Thirds	Dry	Light Rain	Heavy Rain	
	3	11/08/2017	05:57	03:57	05:57	14	13	1		x		x			Optimal
B29	1	03/07/2017	21:39	21:24	23:39	16	15	0			x		x		Suitable
	2	20/07/2017	05:23	03:23	05:23	15	13	3			x	x			Suitable
B30	1	04/07/2017	05:06	03:06	05:06	16	15	0			x	x			Optimal
	2	20/07/2017	05:23	03:23	05:23	14	13	3			x	x			Suitable
	3	03/08/2017	21:03	20:48	23:03	17	15	5			x		x		Sub-optimal
B31	1	04/07/2017	05:06	03:06	05:06	16	16	1			x	x			Optimal
B32	1	04/07/2017	21:39	21:24	23:39	16	14	0		x		x			Optimal
B33	1	04/07/2017	21:39	21:24	23:39	18	13	0		x		x			Optimal
B34	1	07/07/2017	05:09	03:09	05:09	16	15	2			x	x			Optimal
	2	26/07/2017	21:16	21:01	23:16	15	14	4	x			x			Suitable
B35	1	20/07/2017	05:23	03:23	05:23	14	14	1			x	x			Optimal
B36	1	13/07/2017	05:14	03:14	05:14	12	8.5	0	x			x			Suitable
	2	27/07/2017	21:14	20:59	23:14	15	15	5	x			x			Suitable
B37	1	12/07/2017	21:33	21:18	23:33	15	13	1	x			x			Optimal
B38	1	12/07/2017	05:13	03:13	05:13	14	12	1	x			x			Optimal
	2	27/07/2017	05:34	03:34	05:34	18	17	1	x			x			Optimal
	3	10/08/2017	20:50	20:35	22:50	15	13	1	x			x			Optimal
T1	1	24/07/2017	21:19	21:04	23:19	18	13	0	x			x			Optimal

Structure ID	Visit No.	Survey Date	Survey Times			Temperature (°C)		Wind (Beaufort Scale)	Cloud Cover			Rain			Suitability
			Sunset/ Sunrise	Start Time	End Time	Start	End		One Third	Two Thirds	Three Thirds	Dry	Light Rain	Heavy Rain	
	2	21/08/2017	20:31	20:16	22:31	18	16	1			x	x			Optimal
T7	1	19/07/2017	05:20	03:20	05:20	20	18	3		x		x			Suitable
	2	09/08/2017	20:52	20:37	22:52	17	15	0	x			x			Optimal
T14	1	28/07/2017	21:28	21:13	23:28	23	14	0		x		x			Optimal
	2	04/08/2017	05:46	03:46	05:46	17	15	3			x		x		Sub-optimal
	3	22/08/2017	06:14	04:14	06:14	18	17	0		x		x			Optimal
T19	1	19/07/2017	21:26	21:11	23:00	20	15	0			x			x	Sub-optimal
	2	03/08/2017	05:44	03:44	05:44	17	16	4			x			x	Sub-optimal
T21	1	10/07/2017	21:06	21:11	23:00	19	15	1			x		x		Suitable
	2	03/08/2017	05:44	03:44	05:44	16	15	5			x			x	Sub-optimal
	3	23/08/2017	06:16	04:16	06:16	18	17	1			x		x		Optimal
T22	1	19/07/2017	21:26	21:11	22:55	17	14	2			x			x	Sub-optimal
	2	03/08/2017	05:44	03:44	05:44	17	16	5			x			x	Sub-optimal
	3	23/08/2017	06:16	04:16	06:16	18	17	1			x		x		Suitable
T23	1	19/07/2017	21:26	21:11	22:56	20	18	2			x		x		Suitable
	2	03/08/2017	05:44	03:44	05:44	21	17	4			x			x	Sub-optimal
T24	1	19/07/2017	21:26	21:11	22:50	20	18	2			x		x		Suitable
	2	03/08/2017	05:44	03:44	05:44	15	15	3			x			x	Sub-optimal

Appendix 3 – Bat Survey Results

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B1	1	13/07/17	1	N	N/A	0	0	0	0	0	
			2	Possible	Unknown	0	0	1	1	2	
			3	N	N/A	0	0	1	1	2	
	2	02/08/17	1	Possible	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	1	1	
B2	1	14/07/17	1	N	N/A	0	0	0	0	0	
	2	03/08/17	1	N	N/A	0	0	0	1	1	
B3	1	14/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	2	2	
			3	N	N/A	0	0	0	2	2	
	2	03/08/17	1	N	N/A	0	0	1	1	2	
			2	Y	Common pipistrelle	0	0	0	3	3	
			3	Y	Common pipistrelle	0	0	0	0	0	
B4	1	13/07/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
			3	N	N/A	0	0	0	0	0	
	2	02/08/17	1	Y	Soprano pipistrelle	0	0	0	13	13	
			2	Y	Soprano pipistrelle and Myotis sp.	0	0	0	6	6	
			3	N	N/A	0	0	0	3	3	
B5	1	06/07/17	1	N	N/A	0	0	0	4	4	
			2	N	N/A	0	0	0	0	0	
	2	28/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B6	1	12/07/17	1	N	N/A	0	0	0	1	1	
			2	Y	Soprano pipistrelle	0	0	0	0	0	
	2	26/07/17	1	N	N/A	1	0	1	2	4	
			2	Y	Soprano pipistrelle	0	0	0	2	2	
B7	1	19/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B8	1	18/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	1	1	
	2	04/08/17	1	Possible	Soprano pipistrelle	0	0	0	1	1	
			2	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B9	1	10/07/17	1	N	N/A	0	0	0	0	0	
			2	Y	Common pipistrelle	0	0	0	2	2	
			3	N	N/A	0	0	0	0	0	
	2	01/08/17	1	N	N/A	0	0	0	4	4	
			2	N	N/A	0	0	0	4	4	
			3	N	N/A	0	0	0	0	0	
B10	1	11/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
	2	25/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
B11	1	05/07/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	1	1	
			4	Y	Common pipistrelle	0	0	0	0	0	
	2	01/08/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	Y	Common pipistrelle	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B12	1	17/07/17	1	N	N/A	0	0	0	0	0	
B13	1	17/07/17	1	N	N/A	0	0	1	1	2	
			2	N	N/A	0	0	0	4	4	
			3	N	N/A	0	0	0	23	23	
			4	N	N/A	0	0	0	0	0	
	2	02/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	N	N/A	0	0	0	0	0	
	3	22/08/17	1	N	N/A	0	0	0	2	2	
			2	N	N/A	0	0	2	0	2	
			3	N	N/A	0	0	0	3	3	
			4	N	N/A	0	0	0	0	0	
B14	1	18/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	1	1	
	2	01/08/17	1	N	N/A	0	0	0	2	2	
			2	N	N/A	0	0	0	1	1	
B15	1	18/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
	2	02/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B16	1	18/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B17	1	17/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B18	1	12/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
B19	1	13/07/17	1	N	N/A	0	0	0	1	1	
			2	N	N/A	0	0	0	0	0	
	2	31/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B20	1	06/07/17	1	N	N/A	0	0	0	6	6	
			2	N	N/A	0	0	0	18	18	
	2	25/07/17	1	N	N/A	0	0	0	6	6	
			2	N	N/A	0	0	0	34	34	
B21	1	12/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B22	1	07/07/17	1	N	N/A	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	1	1	
	2	31/07/17	1	N	N/A	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	2	2	
	3	21/08/17	1	N	N/A	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	1	1	
B23	1	25/07/17	1	Y	Soprano pipistrelle	0	0	1	12	13	
			2	N	N/A	0	0	3	1	4	
	2	09/08/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B24	1	06/07/17	1	N	N/A	0	0	0	3	3	
			2	N	N/A	0	0	0	0	0	
	2	25/07/17	1	N	N/A	0	0	1	88	89	
			2	N	N/A	0	0	0	111	111	
	3	10/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B25	1	11/07/17	1	Y	Soprano pipistrelle	0	0	0	1	1	
			2	Y	Soprano pipistrelle	0	0	0	0	0	
	2	26/07/17	1	Y	Soprano pipistrelle	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
			2	Y	Soprano pipistrelle	0	0	0	0	0	
	3	10/08/17	1	Y	Soprano pipistrelle	0	0	0	1	1	Little owl heard
			2	Y	Soprano pipistrelle	0	0	0	1	1	Little owl heard
B26	1	11/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B27	1	10/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	4	4	
	2	24/07/17	1	N	N/A	1	0	0	1	0	
			2	N	N/A	1	0	0	1	2	
			3	N	N/A	1	0	1	0	2	
	3	11/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
B28	1	03/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
	2	28/07/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	Y	Soprano pipistrelle	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
	3	11/08/17	1	Y	Soprano pipistrelle	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
B29	1	03/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
	2	20/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	1	1	
B30	1	04/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
	2	20/07/17	1	N	N/A	0	0	0	1	1	
			2	N	N/A	0	0	0	1	1	
	3	03/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B31	1	04/07/17	1	N	N/A	0	0	0	2	2	
			2	N	N/A	0	0	0	1	1	
B32	1	04/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
B33	1	04/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B34	1	07/07/17	1	N	N/A	0	0	0	0	0	
			2	Y	Soprano pipistrelle	2	0	1	0	3	
	2	26/07/17	1	N	N/A	0	0	0	0	0	
			2	Y	Soprano pipistrelle	0	0	0	0	0	
B35	1	20/07/17	1	N	N/A	0	0	0	1	1	
			2	N	N/A	0	0	0	0	0	
B36	1	13/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	N	N/A	0	0	0	0	0	
	2	27/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	N	N/A	0	0	0	0	0	
			5	N	N/A	0	0	0	0	0	
			6	N	N/A	0	0	0	0	0	
B37	1	12/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	9	9	
			3	N	N/A	0	0	0	2	2	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
B38	1	12/07/17	1	N	N/A	0	0	0	1	1	
			2	N	N/A	0	0	0	0	0	
	2	27/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	N	N/A	0	0	0	3	3	
			5	N	N/A	0	0	0	1	1	
			6	N	N/A	0	0	0	0	0	
	3	10/08/17	1	Possible	Soprano pipistrelle	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
			3	N	N/A	0	0	0	0	0	
			4	N	N/A	0	0	0	0	0	
			5	N	N/A	0	0	0	0	0	
			6	Possible	Soprano pipistrelle	0	0	0	0	0	
T1	1	24/07/17	1	N	N/A	0	0	0	3	3	
			2	N	N/A	0	0	0	2	2	
	2	21/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
T7	1	19/07/17	1	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
			2	N	N/A	0	0	0	0	0	
	2	09/08/17	1	N	N/A	0	0	0	2	2	
			2	N	N/A	0	0	0	7	7	
T14	1	18/07/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	1	1	
	2	04/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
	3	22/08/17	1	N	N/A	0	0	0	0	0	
			2	N	N/A	0	0	0	0	0	
T19	1	19/07/17	1	N	N/A	0	0	0	0	0	
	2	03/08/17	1	N	N/A	0	0	0	0	0	
T21	1	19/07/17	1	N	N/A	0	0	0	0	0	
	2	03/08/17	1	N	N/A	0	0	0	0	0	
	3	23/08/17	1	N	N/A	0	0	0	0	0	
T22	1	19/07/17	1	N	N/A	0	0	1	2	3	
	2	03/08/17	1	N	N/A	0	0	0	0	0	
	3	23/08/17	1	N	N/A	0	0	0	3	3	
T23	1	19/17/17	1	N	N/A	0	0	0	0	0	
	2	03/08/17	1	N	N/A	0	0	0	0	0	

Structure ID	Visit No.	Survey Date	Survey Location	Bat Roost Results		Incidental Activity of Greater Horseshoe, Lesser Horseshoe, Barbastelle and Myotis bats (No. Passes)					Other Notable Species Records
				Roost Observed?	Species Roosting	GH	LH	Barb.	Myotis sp.	Total Passes	
T24	1	19/07/17	1	N	N/A	0	0	0	2	2	
	2	03/08/17	1	N	N/A	0	0	0	3	3	

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A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.6: Badger Survey Information

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

NB: Badger Sett Drawings have been withdrawn from this ES as the information displayed is confidential.

NB: Badger Sett Drawings have been withdrawn from this ES as the information displayed is confidential.

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A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.7: Breeding Bird Status Table

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

BTO Code	Species	Confirmed	Possible	Non-breeding	Schedule 1	Annex 1	S7 Priority	BOCC Red	BOCC Amber	BOCC Green	Welsh Red	Welsh Amber	Welsh Green
B.	Blackbird	Yes								Yes			Yes
BC	Blackcap	Yes								Yes			Yes
BF	Bullfinch		Yes				Yes		Yes		Yes		
BT	Blue tit	Yes								Yes			Yes
BZ	Buzzard		Yes							Yes			Yes
C.	Carrion crow	Yes								Yes			Yes
CC	Chiffchaff	Yes								Yes			Yes
CG	Canada goose			Yes						Yes			Yes
CH	Chaffinch	Yes								Yes			Yes
CT	Coal tit		Yes							Yes			Yes
D.	Dunnock	Yes					Yes		Yes				Yes
FP	Feral pigeon		Yes							Yes			Yes
GB	Great black-backed gull			Yes					Yes		Yes		
GC	Goldcrest	Yes								Yes		Yes	
GO	Goldfinch	Yes								Yes			Yes
GR	Greenfinch		Yes							Yes		Yes	
GS	Great spotted woodpecker	Yes								Yes			Yes
GT	Great tit	Yes								Yes			Yes
GW	Garden warbler		Yes							Yes			Yes
H.	Grey heron			Yes						Yes		Yes	
HG	Herring gull			Yes			Yes	Yes			Yes		
HM	House martin	Yes							Yes				Yes
HS	House sparrow	Yes					Yes	Yes				Yes	
J.	Jay		Yes							Yes			Yes
JD	Jackdaw	Yes								Yes			Yes
K.	Kestrel			Yes			Yes		Yes		Yes		
LB	Lesser black-backed gull			Yes					Yes			Yes	
LG	Little grebe		Yes							Yes			Yes
LI	Linnet	Yes					Yes	Yes			Yes		
LT	Long-tailed tit	Yes								Yes		Yes	
M.	Mistle thrush	Yes						Yes				Yes	
MA	Mallard		Yes						Yes			Yes	
MG	Magpie		Yes							Yes			Yes
MH	Moorhen		Yes							Yes			Yes
MP	Meadow pipit			Yes					Yes			Yes	
MT	Marsh tit		Yes				Yes	Yes			Yes		
NH	Nuthatch	Yes								Yes			Yes
PH	Pheasant			Yes						Yes			Yes
PW	Pied wagtail	Yes								Yes			Yes
R.	Robin	Yes								Yes			Yes
RB	Reed bunting		Yes				Yes		Yes			Yes	
RN	Raven		Yes							Yes			Yes
RO	Rook	Yes								Yes			Yes
SD	Stock dove		Yes						Yes				Yes
SF	Spotted flycatcher		Yes				Yes	Yes			Yes		
SH	Sparrowhawk			Yes						Yes			Yes
SK	Siskin		Yes							Yes			Yes

SL	Swallow	Yes								Yes			Yes
ST	Song thrush	Yes					Yes	Yes				Yes	
TC	Treecreeper		Yes							Yes			Yes
TO	Tawny owl		Yes							Yes			Yes
WH	Whitethroat	Yes								Yes		Yes	
WP	Woodpigeon	Yes								Yes			Yes
WR	Wren	Yes								Yes			Yes
WT	Willow tit		Yes					Yes			Yes		
WW	Willow warbler	Yes							Yes		Yes		
Y.	Yellowhammer		Yes				Yes	Yes			Yes		
YW	Yellow wagtail			Yes			Yes	Yes			Yes		
	58 sp.	**27**	**21**	**10**	**0**	**0**	**12**	**10**	**11**	**37**	**11**	**12**	**35**

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.8a: Dormouse Licence Draft Method Statement

A40LVP-ARP-EBD-SWI-RP-LE-0005

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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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A1 Dormouse Survey Results

A2 Dormouse Nest Tube Locations

A3 Environmental Master Plans

1 Introduction

1.1.1 The Welsh Government has appointed Ove Arup & Partners Ltd to undertake initial design and consenting work for the Llanddewi Velfrey to Penblewin section of the A40 Improvements including a new bypass around Llanddewi Velfrey. These proposals are hereafter known as 'the Scheme'.

1.1.2 The Scheme will extend from Penblewin roundabout (Grid reference: SN120166) in the west to the point approximately 0.6km to the east of Llanddewi Velfrey (Grid reference: SN157169), and include a new section of road through agricultural land to the north of Llanddewi Velfrey. The Scheme is approximately 4.3km in length.

1.2 Background to Activity / Development

1.2.1 The Scheme includes improvements to the A40 between Llanddewi Velfrey and the Penblewin Roundabout. This will include the upgrading of 4.3km of highway comprising 2.5km offline bypass of Llanddewi Velfrey and online improvements including structures, earthworks and new junctions.

1.3 Ecological Background

1.3.1 An ecological study was undertaken to assess the potential impacts of the new Scheme. This study included an extended Phase 1 habitat survey, and protected species surveys which included amphibians, bats, dormice, otter, water vole, badger, reptiles and breeding birds.

1.3.2 Dormouse nests were identified at two locations during the surveys. The hedgerows and woodland located within the study area are considered to provide high quality habitat for dormice, and it is considered likely that they are present throughout the study area.

1.3.3 Dormice are a European protected species designated under Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (hereafter referred to as the 'Habitats' Regulations). Due to the records for dormice in the study area a EPS Development Licence will be required to facilitate the construction works.

1.3.4 This report provides the information required for a licence application. This information includes a summary of the construction phase works and necessary mitigation requirements.

1.4 Details of works proposed to be covered by the licence

1.4.1 The construction of the Scheme will entail the following activities:

a) Tree felling;

b) Construction of the Scheme including earthworks, installation of services and drainage network, lighting and surfacing;

c) Landscape planting and fencing.

1.5 Actions requiring a licence

1.5.1 The construction of the Scheme will require the removal of all vegetation within the Scheme footprint, including dormouse habitat such as woodland and hedgerows. Due to the presence of dormice, this needs to be undertaken under a licence.

2 Survey results and interpretation

2.1.1 Dormouse surveys were undertaken to inform the Scheme design in 2016 by Mott Macdonald Bentley (MMB).

2.2 Objective of the dormouse survey

2.2.1 The dormouse surveys in 2016 aimed to provide as assessment of presence or likely absence of dormouse along the route of the Scheme.

2.3 Scaled plan / map of the survey area

2.3.1 The locations of nest tubes used during the surveys and the results are shown on Figure 8.7[1] within Appendix A. The Environmental Masterplans for the Scheme are also provided in this Appendix.

2.4 Background data

Desk study search

2.4.1 A desk study of the area was undertaken by MMB in 2016, which included a biodiversity information search from the West Wales Biodiversity Information Centre (WWBIC) for protected species within 2km of the proposed Scheme. No previous records of dormice in the search area were provided by the biodiversity information search.

Statutory sites notified for the species within 10km or within the same catchment

2.4.2 A desk study was undertaken to identify statutory designated sites within 10km of the Application site. The Multi-Agency Geographic Information for the Countryside (MAGIC) website was reviewed for information on the nationally and internationally designated sites of nature conservation importance within 10km. The search included included Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites, and Sites of Special Scientific Interest (SSSIs). No designated sites for dormice were identified within 10km of the Scheme.

[1] Figures taken from the Environmental Statement.

2.5 Field methodology

Dormouse nest tube surveys

2.5.1 A total of 1450 dormouse nest tubes were erected in areas of suitable habitat within the Study Area as shown on Figure 8.7. These were installed in April and May 2016, where access permitted. The tubes were checked on three occasions in May/June, September and November, although access restrictions prevented some areas from being checked each time.

Habitat suitability assessment and nut search

2.5.2 The habitat suitability assessment was carried out during 2017 by an experienced ecologist and dormouse survey licence holder and entailed the consideration of habitats present in terms of species composition and connectivity. Searches for characteristically chewed hazel nuts were undertaken where fruiting hazel was found to be present during the habitat suitability assessment.

2.6 Results

2.6.1 Dormice nests were found within tubes in two locations at either end of the Scheme. One (Nest A) was in a hedgerow adjacent to the Caermnaenau- Fawr bed and breakfast and the other (Nest B) in Castell-Gwyndy Wood to the north of Bethel Chapel. Results of the dormouse surveys area provided on Figure 8.79 in Appendix A.

2.6.2 Nest A was a nest built within one of the survey tubes. Nest B was a winter nest.

2.6.3 The habitat assessment undertaken in 2017 confirmed that the hedgerows and woodland located within the study area are considered to provide high quality habitat for dormice, and it is considered likely that they are present throughout the study area albeit at low population densities. No hazel nuts eaten by dormouse were found during the nut searches. The dormouse population within the study area is considered to be of local importance.

2.7 Survey limitations

2.7.1 During the nest tube surveys access permission was not granted to all of the survey locations and at some of the locations the habitat was not suitable to enable the nest tubes to be installed in the vegetation. Following initial installation of the 1450 nest tubes, ten of the tubes were not found on subsequent visits to check tubes.

3 Assessment of Potential Impacts

3.1.1 The following assessment of potential impacts of the development on dormice follows the Dormouse Conservation Handbook[2].

3.2 Injury / harm to dormice

3.2.1 There is potential for dormice to be injured or harmed during the construction of the proposed Scheme through death or injury from plant machinery or during vegetation clearance.

3.3 Short term disturbance

3.3.1 The construction works in the vicinity of habitats (such as hedgerows, trees and scrub) have the potential to disturb dormice through:

a) Noise and vibration from machinery;
b) Overnight lighting directed onto vegetation such as hedgerows and trees.

3.4 Long term habitat loss

3.4.1 The Scheme will result in the loss of 4.16ha of woodland and scrub habitat for dormice, and 5,594m of hedgerow which has been assessed as being of high suitability for dormice.

3.4.2 The areas that will be lost are a worst-case prediction based on the area of land being purchased for the Scheme. Where possible habitats within this area which are not required for the construction of the Scheme will be retained.

3.5 Fragmentation

3.5.1 In the absence of mitigation or landscape planting, the cleared corridor of the Scheme is likely to act as a barrier to the movement and dispersal of dormice leading to fragmentation of the population.

[2] P Bright et al (2006). Dormouse Conservation Handbook, English Nature.

3.6 Post development interference impacts

3.6.1 Post construction of the Scheme there will be long-term maintenance requirements in terms of hedge cutting and thinning of woodland plantations within the landscape plans. These will be undertaken by the South Wales Trunk Roads Agency under appropriate licences.

3.7 Predicted scale of impacts

3.7.1 In the absence of mitigation or compensation the local population of dormice could be negatively affected. This assessment is based on the assumption that a small population is present.

4 Mitigation Strategy

4.1 Site clearance

4.1.1 The vegetation clearance will be undertaken using a phased method in accordance with guidance in the Dormouse Conservation Handbook with respect to the time of year, and under the supervision of the Named Ecologist or accredited agents.

4.1.2 It is anticipated that the vegetation clearance will be undertaken over winter prior to the construction commencing, with the tree stumps removed in the following April.

4.1.3 If dormice are found, at any point during the clearance works, the nest and dormouse will be placed inside a nest box by the licensed ecologist or their accredited agent. The nest box will then be moved to an area of suitable dormice habitat within the retained habitat, outside the zone of construction. The nest, box and dormouse will be located in an area protected from frost and direct sunlight in accordance with advice given in section 5.9 of the Handbook.

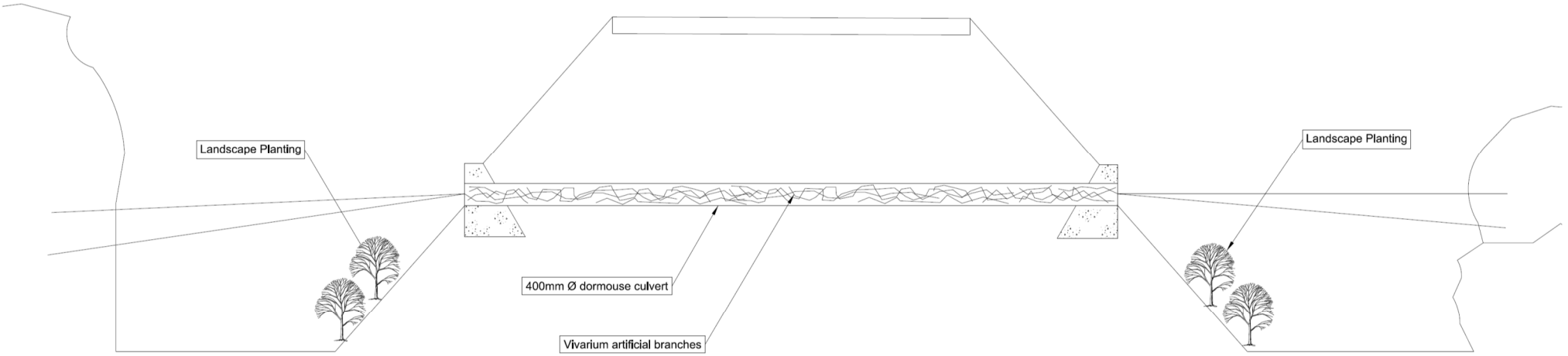
4.2 Enhancement and compensation measures

4.2.1 The landscape design for the Scheme incorporates 11.3ha of woodland and scrub planting that will be suitable for dormice, along with 4.11km of hedgerows. This provides replacement habitat for that lost under the footprint of the Scheme at a ratio of 2.15:1.

4.2.2 The habitats being created comprise a mixture of woodland, linear tree belts, shrubs, scattered woodland, scrub planting and hedgerows. The species composition within these areas will be based on the guidance within the Dormouse Conservation Handbook and will ensure suitable food sources for dormice are available throughout the year.

4.2.3 In order to reduce the effects of severance two dormouse crossing structures have been incorporated in to the design of the Scheme to maintain connectivity between Blaen-Pen-Troydin Wood and other areas of dormouse habitat to the north. The locations of these are shown on the Environmental Masterplans provided in Appendix A.

4.2.4 The crossing points will comprise a 400mm diameter pipe buried within the embankment, through which branches and hemp ropes will be placed to provide a natural substrate to allow dormice to safely pass from one side to the other as shown in Picture 1 below.



Picture 1 Indicative Dormouse Crossing Design

4.3 Additional Mitigation Measures

4.3.1 In addition to the provision of crossing structures and replacement planting, the following measures will also be employed during the construction of the Scheme to reduce any impacts on dormice:

c) Restrictions on working hours to avoid night working and task lighting, such that no night working is undertaken in the vicinity of retained dormouse habitat, and any task lighting elsewhere is restricted to ensure no light spill into adjacent habitats (such as vegetation).

d) Where possible, mature hedgerows affected by the construction works will be translocated to suitable receptor sites.

4.4 Mechanism for ensuring delivery of mitigation and compensation measures

4.4.1 It is anticipated that the provisions of the compensation above will be included within the Construction Environmental Management Plan (CEMP) being prepared by the Contractor for the works.

4.4.2 Mitigation measures will be set out in a 'toolbox talk' at the outset of works, in addition to being explained to the site contractors at a pre-works commencement meeting on site.

4.4.3 The Named Ecologist or accredited agent will be on site for the duration of relevant parts of the works to ensure that actions are being implemented in accordance with the licence.

5 Post-development Site Safeguard

5.1 Habitat / Site Management and Maintenance

5.1.1 All habitat planting will be checked every year for three years to ensure that they have not been damaged and are in healthy condition.

5.1.2 The replacement habitat for dormice within the Scheme footprint will be safeguarded by virtue of being within the highway boundary. These areas will be managed and maintained by the South Wales Trunk Roads Agency following the end of the aftercare period.

5.2 Population and Habitat Use Monitoring

5.2.1 Nest tubes will be used to monitoring the use of replacement and retained habitats by dormice. This will be undertaken as set out in the table below.

Habitat Area	**Years post construction in which monitoring to be undertaken**
Retained habitats	1, 2, 3, & 5
Replacement planting	3, 4, 5 & 7

5.2.2 The results of the monitoring will be reported to NRW and other relevant statutory environmental bodies on an annual basis. In addition, the scope of the monitoring, methods and results will be discussed through further engagement with the Environmental Liaison Group during and post-construction.

5.3 Mitigation contingencies

5.3.1 Prior to commencement of work a meeting will take place with the site team managers, who will be briefed regarding constraints on working methods and a copy of this method statement held in the site office. The site managers will maintain communication with the Named Ecologist to ensure that they will be present during works that may cause disturbance to dormice, and provide prior notice of when the vegetation clearance are programmed to go ahead.

5.3.2 Prior to any works on site, the licenced ecologist or accredited agent will provide a tool-box talk to the workers on site, and they will sign a copy of this method statement to provide evidence that they have read and understood the sensitivity of the work.

5.3.3 The Named Ecologist or accredited agent will be supervising and recording all works covered under the licence, in addition to recording any dormice found.

5.3.4 Upon identifying any additional actions or remedial work that is required, this will be discussed with NRW to ensure the Favourable Conservation Status (FCS) of the local dormouse population is maintained.

5.4 Biosecurity Measures

5.4.1 All equipment and footwear will be cleaned thoroughly before entering the site with a suitable disinfectant. No invasive species are known to be present within the site, and therefore there are no risks of spreading these from the site.

6 Timetable of works

6.1.1 A detailed timetable of works will be prepared for the licence application once the construction programme is known. However it is anticipated that clearance of vegetation would be cleared over the winter and spring period preceding the commencement of construction works.

7 Land ownership – Mitigation site

7.1 Mitigation/compensation site ownership

7.1.1 The land within the existing highways boundary is own by Welsh Government as part of the Trunk Road network and managed by the South Wales Trunk Roads Agency. Areas of land for the Scheme will be acquired through compulsory purchase order.

7.2 Mitigation site /compensation ownership post construction

7.2.1 The Scheme will remain in ownership of Welsh Government. The areas of the existing A40 that will no longer be part of the trunk road network will revert to the ownership of Pembrokeshire County Council as the Highways Authority.

8 Consideration of the Conservation of Habitats and Species Regulations 2017

8.1 Consideration of Regulation 55(2)(e)

8.1.1 The proposed Scheme is considered to be of overriding public interest as it will provide a bypassing of the village of Llandewi Velfry and improve journey times and journey time reliability on an important trunk road.

8.2 Consideration of Regulation 55(9)(a)

8.2.1 The habitats supporting dormice within the footprint of the Scheme will need to be to be cleared in order to allow the construction of the Scheme. There are no alternative options as any changes to the alignment would cause other areas of habitat to be cleared.

8.3 Consideration of Regulation 55(9)(b)

8.3.1 The Favourable Conservation Status of the dormouse will be maintained through the provision of replacement habitat within the landscape planting for the Scheme.

Appendix A

Scaled plans and drawings of the site

A1 Dormouse Survey Results

A2 Dormouse Nest Tube Locations

A3 Environmental Masterplans

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.8b: Bat Licence Draft Method Statement

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A2 Bat Roost Survey Summary Plan

A3 Enviromental Master Plans

B1 Thomson Ecology Bat Survey Results Report

B2 Thomson Ecology Bat Survey Schedule Report

1 Introduction

The Welsh Government has appointed Ove Arup & Partners Ltd to undertake initial design and consenting work for the Llanddewi Velfrey to Penblewin section of the A40 Improvements including a new bypass around Llanddewi Velfrey. These proposals are hereafter known as 'the Scheme'.

The Scheme will extend from Penblewin roundabout (Grid Reference: SN 120 166) in the west to the point approximately 0.6km to the east of Llanddewi Velfrey (Grid Reference: SN 157 169) and includes a new section of road through agricultural land to the north of Llanddewi Velfrey. The scheme is approximately 4.3km in length.

1.1 Background to Activity / Development

1.1.1 The Scheme includes improvements to the A40 between Llanddewi Velfrey and the Penblewin Roundabout. This will include the upgrading of 4.3km of highway comprising a 2.5 km offline bypass north of Llanddewi Velfrey, and online improvements including structures, earthworks and new junctions.

Ecological Background

1.1.2 An ecological study was undertaken to assess the potential impacts of the Scheme. This study included an extended Phase 1 habitat survey, and protected species surveys which included amphibians, bats, dormice, otter, water vole, badger, reptiles and breeding birds.

1.1.3 Bat roosts were identified at 14 of the 38 structures surveyed which are located within 50m of the proposed Scheme, with one maternity roost identified at Ffynnon Chapel used by brown long-eared bats (*Plecotus auritus*) and soprano pipistrelle (*Pipistrellus pygmaeus*). In addition, three confirmed bat tree roosts of brown long-eared bats were identified during aerial inspections, two of which are within 50m of the Scheme.

1.1.4 Due to the proximity of bat roosts to the Scheme a licence will be required for the construction works. This method statement provides the information required for a licence application.

1.2 Full details of proposed works that are to be covered by the licence

1.2.1 The construction of the Scheme will entail the following activities:

a) Demolition of one property (Trefangor Cottage) under the footprint of the Scheme;

b) Tree felling;

c) Construction of the Scheme including earthworks, installation of services and drainage network, lighting and surfacing;

d) Landscape planting and fencing.

1.3 Actions requiring licensing

1.3.1 The proposed works will entail the destruction of a small soprano pipistrelle roost at Trefangor Cottage, which will require the exclusion of bats from the cottage at an appropriate time of year.

1.3.2 In addition, a further 13 bat roosts will be disturbed by the construction works.

2 Survey and site assessment

2.1 Existing information on the bat species at the survey site

2.1.1 A desk study of the area was undertaken in 2016 as part of a Preliminary Ecological Appraisal, which included a biodiversity information search from the West Wales Biodiversity Information Centre (WWBIC) for protected species within 2km of the proposed scheme. The biodiversity information search provided seven records and details are provided in Table 1.

Table 1 Bat records within 2km of the site

Species	Number of records	Closest record
Whiskered bat (*Myotis mystacinus*)	1	1.2km
Natterer's bat (*Myotis nattereri*)	1	1.2km
Noctule bat (*Nyctalus noctula*)	2	0.3km
Common pipistrelle (*Pipistrellus pipistrellus*)	3	0.6km
Soprano pipistrelle (*Pipistrellus pygmaeus*)	3	0.3km
Brown long-eared bat (*Plecotus auritus*)	3	0.9km
Greater horseshoe bat (*Rhinolophus ferrumequinum*)	1	1.2km

2.2 Statutory sites notified for the species within 10km

2.2.1 A desk study was undertaken to identify statutory designated sites within 10km of the Scheme. The Multi-Agency Geographic Information for the Countryside (MAGIC) website[1] was reviewed for information on nationally and internationally designated sites of nature

[1] http://magic.defra.gov.uk/magicmap.aspx

conservation importance within 10km. The search included Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites, and Sites of Special Scientific Interest (SSSIs).

2.2.2 One SAC designated for bats was identified within a 10km of the site, and a further two SACs designated for bats identified within 20km of the site. A list of the sites is provided in Table 2.

Table 2 Statutory Designated Sites designated for bats within 20km of the site

Site	**Distance**	**Qualifying features**
Pembrokeshire Bat Sites and Bosherston Lakes / Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherston SAC	9.1km	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
		Greater horseshoe bat (*Rhinolophus ferrumequinum*)
		Lesser horseshoe bat (*Rhinolophus hipposideros*)
		European otter (*Lutra lutra*)
Limestone Coast of South West Wales / Afordir Calchfaen de Orllewin Cymru SAC	17.8km	Vegetated sea cliffs of the Atlantic and Baltic coasts
		Fixed coastal dunes with herbaceous vegetation (grey dunes)
		European dry heaths
		Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (important orchid sites)
		Caves not open to the public
		Submerged or partially submerged sea caves
		Greater horseshoe bat
		Early gentian (*Gentianella anglica*)
		Petalwort (*Petalophyllum ralfsii*)
North Pembrokeshire Woodlands / Coedydd Gogledd Sir Benfro SAC	18.5km	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles
		Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*
		Barbastelle (*Barbastella barbastellus*)

2.3 Objectives of the survey

2.3.1 The bat surveys aimed to establish the presence or likely absence of bat roosts along the route of the Scheme.

2.4 Scaled Plan / map of the survey area

2.4.1 The locations of the bat surveys, and locations with bat potential and the areas of proposed works are shown on a scaled plan and drawings included in Appendix A1 and A2.

2.5 Site / habitat description

2.5.1 The study area is dominated by areas of improved grassland used for cattle grazing. The fields are separated by large hedgerows with trees, with occasional stream corridors with larger areas of broad leaved woodland. The existing A40 corridor is lined with mature hedgerows and areas of mixed plantation woodland, most notably where it passes through Ffynnon wood.

2.6 Field Surveys methodology

2.6.1 A programme of ecological surveys in the vicinity of the Scheme has been undertaken during 2016 and 2017 to inform the Environmental Impact Assessment. The studies have included a desk study of available information undertaken in 2016, and surveys of habitats and species protected by law or otherwise of nature conservation importance in 2016 and 2017. Full details of the surveys undertaken are included within the Environmental Statement for the Scheme.

2.6.2 Bat surveys were undertaken in 2016 by Mott Macdonald Limited. These surveys identified and confirmed roosts or possible roosts in twelve structures within the zone of influence of the development. Thomson Ecology were commissioned by Ove Arup & Partners Ltd to carry out emergence and re-entry surveys in 2017 of 38 buildings and nine trees within the zone of influence of the development, following good practice guidelines (Collins, 2016).

2.6.3 The details and results of the bat surveys are provided below.

Daytime inspections

2.6.4 During the extended Phase 1 Habitat Survey undertaken in 2016, an initial assessment was made of the potential for trees and buildings within the study area to support bat roosts. This bat assessment was undertaken in accordance with the guidance set out in the Bat Conservation Trust (BCT) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, 2016).

2.6.5 Trees within the study area were assessed for the presence of natural holes, woodpecker holes, cracks and splits, loose bark and cavities. The presence of such features were considered in determining the potential for bat roosts to be present and assigning trees to four categories of potential: negligible, low, moderate and high, as recommended by the BCT Guidelines (Collins, 2016).

2.6.6 Buildings within the study area were also assessed for their potential to support bat roosts based on the presence of potential roost access points. Buildings were also categorised as high, moderate, low or negligible potential in accordance with the guidelines.

Roost surveys

2.6.7 Following the initial assessment of trees, an aerial inspection was carried out on trees which had potential roost features identified from the ground. This inspection was undertaken by a licensed bat ecologist and tree climber using a video scope during June and September 2016.

2.6.8 Emergence and re-entry surveys were undertaken on buildings within the study area during August and September 2016 (Dates and weather conditions are included in Appendix B). Due to the lateness of the surveys in relation to the guidelines and the ability to identify maternity roosts, further emergence and re-entry surveys were undertaken in July and August 2017. These 2017 surveys were undertaken by Thomson Ecology and included all buildings and trees within 50m of the Scheme. A schedule of all the emergence and re-entry surveys is provided in Appendix B and the locations are shown within the Thomson Ecology Report in Appendix C.

Survey limitations

2.6.9 The only constraint to the 2016 surveys was the time of the emergence/re-entry surveys in August and September, which may have missed the presence of some maternity roosts. As a result of this further surveys in line with BCT guidance were undertaken in 2017.

2.6.10 A number of limitations were encountered during the 2017 surveys which are described in Table 3.

Table 3 Survey limitations during 2017 surveys

Structure ID	Description of limitation
1	Visit 2 - dusk survey finished approximately 20 minutes early due to heavy rain.
4	Visit 2 - dusk survey finished approximately 20 minutes early due to heavy rain.
5	Trees obstructed view of the north, east and west sides of the building.
6	Survey carried out from track as access not granted to private land.
8	Visit 2 - moderate to heavy showers during dawn survey.
9	Visit 2 – dawn completed in heavy rain.
13	Part of southern side of building obscured by dense vegetation. Not a significant limitation.
14	No access to the northern side of the building.
19	Visit 2 – dusk survey finished approximately 30 minutes early due to sustained heavy rain.
20	Access not granted to the back of the building.
22	Limited view of the west side of the building due to the proximity of a hedgerow.

Structure ID	Description of limitation
23	Dense vegetation obstructing view of the back of the building.
24	The north end of the culvert was surveyed from the top of a steep sided slope, making visibility of, and access to, the culvert entrance difficult. The south entrance to the culvert was located in dense vegetation and could not be safely located or accessed.
27	Dense vegetation along the eastern side of the building obstructing view. Visit 1 – dusk survey finished 15 minutes early due to onset of heavy rain.
32	North and west sides of the building inaccessible due to dense vegetation.
33	North, east and south sides of the chapel inaccessible due to dense vegetation.
38	Limited visibility of south of building due to trees and dense vegetation.
T7	View of the west side of the tree blocked by dense vegetation.
T19 and T21 – T24	Visit 1 – dusk survey finished 30 minutes early due to onset of heavy rain Visit 2 – occasional heavy showers, however conditions under the canopy stayed relatively dry.
T25	Tree could not be located.

2.7 Survey results

Building surveys

2.7.1 Thirty-eight buildings/properties were surveyed for bats during 2016 by external inspection and emergence/re-entry surveys. Further surveys were undertaken in 2017 to augment the 2016 surveys and confirm the potential presence of maternity roosts. Bat roosts were identified at nine

of the 38 buildings surveyed, with maternity roosts identified at Ffynnon Chapel.

Table 4 Buildings/Sites surveyed for Bats

Reference	Property Name	Building description	2016 results	2017 results
1	Caermaenau-fach	main house	Soprano pipistrelle roost	1 unidentified bat using building
2		Barn	Possible roost	No bats recorded using the building
3		Workshop/Garage	Possible roost	Common pipistrelle – max count of 3
4		building to S of main house	Pipistrelle roost – max count of 8 bats	Soprano pipistrelle – max count of 3 bats Myotis species[2] – max count of 3 bats
5	Trefangor Cottage	Cottage	Soprano pipistrelle roost – single bat	No bats recorded using the building
6	Ffynnon Vestry	Vestry	Soprano pipistrelle roost	Soprano pipistrelle roost – max count 10 bats
7	Maes-y-Ffynnon	House	No bats recorded using the building	No bats recorded using the building
8		outbuilding		Possible soprano pipistrelle roost – single bat
9	Maes-y-Rhos	stone house	Common pipistrelle roost– max count 1 bat	Common pipistrelle roost– max count 2 bats
10		Garage	No bats recorded using the building	No bats recorded using the building
11	Pen-troydin-fach	Farm house	Soprano pipistrelle roost – max count 2 bats Common pipistrelle roost – single bat	Soprano pipistrelle roost – max count 4 bats Common pipistrelle roost – 2 bats

[2] Considered likely to be a common species of Myotis bat: Natterer's bat, Daubenton's bat, whiskered or Brandt's bat

Reference	Property Name	Building description	2016 results	2017 results
12		Farm building 1	No bats recorded using the building	No bats recorded using the building
13		farm building 2	No bats recorded using the building	No bats recorded using the building
14		Farm building 3	No bats recorded using the building	No bats recorded using the building
15		Farm building 4	No bats recorded using the building	No bats recorded using the building
16		Farm building 5	No bats recorded using the building	No bats recorded using the building
17		Farm building 6	No bats recorded using the building	No bats recorded using the building
18	Bethel Cottage	house	No bats recorded using the building	No bats recorded using the building
19		outbuilding	No bats recorded using the building	No bats recorded using the building
20	Bethel Vestry	house	Not surveyed	No bats recorded using the building
21	barn behind Bethel Chapel	barn	Not surveyed	No bats recorded using the building
22	Penrhiw	house	Not surveyed	Soprano pipistrelle roost – max count 7 bats
23	Ffynnon Chapel	Chapel	Brown long-eared maternity roost – max count 30 bats Soprano pipistrelle roost – max count 2 bats	Soprano pipistrelle roost – max county 23 bats. Assumed maternity roost
24	Ffynnon Bridge	Bridge/culvert	Not surveyed	No bats recorded using the building
25	Henllan Lodge	lodge	Not surveyed	Soprano pipistrelle maternity roost – max count 68 bats

Reference	Property Name	Building description	2016 results	2017 results
26	Brominau	house	Not surveyed	No bats recorded using the building
27		outbuilding	Not surveyed	No bats recorded using the building
28	Trefangor Farm	farmhouse	Not surveyed	Soprano pipistrelle roost – max count 12 bats
29		Outbuilding 1	Not surveyed	No bats recorded using the building
30		Outbuilding 2	Not surveyed	No bats recorded using the building
31		Outbuilding 3	Not surveyed	No bats recorded using the building
32		Outbuilding 4	Not surveyed	No bats recorded using the building
33		Outbuilding 5	Not surveyed	No bats recorded using the building
34	Bethel Chapel	chapel	Common pipistrelle roost – single bat	Soprano pipistrelle roost – max count 13 bats
35	Penblewin	House	No bats recorded using the building	No bats recorded using the building
36		white barns	Common pipistrelle roost – single bat Soprano pipistrelle – single bat	No bats recorded using the building
37		barn 2	No bats recorded using the building	No bats recorded using the building
38		Stone Barn	No bats recorded using the building	Possible soprano pipistrelle roost – single bat

Trefangor Cottage

2.7.2 During 2016 a single soprano pipistrelle bat emerged from a joint between the main building and the extension during an emergence survey on 31st August 2016. An unknown bat may also have emerged from the building. The 2017 surveys were limited in the ability to observe the rear of the building, although no bats were recorded emerging from the front aspects. It is therefore assumed that soprano pipistrelle bats continue to use the building.

Tree climbing surveys

2.7.3 An inspection of 39 trees was undertaken by ground based and aerial climbing methods. Three confirmed roosts of brown long-eared bats were identified from either the presence of bats or droppings which were analysed for DNA identification in 2016. These roosts were located in an ash tree in a hedgerow near Grosvenor Court (T13), a beech tree within the avenue south of Henllan Lodge (T21), and an ash tree near to Henllan Farm. The locations of trees with potential for bats are shown on in Appendix A.

2.7.4 No further bat roosts were identified in the trees located within 50m of the proposed Scheme alignment during emergence and re-entry surveys (of trees with moderate or high potential to support bats).

2.8 Interpretation / evaluation of survey results

2.8.1 The roosts of soprano pipistrelle, common pipistrelle, brown long-eared bat and Myotis species are considered to be of local importance as these are relatively common or widespread species in Wales.

3 Impact Assessment

3.1 Short-term impacts

Disturbance

3.1.1 There are 14 bat roosts and one possible roost located within buildings within 50m of the proposed constructions areas, which are likely to experience disturbance through noise or vibration caused by construction works, however it is noted that these roosts are located in buildings near to or adjacent to an existing trunk road.

3.1.2 The disturbance of other roosts is considered to be a moderate magnitude impact which would be a significant effect at a local scale if maternity roosts were subject to significant disturbance during the period when bats have dependent young.

Incidental mortality during site clearance and construction

3.1.3 Given the presence of bats across the survey area, in the absence of mitigation there is potential for incidental mortality during site clearance and construction works adjacent to habitat with roosting potential, or where there are previously identified roosts.

3.2 Long-term impacts: roost modification

3.2.1 Not applicable (a roost will be lost as the building will be demolished as part of the proposed Scheme).

3.3 Long-term impacts: Roost loss

3.3.1 The construction of the proposed Scheme would result in the loss of a roost site within Trefangor Cottage. No other buildings will be demolished.

3.3.2 The loss of a roost site for a single soprano pipistrelle at Trefangor Cottage is considered to be a low magnitude impact which is unlikely to be significant.

3.4 Long-term impacts: fragmentation and isolation

3.4.1 To allow for the construction of the proposed Scheme, habitat loss through vegetation clearance will cause long-term effects. This habitat loss could lead to the fragmentation of habitats which may prevent certain species - such as horseshoe bats - from crossing the gaps created and accessing foraging areas. It could also lead to mortality through bats being stricken by oncoming traffic, if the vegetation lost was used by bats to cross the road (with horseshoe bats being one of the most affected species). Replacement habitat has been included within the landscape plan, and will be created as part of the mitigation programme.

3.4.2 A full assessment of the implications of the Scheme on foraging and flight routes of bats is provided within the Environmental Statement and Statement to Inform an Appropriate Assessment which have been prepared for the Scheme.

3.5 Post development interference impacts

3.5.1 Once constructed the Scheme will be open for vehicles and no further impacts are predicted. The level of disturbance from vehicles using the Scheme will not be sufficient to cause additional disturbance, or will be equivalent to disturbance present in the existing situation.

3.6 Predicted scale of impact

3.6.1 In the absence of mitigation or compensation for the works to negatively affect bat as described above. The loss of the roost within Trefangor Cottage (used by single or small numbers of soprano pipistrelle bats) is considered to be a minor impact that is not significant. The disturbance of other roosts including maternity roosts is considered to be a moderate scale impact, however it is noted that the majority of these roosts are in close proximity to an existing trunk road.

4 Works to be undertaken

4.1 Capture and exclusion

4.1.1 Bats within Trefangor Cottage will be excluded using Constantine devices (as shown in Figure 1) which allow bats to leave the roost but not return. This is likely to be undertaken in spring or autumn subject to the construction programme and granting of a European Protected Species Licence by NRW.

4.1.2 The devices will be installed on all potential roost entrances and be left in place for a minimum of 1 week. If poor weather conditions are experienced during this period, the duration will be extended. Once the Named Ecologist is satisfied that any bats present have left the building, the roof covering will be removed by hand under the supervision of an ecologist named on the EPS licence. If bats are found during this process they will be removed and placed in one of the bat boxes that will be erected for the Scheme.

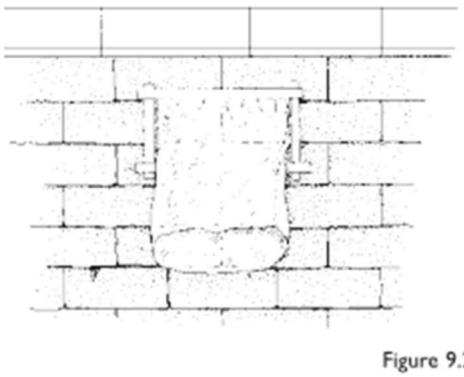

Figure 1 Examples of Constantine devices to exclude bats (JNCC, 2004)

4.2 Bat roost and habitat

In-situ retention of roost(s)

4.2.1 13 of the confirmed roosts and the one unconfirmed possible will be retained during the construction of the Scheme, although they may be subject to disturbance during construction activities.

Modification of existing roost(s)

4.2.2 There will be no roost modification impacts .

New roost creation

4.2.3 A minimum of nine bat boxes will be erected on retained mature trees within the footprint of the Scheme or within 50m of the Scheme prior to the start of construction and exclusion of bats from Trefangor Cottage. The boxes will comprise a mixture of Schwegler box types or equivalent makes. The location of the boxes will be determined by the Named Ecologist following completion of the detailed design work once the location of retained trees is confirmed.

4.2.4 The boxes will be installed on trees at a height of 3 to 6 m above ground level on the west, south and east aspects of the tree respectively, offering a range of internal microclimatic regimes that the bats can easily move between as necessary.

Maintenance &/or modification of new and existing habitat

4.2.5 A scheme of landscape planting has been devised to maintain connectivity around the scheme and to provide safe crossing points for bats through the provision of 1.8m diameter underpasses, NMU underpasses and planting.

Scaled maps / plans

4.2.6 Scaled plans are provided in Appendix A1.

4.3 Mechanism for ensuring delivery of mitigation and compensation measures

4.3.1 All mitigation and compensation measures will be undertaken during the period of licensed works and will therefore be ensured by the bat licence. The named ecologist or accredited agent will check that the bat boxes have been installed appropriately prior to commencement of exclusion works.

4.3.2 It is anticipated that the provisions of the mitigation and compensation measures will be included within the Construction Environmental Management Plan (CEMP) being prepared by the Contractor for the works.

4.4 Mitigation contingencies

4.4.1 If the exclusion devices are damaged in any way during the exclusion period, they will be repaired/re-fitted and the exclusion period will be extended for a further three nights.

4.4.2 If any injured bats are encountered during the soft strip works, they will be placed in an appropriate container and transported to the nearest bat carer or be cared for by the named ecologists and accredited agents until fit for release.

4.4.3 In the unlikely event that bat species other than soprano pipistrelle are found during the soft strip, more than five bats are found, or it becomes apparent that the roost is of greater conservation status than an occasional roost (e.g. a maternity roost), the soft strip works will stop immediately and Natural Resources Wales will be contacted to agree an appropriate course of action.

4.4.4 If following completion of the detailed design work it is apparent that significant earthworks are required within 60m of the maternity roosts identified on the Scheme, the timing of such works will be limited to avoid the period when bats may have dependent young.

4.5 Biosecurity risk assessment

Biosecurity risk associated with the proposed demolition works and associated mitigation is assessed as negligible, as no invasive species

have been recorded in the vicinity of the building and any bats captured during the soft strip will be released close to the building, thereby not facilitating the spread of any disease carried by the bats beyond their natural range.

4.5.1 All equipment used to handle or contain bats will be new or disinfected prior to use to prevent transfer of disease.

5 Post-development Site Safeguard

5.1 Habitat / site management and maintenance

5.1.1 The trees on which the bat boxes are to be installed will be safeguarded by virtue of being within retained areas, and by being marked by suitable warning signs during the construction period.

5.1.2 The bat boxes will be checked from ground level every year for three years after installation to ensure that they are still in position and have not been damaged. If any of the boxes are lost or significantly damaged within the first three years of installation they will be replaced.

5.2 Population and habitat use monitoring

5.2.1 Monitoring of the use of replacement bat boxes will be undertaken during the construction period and for five years post-construction. The monitoring will be undertaken by a licenced bat specialist on three occasions each year.

5.2.2 If any of the boxes are lost or significantly damaged within the first three years of installation they will be replaced.

5.2.3 The results of the monitoring will be reported to NRW and other relevant statutory environmental bodies on an annual basis. In addition, the scope of the monitoring, methods and results will be discussed through further engagement with the Environmental Liaison Group during and post-construction.

5.3 Post-development mitigation contingencies

5.3.1 The bat boxes will not require management after the completion of the works. If found to be damaged, the bat boxes will be replaced by the South Wales Trunk Roads Agency.

5.4 Mechanism for ensuring delivery of post-development works

5.4.1 Following the end of construction the mitigation measures will be monitored during the after-care period to ensure they are available for bats. There will be no other post-development works.

6 Timetable of works

6.1.1 A detailed timetable of works will be prepared for the licence application once the construction programme is known. However it is anticipated that the exclusion of bats from Trefangor Cottage would take place in either the spring or autumn preceding the start of construction.

7 Land ownership – Mitigation site

7.1 Mitigation/compensation site ownership

7.1.1 The land within the existing highways boundary is own by Welsh Government as part of the Trunk Road network and managed by the South Wales Trunk Roads Agency. Areas of land for the Scheme will be acquired through compulsory purchase order.

7.2 Mitigation site /compensation ownership post construction

7.2.1 The Scheme will remain in ownership of Welsh Government. The areas of the existing A40 that will no longer be part of the trunk road network will revert to the ownership of Pembrokeshire County Council as the Highways Authority.

8 Consideration of the Conservation of Habitats and Species Regulations 2017

8.1 Consideration of Regulation 55(2)(e)

8.1.1 The proposed Scheme is considered to be of overriding public interest as it will provide a bypassing of the village of Llandewi Velfry and improve journey times and journey time reliability on an important trunk road.

8.2 Consideration of Regulation 55(9)(a)

8.2.1 The structure where the existing bat roost is located will need to be to be demolished in order to allow the construction of the Scheme. There are no alternative options as any changes to the alignment would cause other buildings to need to be demolished.

8.3 Consideration of Regulation 55(9)(b)

8.3.1 The Favourable Conservation Status of the soprano pipistrelle will be maintained through the provision of bat boxes providing summer roosting opportunities within areas of retained trees in proximity to the Scheme.

Appendix A

Scaled Plans

A1 Bat Roost Suitability Results (3 Sheets)

Appendix B

Survey Dates

B1

Appendix C

2017 Emergence Survey Report

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 8.8c: Badger Licence Draft Method Statement CONFIDENTIAL

A40LVP-ARP-EBD-SWI-RP-LE-0007

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11/10/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Tables

Table 1 Badger Setts and their proximity to the Scheme 4

Appendices

A1 Badger Survey Results Plans (3 Sheets)
A2 Badger Setts Requiring Closure Plans (3 Sheets)
B1 Environmental Master Plans

1 Introduction

The Welsh Government has appointed Ove Arup & Partners Ltd to undertake initial design and consenting work for the Llanddewi Velfrey to Penblewin section of the A40 Improvements including a new bypass around Llanddewi Velfrey. These proposals are hereafter known as 'the Scheme'.

The scheme will extend from Penblewin roundabout (Grid reference: SN120166) in the west to the point approximately 0.6km to the east of Llanddewi Velfrey (Grid reference: SN157169), and include a new section of road through agricultural land to the north of Llanddewi Velfrey. The scheme is approximately 4.3km in length.

The Scheme includes improvements to the A40 between Llanddewi Velfrey and the Penblewin Roundabout. This will include the upgrading of 4.3km of highway comprising 2.5km offline bypass of Llanddewi Velfrey and online improvements including structures, earthworks and new junctions.

1.1 Ecological Background

1.1.1 An ecological study was undertaken to assess the potential impacts of the new scheme. This study included an extended Phase 1 habitat survey, and protected species surveys which included amphibians, bats, dormice, otter, water vole, badger, reptiles and breeding birds.

1.1.2 Badgers are protected under the Protection of Badgers Act 1992 due to their history of persecution. Due to the presence of badger setts in the study area a licence will be required to facilitate the construction works. This report provides the information required for a licence application. This information includes a summary of the construction phase works and necessary mitigation requirements.

1.2 Details of works proposed to be covered by the licence

1.2.1 The construction of the Scheme will entail the following activities:

a) Tree felling;

b) Construction of the Scheme including earthworks, installation of services and drainage network, lighting and surfacing;

c) Landscape planting and fencing.

1.3 Actions requiring a licence

1.3.1 The construction of the Scheme will result in the closure of 9 setts which are under the footprint of the Scheme and disturbance of a further 13 setts due to their proximity to the Scheme. Some of these 13 setts may need to be closed depending on the proximity to the construction works.

2 Survey Information

2.1 Methods

2.1.1 The badger survey was undertaken in April 2016 for the whole of the study area extending 250m either side of the indicative centre line of the Scheme (TR111 line). Surveys included a search for characteristic field signs (faeces, setts, paths, scratching posts, snuffle holes, day nests, hair traces, footprints and latrines). Where setts were identified, these were classified in terms of their type and level of activity in reference to available guidance[1].

2.1.2 A further survey was undertaken in October 2017 to confirm the location and type of setts within the corridor 50m either side of the Scheme design.

2.2 Survey Results

2.2.1 A total of 48 setts or possible setts were recorded within the study area during the 2016 surveys. A further six setts were recorded during 2017 surveys which were targeted to confirm sett location and type. The survey data from 2017 confirmed that six of the possible setts recorded in 2016 were not being used by badgers.

2.2.2 The locations of setts are shown on Figure 8.81 - 83. The 48 setts therefore comprise six main setts, one annex sett, two subsidiary setts and 38 outliers (further information is supplied in Appendix 8.6).

2.2.3 Where possible the potential arrangement of family groups (clans) have been inferred based on the proximity to other setts and associated field signs. Six potential clans (shown as A to F on Figure 8.81 - 83) were identified although not all setts could be attributed to a family group.

2.2.4 The habitats present within the study area provide optimum habitat for badgers and it is anticipated that population levels will be high with small territory sizes. As badgers are widespread and common throughout West Wales, the population of badgers was considered to be of local importance.

[1] Harris, S., Cresswell, P. & Jefferies, D., 1989. Surveying Badgers.

2.3 Impact assessment

2.3.1 Nine of the badger setts identified are located within the proposed footprint of the engineering layout for the Scheme. A further 13 setts are located with 30m of the areas required for the construction of the Scheme, including one main sett (as shown in Table 1). There is the potential for badgers to be killed or injured by construction activities in the vicinity of setts if the works result in the collapse of tunnels or chambers within the setts. Furthermore, there is the potential for badgers to be displaced from setts if subject to significant disturbance.

Table 1 Badger Setts and their proximity to the Scheme

Sett No	Type	Under footprint of Scheme	With 30m of proposed works	Outside zone of influence (30m)
A1	Main	×	✓	×
A2	Subsidiary	✓	×	×
A3	Outlier	✓	×	×
A4	Outlier	×	✓	×
A5	Outlier	×	✓	×
B1	Main	×	✓	×
B2	Subsidiary	×	✓	×
B3	Outlier	×	✓	×
B4	Outlier	✓	×	×
B5	Outlier	×	✓	×
B6	Annex	×	×	✓
B7	Outlier	×	×	✓
B8	Outlier	×	✓	×
B9	Outlier	✓	×	×
B10	Outlier	✓	×	×
C1	Main	×	✓	×
C2	Outlier	×	×	✓
C3	Outlier	✓	×	×
C4	Outlier	×	✓	×
C5	Outlier	✓	×	×
C6	Outlier	×	✓	×
C7	Outlier	×	✓	×
D1	Main	×	×	✓
D2	Outlier	×	×	✓

Sett No	Type	Under footprint of Scheme	With 30m of proposed works	Outside zone of influence (30m)
D3	Outlier	×	×	✓
D4	Outlier	×	×	✓
D5	Outlier	×	✓	×
D6	Outlier	×	×	✓
D7	Outlier	×	×	✓
D8	Outlier	×	×	✓
D9	Outlier	×	×	✓
E1	Main	×	×	✓
E2	Outlier	×	×	✓
E3	Outlier	×	×	✓
E4	Outlier	×	×	✓
F1	Main	×	×	✓
U1	Outlier	×	×	✓
U2	Outlier	×	×	✓
U3	Outlier	×	×	✓
U4	Outlier	×	×	✓
U5	Outlier	✓	×	×
U6	Outlier	✓	×	×
U7	Outlier	×	×	✓
U8	Outlier	×	×	✓
U9	Outlier	×	×	✓
U10	Outlier	×	×	✓
U11	Outlier	×	×	✓
U12	Outlier	×	×	✓

2.3.2 The potential for badgers to be killed or injured during construction is considered to be a moderate scale effect which would be significant.

3 Method Statement/Mitigation Strategy

3.1 Mitigation / Compensatory Measures

3.1.1 The badger setts under the footprint of the Scheme will be closed permanently. Those within 30m of the construction activities will be excluded, although where possible the exclusion will only be temporary to ensure that badgers are neither disturbed or harmed during the construction works.

3.1.2 One replacement sett will be provided for the main sett B1 that is located within 30m of the Scheme as shown on the Environmental Masterplans. The replacement sett will be constructed from wooden posts and plastic pipe sections as shown on the attached plans. The replacement sett is to be located within an area being purchased by Welsh Government for the construction of a attenuation pond but will be located more that 30m away from the road construction area.

3.1.3 All site operatives will receive a toolbox talk from the named ecologist or accredited agent on badgers and the requirements of the licence.

3.1.4 No vehicles involved with construction will be allowed within 30m of the artificial sett, and overnight works will be avoided in order to minimise disturbance to badgers.

3.1.5 Where possible percussive techniques will be kept to a minimum.

3.1.6 The Scheme design includes a number of oversized stream culverts and mammal underpasses to ensure that badgers can move between different setts and safely pass under the road. Fencing along the boundary of the Scheme will act to guide badgers to these safe crossing points. Further details of the mitigation measures are provided in the Environmental Statement for the Scheme and shown on the Environmental Masterplans.

3.2 Methodology for Sett Closure

3.2.1 The following methods will be used to close all entrances of the setts to prevent the risk of badgers being present in chambers or tunnels within the area of the works. The artificial sett will be constructed prior to main sett closure.

3.2.2 Prior to the exclusion of the sett entrances, any undergrowth will be cleared using hand power tools, although larger hedgerow trees will be retained. This will allow any currently hidden entrances to be found and facilitate the installation of wire mesh.

3.2.3 One-way badger gates constructed in accordance to the specification set out in the Design Manual for Roads and Bridges Volume 10, Section 4 Part 2 (HA 59/92 Mitigating Against Effects on Badgers) will be placed at all the entrances where badgers will be excluded. The gates will be surrounded by welded mesh fencing laid on the ground for a radius of 5m around each entrance. For the first week following installation the gates will be held open using wire.

3.2.4 The wire mesh will be held down on the ground using metal or wooden pegs and brought up around the base of trees and secured with wire. The aim of this mesh is to prevent badgers from digging around the gates back in to the sett.

3.2.5 Once the gates have been in place for a week the gates will be set in a one-way position so that animals are only able to come out of the entrances but are not able to re-enter. Soft sand will be placed in the entrances to record footprints of animals and the trail cameras will also be used to record if any animals are using the entrances being closed.

3.2.6 The gates will be inspected on a daily basis for at least one week and only once the named ecologist and/or accredited agents on the licence are satisfied that there is no potential for badgers or other mammal species to be trapped within the entrances the gates will be wired shut to prevent re-entry.

4 Timetable of Works

4.1.1 A detailed timetable of works will be prepared for the licence application once the construction programme is known. However, it is anticipated that the exclusion of badgers from the setts would take place during the period from July to November preceding the start of construction.

5 Monitoring

5.1.1 Monitoring of the use of the replacement sett will be undertaken during the construction period and for five years post-construction. The monitoring will be undertaken using trail cameras to record badgers use of the sett. Retained setts, including those temporarily closed during the construction of the Scheme, will be monitored annually for two years following the completion of the construction of Scheme.

5.1.2 The results of the monitoring will be reported to NRW and other relevant statutory environmental bodies on an annual basis. In addition, the scope of the monitoring, methods and results will be discussed through further engagement with the Environmental Liaison Group during and post-construction.

6 Conclusion

6.1.1 The construction of the A40 Llandewi Velfry to Penblewin Improvements will result in the closing of a number of badger setts. The majority of these are small outlier setts although one main sett will also need to be closed due to its proximity to the construction works.

6.1.2 Badgers will be excluded from the setts to ensure that no animals are harmed. A replacement sett will be provided for the main sett which will need to be closed.

6.1.3 The mitigation measures are deemed sufficient to mitigate the effects on badgers from the Scheme.

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.1: LANDMAP Aspect Area Descriptions

A40LVP-RML-ELS-SWI-RP-L-0003

P02 | S3

02/10/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 LANDMAP Evaluation of Landscape Character Areas

1.1 Visual and Sensory Aspect Areas

Clarbeston Road (PMBRK-VS-042)

Condition of Landscape: Fair	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The Aspect Area is a fairly typical rural landscape featuring a rolling agricultural and woodland mosaic with scattered villages and farmsteads that is enhanced by the presence of a large number of mature trees.			
Summary Description The relatively large Aspect Area of Clarbeston Road contains an agricultural landscape with a mixture of large open fields and smaller fields which typically have mature trees in hedgerow boundaries. Some areas contain clusters of small-scale wooded valleys and the area is interspersed with occasional farmsteads and small villages. The relatively "enclosed" character to the landscape results from a high degree of mature hedgerow and woodland. Change detection 2014: Various developments at Withybush means that this part now forms new aspect area. Generally some increase of developments north of Haverfordwest. This is now 'landscape with very occasional turbines'.			
LANDMAP Aspect Areas Overlap Historic Landscape: PMBRK-HL-46204 – Wiston Llawhaden, 46208 – Walton East, 46224 – Drim Wood. Cultural Landscape: PMBRK-CL-009 – Railway System, 196 – Lowlands, 977 – Principal Roads.			

New Inn (PMBRK-VS-044)

Condition of Landscape: Fair	**Value of Landscape**: High	**Scenic Quality**: High	**Character Evaluation**: High
Overall Evaluation: High The area has been judged as having two moderate and high evaluations. The fine grained field patterns on the upland slopes and views over the coast justify high evaluation.			
Summary Description The New Inn Aspect Area, covering several geographically close areas of land contains an upland agricultural landscape with scattered farmsteads throughout. Mature trees in overgrown hedges and woodland belts often associated with small valleys include a strong presence of conifer plantations which add to the upland association of the landscape. Borrowed views of Preseli Hills add to this upland sense of place.			

LANDMAP Aspect Areas Overlap

Historic Landscape: PMBRK-HL-42472 - Llandissilio, 46208 – Walton East.

Cultural Landscape: PMBRK-CL-196 – Lowlands.

Eastern Cleddau (PMBRK-VS-046)

Condition of Landscape: Fair	**Value of Landscape**: High	**Scenic Quality**: High	**Character Evaluation**: High

Overall Evaluation: High

There are fine views along and across the valley focussing on the river corridors with their riparian vegetation and on the pleasing scale of the valley floor with steep wooded valley sides in places. There are also highlights of stone bridges and vernacular architecture and positive landmarks such as Llawhaden church. The area has a consistent character and is generally well managed with only the A40[T] as a detractor affecting a small part of the southern stretch of the aspect area. The area has a sense of place that is defined by the river corridors set within the wider agricultural landscape that is visually enhanced by the high frequency of mature trees along the rivers and in overgrown hedgerows. Places such as around Llawhaden church and bridge have a strong sense of place. The landscape is similar to many valleys in Pembrokeshire.

Summary Description

The Eastern Cleddau aspect area contains a gentle agricultural valley landscape with an open lowland character, dominated by the meandering Eastern Cleddau river through the valley bottom. The area also includes steep valley sides in places, covered with deciduous woodland that help define the character and enclosed feel of the area. The area has with some clumps of riparian woodland and mature trees featuring in overgrown hedgerows and contains scattered farmsteads and hamlets linked by minor lanes. There are stone bridges such as at Llawhaden which add to the character and vistas along the valley towards traditional settlements. Overall the area feels tranquil apart from where it is crossed by the A40[T]. Change detection 2014: Robeston Watham bypass and junction has cut through and opened up some views to and from.

LANDMAP Aspect Areas Overlap

Historic Landscape: PMBRK-HL-42472 - Llandissilio, 42473 – Clynderwen, 43906 – Canaston and Minwear Woods, 46162 – Amroth, 46204 – Wiston and Llawhaden, 46205 – Robeston Wathen, 46206 – Llanddewi Velfrey, 46208 – Walton East, 46224 – Drim Wood.

Cultural Landscape: PMBRK-CL-009 – Railway System, 196 – Lowlands, 977 – Principal Roads.

Narberth (PMBRK-VS-048)

Condition of Landscape: Fair	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The Aspect Area is a relatively attractive market town set within the agricultural landscape of south Pembrokeshire.			
Summary Description The Aspect Area contains the mid-sized historic market town of Narberth which is situated on a higher area of ground at the western limit of Lampeter Vale and acts as a focal point within the wider landscape of agricultural land in other Aspect Areas. The settlement contains mixed development with the remains of Narberth Castle adding to the sense of place. Change detection 2014: expansion of housing and industry in north.			
LANDMAP Aspect Areas Overlap Historic Landscape: PMBRK-HL-46205 – Robeston Wathen, 46206 – Llanddewi Velfrey, 46207 – Narberth. Cultural Landscape: PMBRK-CL-009 – Railway System, 196 – Lowlands, 829 – Narberth.			

Templeton (PMBRK-VS-047)

Condition of Landscape: Fair	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The Aspect Area contains a high presence of attractive minor lanes with species rich hedgebanks and scattered woodland associated with small streams set in a lowland farm landscape. These are affected only locally by modern leisure development to the west.			
Summary Description The large Aspect Area of Templeton is comprised of an undulating farmland landscape on the eastern edge of the study area The area is crossed by a series of connected hedgebank bounded lanes, with farmland incised by numerous small wooded stream valleys and occasional woodland patches and plantations. It is crossed by the A40[T] and surrounds Narberth and also includes Oakwood Leisure Park and Bluestone Holiday Village. These reduce tranquillity locally. Elsewhere, quiet rural villages & smaller settlements are dispersed throughout. Change detection 2014: increase/enlargement of Bluestone/Oakwood and Folly Farm has made tourism developments more intrusive and a key feature of this area. Robeston Wathen bypass also adds to intrusions.			

LANDMAP Aspect Areas Overlap Geological Landscape: PMBRK-GL-195 – Narberth and Llanddewi Velfrey. Landscape Habitats: PMBRK-LH-885 – North-east of Saundersfoot Historic Landscape: PMBRK-HL-40349 – Lampeter Velfrey, 40350 – Eglwys Cummin, 40353 – Lampeter Vale, 42472 – Llandissilio, 42473 – Clynderwen, 43906 – Canaston and Minwear Woods, 46162 – Amroth, 46163 – Tafarnspite, 46164 – Newhouse, 46166 – Templeton Strip Fields, 46168 – Narberth Mountain, 46205 – Robeston Wathen, 46206 – Llanddewi Velfrey, 46207 - Narberth. Cultural Landscape: PMBRK-CL-009 – Railway System, 196 – Lowlands, 829 – Narberth, 977 – Principal Roads.

Mid Taf Vale (CRMRT-VS-459)

Condition of Landscape: Unassessed	**Value of Landscape**: High	**Scenic Quality**: High	**Character Evaluation**: High
Overall Evaluation: High On account of the scenic quality of the area, its integrity and character.			
Summary Description A lowland river valley, relatively wide valley floor compared to valleys to the east. More wooded to the north and larger agricultural fields to the west. A gentle lush and green landscape, well wooded, strong field pattern with hedgerows in the main. Many mature trees. Small settlement with several traditional buildings at LLanfallteg, elsewhere scattered farms, some with fairly large farmhouses - more akin to Pembrokeshire. Railway runs through the area, but barely visible. Some feeling of enclosure but this is a wider, more open valley than those to the east.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40346 – Pont-Y-Fenni and Whitland Abbey, 40347 – Whitland, 40353 – Lampeter Vale, 40354 – Penbontbren, 42460 – Henllanfallteg, 42472 – Llandissilio, 42473 – Clynderwen, 42474 - Trelech. Cultural Landscape: CRMRT-CL-001 – M4 A48 and A40, 005 – Swansea to Haverfordwest Railway, 050 – Whitland, 061 – Rural Carmarthenshire.			

Efailwen Uplands (CRMRT-VS-964)

Condition of Landscape: Unassessed	**Value of Landscape**: High	**Scenic Quality**: High	**Character Evaluation**: High
Overall Evaluation: High Considered to be high on account of scenic quality largely due to the variety of elements consistent with an upland plateau landscape. The views from this area are also considered to be of high quality.			
Summary Description An area of exposed upland, with extensive views particularly to the east. Enclosed grazing with hedged field boundaries of varying types as well as unenclosed land.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-42472 – Llandissilio, 42473 – Clynderwen, 42474 – Trelech. Cultural Landscape: CRMRT-CL-061 – Rural Carmarthenshire.			

Lampeter Vale (PMBRK-VS-049)

Condition of Landscape: Fair	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The Aspect Areas overall evaluation of "moderate" takes into account the "moderate. values given for all assessment criteria of scenic quality, integrity, character and rarity due to the common nature of this agricultural landscape type within Pembrokeshire.			
Summary Description The Aspect Area of Lampeter Vale contains an agricultural landscape within a gentle "U" shaped valley with areas of rough grazing and frequent overgrown hedgerows displaying mature trees. Woodland plantations and small clumps of trees add to the wooded character of the landscape which has occasional scattered farmsteads throughout. A visual and sensory (noise) detractor is formed by the railway that bisects the southern valley edge and the A40 corridor through the centre of the area.			
LANDMAP Aspect Areas Overlap Historic Landscape: PMBRK-HL-40349 – Lampeter Velfrey, 40353 – Lampeter Vale. Cultural Landscape: PMBRK-CL-009 – Railway System, 196 – Lowlands, 977 – Principal Roads.			

Upper Cwm Taf (CRMRT-VS-119)

Condition of Landscape: Unassessed	**Value of Landscape**: High	**Scenic Quality**: High	**Character Evaluation**: High
Overall Evaluation: High The area is considered to have high scenic quality and high integrity, it is not an especially rare valley as there are others to the east. The landscape consists of a range of attractive elements, field boundaries, woodlands, the river and buildings.			
Summary Description Steep sided and well wooded narrow river valley with attractive farms and small settlements - Login, Llanglydwen and Rhydowen. With narrow roads, high hedges, the area has an enclosed feel.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40354 – Penbontbren, 42460 – Henllanfallteg, 42473 – Clynderwen, 42474 - Trelech. Cultural Landscape: CRMRT-CL-061 – Rural Carmarthenshire.			

Cwmfelin Boeth (CRMRT-VS-747)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The overall score is moderate, although some criteria score high.			
Summary Description A network of open valleys and hills with an overall southerly aspect, valleys are less wooded than adjacent areas. Scattered traditional farms plus small settlements. Mostly narrow roads, some with more open aspect and wider. A hedges landscape with significant tree cover, some small woods and water courses.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40346 – Pont-y-Fenni and Whitland Abbey, 40353 – Lampeter Vale, 40354 – Penbontbren, 42460 – Henllanfallteg, 42473 – Clynderwen, 42474 - Trelech. Cultural Landscape: CRMRT-CL-050 – Whitland, 061 – Rural Carmarthenshire.			

Whitland (CRMRT-VS-115)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate Traditional town quality marred by more modern developments on the settlement edge. Historic core retains integrity evaluation score reflects the effects of more modern development. Retains small market town feel which has been complemented with the construction of the A40 bypass.			
Summary Description A small town, in an open rural lowland setting. The main A40 previously passed through the town, but it is now by-passed.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40345 – Afon Taf, 40346 – Pont-y-Fenni and Whitland Abbey, 40347 – Whitland, 40349 – Lampeter Velfrey, 40353 – Lampeter vale Cultural Landscape: CRMRT-CL-001 – M4 A48 and A40, 005 – Swansea to Haverfordwest Railway, 050 – Whitland, 061 – Rural Carmarthenshire.			

Brandy Hill (CRMRT-VS-103)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate There are other similar landscape in the county, several of which area affected by the pylons that run through them. The area is considered to be of moderate importance for its landscape, one of its attributes being its elevated position.			
Summary Description Rolling lowland hills c.200m max but exposed due to proximity to the coast. An east/west spine of higher land dominates this area, and close to this run the pylons that are a significant element in this landscape. It is an area with a open and working agricultural landscape. On the more exposed land the field pattern is mainly rectilinear, at lower elevations towards the valleys this is less evident. Tavernspite (Pembs.) is the dominant settlement and apart form this, at a junction of roads, there are dispersed farms. There are fewer trees at higher elevations and an increasing feeling of exposure, here most of the hedgerows are flailed. The majority of the land is improved for agriculture and pasture dominates, but there is greater variety of land cover in the valleys that run from the higher ground. Change detection 2014: New A477 bypass cuts through this area bringing intrusive noise, views to and from it, plus nearby single turbine adds to intrusions.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40348 – Allt Ffynnoncyll, 40349 – Lampeter Velfrey, 40350 – Eglwys Cummin Cultural Landscape: CRMRT-CL-061 – Rural Carmarthenshire.			

Cwm Gronw (CRMRT-VS-718)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: High	**Character Evaluation**: Moderate
Overall Evaluation: Moderate The overall score is moderate, scores high against integrity and a scenic quality and moderate against rarity and character.			
Summary Description A steep sided valley, with a mosaic of grassland and woodland, conifers and broad-leaves. Some very attractive parkland type landscape nearer Whitland Abbey with mature field trees. Scattered farms and small roads, quiet.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40346 – Pont-y-Fenni and Whitland Abbey, 42460 – Henllanfallteg, 42474 – Trelech Cultural Landscape: CRMRT-CL-033 – Windfarms, 050 – Whitland, 061 – Rural Carmarthenshire.			

Llanddowror, Old Pale and Whitland Woods (CRMRT-VS-446)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: Moderate
Overall Evaluation: Moderate Moderate, while these valleys are attractive, they are not considered to be of county importance.			
Summary Description Well wooded valleys and valley sides, mostly broad-leaves but with some conifers, with small area of agricultural land. The Llanddowror and Old Pale woods are managed. The Llanddowror area in the east also carries the main road to Pembroke and this together with the settlement creates a linear character. Views into Old Pale wood from the A40 to the north of Llanddowror. Change detection 2014: A477 now bypasses this area, making it more tranquil.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40345 – Afon Taf, 40348 – Allt Ffynnoncyll, 40349 – Lampeter Velfrey, 40350 – Eglwys Cummin Cultural Landscape: CRMRT-CL-005 – Swansea to Haverfordwest Railway, 061 – Rural Carmarthenshire.			

Llanboidy and Blaunwaun Uplands (CRMRT-VS-259)

Condition of Landscape: Unassessed	**Value of Landscape**: Moderate	**Scenic Quality**: Moderate	**Character Evaluation**: High
Overall Evaluation: Moderate Of moderate importance for it visual and sensory landscape, could be considered to be fairly monotonous, but with good views of the Preselis to the west..			
Summary Description An elevated area of plateau, considered as upland on account of its exposure rather than altitude or landscape. Largely improved for agriculture, - a mix of improved grassland and some arable crops, little tree cover and individual trees show sign of wind pruning. Field boundaries are sparse, sometimes only wire or gorse. Also home to Carmarthenshire"s first wind farm at Blaenwaun. Extensive views of the Preselis Could be considered a fairly monotonous landscape when compared to others in the county.			
LANDMAP Aspect Areas Overlap Historic Landscape: CRMRT-HL-40346 – Pont-y-Fenni and Whitland Abbey, 40350 – Penbontbren, 42460 – Henllanfallteg, 42474 – Trelech Cultural Landscape: CRMRT-CL-033 – Windfarms, 061 – Rural Carmarthenshire.			

1.2 Geological Landscape Aspect Areas

Narberth and Llanddewi Velfrey (PMBRK-GL-195)

Condition: Good	**Value**: High	**Rarity/Uniqueness**: High
Overall Evaluation: High Includes nationally important proposed geological SSSI at Pengawse Hill (Ordovician stratigraphy)..		
Summary Description Prominent block with steep scarp surrounding the N, W and SW of Lampeter Vale and formed of Ordovician and Silurian slates, the latter with thin sandstone bands, Dissected by steep-side cwms, most prominently on the N side of the Vale where a sub-plateau feature at around 135-145 m is present in the Llandewi Velfrey area. Scarp also present on the W side of the ridge, W of Narberth.		

1.3 Landscape Habitat Aspect Areas

N.E. of Saundersfoot (PMBRK-LH-885)

Condition: Unassessed	**Value**: Moderate	**Connectivity/Cohesion**: Low
Overall Evaluation Habitat and Species: Moderate Generally low value habitat but has some areas of real value that support a range of key species. A number of relatively large woodland areas are present, particularly near the centre of the Aspect Area which are of value but are not large enough to warrant a separate Aspect Area for a level 3 study. The area also has a number of designations present all be it covering only a small % of the Aspect Area. The area certainly appears to have greater ecological value than a number of other improved grassland dominated Aspect Areas.		
Summary of Key Features An area of predominately improved grassland comprising a considerable number of fields with associated field boundaries. Also present are some small areas of a number of other habitats.		

1.4 Historic Landscape Aspect Areas

Afon Taf (CRMRT-HL-40345)

Condition: Unassessed	**Value**: Outstanding
Overall Evaluation: Outstanding Outstanding - this landscape scores highly in most categories. It is a good example of a relatively rare landscape type.	
Summary Description Afon Taf area runs along the river valley including regular fields of pasture with no current settlement pattern but encompassing various important archaeological sites. A modern bypass road, taking the A477 north of Llanddowror, cuts across the eastern end of this aspect area and is a significant new landscape feature.	

Pont-y-Fenni and Whitland Abbey (CRMRT-HL-40346)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Pont-y-fenni, Whitland Abbey is a very large area encompassing medium to large irregular pasture fields, areas of strip field remnants to the SE around St Clears and areas of woodland. The settlement pattern is one of dispersed farmsteads and cottages. A large solar farm has been installed to the northwest of Whitland. Most significant archaeological element(s): Whitland Abbey, Llangan church and cropmarks, Roman Road.	

Whitland (CRMRT-HL-40347)

Condition: Unassessed	**Value**: Moderate
Overall Evaluation: Moderate This area scores lowly in most categories, but its potential for interpretation and amenity is potentially high.	
Summary Description Whitland encompasses the urban area of Whitland (Hendy-Gwyn) and Trevaughan. Most significant archaeological element(s): medieval church, post med settlement.	

Allt Ffynnoncyll (CRMRT-HL-40348)

Condition: Unassessed	**Value**: Moderate
Overall Evaluation: Moderate This is not an uncommon landscape type in Carmarthenshire. It contains no elements of national importance. Its value is reduced by the large-scale forestry plantations.	
Summary Description Allt Ffynnoncyll, Pale Wood, Coed-Rhosgoch, Woodhouse Wood is a large sinuous area encompassing large areas of stream/riverside woodland and some areas of regular field enclosures. The settlement pattern is of dispersed farmsteads and cottages. In modern times a large cutting for a bypass on the A477 north of Llanddowror has been cut through this aspect area. Most significant archaeological element(s): Medieval Pilgrims Way, extensive cairn field.	

Lampeter Velfrey (CRMRT-HL-40349)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Lampeter Velfrey is a large area of irregular medium sized field enclosures with a settlement pattern of dispersed farmsteads and cottages. Most significant archaeological element(s): Neolithic chambered tombs, Bronze Age burnt mounds.	

Lampeter Velfrey (PMBRK-HL-40349)

Condition: Unassessed	**Value**: High
Overall Evaluation: High The overall value of high reflects the well-preserved character of the post-medieval fieldscape and the presence of potentially significant prehistoric remains..	
Summary Description Lampeter Velfrey is a large aspect area (20.69 sq km) of lowland hills and valleys. It lies partly in Carmarthenshire. The area is characterised by medium-sized, irregular fields, with some deciduous woodland particularly in the many stream and river valleys. Settlement is mainly dispersed, but there is a small nucleation, at Lampeter Velfrey, of mainly 19th-20th century housing, with a 19th century chapel and a school. Settlement otherwise comprises dispersed farms, both large and small, and mainly informal. There is a medieval church, and a motte castle, at Lampeter Velfrey, and nearby is a group of Neolithic monuments. Recorded archaeology otherwise mainly comprises prehistoric burnt mounds, and post-medieval cottages and quarries. There are some Scheduled Ancient Monuments in the area. Summary of the most significant archaeological elements: prehistoric funerary and ritual monuments, medieval and post-medieval settlement.	

Eglwys Cummin (CRMRT-HL-40350)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Eglwys Cummin has areas of regular field enclosures, intermixed with some areas of irregular fields. The settlement pattern is generally one of dispersed farmsteads and cottages but also encompasses the village of Red Roses (Rhos-goch). There are several single, on-farm wind turbines within the aspect area. Most significant archaeological element(s): Bronze Age barrows and burnt mounds, Medieval settlements.	

Eglwys Cummin (PMBRK-HL-40350)

Condition: Unassessed	**Value**: Moderate
Overall Evaluation: Moderate The moderate overall value assigned to this area reflects the relatively limited scope of the archaeological resource, although possible medieval settlement sites at Crunwere and Upper Carvan offer moderate potential for further investigation.	
Summary Description Eglwys Cummin is a large aspect area (24.37 sq km) of lowland hills and valleys. It lies partly in Carmarthenshire. The area is characterised by large, regular fields. There is little woodland – the wooded valleys belong to the surrounding aspect areas. The area is crossed by a former turnpike road (now an unclassified road), and the A477 trunk road There is a 19th-20th century nucleation around a crossroads at Red Roses, but settlement is otherwise dispersed. There are medieval churches at Crunwere and Eglwys Cymin, both listed, and a 19th century chapel and toll house at Red Roses. Recorded archaeology includes bronze age barrows, iron age defended enclosures, a Romano-British farmstead and a medieval motte castle. There are some Scheduled Ancient Monuments in the area. Summary of the most significant archaeological elements: bronze age ritual activity, iron age hillforts, medieval churches and post-medieval settlement.	

Lampeter Vale (CRMRT-HL-40353)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a good example of a Carmarthenshire agricultural landscape occupying the floor of a river valley.	
Summary Description Lampeter Vale, an area mainly along the valley floor of the Afon Taf, including large regular pasture fields and a settlement pattern of dispersed farmsteads and cottages. Most significant archaeological element(s): Medieval and post medieval field systems, Roman road, Bronze Age ritual monuments.	

Lampeter Vale (PMBRK-HL-40353)

Condition: Unassessed	**Value**: High
Overall Evaluation: High The high value assigned to this area reflects its character as a well-preserved fieldscape exhibiting evidence of multi-period activity spanning the Bronze Age through to the late post-medieval period.	

Summary Description Lampeter Vale is a medium-sized aspect area (7.279 sq km) of lowland hills and valleys. It lies partly in Carmarthenshire. The area is characterised by large regular fields. A wide river valley crosses the area (the Afon Marlais) and there are also many ponds and lakes, and a sewage works. The A40 trunk road, and two railway lines, also cross the area. There is little settlement, and it is dispersed, comprising small and large informal farms, and some post-medieval cottages. The area contains much recorded archaeology including a Scheduled bronze age round barrow, a Scheduled medieval/post-medieval house site, a Roman road, two iron age defended enclosures, further bronze age round barrows and a possible standing stone, a possible burnt mound, medieval ridge-and-furrow and field systems, and from the post-medieval period, a mill, lodges and bridges. Summary of the most significant archaeological elements: Roman road, prehistoric funerary and ritual monuments, medieval settlement.

Penbontbren (CRMRT-HL-40354)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a good example of a Carmarthenshire agricultural landscape occupying the floor of a small river valley.	
Summary Description Penbontbren, valley floor of the Afon Taf from Login to Llanfallteg bridge encompassing some regular field enclosures and areas of woodland, with a settlement pattern of dispersed farmsteads. Most significant archaeological element(s): post medieval settlement.	

Henllanfallteg (CRMRT-HL-42460)

Condition: Poor	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Henllanfallteg comprises dispersed farms, including some large holdings, in a landscape of small fields and scattered woodland. There are now several individual wind turbines on farms in this area. Most significant archaeological element(s): Extant buildings - churches, chapels, mills, etc, Iron Age defended hillforts, Prehistoric funerary and ritual sites.	

Llandissilio (CRMRT-HL-42472)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Llandissilio comprises the village of Llandissilio and dispersed farms, including some large holdings, in a landscape of small fields and scattered woodland. Most significant archaeological element(s): Extant buildings - churches, chapels, mills, etc, Deserted rural settlements, Iron Age forts.	

Llandissilio (PMBRK-HL-42472)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area has been assigned an overall value of high based on the apparent survival of a late Neolithic ritual landscape. However, further work is required to substantiate this interpretation. There is also evidence of Bronze Age ritual activity and later prehistoric settlement, as well as an early medieval ecclesiastical presence.	
Summary Description Llandissilio is a large aspect area (13.89 sq km) essentially representing a lowland plateau, characterised by medium-large irregular enclosures, intersected by river valleys including the Eastern Cleddau. There is some woodland, especially on the valley sides, but scattered elsewhere. The area is crossed by a number of modern roads, including the A478 trunk road, and by two railway lines. Settlement is mainly dispersed and includes large and small farms, both informal and in line. Some of the holdings are large. There is also a nucleation at Llandissilio, which has origins as settlement around a listed medieval church, but is mainly represented by 19th-20th century roadside ribbon development. There is further 19th-20th century housing, especially along the A478. There are a number of disused quarries and gravel pits. Other landscape elements include 19th religious buildings, a school, a modern caravan park and a fish farm. Scheduled monuments comprise bronze age round barrows, an iron age defended settlement and a possible medieval defended site. Other recorded archaeology includes further bronze age round barrows and an iron age defended settlement, a prehistoric enclosure; a Roman road, the medieval church, with important Early Christian Monument, and a ruined medieval church. Summary of the most significant archaeological elements: iron age forts and deserted rural settlements, standing post-medieval buildings including churches, chapels and mills.	

Clynderwen (CRMRT-HL-42473)

Condition: Unassessed	**Value**: High
Overall Evaluation: High This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.	
Summary Description Clynderwen comprises the village of Clynderwen, with a main road and railway line and a Roman road, and dispersed farms, including some large holdings, in a landscape of medium-sized fairly regular fields and scattered woodland. Most significant archaeological element(s): Extant buildings - churches, chapels, mills, etc, Iron Age forts, Roman road.	

Clynderwen (PMBRK-HL-32473)

Condition: Unassessed	**Value**: Moderate
Overall Evaluation: Moderate This area has been assigned an overall value of moderate, as, although the fieldscape and dispersed settlement pattern shown on the early editions of the OS survives largely intact, the archaeological resource is limited. The Iron Age enclosure sites do, however, offer some potential.	
Summary Description Clynderwen is a large aspect area (24.95 sq km), essentially representing a lowland plateau, partly lying in Carmarthenshire. It is characterised by large regular fields, intersected by river valleys including the Eastern Cleddau. There is some woodland, especially on the valley sides, but scattered elsewhere. The area is crossed by a number of modern roads, including the A478 trunk road, and by a railway line. Settlement is mainly dispersed and includes large and small farms, both informal and in line, and some dispersed cottages. Some of the holdings are large. There is also a nucleation at Clynderwen which has 19th century origins as a settlement around the railway station. It is mainly represented by 19th-20th century roadside ribbon development but includes commercial buildings, a school and 19th century religious buildings. There are a number of listed Buildings including, outside the village, estate lodges. Recorded archaeology includes a scheduled bronze age round barrow group, a scheduled iron age defended enclosure, other prehistoric funerary and ritual sites; Roman road including scheduled stretches, a rebuilt medieval church with an Early Christian Monument, and a medieval church. Summary of the most significant archaeological elements: prehistoric monuments, Roman road and standing post-medieval buildings including churches, chapels and mills.	

Trelech (CRMRT-HL-42474)

Condition: Fair	**Value**: High

Overall Evaluation: High

This area scores highly in most categories but its potential and rarity scores are moderate. It is a typical example of a Carmarthenshire agricultural landscape.

Summary Description

Trelech is a very large area of hamlets and dispersed farms, including some large holdings, in a landscape of irregular fields. Fields become larger on higher ground to the north. Woodland on the steep, deeply incised valley sides is characteristic. THere are a number of small wind farms and individual wind turbines within the aspect area. Most significant archaeological element(s): Extant buildings - churches, chapels, mills, etc, Iron Age forts, Small industrial sites.

Canaston and Minwear Woods (PMBRK-HL-43906)

Condition: Good	**Value**: Outstanding

Overall Evaluation: Outstanding

The outstanding overall value assigned to this area is based on two counts: 1/The long established character of this area as a heavily wooded landscape, which has remained intact in spite of intrusion by modern coniferous plantation 2/ the remarkable diversity and importance of the archaeological resource within this area, including three Iron Age hillforts, an outstanding example of a late medieval fortified house (Castell Coch), a substantial 15th-17th century farmstead complex (The Sisters' House), an historically important early 17th century iron furnace and forge site in Canaston Wood, and Blackpool Mill, an impressive early 19th century water mill.

Summary Description

HLC 330 Canaston and Minwear Woods Most significant archaeological element(s): 3 Iron Age forts, Early iron furnace, Castell Coch. This historic landscape area lies across the north and south valley sides and surrounding hills of the upper reaches of the Milford Haven waterway. The overriding component of this landscape is woodland. Deciduous woodland cloaks the lower slopes along the banks of the Milford Haven waterway, or Eastern Cleddau as it should be termed in these upper reaches, and parts of the northern valley side, but commercial 20th century coniferous plantations dominate this area. Open areas are few, and consist of a few fields, such as those on the valley floor close to Blackpool Bridge. Included in this area are the water pumping station at Canaston Bridge; Canaston Bridge itself which is Grade II listed; Blackpool Mill, a Grade II* listed four storey, five bay Georgian structure, now a popular tourist attraction; Blackpool Mill Bridge, a Grade II* listed single-arched stone built structure; Castell Coch, a medieval defended house, deserted and ruinous; and the Sisters" House, an early modern farmstead with a massive stone barn, now all ruinous. As well as tourist facilities at Blackpool Mill there are woodland walks and picnic places. In addition to the archaeological sites of Castell Coch and the Sisters" House there are three iron age hillforts, limekilns on the shore of the waterway, and the sites of an iron furnace and iron forge. The latter two sites are of great importance - Mynne's furnace in Canaston Wood remains the only known blast furnace from this crucial period in the development of the Welsh iron working industry, and woodland in the 17th century and 18th century was managed specifically to produce charcoal for the furnace and forge. This is very distinct historic landscape area, and contrasts sharply with the surrounding landscape of fields, farms and parkland.

Amroth (PMBRK-HL-46162)

Condition: Fair	**Value**: High

Overall Evaluation: High

The overall value of high assigned to this area reflects the diverse, multi-period scope of the archaeological record, with evidence of Neolithic/Bronze Age ritual/funerary activity, several Iron Age defended enclosures, the rare survival of a Romano-British villa site located within an earlier earthwork enclosure at Trelissey, several medieval churches (Amroth, Ludchurch, Mounton and Newton North) and moated sites, and a number of important post-medieval gentry houses with Grade II listed gardens and landscaped parks (Colby Lodge, Merrixton and Kilgetty).

Summary Description

Amroth is a very large, complex aspect area (56.33 sq km), spread out over what is essentially an incised coastal plateau. All field types are represented, but the majority are medium-sized and regular. There is a fair amount of deciduous woodland, particularly within the numerous, mainly steep-sided valleys that cross the area, and there is also some planted mixed woodland. Pockets of moorland also exist on the higher ground. Settlement is in the main dispersed, but a number of nucleations are also present. These are mainly post-medieval in origin, many having developed in the 19th century in response to the rising, local coal industry. All farm types and housing types are represented, including gentry houses. A number of modern roads, including the A477 trunk road, cross the area, as well as a railway line which is still in use. The area is also characterised by tourist facilities, including caravan parks, which are concentrated towards the coast. There are a very large number of archaeological sites, from all periods, and many listed buildings. Many Listed Buildings. Scheduled Ancient Monuments comprise a prehistoric burnt mound, two iron age defended enclosures, a medieval fortified manor house and fishpond, a medieval church, a post-medieval iron forge, and disused coal workings. In addition, a number of medieval churches and castles are present. The area also includes three Registered Parks and Gardens (Colby Lodge, Kilgetty and Merrixton). Summary of the most significant archaeological elements: iron age defended enclosures, medieval churches and castles, post-medieval buildings, landscapes and sites.

Tafarnspite (PMBRK-HL-46163)

Condition: Fair	**Value**: Moderate

Overall Evaluation: Moderate

The moderate overall value given to this area chiefly reflects the limited scope of the archaeological record and the fact that many of the 19th century houses and cottages have been remodelled in recent years or subsumed within modern housing development.

Summary Description

Tafarnspite is a very small, built-up aspect area (0.1072 sq km) comprising the village of Tafarnspite. This is a small nucleation which originated in 19th century at the junction of six roads, one of which was the main turnpike into south Pembrokeshire prior to the construction of the A477 trunk road in c.1830. It comprises a loose agglomeration of dwellings around a former coaching inn. Housing is mainly detached, but there is one terrace. The older dwellings are 19th century, but have mostly been modernised, and there has been considerable 20th century development which is mainly represented by detached housing in cul-de-sacs. Public and commercial buildings are represented by a primary school and a garden centre. There are two listed mileposts on the former turnpike. Recorded archaeology is otherwise restricted to built heritage. Summary of the most significant archaeological elements: post-medieval buildings and other structures.

Newhouse (PMBRK-HL-46164)

Condition: Good	**Value**: High

Overall Evaluation: High

The overall value of this aspect area has been assessed as high, based on the diverse, multi-period scope of the archaeological resource, distinguished particularly by the survival of two important prehistoric ritual/funerary complexes at Newhouse Barrows and Crug Swyllt, W of Tavernspite, both of which offer considerable potential for further investigation.

Summary Description

Newhouse is a medium-sized aspect area (10.23 sq km) essentially occupying a flat lowland ridge. It comprises medium-large regular enclosures, some of which, particularly towards the east, may be relict medieval strip fields. Very little woodland is present, although there are a number of planted shelter belts at the west end which are associated with a gentry house. The area is crossed by a modern road, which was formerly a turnpike and features a listed milestone. Characteristic of this area is the lack of modern development. Settlement is dispersed, slight and scattered, and is mainly represented by small informal farms. Little other settlement is present, although two former parsonages are listed buildings, and there is a gentry house, with a lodge. A caravan park is also present. The area is rich in prehistoric monuments including a bronze age barrow cemetery (part-scheduled), another scheduled round barrow, a standing stone and a scheduled iron age defended settlement. Recorded archaeology is otherwise restricted to post-medieval buildings, documented sites and a disused quarry. Summary of the most significant archaeological elements: prehistoric funerary and ritual sites, iron age hillforts, post-medieval buildings and other structures. There are a number of individual wind turbines within this aspect area.

Templeton Strip Fields (PMBRK-HL-46166)

Condition: Fair	**Value**: High

Overall Evaluation: High

The overall value of high assigned to this area reflects the remarkable survival of the fossilised medieval strip field system surrounding the village of Templeton, one of the best preserved examples of its type in southern Pembrokeshire, and the diverse, multi-period scope of the archaeological record, including an Iron Age hillfort and medieval ringwork castle, as well as the earliest Baptist chapel in Pembrokeshire at Molleston, together with its unusual, Grade II listed formal garden.

Summary Description

Templeton Strip Fields is a medium-sized, lowland aspect area (5.358 sq km) representing a fossilised system of medieval strip fields that surround the village of Templeton. They constitute almost the entire area, but there is a little deciduous woodland and a planted shelter belt at the east end. The area is also characterised by modern roads, and a railway line that is still in use. Settlement is dispersed, and limited to a few informal farms, both large and small, a few of them being attached to gentry houses. There is little other settlement. However, a few dwellings lie beside the former turnpike that runs along the southern edge of the area, and the area also includes some of the 20th century housing on the northern edge of Templeton village. There is also a caravan park. The listed 19th century Baptist chapel at Molleston is associated with a Registered Park and Garden. A motte castle associated with the medieval settlement at Templeton is scheduled, as is an iron age defended enclosure. Other recorded archaeology is limited to built heritage, a holy well and disused quarries. Summary of the most significant archaeological elements: iron age fort, medieval earthwork castle, post-medieval buildings and structures.

Narberth Mountain (PMBRK-HL-46168)

Condition: Fair	**Value**: High
Overall Evaluation: High The overall value of high assigned to this area is based on the well-preserved, coherent nature of the fieldscape and settlement pattern and the diverse, multi-period scope of the archaeological record with evidence of Bronze Age burnt mounds, Iron Age defended enclosures and the rare survival of the extensive earthworks of a 17th century formal garden at The Grove.	
Summary Description Narberth Mountain is a small aspect area (3.068 sq km), occupying the gentle north-facing slope of a lowland ridge. Fields are mainly medium-large, regular enclosures which probably date to the 18th or 19th century. Woodland is restricted to the sides of a few stream valleys, and there are further small, scrubby patches. Settlement is dispersed and is mainly represented by small, informal farms, but there has also been some 19th-20th century domestic development along the A478 trunk road, which runs through the area. There are no listed buildings. Recorded archaeology is more-or-less restricted to a scheduled iron age defended enclosure; however possible burnt mounds, a possible iron age defended enclosure, and disused quarries are also present. Summary of the most significant archaeological elements: iron age hillfort, post-medieval quarries, possible sites.	

Wiston and Llawhaden (PMBRK-HL-46204)

Condition: Fair	**Value**: Outstanding
Overall Evaluation: High The overall value of outstanding assigned to this area reflects the remarkable diversity and multi-period scope of the archaeological resource in this area, particularly distinguished by the widespread distribution of Iron Age defended sites (a remarkable number of which have been excavated), the survival of significant evidence of medieval occupation (including an outstanding example of a motte and bailey castle at Wiston and the impressive bishops palace at Llawhaden) and the survival of a number of Grade II listed gentry houses.	

Summary Description

Wiston - Llawhaden is a very large but homogeneous aspect area (43.26 sq km), occupying an open lowland plateau. All field types are represented, but are mainly medium-sized and regular, with some narrower fields that may represent relict medieval strip fields. In general, the area is characterised by a lack of woodland although there are some dispersed wooded pockets, and some coniferous plantation. Settlement is in the main dispersed, but there are nucleations at Wiston, Llawhaden, and Clarbeston Road. Wiston and Llawhaden both have origins as medieval boroughs, around substantial, medieval masonry castles (both scheduled), but show no evidence of planned layouts. Wiston, which is a Conservation Area, is a loose cluster of 18th-20th century dwellings including a gentry farm, but also includes a listed, landmark medieval parish church. A Roman fort just to the north of Wiston village was excavated by DAT in 2013, marking an important advance in our understanding of the Roman penetration of southwest Wales. The fort was dated to c.AD74 and used until c.AD100. A settlement developed by aroun AD150 and this seems to have been occupied into the 3rd century AD, possibly into the 4th century AD. A Roman road has also been identified in association with the fort and a possible Romano-British farmstead just to the south of the fort. Llawhaden is more developed but is largely 19th-20th century, with a significant 20th century housing element. It is also a Conservation Area and includes a number of listed buildings and a scheduled medieval chapel. Clarbeston Road, in contrast, has origins in the 19th century having developed around a railway station, and the building stock is all 19th-20th century. The railway line forms the northern boundary of the area while the A40 trunk road bisects the southern part. All farm types and housing types are represented within the area, including a number of gentry houses, but there are no other listed buildings.

Robeston Wathen (PMBRK-HL-46205)

Condition: Fair	**Value**: Moderate

Overall Evaluation: Moderate

The moderate value assigned to this area reflects its character as a well-preserved but by no means unique post-medieval fieldscape and associated nucleated settlement offering some potential for further research, particularly with regard to the prehistoric landscape.

Summary Description

Robeston Wathen is a small, well-defined lowland aspect area (5.435 sq km), representing the village of Robeston Wathen and its medieval open field system. It is a landscape of medium-sized, fairly regular enclosures co-axial on, and crossed by, the A40 trunk road. Those enclosures around the village of Robeston Wathen, have demonstrable origins as medieval strip fields, while field morphology in the remainder of the area suggests similar origins. Stands of deciduous trees, particularly in the valleys, lend the area a wooded aspect. The village of Robeston Wathen has medieval origins around a listed, landmark medieval parish church. However, development is largely 19th-20th century but it does include a listed, 18th century gentry house. The A40 formerly ran through the heart of the village, but now runs just to the south, following the construction of a new bypass during the second decade of the 21st century. The area also includes the northern outskirts of the town of Narberth and its 20th century roadside ribbon development, some 20th century infrastructure, a sports fields and a caravan park. There is some further, dispersed settlement, confined to a few large informal farms, and scattered 19th-C20th century roadside development. Recorded archaeology comprises possible bronze age standing stones, iron age defended enclosures, one of which is scheduled, the medieval church, post-medieval buildings, and disused quarries and limekilns. Summary of the most significant archaeological elements: iron age forts, post-medieval buildings.

Llanddewi Velfrey (PMBRK-HL-46206)

Condition: Fair	**Value**: High

Overall Evaluation: High

This multi-period landscape has been assigned an overall value of high based on the diversity of its archaeological remains and built heritage, including two substantial Iron Age defended enclosures, a well-preserved Georgian gentry house (Panteg) and an important Grade II Listed garden (Blackaldern).

Summary Description

Llanddewi Velfrey is a large aspect area (24.23 sq km) of lowland hills and valleys. It comprises all field types, but they are mainly medium-sized and regular. Stands of woodland, particularly in the valleys, lend the area a wooded aspect, while the steep slopes at east end of area are cloaked in deciduous woodland. The area is crossed by a number of major roads including the A40 trunk road, including a portion of the Robeston Wathen bypass at the western end of the aspect area. A former turnpike road marks the southern edge of the aspect area. The main railway line to Pembroke Dock runs through the area and remains in use. Settlement is in the main dispersed but there are a number of small nucleations. Crinow is an informal, loose cluster of dwellings, mainly 19th-20th century in date, around a listed, rebuilt medieval parish church. A scheduled medieval earthwork castle lies nearby. Llanmill is a cluster of buildings, again mainly 19th century, around a mill. Llanddewi Velfrey developed along the line of the A40 during the 19th century and is a straggling settlement of development and commercial buildings, mainly roadside, from the 19th-20th century. Princes Gate is similarly 19th-20th century, and developed around a toll-gate on the turnpike road. All farm types and housing types are represented, including a number of gentry houses one of which, Blackaldern, is both listed and a Registered Park and Garden. Another gentry house site, Henllan, is also surrounded by a designed landscape. There is further, scattered domestic development, which is mainly 19th-20th century and confined to roadsides. Caravan parks, a crematorium, and sewage works, form the 20th century, are prominent landscape features. Other listed buildings include further medieval churches, 19th century chapels, and milestones alongside the turnpike road. There are number of Scheduled Ancient Monuments including a bronze age round barrow group, iron age defended enclosures.

Narberth (PMBRK-HL-46207)

Condition: Fair	**Value**: High

Overall Evaluation: High

This area has been assigned an overall value of high, reflecting the survival of the historic core of Narberth, representing a particularly well-preserved example of an early to mid 19th century market town with important earlier components surviving (specifically Narberth Castle) and which has retained its historic character in spite of late 20th century housing development on its periphery.

Summary Description

Narberth is a small, built-up aspect area (0.8509 sq km) representing the town of Narberth. This is a large nucleation, with origins as a medieval borough based on a castle. The castle, whose masonry ruins are scheduled, occupies a prominent position on a spur overlooking the town, opposite the listed, medieval parish church. There is little evidence that the medieval settlement was planned. It appears instead that it developed informally along the road, now the A478 trunk road, that runs through the town. However, post-medieval development appears more planned, based around a market square which now features a handsome early 19th century town hall. Narberth's development mainly belongs to the 19th century and is concentrated alongside the roads leading into the town. It is generally of good quality, with fine terraced housing in the vernacular tradition, and commercial properties including a coaching inn. Many of these buildings are listed. Twentieth century development is represented by infill and ribbon development, including a number of housing estates and closes. There are also schools, a sports fields, a caravan park and other infrastructure on the periphery of the area. The historic core of the town is a Conservation Area. Recorded archaeology is mainly confined to buildings, and there are no other Scheduled Ancient Monuments. Summary of the most significant archaeological elements: medieval castle and church, post-medieval buildings.

Walton East (PMBRK-HL-46208)

Condition: Fair	**Value**: Outstanding

Overall Evaluation: High

This area has been assigned an overall value of outstanding based on the richness and diversity of the archaeological record, which potentially includes evidence of prehistoric ritual activity of national importance.

Summary Description

Walton East is a very large aspect area (46.39 sq km), essentially comprising an open lowland plateau. There is some woodland, including fairly extensive coniferous plantations, but in general the area is an open treeless landscape and the stream valleys that cross the area are similarly not wooded. All field types are represented, but they are mainly medium-sized and regular. There has been some loss of hedges in the exposed areas. A number of major roads cross the area including the A40 trunk road, and the B4329, in addition to two railway lines. Settlement is in the main dispersed but there is a nucleation at Walton East, which is an informal, loose cluster of houses, mainly 19th-20th century in date, around a rebuilt medieval parish church. There are small hamlets at Rudbaxton and Bletherston, both clustered around listed medieval parish churches, the former also featuring a scheduled motte castle. The hamlet at Clarbeston also lies around a listed, landmark medieval parish church, which has been rebuilt. All farm types and housing types are represented, farms ranging from small vernacular holdings to large Georgian farms. There are also a number of gentry houses, some with listed buildings and designed landscapes, for example Scolton Manor, which is a listed building and a Registered Park and Garden, and is now a museum. Other scattered domestic development is mainly 19th-20th century and confined to roadsides. Modern features include extensive gravel workings, and a sewage works. There are a very large number of archaeological sites, from all periods. Scheduled Ancient Monuments are represented by a prehistoric pit circle, a bronze age round barrow, two large, landmark iron age defended enclosures and two smaller enclosures, and a further medieval motte. Other recorded archaeology also includes a round barrow group, other iron age defended enclosures, medieval chapel sites and mills.

Drim Wood (PMBRK-HL-46224)

Condition: Good	**Value**: Moderate
Overall Evaluation: Moderate The moderate overall value assigned to this area reflects the relatively modest scope of the archaeological record. However, there is potential for further investigation of the Iron Age defended enclosure at Holgan Camp; there is potential for improvement of visitor access and on-site information relating to this site.	
Summary Description Drim Wood is a small aspect area (0.7641 sq km) of 20th century coniferous plantation, lying on the steep western slopes of the Eastern Cleddau. It is not enclosed but there a few old field boundaries are present. The forestry is crossed by modern trackways. A minor road follows the foot of the slope, along which a very small amount of 19th-20th century ribbon development occurs at the north end of the area, including a chapel. A scheduled iron age defended enclosure is present, but recorded archaeology is otherwise limited to post-medieval buildings and disused quarries. Summary of the most significant archaeological elements: iron age fort, post-medieval quarries.	

1.5 Cultural Landscape Aspect Areas

M4, A48, A40 (CRMRT-CL-001)

Condition: Good	**Value**: Outstanding	**Rarity**: Commonplace
Overall Evaluation: Outstanding Fundamental components of the main road system that influences cultural change and character of the Study Area for military, industrial, commercial and leisure purposes.		
Summary Description These three major road corridors contain major routes into and out of Wales and provide inter-regional access, bringing goods and people, new influences and change, tourism etc. They are of very great socio-economic importance.		

Swansea to Haverfordwest Railway (CRMRT-CL-005)

Condition: Unassessed	**Value**: Outstanding	**Rarity**: Representative
Overall Evaluation: Outstanding Outstanding as a product of the industrial age requiring fast and efficient transport for manufactured goods and passengers that still performs its original function.		

Summary Description Extension of mainline inter-city railway from London to West Wales via Swansea, providing fast and mostly efficient transport for passengers and manufactured goods, having a materially significant influence on the society and economy of the Study Area. Although this is a national link it is still heavily used as local transport.

Windfarms (CRMRT-CL-033)

Condition: Good	**Value**: Low	**Rarity**: Representative
Overall Evaluation: Low Low as windfarms visible phenomena affecting the established culture of adjacent landscapes over long vistas of the Study area.		
Summary Description Part of the aspect area is straddled by a Strategic Search Area (SSA). Common grazing significant on Mynydd Llanllwni.		

Whitland (CRMRT-CL-050)

Condition: Fair	**Value**: High	**Rarity**: Rare
Overall Evaluation: High High for associations with Hywel Dda.		
Summary Description It is thought that Hwyel Dda wrote the first Welsh laws here in the 10th century. The present town is largely 19th century and developed following the arrival of the railway. The creamery, the last major employer in the town closed recently. The Hywel Dda Interpretive Centre and Gardens have been developed on the mart site. Whitland Abbey's site contains only vestigial remains.		

Rural Carmarthenshire (CRMRT-CL-061)

Condition: Unassessed	**Value**: High	**Rarity**: Commonplace
Overall Evaluation: High High for the varying topography of each of the areas being emblematic of the beauties of the countryside, and for the survival of its principal cultural activity of farming.		

Summary Description Multi-faceted appearance but largely homogenous cultural use in the form of farming. The county of Carmarthenshire is so large, and indeed so topographically, culturally and socially diverse as between its various components, that it is not possible within resources to characterise all its cultural features other than those which have a special resonance. However, on the basis that historically, and currently, the principal cultural activity is farming, and recognising that the landscape changes from coastal flats to rugged and inaccessible high points riven by mountain river and stream valleys with undulating landscapes of soothing attractiveness, this catch-all designation appears to be appropriate.

Railway System (PMBRK-CL-009)

Condition: Poor	**Value**: High	**Rarity**: Representative
Overall Evaluation: High High rather than Outstanding in that although there are Brunel connections, it is understood that there is little in the way of historic engineering works or cultural "story" associated with these lines.		
Summary Description A railway system, made up of lines of different dates, most of which have been downgraded in the course of the twentieth century.		

Lowlands (PMBRK-CL-196)

Condition: Fair	**Value**: High	**Rarity**: Commonplace
Overall Evaluation: High This is an area that is experiencing cultural change as the economics of rural land use are influencing the types of crops grown, the size of actual farms and other human geography. Although individual settlements within this area might not score highly in this respect, this the area that effectively defines Pembrokeshire, the one which travellers through and from Ireland see, and which preserves many of the distinctive features of Medieval settlement.		
Summary Description The lowland part of Pembrokeshire, characterised by rich farmland, English speaking communities, residential and commercial expansion. The settlement patterns are historically rich, and the area also includes the Landsker castles as well as more modern defensive structures around Milford Haven.		

Narberth (PMBRK-CL-829)

Condition: Good	**Value**: High	**Rarity**: Rare

Overall Evaluation: High

Flourishing tourist destination. There is a danger that because of Narberth's success at re-inventing itself that the pressure for new development could actually change the character that has given its present cultural significance. It personifies a "middle class" settlement.

Summary Description

Narberth has undergone a cultural transformation in the last thirty years from a small market centre serving a small restricted area to become a significant tourist centre gaining a wide reputation as a place for quality visitor experience. With its variety of art, craft and coffee shops Narberth has become an ideal tourist centre for both wet and dry weather conditions. It has also become known as the "capital" of the Landsker Borderlands. This has been largely due to the efforts of SPARC (South Pembrokeshire Partnership for action with Rural Communities) a locally based, non-government organisation that works with and within the community.

Principal Roads (PMBRK-CL-977)

Condition: Good	**Value**: High	**Rarity**: Commonplace

Overall Evaluation: High

Improvements to the A40 infrastructure will potentially help to create an economic corridor which is considered essential to the regeneration of the area's economy and employment base, and in overcoming its peripheral location. The A40 trunk road links St Clear, Haverfordwest and Fishguard, and is the main transport artery in Pembrokeshire. The 60 million pounds improvement plan for the A40 trunk road could result in the regeneration of peripheral locations. There are concerns from organisations such as Friends of the Earth, that spending 60 million pounds upgrading or dualling the A40 would only encourage more traffic, more car dependency and more global warming emissions.

Summary Description

The A40 trunk road links St Clear, Haverfordwest and Fishguard. The A40, along with the A477 are part of the Trans-European Road Network (TERN) because of the importance of their strategic linking of Ireland, the UK, and Europe. Proposals for improving the A40 are included in the Joint Unitary Development Plan for Pembrokeshire 2000 - 2016 prepared by Pembrokeshire County Council and the Pembrokeshire Coast National Park Authority. The A40/M4 corridor and links between the M4 and the Pembrokeshire ports are designated in the Welsh Office's "Priority for Trunk Road Improvement".

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.2: Landscape Character Area Assessment

A40LVP-RML-ELS-SWI-RP-L-0004

P01 | S3

02/10/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Landscape Character Area Assessment

1.1 Llawhaden

Physical characteristics

Landcover, pattern and texture: Within Llawhaden the area contains rolling lowland farmland, predominantly pastoral. Cover is a mosaic of grassland, woodland, small villages and dispersed rural settlements. It is crossed by several minor roads where views of the surrounding landscape are limited to field access gates and gaps in roadside hedgerows. Woodland is more prominent where the rolling lowland meets the steeper valley slopes of the Eastern Cleddau.

Visual and Sensory characteristics

Scale and appearance: Field sizes are of medium scale and the boundary hedge-banks with trees provide an enclosed character. Llawhaden Castle is a prominent building that overlooks the Eastern Cleddau. Llawhaden village also features a cluster of listed buildings associated with Llawhaden House. Detractors include the transport corridor of the A40, but this is also considered as essential to the area's economy.

Tranquillity: Away from the sound of traffic using the A40 corridor and the intermittent sound of trains using the Carmarthen to Fishguard railway line, the landscape is tranquil due to rolling terrain and field boundaries. It is crossed by several minor roads where views of the surrounding landscape are limited to field access gates and gaps in roadside hedgerows.

Night-time changes: The LCA is generally dark away from the influence of the A40 corridor. Light sources come from the small villages and scattered rural dwellings distributed throughout the area.

Historic and Cultural characteristics

There are prehistoric forts, raths and enclosures, an early medieval ringwork, medieval motte, castle and hospital.

Assessment

Susceptibility to change: A rolling landform with an enclosed character that would be at a long distance from the Scheme suggests a landscape with a low susceptibility to change.

Landscape value: Registered ancient woodland sites to south, and east along Eastern Cleddau valley side. Cleddau Rivers SAC to north-east of area (tributary of Deepford Brook and Eastern Cleddau). High concentration of scheduled monuments and listed buildings near to Llawhaden village. Southern boundary next to Pembrokeshire Coast National Park and Milford Haven Waterway Historic Landscape. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.2 New Moat

Physical characteristics

Landcover, pattern and texture: Within New Moat the area contains pastoral land that gradually rises from the lowlands of the Eastern Cleddau. Cover is predominantly grassland fields bounded by maintained hedges with occasional trees. Woodland tends to be confined to small stream valley sides. Settlement consists of small villages and dispersed rural settlements connected by a network of minor roads.

Visual and Sensory characteristics

Scale and appearance: Field sizes are a mixture of small to medium scale, with mostly well-maintained hedge boundaries that provide an open character. Prominent buildings tend to be agricultural sheds, and St Nicholas' Church in New Moat. Elsewhere religious buildings tend not to have spires and blend into the landscape.

Tranquillity: Minor roads follow the ridges in-between small wooded valleys and enjoy views of their surroundings and the Preseli Hills.

Night-time changes: Away from the small villages light sources are confined to scattered farms distributed throughout the area.

Historic and Cultural characteristics

There are prehistoric forts and enclosures, early medieval ritual sites, and medieval motte and bailey defences. Listed buildings clustered in the small hamlets of New Moat, Bletherston and Llys-y-frân. Lowland part of Pembrokeshire characterised by rich farmland, an impression of the county as experienced by those travelling through the area.

Assessment

Susceptibility to change: A hillside and scarp slope landform with an open character that would be at a long distance from the Scheme suggests a landscape with a medium susceptibility to change.

Landscape value: Registered ancient woodland sites confined to river valleys of neighbouring character areas, except for an area south of New Moat. Llys-y-frân reservoir forms part of the western boundary to this area, part of which is a Country Park, and the waterbody is part of Cleddau Rivers SAC and Afon Cleddau SSSI. There is a moderate distribution of listed buildings and scheduled monuments throughout. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Medium susceptibility to change and high value. Sensitivity is judged as being medium.

1.3 Eastern Cleddau

Physical characteristics

Landcover, pattern and texture: Within Llawhaden the area is a flat pastoral valley with field boundary hedgerows containing many trees and wooded valley sides that provide an enclosed character. Upstream of the confluence the valley has a more open character but is contained by surrounding hills.

Visual and Sensory characteristics

Scale and appearance: Field sizes are defined by the valley sides but are generally of medium scale. St Aidan's Church at Llawhaden is the most prominent building, elsewhere building are limited to old mills, fisheries and a small number of dwellings and bridges. The A40 is a detractor where it crosses the Eastern Cleddau, as is the steep sided Carmarthen to Fishguard Railway embankment.

Tranquility: Away from the sound of road traffic and intermittent sound of trains this is a tranquil area and one which offers attractive view of the river valley and the uplands to the north.

Night-time changes: This LCA is dark away from the influence of the A40 road corridor. Light sources are limited to the small number of dwellings built alongside the two rivers.

Historic and Cultural characteristics

Listed buildings are distributed along the rivers feature bridges, mills, a church, cottages and farmhouses. Lowland part of Pembrokeshire characterised by rich farmland, an impression of the county as experienced by those travelling through the area along main roads and railways.

Assessment

Susceptibility to change: A lowland valley landform with an enclosed character that would be at a long distance from the Scheme suggests a landscape with a low susceptibility to change.

Landscape value: Registered ancient woodland sites are a feature of the valley sides. The Landsker Borderlands trail follows the Eastern Cleddau. Afon Syfni and Eastern Cleddau are part of the Cleddau Rivers SAC and Afon Cleddau SSSI. There is a relatively high distribution of listed buildings throughout. The section of river valley between Canaston Bridge and Blackpool Bridge lies within the Pembrokeshire Coast National Park and the Milford Haven Waterway Historic Landscape. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Low susceptibility to change and high value. Sensitivity is judged as being medium.

1.4 Narberth

Physical characteristics

Landcover, pattern and texture: Narberth developed informally along what is now the A478 around the medieval castle and church located on the south facing slopes at the southern edge of the village. Narberth developed significantly in the 19th Century around the market square and along the main roads that connect it to neighbouring settlements.

Visual and Sensory characteristics

Scale and appearance: Although considered to be a village, Narberth has the appearance of a small market town. Buildings are typically of stone with a smooth rendered and painted finish and the bustling streets are narrow with several antique, and specialist food and gift shops serving the Pembrokeshire tourist trade. North of the centre 20th Century ribbon development includes suburban housing estates, retail and leisure parks.

Tranquility: The area is lively. Narrow roads are busy with cars and drivers looking for parking places and the pavements are busy with shoppers.

Night-time changes: Street lights are limited to the core of the settlement but retail and leisure development along the B4313 to the north cause the overspill of night-time lighting to the surrounding countryside.

Historic and Cultural characteristics

The area features medieval Narberth Castle and several listed buildings concentrated in the centre along the High Street, St James Street, Market Street and Church Street. Narberth has become a tourist centre and is known as the "capital" of the Landsker Borderlands.

Assessment

Susceptibility to change: A village with an enclosed character that would be at an intermediate distance from the Scheme suggests a landscape with a low susceptibility to change.

Landscape value: South of Landsker trail passes through Narberth. There is a very high concentration of listed buildings and a scheduled monument in the village centre. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.5 Templeton

Physical characteristics

Landcover, pattern and texture: Throughout, this is predominantly an area of pastoral farmland with an undulating terrain of ridges and hills which steep sided valleys have carved through. Cover is a mosaic of grassland with fields boundaries made of significant hedgerow-banks with many trees, areas of woodland, dispersed settlements connected by main and minor roads. Llawhaden includes the settlements of Robeston Wathen and Bethesda that are separated by a small stream valley that originates in Ffynnon Wood and flows into the Eastern Cleddau. It also includes a significant area of woodland of Canaston Wood which provides a setting for the Bluestone Leisure Park. Templeton includes the Narberth Mountain ridge, the Whitland to Pembroke Dock railway line and the settlement of Templeton itself. Narberth Rural includes dispersed farms and dwellings located amongst undulating terrain between two small streams that flow into the Eastern Cleddau. Llanddewi Velfrey is a prominent ridge separated from the surrounding uplands by the Afon Taf to the north and the Afon Marlais to the south, and includes the village of Llanddewi Velfrey and clusters of dwellings distributed along the A40 corridor. Lampeter Velfrey occupies the north-facing slopes to the south of the Afon Marlais and includes the settlements of Lampeter Velfrey and Tavernspite. Ludchurch and Crunwere are to the south of the Templeton to Tavernspite ridge and potential influence caused by the Scheme diminishes. Detractors include the A40 and A477 road corridors and the National Grid Pylons which cross Ludchurch and Crunwere. There are also several wind turbines near to Ludchurch.

Visual and Sensory characteristics

Scale and appearance: Field sizes range from small where ground is steep or conditions are wet to medium scale where ground is more suitable for harvesting forage. The numerous hedgerow banks with trees and areas of woodland can provide an enclosed character, but there are also more open areas that offer views to the Preseli Hills.

Tranquillity: The A40 and A477 are essential transport corridors that influence the north and south of the LCA, also the Whitland to Pembroke Dock railway line is an intermittent influence on the central area. Within the wooded valleys and sunken lanes throughout the area the perception of the transport corridors is reduced. Agricultural vehicles and traffic using the minor roads interrupt the tranquillity in other areas.

Night-time changes: There is an even distribution of settlements, rural dwellings and leisure parks, that are connected by the network of main and minor roads. Light sources are distributed throughout the area, with concentrations based along the main roads. Main sources of light influencing the area include Oakwood Leisure Park, Canaston Bridge roundabout, Robeston Wathen village, Narberth outskirts and Redstone Cross junction, Penblewin roundabout and service park, Llanddewi velfrey village and Blaencilgoed Quarry near Ludchurch.

Historic and Cultural characteristics

There are prehistoric hillforts, round barrows, enclosures, promontory forts, ringworks, raths, ring barrows and chambered tombs, and medieval houses and mottes distributed throughout the area. Listed Buildings are also evenly distributed dispersed settlements, rural dwellings and small nucleated settlements. Lowland part of Pembrokeshire characterised by rich farmland, an impression of the county as experienced by those travelling through the area along main roads and railways.

Assessment

Susceptibility to change: A rolling lowland landscape with generally an open character that would be directly affected by the Scheme suggests a landscape with a medium susceptibility to change.

Landscape value: Registered Ancient Woodland sites are located on the steep valley sides that cut through Llanddewi Velfrey and Templeton ridges. A part of the Pembrokeshire Coast National Park and the Milford Haven Waterway Historic Landscape overlap the character area to the south-east of Canaston. The South of Landsker trail crosses a south-east portion of this LCA between Canaston and Templeton. The Landsker Borderlands trail and Cistercian Way cross a south-western portion between Whitland and Ludchurch. There is a moderate distribution of scheduled historic monuments. Westward flowing tributaries of the Eastern Cleddau are part of the Cleddau Rivers SAC and Afon Cleddau SSSI. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Medium susceptibility to change and medium value. Sensitivity is judged as being medium.

1.6 Mid Taf Vale

Physical characteristics

Landcover pattern and texture: Within Clynderwen the area consists of gently undulating lowland farmland that separates the Eastern Cleddau and Afon Tâf drainage systems. The Cilymaenllwyd South area features a landform gently rising in a northward direction that is divided by narrow wooded valley tributaries of the Afon Tâf. The Henllanfallteg, Llanddewi Velfrey and Whitland areas feature a lowland valley with more irregularly shaped fields. Cover throughout is a mosaic of pastoral fields with hedge-bank and woodland boundaries, small villages, leisure parks and dispersed rural dwellings. Caermelyn Solar Farm occupies approximately 25 ha of land next to the railway line near to Whitland.

Visual and Sensory characteristics

Scale and appearance: Field sizes tend to be of medium scale with boundaries featuring a mixture of managed hedges, hedge-banks, hedgerows and trees. There is generally an open aspect away from the valley floors, and views out of the character area are available away from tall boundary hedgerows and areas of woodland. Prominent buildings tend to be agricultural or those of religious use. There is a small cluster of listed builings associated with Glanrhyd Farm, which is located near to Llanfallteg Road.

Tranquillity: The A478 travels across the area at Clunderwen, the A40 at Whitland, and the Carmarthenshire to Fishguard railway line travels along the area. Apart from the main transport routes the western part of the character area is served by a network of minor roads, but the eastern part is served by fewer roads.

Night-time changes: The LCA is generally dark away from the influence of Whitland and the A478 at Clunderwen. Llanfallteg village and dispersed farms along Llanfallteg Road contribute a little to the overall influence.

Historic and Cultural characteristics

There are prehistoric enclosures, a promontory fort and a roman road in this area. Listed Buildings are associated with bridges, rural dwellings and farm buildings. Principal cultural activity is farming.

Assessment

Susceptibility to change: A lowland valley with an open character that would be indirectly affected by the Scheme suggests a landscape with a medium susceptibility to change.

Landscape value: Ancient woodland surrounding Llanfallteg West and valley sides that connect to Afon Taf vale. Landsker Borderlands trail crosses the western portion of this area. West flowing tributaries of the Eastern Cleddau are part of the Cleddau Rivers SAC and Afon Cleddau SSSI. There is a moderate distribution of historic monuments throughout the area. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Medium susceptibility to change and high value. Sensitivity is judged as being medium.

1.7 Llandissilio

Physical characteristics

Landcover pattern and texture: The landcover features a mosaic of pastoral fields with hedge-bank boundaries and hedgerows trees. The village of Llandissilio is a linear settlement that has developed alongside the A478 and is the core of a network of minor roads that spread out into neighbouring areas.

Visual and Sensory characteristics

Scale and appearance: Field sizes are a mixture of small to medium scale, away from areas of woodland and settlement the character is open, and views of adjacent character areas are available from hill tops and ridges. Visual detractors include 20th Century ribbon development in Llandissilio.

Tranquility: There is a radial network of roads spreading out from Llandissilio which affects the tranquillity of the area with the A478 providing the most prominent source of noise and movement.

Night-time changes: Light sources from the A478 and Llandissilio have a small influence on the surrounding area.

Historic and Cultural characteristics

There is a prehistoric hillfort and round barrow, and an early medieval ritual site in this area. Listed buildings are spread along the A478 in Llandissilio and include a church, cottage and war memorial.

Assessment

Susceptibility to change: A hillside and lower plateau landform with an open character that would be at a long distance from the Scheme suggests a landscape with a medium susceptibility to change.

Landscape value: Ancient woodland is a feature where land is not appropriate for agriculture. Landsker Borderlands trail crosses the western portion of this area. A westward flowing tributary of the Eastern Cleddau is part of the Cleddau Rivers SAC and Afon Cleddau SSSI. There is a low density of historic monuments. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Medium susceptibility to change and high value. Sensitivity is judged as being medium.

1.8 Lampeter Vale

Physical characteristics

Landcover, pattern and texture: The valley floor is a mosaic of meadows, fisheries and areas of carr woodland and conifer plantations. Field boundaries are made up of hedgerows and ditches. Settlement is limited to scattered farms and the outlying edges of Lampeter Velfrey and Trevaughan. The Lampeter Vale section of the Whitland to Pembroke Dock railway line and associated structures are a major feature of this LCA.

Visual and Sensory characteristics

Scale and appearance: Field sizes are of a medium scale, the areas of woodland at the edge of the valley provide an enclosed character, although this trait does become more open nearer to the confluence of the Afon Tâf and Afon Marlais. Other than the railway bridges that cross the minor roads, St Peter's Church in Lampeter Velfrey at the edge of this LCA is perhaps the most prominent building.

Tranquility: The A40 defines the eastern boundary to this LCA, and the Lampeter Vale railway line is a prominent feature that runs along the valley floor. Away from the influence of the A40, noise and movement is limited to that of intermittent trains and users of minor roads.

Night-time changes: This LCA is dark away from the influence of Whitland and Narberth. The Llanddewi Velfrey ridge interrupts night-time influence from much of the A40 corridor.

Historic and Cultural characteristics

There is a prehistoric round barrow, and medieval manor, motte and ringwork. Waundwrgi farmhouse is the only listed building within the valley floor, although there is a small cluster of buildings in the centre of Lampeter Velfrey, which falls within neighbouring Templeton LCA5. Lowland part of Pembrokeshire characterised by rich farmland.

Assessment

Susceptibility to change: A lowland valley with an enclosed character, and visually separated from the Scheme by the Llanddewi Velfrey ridge and wooded valleys suggests a landscape with a low susceptibility to change.

Landscape value: A moderate distribution of historic monuments. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.9 Upper Cwm Taf

Physical characteristics

Landcover, pattern and texture: The valleys tend to be steep sided and well wooded. Login is a small settlement nestled at the meeting point of three valleys and a crossroads between two minor roads. Elsewhere, settlement is limited to scattered rural dwellings and the outskirts of small hamlets in neighbouring character areas.

Visual and Sensory characteristics

Scale and appearance: This enclosed valley is small in scale. Woodland cover limits views into and out of the area, and the chapel at Login is perhaps the most prominent building.

Tranquility: This is a tranquil and sheltered area, crossed only by minor roads. The former Whitland to Cardigan railway line is unused.

Night-time changes: The LCA is dark. Llanfallteg and Login provide very little source of light pollution.

Historic and Cultural characteristics

Pont Cwm-miles and Calfaria Chapel are the only listed buildings here. The principal cultural activity is farming.

Assessment

Susceptibility to change: A tranquil lowland valley with an enclosed character suggests a landscape with a low susceptibility to change of the type proposed.

Landscape value: Areas of ancient woodland located on the steep valley sides of the Afon Taf and tributaries. Landsker Borderlands trail and Celtic Way meet at Login. A low density of historic monuments. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Low susceptibility to change and high value. Sensitivity is judged as being medium.

1.10 Cwmfelin Boeth

Physical characteristics

Landcover, pattern and texture: The area is one of rolling lowland pastoral farmland with prominent hills. Cover is a mosaic of fields bounded by a mixture of maintained hedge-banks and hedges with trees, woodland, hamlets and scattered rural dwellings. It is crossed by several minor roads.

Visual and Sensory characteristics

Scale and appearance: Field sizes are of medium scale and well-maintained hedges and hilltops provide an open character where views of neighbouring character areas are available. A single wind turbine at Cwmfelin Boeth is the most prominent structure, elsewhere religious and agricultural buildings are prominent buildings.

Tranquillity: There are several small settlements distributed throughout this LCA, connected by a network of minor roads. The presence of the wind turbine and agricultural vehicles using local roads provide intermittent movement.

Night-time changes: Light sources tend to be from farms and rural dwellings rather than small hamlets. There is also some influence from nearby Whitland and the A40 corridor.

Historic and Cultural characteristics

There are prehistoric monuments and early medieval ritual sites, listed buildings are rural dwellings. The principal cultural activity is farming.

Assessment

Susceptibility to change: An area of rolling lowland and prominent hills with an open character suggests a landscape with a medium susceptibility to change.

Landscape value: Areas of ancient woodland located where land is not suitable for agriculture. A low distribution of historic monuments. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Medium susceptibility to change and medium value. Sensitivity is judged as being medium.

1.11 Whitland

Physical characteristics

Landcover, pattern and texture: Whitland and Trevaughan have developed along the main roads and the railway which serve the town.

Visual and Sensory characteristics

Scale and appearance: Buildings are typically of stone, with a mixture of finishes including natural stone, pebble-dash, and smooth rendered and painted. The A40 bypasses the town which now appears to be in decline. Away from the centre and the railway station built up areas are a mixture of industrial and residential 20th Century ribbon development. Prominent buildings include the former dairy.

Tranquility: This is a settled area, there is some human activity that detracts from the area's tranquillity. Recently renovated Hywel Dda Gardens provide places for reflection.

Night-time changes: The core of Whitland including West Street, Station Road, Market Street and North Road and roundabouts on the A40 are the main sources of light. Away from these the influence of light diminishes.

Historic and Cultural characteristics

Trevaughan Bridge is a listed building. Largely 19th Century development following arrival of railway.

Assessment

Susceptibility to change: A developed area with an open character suggests a landscape with a low susceptibility to change.

Landscape value: Landsker Borderlands trail and Cistercian Way pass through the town. There is a low distribution of historic monuments in this character area. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.12 Brandy Hill

Physical characteristics

Landcover, pattern and texture: Cover is mostly pastoral farmland with hedged boundaries, hamlets and rural settlements. It is served by the A477 Trunk Road, the B4328 connecting Whitland to Tavernspite and several other minor roads.

Visual and Sensory characteristics

Scale and appearance: Field sizes are of medium scale and well-maintained hedges and relatively low woodland cover provide an open aspect. Prominent structures include the Brandy Hill telecommunication mast, National Grid pylons and large agricultural buildings.

Tranquility: This is an active area influenced by transport, rural businesses and energy distribution.

Night-time changes: Light sources are distributed throughout the area. There is no particular concentration of light-pollution.

Historic and Cultural characteristics

There is a prehistoric round barrow here, listed buildings reflect a mixture of transport and industrial heritage, dwellings and religious buildings. The principal cultural activity is farming.

Assessment

Susceptibility to change: A rolling lowland landform with an open character that would be at a long distance from the Scheme suggests a landscape of medium susceptibility to change.

Landscape value: A low distribution of historic monuments. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Medium susceptibility to change and medium value. Sensitivity is judged as being medium.

1.13 Cwm Gronw

Physical characteristics

Landcover, pattern and texture: Cover is a mosaic of woodland and pastoral farmland, and scattered rural dwellings. It is served by a single minor road that connects Whitland Abbey to Llanboidy. The minor road follows a ridge between steep-sided valleys but views out are contained by neighbouring ridges and woodland.

Visual and Sensory characteristics

Scale and appearance: Field sizes are of medium scale, well-maintained hedges enable views within the LCA, but overall the area has an enclosed character. Agricultural sheds are the most prominent buildings.

Tranquillity: The area is served by a single minor road and the Landsker Borderlands Trail long distance path follows one of the valleys. It is a tranquil and sheltered area.

Night-time changes: This is a dark LCA. There is little if any noticeable source of light.

Historic and Cultural characteristics

There is a prehistoric hillfort, a medieval abbey and enclosure. The remains of Whitland Abbey including a garden wall are listed. Associated with being the place where Hywel Dda drew up his laws in the 10th Century. The principal cultural activity is farming.

Assessment

Susceptibility to change: A valley landform with an enclosed character that would be at a long distance from the scheme suggests a landscape with a low susceptibility to change.

Landscape value: Much of the wooded valley sides are registered ancient woodland. Landsker Borderlands trail and Cistercian Way pass through the valley. There is a moderate distribution of historic monuments throughout this area. Deemed to be of high scenic quality, value is judged as high.

Landscape sensitivity: Low susceptibility to change and high value. Sensitivity is judged as being medium.

1.14 Ciffig Wooded Valley

Physical characteristics

Landcover, pattern and texture: Cover is almost entirely woodland. It is served by private tracks and public footpaths.

Visual and Sensory characteristics

Scale and appearance: Woodlands are of medium scale and limit the views into and out of the LCA and give an enclosed character. There are no prominent buildings within this LCA.

Tranquillity: This is a sheltered area and the lack of access makes it tranquil.

Night-time changes: The LCA is generally dark, it is influenced by light sources in neighbouring areas.

Historic and Cultural characteristics

Managed woodland, a mixture of broad-leaf and conifer.

Assessment

Susceptibility to change: A valley landform with an enclosed character that would be at a long distance from the Scheme suggests a landscape with a low susceptibility to change.

Landscape value: Majority of woodland is registered ancient woodland. Landsker Borderlands trail and Cistercian Way pass through the area. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.15 Whitland to Pont-y-fenni

Physical characteristics

Landcover, pattern and texture: This is mostly pastoral farmland, but includes recreational areas in Whitland, rural businesses and scattered dwellings. The A40 and Carmarthen to Fishguard railway are prominent features in the landscape.

Visual and Sensory characteristics

Scale and appearance: Field sizes of this lowland valley are of a large scale. Away from roadside plantations and tree lined streams the area tends to have an open character. Road and railway cuttings and embankments are perhaps the most prominent built features.

Tranquillity: This is generally a busy and noisy area, influenced by the transport corridors. There is little variety in the landform that could provide for quieter areas.

Night-time changes: Whitland and the roundabouts on the A40 are the main sources of light in this character area. Other light sources from scattered dwellings are evenly distributed throughout the area.

Historic and Cultural characteristics

There are the remains of a Roman road just to the north of Whitland. Important communications/transport corridor. The principal cultural activity is farming.

Assessment

Susceptibility to change: A rolling lowland landform with an open character that would be at a long distance from the Scheme, and one already influenced by the A40 road corridor, suggests a landscape with a low susceptibility to change.

Landscape value: Some registered ancient woodland on steep slopes to the north of the A40. A very low distribution of historic monuments. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Low susceptibility to change and medium value. Sensitivity is judged as being low.

1.16 Hiraeth Upland

Physical characteristics

Landcover, pattern and texture: Cover is mostly pastoral farmland served by a network of minor roads along which rural businesses and dwellings are located. There is little tree cover away from the valleys that incise this plateau landscape.

Visual and Sensory characteristics

Scale and appearance: Field sizes tend to be of large scale, with well-maintained hedge-bank boundaries that provide an open character which provides extensive views of surrounding areas. Prominent buildings are farm dwellings scattered throughout.

Tranquillity: This is an open and exposed area, due to the lack of tree cover.

Night-time changes: Other than light-sources from scattered rural dwellings, this is a dark LCA.

Historic and Cultural characteristics

The principal cultural activity is farming.

Assessment

Susceptibility to change: A rolling landform with an open character that would be at a long distance from the Scheme suggests a landscape with a moderate susceptibility to change

Landscape value: No significant designations. Deemed to be of moderate scenic quality, value is judged as medium.

Landscape sensitivity: Medium susceptibility to change and medium value. Sensitivity is judged as being medium

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Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.3: Arboricultural Survey Schedule

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

FieldID	Code	Height (m)	Girth (m)	Ø Stem (m)	Spread (m)	Life Stage	Observa1	ERC (years)	Quality	Category	Road Fall	Build Fall	Feat Fall	Fall Comment
PT.001	As-hip	20	3.53	1.12	6	mature	Horse Chestnut leaf miner	40+	Moderate	B	Y	Y	Y	
PT.002	Fr-exc	20	3.62	1.15	7	over-mature	some dieback in crown	20+	Moderate	B	Y	N	N	
PT.003	Fr-exc	25	3.22	1.02	11	mature		40+	High	A	Y	N	N	
PT.004	Fr-exc	20	2.78	0.88	12	mature		40+	High	A	Y	N	N	
PT.005	Qr-pet	22	2.78	0.88	11	mature		40+	High	B	N	N	N	
PT.006	Qr-pet	15	1.8	0.57	6	mature		40+	Moderate	B	Y	N	Y	
PT.007	Qr-pet	16	1.4	0.45	7	mature		40+	Moderate	B	N	N	N	
PT.008	Fr-exc	20	1.2	0.38	6	mature	within proposed earthworks footprint	40+	Moderate	B	Y	N	N	
PT.009	Fg-syl	28	3.45	1.1	11	mature		40+	High	A	N	N	N	
PT.010	Fr-exc	14	1.2	0.38	6	early mature		40+	Moderate	B	N	N	Y	near to OH-HV line
PT.011	Fr-exc	16	0.9	0.29	4	early mature	ivy clad	40+	Low	C	N	N	N	
PT.012	Qr-pet	26	1.1	0.35	7	mature	within earthworks footprint	40+	Moderate	B	N	N	N	
PT.013	Qr-pet	20	2.1	0.67	10	mature		40+	Moderate	B	N	N	N	
PT.014	Qr-pet	30	3.4	1.08	12	mature	within proposed highway footprint	40+	Moderate	B	Y	N	N	
PT.015	Qr-pet	25	2.3	0.73	4	mature	near to proposed access road	40+	Moderate	B	Y	N	N	
PT.016	Qr-pet	28	1.9	0.6	6	mature	near to proposed access road	40+	Moderate	B	Y	N	N	
PT.017	Fr-exc	20	1.1	0.35	7	mature		40+	Moderate	B	Y	N	N	near to existing A40
PT.018	Cs-sat	35	3	0.95	15	mature	multi-stem / coppiced	20+	Moderate	B	N	N	N	
PT.019	Cs-sat	35	3	0.95	15	mature	multi-stem / coppiced	20+	Moderate	B	N	N	N	
PT.020	Fg-syl	35	4.3	1.37	14	mature		40+	High	A	N	N	Y	
PT.021	Ac-pse	20	1.3	0.41	5	early mature	within proposed highway footprint	40+	Moderate	B	Y	N	N	
PT.022	Fr-exc	16	1.2	0.38	6	mature	multi-stem	40+	Moderate	B	Y	N	Y	
PT.023	Fg-syl	30	1.6	0.51	8	mature	crown influenced by neighbour	40+	Moderate	B	Y	Y	Y	near to existing weighbridge
PT.024	Qr-pet	30	2.4	0.76	11	mature		40+	Moderate	B	Y	Y	Y	near to existing weighbridge
PT.025	Qr-pet	26	2.2	0.7	10	mature		40+	Moderate	B	Y	N	N	
PT.026	Qr-pet	26	2.3	0.73	12	mature		40+	Moderate	B	Y	N	N	
PT.027	Fg-syl	24	1.3	0.41	7	mature		40+	Moderate	B	Y	N	N	
PT.028	Qr-rob	25	1.3	0.41	9	mature		40+	Moderate	B	N	N	N	
PT.029	Fg-syl	28	4.14	1.32	7	mature		40+	Moderate	B	N	N	N	
PT.030	Fr-exc	16	2.5	0.8	4	mature	multi-stem, near to proposed access road	40+	Moderate	B	Y	N	N	
PT.031	Qr-rob	14	1.3	0.41	8	mature	2 small Fg-syl growing at base	40+	Moderate	B	Y	N	N	
PT.032	Fg-syl	32	3.9	1.24	10	mature		40+	Moderate	B	Y	N	Y	near to existing A40 and farm buildings
PT.033	Fr-exc	16	2.6	0.83	5	mature	multi-stem	40+	Moderate	B	Y	N	N	
PT.034	Fr-exc	14	0.4	0.13	4	early mature		40+	Low	C	Y	N	N	
PT.035	Fr-exc	12	0.4	0.13	4	early mature		40+	Low	C	Y	N	N	
PT.036	Qr-pet	16	2.9	0.92	8	mature	multi-stem	40+	High	A	Y	N	N	
PT.037	Il-aqu	6	0.9	0.29	3	early mature		<10	Low	U	N	N	N	
PT.038	Qr-pet	14	3	0.95	9	mature		40+	High	A	N	N	N	
PT.039	Ul-gla	18	1.1	0.35	6	mature	within proposed highway footprint	40+	Moderate	B	Y	Y	N	
PT.040	Ac-pse	14	0.8	0.25	6	early mature	within proposed highway footprint	40+	Moderate	B	Y	Y	N	
PT.041	Fr-exc	20	4	1.27	10	mature	multi-stem	40+	Moderate	B	N	Y	N	near to agricultural building
PT.042	Ac-pse	15	0.6	0.19	6	early mature		40+	Moderate	B	N	Y	N	near to agricultural building
PT.043	Fr-exc	18	0.4	0.13	3	semi-mature		40+	Low	C	N	Y	N	near to agricultural building
PT.044	Fr-exc	20	1.3	0.41	10	mature		40+	Moderate	B	N	N	N	
PT.045	Ac-pse	14	1.8	0.57	6	early mature	multi-stem	40+	Moderate	B	N	N	N	
PT.046	Fr-exc	20	1.1	0.35	8	early mature		40+	Moderate	B	N	N	N	
PT.047	Qr-pet	26	2.4	0.76	14.5	mature		40+	High	A	N	N	N	
PT.048	Qr-pet	14	1.4	0.45	8	mature		40+	Moderate	B	N	N	N	
PT.049	Qr-pet	16	1.5	0.48	10	mature		40+	Moderate	B	N	N	N	
PT.050	Qr-pet	14	1.9	0.6	8	mature	in prominent location	40+	Moderate	B	N	N	N	
PT.051	Ac-pse	15	1.2	0.38	5	mature	within proposed earthworks footprint	40+	Moderate	B	Y	N	N	
PT.052	Fr-exc	24	1.8	0.57	7	mature		40+	Moderate	B	Y	N	N	
PT.053	Qr-pet	12	0.9	0.29	5	early mature		40+	Moderate	B	Y	N	N	
PT.054	Fr-exc	16	4	1.27	6	mature	multi-stem	40+	Moderate	B	Y	N	N	

FieldID	Code	Height (m)	Girth (m)	Ø Stem (m)	Spread (m)	Life Stage	Observa1	ERC (years)	Quality	Category	Road Fall	Build Fall	Feat Fall	Fall Comment
PT.055	Fr-exc	14	1.4	0.45	4	mature	multi-stem	40+	Moderate	B	Y	N	N	
PT.056	Fr-exc	16	2.1	0.67	7	over-mature	some dieback in crown	20+	Moderate	B	Y	N	N	
PT.057	Fr-exc	16	2.1	0.67	6	mature	within proposed highway footprint	40+	Moderate	B	Y	N	N	
PT.058	Fr-exc	20	2.2	0.7	7	mature		40+	Moderate	B	Y	N	N	
PT.059	Qr-rob	11	1.8	0.57	4	over-mature	dieback in crown	20+	Low	C	Y	N	N	
PT.060	Qr-rob	14	1.15	0.37	6	mature		40+	Moderate	B	Y	N	N	
PT.061	Fr-exc	18	2.1	0.67	8	mature		40+	Moderate	B	Y	N	N	
PT.062	Qr-pet	10	3	0.95	5	mature	multi-stem	40+	Moderate	B	N	N	N	
PT.063	Qr-pet	8	1	0.32	6	mature		40+	Moderate	B	N	N	N	
PT.064	Fr-exc	12	6	1.91	8	mature	multi-stem	40+	Moderate	B	N	N	N	
PT.065	Qr-rob	12	1.05	0.33	6	mature		40+	Moderate	B	Y	N	N	
PT.066	Qr-rob	12	1.05	0.33	6	mature		40+	Moderate	B	Y	N	N	
PT.067	As-hip	8	1.1	0.35	4	semi-mature		40+	Moderate	B	Y	N	N	
PT.068	Pp-eur	20	1.8	0.57	8	mature		20+	Moderate	B	Y	Y	N	
PT.069	Pp-eur	20	1.8	0.57	8	mature		20+	Moderate	B	Y	Y	Y	near to lighting column
PT.070	Fr-exc	28	2.6	0.83	10	mature		40+	Moderate	B	Y	N	N	
PT.071	Fr-exc	16	1.2	0.38	7	mature		40+	Moderate	B	Y	N	N	
PT.072	Fr-exc	18	2	0.64	8	mature	multi-stem	40+	Moderate	B	Y	N	N	
PT.073	Fr-exc	14	1.15	0.37	4	mature	within proposed earthworks footprint	40+	Moderate	B	Y	N	N	
PT.074	Qr-pet	12	2.05	0.65	6	mature		40+	Moderate	B	Y	N	N	
PT.075	Ac-pse	11	1.1	0.35	4	mature		40+	Moderate	B	Y	N	N	
PT.076	As-hip	25	3.5	1.11	11	mature	multi-stem	40+	High	A	Y	Y	N	at risk
PT.077	Qr-pet	30	4	1.27	15	mature		40+	High	A	Y	N	N	at risk
PT.078	Qr-pet	28	3.5	1.11	15	mature	within proposed earthworks footprint	40+	High	A	Y	N	N	
PT.079	As-hip	16	1.35	0.43	5	mature		40+	Moderate	B	Y	Y	N	at risk
PT.080	Qr-pet	14	2.1	0.67	9	mature		40+	Moderate	B	N	N	Y	near to OH-HV line
PT.081	Qr-pet	18	3.4	1.08	10	mature	within proposed earthworks footprint	40+	Moderate	B	N	N	N	
PT.082	Qr-pet	22	2.2	0.7	10	mature		40+	Moderate	B	N	N	N	at risk
PT.083	Qr-pet	16	3.2	1.02	9	mature		40+	Moderate	B	N	N	N	at risk
PT.084	Fr-exc	30	4	1.27	10	mature	typical of tree type within group, within proposed highway footprir	40+	Moderate	B	Y	N	N	
PT.085	Ac-pse	18	1.5	0.48	8	mature		40+	Moderate	B	N	N	N	
PT.086	Qr-pet	12	1.2	0.38	4	mature	within proposed earthworks footprint	40+	Moderate	B	Y	N	N	
PT.087	Fr-exc	12	3	0.95	9	mature	multi-stem	40+	Moderate	B	N	N	N	
PT.088	Fr-exc	10	1.1	0.35	5	mature		40+	Moderate	B	N	N	N	
PT.089	Qr-pet	9	0.9	0.29	4	mature	within proposed earthworks footprint	40+	Moderate	B	Y	N	N	
PT.090	Fr-exc	10	1	0.32	6.5	mature	within proposed highway footprint	40+	Moderate	B	Y	N	N	
PT.091	Fr-exc	12	5	1.59	12	mature	multi-stem, matured from lain hedge	40+	Moderate	B	N	N	N	

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.4: Representative Viewpoints

A40LVP-RML-ELS-SWI-RP-L-0006

P02 | S4

21/01/19

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Representative Viewpoints

1.1 A. Cairn at Foel Eryr

VIEWING POSITION			
OS Grid Ref: SN 06573206	**Post Code (nearest):** SA66 7RB	**Community:** Eglwyswrw and Henry's Moat	**Distance from Scheme:** 16,300 m
Viewpoint: Cairn at Foel Eryr, Pembrokeshire Coast National Park. Promoted viewpoint shown on Ordnance Survey maps, one of the westernmost summits of the Preseli range of hills and accessible from the B4329 at Bwlch-gwynt. The summit at 468 m AOD makes it the second highest peak of the Preseli Hills. The scheme would occupy an approximately 12 degree horizontal field of view, in a south-south-eastern direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 27th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
During periods of excellent visibility views of Snowdonia, Plynlimon Hills, Brecon Beacons, Exmoor and Dartmoor, Wexford and Wicklow, are available. The moorland pasture in the foreground slopes steeply south-eastward towards the B4329 and the Afon Syfni. Beyond the Afon Syfni, is the settlement of Rosebush, with Rosebush Quarry a prominent feature. Rosebush is set against a ridge that runs south-westward from the summit of Foel Cwmcerwyn. Beyond this ridge, are the undulating lowland hills and settlement of Maenclochog and the heads of the wooded valleys that drain into the Eastern Cleddau. The next range of lowland hills visible are those in Llandissilio, followed by the Llanddewi Velfrey ridge and finally the Templeton to Tavernspite ridge forms the horizon. The existing A40 is not distinguishable in the view despite running close to the summit of the Llanddewi Velfrey ridge. The landscape is rural, with an irregular pattern of moorland, quarries, pastoral farmland, reservoirs, woodland, roads, settlements, groups of dwellings and isolated farms. The view is open and panoramic, the description here is focussed on the south-eastward view. Some of the woodland and pastoral farmland of the Llanddewi Velfrey ridge is visible but the accumulation of field boundary hedgerows and trees gives the appearance of woodland. There are a few wind turbines and National Grid pylons visible on the Templeton to Tavernspite ridge in the far distance from this elevated vantage point.	High	Outstanding	High


Cnwc
(summit 427 mAOD)
Rosebush
Quarry
Tavernspite to
Templeton ridge
Llanddewi
Velfrey
Llandissilio
Rosebush
Rosebush
Reservoir

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Views of the Scheme are theoretically available, but the distance is such that earthworks would be very difficult to distinguish. There may be a glimpse of the changes if looked for in the view.	No change	Short term	Long distance	No change
Operation Winter Year 1: A glimpse of the Scheme may be available if looked for. The viewer's attention is drawn to recognisable features in other directions such as the Cardiganshire coastline and the Preseli Hills.	No change	Medium term	Long distance	No change
Operation Summer Year 15: A view of the Scheme would not be available once mitigation and enhancement planting has become established.	No change	Long term	Long distance	No change
Night-time: Across the Preseli Hills is dark, with very little light emanating from the scattered settlements. Night-time influence on the south-facing slopes and ridges of the Preseli Hills would be dominated by those sourced at Milford Haven and Haverfordwest. Night-time activities associated with the construction of the Scheme would not cause noticeable change.	No change	Long term	Long distance	No change

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Neutral

1.2 B. near Great Vaynor

VIEWING POSITION			
OS Grid Ref: SN 1072 1853	**Post Code (nearest):** SA66 7HH	**Community:** Llawhaden	**Distance from Scheme:** 2,235 m
Viewpoint: B represents the view from undulating farmland with dispersed settlement to the north of the A40 and west of the A478. The area is served by the B4313, from which narrow country lanes branch out and connect to neighbouring areas.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 26th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
The road-sides feature hedge-banks that limit outward views. Where there is a gap in these roadside boundaries, such as a field access gate, views across the pastoral landscape are available. From the ridges and hills the view of the existing A40 is screened by roadside hedges, although commercial vehicles and road junction signs are visible. The view is representative of one experienced by road users and countryside workers.	Medium	Medium	Medium


Bounty Farm and Grosvenor Court
A478
Cilrath-fawr
National Grid power lines
A40 direction sign west of Penblewin Roundabout
Wind turbine
Narberth Station
Clirath-fach

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Penblewin roundabout itself and the A40 to the east of it are screened from view, as would construction activities.	No change	Short term	Long distance	No change
Operation Winter Year 1: A view of the Scheme would be interrupted by landform and vegetation.	No change	Medium term	Long distance	No change
Operation Summer Year 15: A view of the Scheme would be interrupted by landform and vegetation.	No change	Long term	Long distance	No change
Night-time: A glimpse of task specific lighting at Penblewin roundabout may be available where gaps in roadside hedge-banks allow. The impact of construction lighting would be reduced by the presence of existing street lighting at Penblewin.	No change	Long term	Long distance	No change

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Neutral

1.3 C. west of Penblewin

VIEWING POSITION			
OS Grid Ref: SN 1186 1660	**Post Code (nearest):** SA67 7EY	**Community:** Narberth Rural	**Distance from Scheme:** 115 m
Viewpoint: C represents the view from the A40 west of Penblewin roundabout.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 20th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Penblewin is located on a rounded hill where the A40 and the A478 meet. The ground drops steeply to north and south. To the east the ground gently undulates. The view is composed of a busy road within a pastoral landscape. Fields are bounded by hedges and Pembrokeshire hedge-banks. Mature trees are located in groups around Penblewin roundabout and Penblewin farm, and individually within field boundaries. In the background, woodland and plantations south of the A40 are visible. Road elements visible include road signs, lighting columns and vehicles. Built elements visible include the dwelling and agricultural buildings at Penblewin. The view is representative of one experienced by road users and countryside workers.	Medium	Medium	Medium


A40 west of Penblewin Roundabout
Penblewin Roundabout lighting columns
Penblewin Farm
A478

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory work - change noticeable would include the removal of a small area of woodland, roadside trees and hedges to the north and west of Penblewin farmhouse as part of preparatory works, and the reconfiguration of the existing street lights during construction. For road users the magnitude of visual impact would be a moderate detrimental one, and the significance of visual effect slight adverse. For countryside workers the magnitude of visual impact would be moderate detrimental, and the significance of effect moderate adverse.	Moderate	Short term	Short distance	Moderate detrimental
Operation Winter Year 1: The street-lighting columns would cover a larger area, and a view of cars would be available where hedges have been removed. Commercial vehicles may be visible to the east of the roundabout.		Medium term	Short distance	
Operation Summer Year 15: Hedges would screen a view of cars on the roundabout and the establishment of scattered trees and woodland would restore the view to one resembling the original.		Long term	Short distance	
Night-time: Occasional views of lighting from construction works at Penblewin roundabout would be experienced at this viewpoint.		Long term	Short distance	

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Moderate adverse			

1.4 D. Longford

VIEWING POSITION			
OS Grid Ref: SN 1196 1852	**Post Code (nearest):** SA66 7HG	**Community:** Clynderwen	**Distance from Scheme:** 1,815 m
Viewpoint: From a Lay-by next to the A478 at the southern outskirts of Clunderwen, near to the dwellings Llwyn-Aur.and Rest Cottage. The Afon Daulan flows eastward in a shallow sided valley to the south of this location. The view is representative of one experienced by road users travelling southward and residents living at the southern outskirts of Clunderwen. The Scheme would be visible in a south-eastward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 28th March 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Main road and Pastoral farmland bounded by hedges and hedge-bank make up the foreground of the view. The land slopes gently down towards Afon Daulan, which is out of sight in the view. South of Afon Daulan the land rises gently at first to a plateau south of Longford Farm and then rises more steeply as it approaches the Llanddewi Velfrey ridge. Agricultural buildings at Longford Farm are a prominent feature of the middle ground of the view, which sits among gently undulating ground that consists of pastoral farmland bounded by hedgerows with many mature trees. In the background Pentroydin fach and Pentroydin-fawr farms are visible, as are the dwellings at Glan Preseli, Scapin and Parc-y-delyn in Llanddewi Velfrey. The landcover on the north-facing ridge is a mosaic of woodland and pastoral farmland with clusters of settlement.	High	Medium	Medium


Bethel Chapel
Pentroydin -fawr
Glan Preseli
Pentroydin -fach
Scapin Farm
Pen-banc
Longford Farm

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: A long distant view of earthworks activities between Pentroydin-fach cutting and Bethel cutting would be available. Bethel Cutting would create a notch in the distant horizon, although it would be partially screened by woodland.	Minor	Short term	Long distance	Negligible detrimental
Operation Winter Year 1: The north facing cutting and embankment slopes would be visible, as would Llanfallteg Road overbridge. A glimpse of commercial vehicles would be available where the road crosses the Pentroydin-fach embankment.	Minor	Medium term	Long distance	Negligible detrimental
Operation Summer Year 15: Cutting and embankment slopes would resemble the mosaic of pastoral farmland and woodland. A glimpse of vehicles would be available where the road crosses Pentroydin-fach embankment. At Llanfallteg Road overbridge, mitigation planting to integrate the cutting and bridge into the landscape would screen views of traffic.	Negligible	Long term	Long distance	Negligible detrimental
Night-time: Views of task lighting at Pentroydin-fach and Pentroydin-fawr are likely to increase the night-time influence of Llanddewi Velfrey village and the scattered rural settlements, on the Afon Taf vale area. Influence from the A487 corridor and Clunderwen itself would affect the amount of visible light from sources outside of the settlement.	Negligible	Long term	Long distance	Negligible detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Neutral

1.5 E. South of Bounty Farm

VIEWING POSITION			
OS Grid Ref: SN 1262 1680	**Post Code (nearest):** SA67 7NY	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 90 m
Viewpoint: View from a public footpath (SP19/31/3), and private access track to Bounty Farm north of the A40 and east of Penblewin roundabout. Ground slopes gently southward towards upper tributaries of the Afon Marlais. The view is representative of one experienced by users of public footpaths.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 26th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Pastoral farmland bounded by substantial Pembrokeshire hedge-banks make up the foreground and restrict views eastward and westward. The view south is towards the western limit of the Llanddewi Velfrey ridge and Tavernspite to Templeton ridge beyond. Landcover is a mosaic of pastoral fields with hedge-bank and hedgerow boundaries, blocks of woodland and scattered rural dwellings. The A40 is screened from view by a roadside hedge but a view of high sided vehicles is available. Wind turbines are visible on the Templeton/Tavernspite ridge. Overhead powerlines also feature in the view.	High	Medium	Medium


Wind
turbine
Ca'rmaenau
-fach
Existing
A40
Narberth
Station

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory work - visible changes would include the removal of part of a Pembrokeshire hedge-bank with the loss of some mature trees. Earthworks - A section of the field in the foreground of the view would also be lost.	Moderate	Short term	Short distance	Moderate detrimental
Operation Winter Year 1: A view of the Scheme and traffic including the local access road to Trefangor Cemetery would be available. Views eastward and westward would be limited by Pembrokeshire hedge-banks.	Moderate	Medium term	Short distance	Major detrimental
Operation Summer Year 15: There is no proposed planting to screen the Scheme from the footpath.	Moderate	Long term	Short distance	Major detrimental
Night-time: A view of task lighting would be available to the public footpath. Night-time use is predicted to be very low. Vehicle headlights would be visible.	Moderate	Long term	Short distance	Major detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Moderate adverse	Large adverse	Large adverse	Large adverse

1.6 F. South of Penca'rmaenau

VIEWING POSITION			
OS Grid Ref: SN 1325 1715	**Post Code (nearest):** SA67 7NY	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 310 m
Viewpoint: From a public footpath (SP19/36/3), and private access track east of Trefangor cemetery and north of Henllan Lodge. The view is representative of one experienced by users of public footpaths. A similar view is available to the dwelling at Penca'rmaenau.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 26th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Pastoral farmland bounded by hedges and hedgerows makes up the foreground of the view. The landform is gently sloping northward and eastward to begin with, but beyond the nearest field boundary the ground begins to fall more steeply and Parc-y-delyn is obscured. Beyond the valley that begins in Ffynnon Wood the land again rises towards Llanddewi Velfrey village centre with north and south facing slopes visible. The A40 is visible near to the broad ridge as it approaches Llanddewi Velfrey. The gently sloping and north facing slopes of the ridge are mostly covered in pastoral fields with hedgerows. The accumulation of hedgerows in the eastward view provide an impression of a landscape with much woodland cover. Pentroydin-fach is partially obscured by trees. Pentroydin-fawr is more prominent. Beyond the broad ridge on which Llanfallteg Road runs the ground is obscured. In the background is a view of Carmarthenshire hills in the Henllanfallteg community. A single wind turbine at Cwmfelin Boeth is visible. Overhead powerlines are also a noticeable feature of this view.	High	Medium	Medium


Wind turbine near Cwmfwlin Boeth
Pentroydin -fawr
Pentroydin -fach
Awel Deg
Maes-y-ffynnon
Existing A40
Llandaff Row

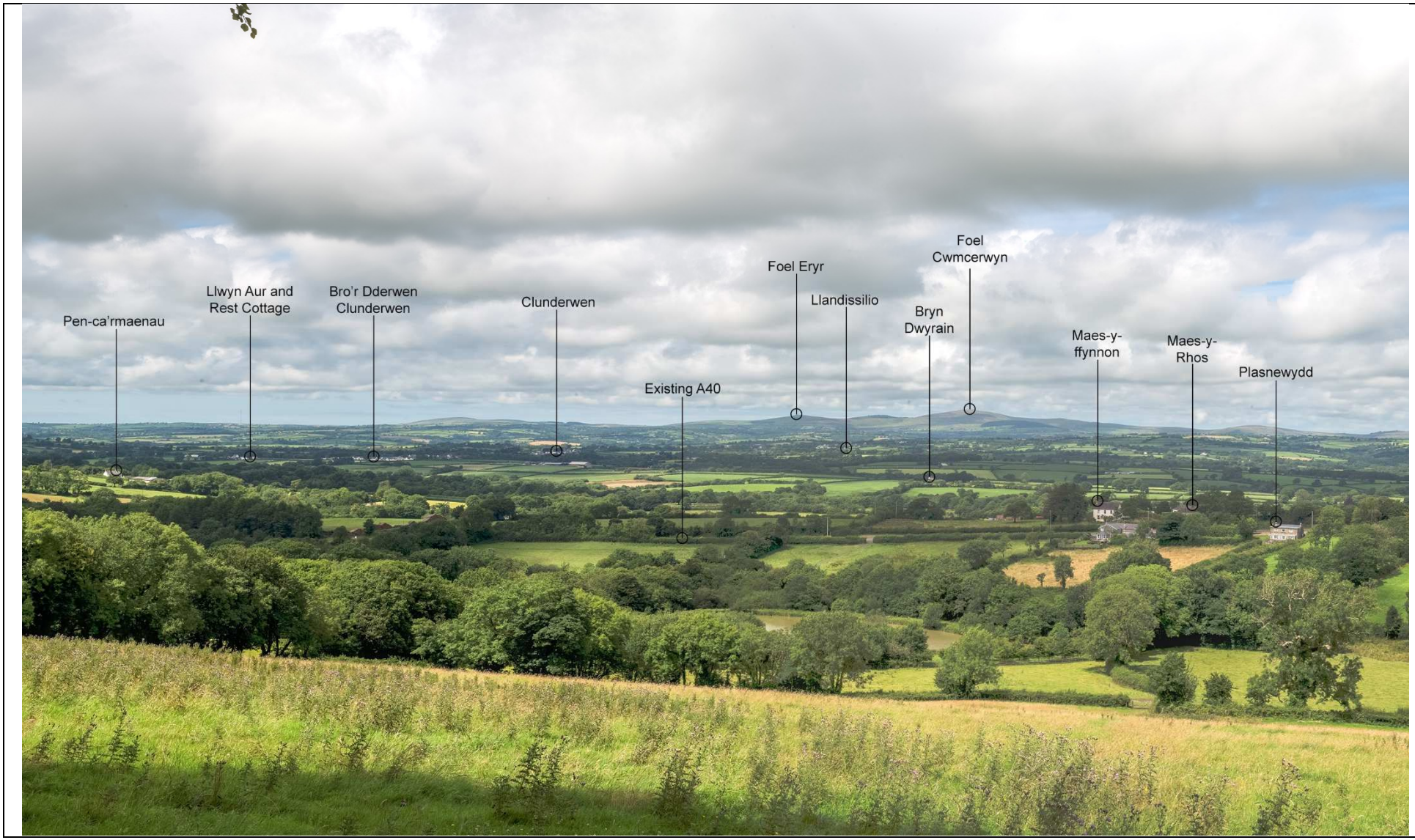
MAGNITUDE OF VISUAL EFFECT				
Change in view (Photograph taken 26th July 2017)	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory work – partial removal of several field boundaries would be noticeable between the existing A40 and Pentroydin-fawr. The site compound would be located in a field between the existing A40 and the line of the Scheme. Earthworks – removal of topsoils, excavation of Pentroydin-fach and Pentroydin-fawr cuttings, construction of Pentroydin-fach embankment and llanfallteg Road overbridge would be visible.	Moderate	Short term	Middle distance	Moderate detrimental
Operation Winter Year 1: A view of the road and traffic at Western Llanddewi Velfrey junction, the road in cutting Pentroydin-fach and Pentroydin-fawr, and on embankment in-between the two cuttings, and a view of the private means of access to Pentroydin-fach would be available. This would be in addition to the view of the de-trunked A40 west of Llanddewi Velfrey village.	Major	Medium term	Middle distance	Major detrimental
Operation Summer Year 15: Scattered trees and new areas of woodland would integrate the Scheme into the landscape and filter views of the road surface and traffic. Cutting and embankment slopes would resemble a mosaic of pastoral fields and hedgerows. There would be a view of commercial vehicles where the road is on embankment, and at the junction with the de-trunked A40.	Minor	Long term	Middle distance	Moderate detrimental
Night-time: A view of task lighting and the site compound would be available to users of this path. Night-time use is predicted to be low, but a considerable area affected by the Scheme would be visible from this location.	Minor	Long-term	Middle distance	Moderate detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Moderate adverse	Large adverse	Moderate adverse	Moderate adverse

1.7 G. Pen-banc

VIEWING POSITION			
OS Grid Ref: SN 1445 1646	**Post Code (nearest):** SA67 8UR	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 630 m
Viewpoint: From the Public Footpath near Pen-banc. Represents the view available to Pen-banc dwelling and Public Footpath SP19/23/1 itself.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Pastoral farmland valley that drains westward into Ffynnon Wood. Scapin Farm occupies the saddle between the two ridges in Llanddewi Velfrey. Landvover in the foreground is a mosaic of grassland, woodland and water features. The middle ground comprises of the northernmost Llanddewi Velfrey ridge along which the A40 runs close to, and individual developments alongside it. The background comprises of undulating ground of Llandissilio and Clynderwen communities, that gradually give way to Llandissilio and Maenclochog uplands, which inturn give way to the Preseli Hills. Foel Eryr and Foel Cwmcerwyn are the most prominent hills on the horizon. Wind turbines are visible in the long distance to the north.	High	High	High


Pen-ca'rmaenau
Llwyn Aur and Rest Cottage
Bro'r Dderwen Clunderwen
Clunderwen
Existing A40
Foel Eryr
Llandissilio
Bryn Dwyrain
Foel Cwmcerwyn
Maes-y-ffynnon
Maes-y-Rhos
Plasnewydd

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Changes visible during preparatory works would include the removal of part of a roadside plantation and hedgerow (ch 1+880 to 1+940 and 2+060 to 2+100). Earthworks activities visible would include the removal of topsoil, excavation of part of Penblewin-fach cutting, the construction of West Llanddewi Velfrey junction and Ffynnon Wood junction. The proposed site compound would also be visible.	Minor	Short term	Middle distance	Negligible detrimental
Operation Winter Year 1: A view of Western Llanddewi Velfrey junction would be available, and the tops of the slopes and commercial vehicles entering/emerging into/from the Pentroydin-fach cutting.	Negligible	Medium term	Middle distance	Negligible detrimental
Operation Summer Year 15: Scattered trees and new areas of woodland would integrate the Scheme into the landscape and filter views of the road surface and traffic. Cutting and embankment slopes would resemble a mosaic of pastoral fields and hedgerows. Hedge-banks and linear belts of woodland would screen the view of commercial vehicles in Pentroydin-fach cutting.	No change	Long term	Middle distance	No change
Night-time: A view of task lighting and the site compound would be available to this location during construction only. Lighting in Llanddewi Velfrey village unchanged.	No change	Long term	Middle distance	No change

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Slight adverse	Slight adverse	Neutral	Neutral

1.8 H. Llanfallteg Road

VIEWING POSITION			
OS Grid Ref: SN 1469 1786	**Post Code (nearest):** SA67 7PG	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 625 m
Viewpoint: Represents the view available to road users travelling southward along Llanfallteg Road. The Scheme would occupy about an 80 degree horizontal field of view in a south-east through to south-south-westward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 26th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
The view southward from Llanfallteg Road at the junction with the access track to Bryn Farm. It is located on the lower slopes of the Llanddewi Velfrey/Llanfallteg Road ridge near to the Afon Daulan. The foreground of the view is one of regularly shaped pastoral fields bounded by a mixture of managed hedges and blocks of woodland. Overhead powerlines are a prominent feature of the view. The middle ground of the view features the steep wooded and pastoral farmland slopes of Llanddewi Velfrey featuring Pentroydin-fawr farm, and dwellings at Glan Preseli are visible on the skyline.	Low	Medium	Low


Llanfallteg Road
Pentroydin-fawr
Awel Deg and Glan Preseli

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory works - removal of part of hedgerow and trees that seperate Pentroydin-fach from Pentroydin-fawr and removal of roadside hedge banks that bound Llanfallteg Road just south of Pentroydin-fawr. East of Llanfallteg Road areas of woodland and lines of trees would be removed. Retained woodland would screen the view of some tree removal but there would be a visible reduction in the depth of tree canopy. Earthworks - removal of topsoil, the excavation of Pentroydin-fawr and Bethel cutting, the construction of Llanfallteg road overbridge and Pentroydin-fawr embankment. Llanfallteg road would be directly affected and temporarily diverted during construction. Structures - the construction of Llanfallteg Road overbridge would be visible. A view of the agricultural underpass at Pentroydin-fach and pedestrian underpass near Blaen-pentroydin may also be visible.	Moderate	Short term	Middle distance	Minor detrimental
Operation Winter Year 1: North-facing slopes of cuttings and embankments from Pentroydin-fach to Blaen-pentroydin would be visible. North facing slopes at Bethel Cutting would be visible, although partially screened by retained trees and hedgerows. Commercial vehicles would be visible where the road is on embankment at Pentroydin-fach and Pentroydin-fawr.	Moderate	Medium term	Middle distance	Moderate detrimental
Operation Summer Year 15: Cutting and embankment slopes would resemble a mosaic of pastoral fields and hedgerows. A view of commercial vehicles on embankment would be a residual impact.	Moderate	Long term	Middle distance	Major detrimental
Night-time: A view of task lighting would be available to this location, in particular lighting associated with the construction of Llanfallteg road overbridge, and temporary lighting required where the road would be diverted as it crosses the proposed road cutting. Where the road is on embankment the light from vehicle headlight would be visible. The glow of street lights at Bethel Roundabout would also be visible.	Minor	Long term	Middle distance	Moderate detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Slight adverse	Moderate adverse	Slight adverse

1.9 I. Glan Preseli

VIEWING POSITION			
OS Grid Ref: SN 1479 1708	**Post Code (nearest):** SA67 7PG	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 160 m
Viewpoint: Representative of the view available from outdoor spaces to residents of Glan Preseli. The landform gently rolls downhill in a northward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 29th March 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Llanfallteg road runs northward along a broad ridge from the village centre. To the west and east, the ridge rolls into two small stream valleys that are tributaries of the Afon Daulan. Afon Daulan forms the community boundary between Llanddewi Velfrey and Clynderwen. The foreground is a mixture of rural and urban edge. Pastoral fields bounded by hedge banks contribute a rural aspect, dwellings, a minor road and overhead powerlines contribute an urban aspect. Where the landform begins to drop more steeply is hidden from view, and the edge of the plateau screens a view of the Afon Daulan valley and the Carmarthen to Fishguard railway that runs along the floor of the next valley. The background of the view features the broad Castelldwyran ridge and beyond, the rolling and rural landscape of Clynderwen and Llandissilio gently rising towards the Preseli Hills.	High	Medium	Medium


Llandissilio
Glynty Farm
Castelldwyran

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory works - the removal of part of a hedgerow and trees next to Llanfallteg Road would be visible. Earthworks - during the initial stages of earthworks activities construction vehicles may be visible whilst excavating. Structures - a view of the construction of Llanfallteg Road overbridge would be available from slightly to the north-east of the viewpoint.	Negligible	Short term	Short distance	Negligible adverse
Operation Winter Year 1: A view of Llanfallteg Road overbridge would be available from slightly to the north-east of the viewpoint. Existing woodland and hedgerows would screen views of the road where it is on embankment at Pentroydin-fach and Pentroydin-fawr.	No change	Medium term	Short distance	No change
Operation Summer Year 15: Scattered trees and shrubs would integrate views of Llanfallteg Road overbridge into the original field boundary hedgerows.	No change	Long term	Short distance	No change
Night-time: A view of task lighting would be available to this location, lighting associated with the construction of Llanfallteg road overbridge, and temporary lighting required where the road would be diverted as it crosses the proposed road cutting.	No change	Long term	Short distance	No change

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Neutral

1.10 J. Blaen-pentroydin

VIEWING POSITION			
OS Grid Ref: SN 1515 1712	**Post Code (nearest):** SA67 7PD	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 125 m
Viewpoint: Represents the view from a public footpath (SP19/1/1), to the north of Blaen-pentroydin, from the eastern side of a style providing access through a hedgerow. Views of the Afon Taf vale and the Carmarthenshire countryside are revealed where the footpath crosses the hedgerow. The view is representative of one experienced by users of public footpaths travelling northward. The Scheme would occupy about 79 degree horizontal field of view. Hedgerows to the east and west limit the extent of visibility. The footpath would be directly affected by the Scheme and would be diverted through a culvert at ch 3+280, and connect with paths SP19/2/1 and SP19/3/2.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 26th July 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
The ground here drops steeply northward towards a small brook that is a tributary of the Afon Daulan. The middle ground is made up of rolling pastoral farmland of hills and broad ridges south of the the Carmerthen to Fishguard railway line. The rooves of agricultural buildings at Felin-bryn are visible, but Bryn Farm is entirely obscured by the landform. Further away, between the railway line and Afon Taf clusters of dwellings located on a ridge near to Llanfallteg West are visible. Beyond the Afon Taf, the gently rolling Carmarthenshire landscape gradually increases in height up to the Preseli Hills. The mosaic of woodland and pastoral farmland eventually gives way to moorland. Built elements in the view include scattered settlements and farms, small wind turbines, overhead power lines and the Preseli transmitting station. Other recognisable buildings visible include the chapel at Henllan Amgoed. The landscape is rural, with an irregular pattern of pastoral farmland, woodland and moorland with scattered settlements. The view is open and panoramic, although limited in extent by hedgerows.	High	High	High


Pen-y-bryn
Llanfallteg West
Felin-bryn
Penderi
Henllan
Amgoed

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory works - removal of hedgerows with trees in the foreground. Earthworks - removal of topsoil, and the construction of the Pentroydin-fawr embankment. The north-facing embankment slope would be longer than the south-facing slope that is visible from this viewpoint. Structures - construction of stream and footpath culverts.	Major	Short term	Short distance	Major detrimental
Operation Winter Year 1: South-facing embankment slope and the view of road surface and traffic would be a dominant feature of this view, interrupting the view of the rolling pastoral landscape in the middle ground of the view. Distant views of rural Carmarthenshire would still be available, but the Scheme would be a dominant feature of the foreground.	Major	Medium term	Short distance	Major detrimental
Operation Summer Year 15: New woodland planting would contribute towards integrating the road into the landscape, and screen the view of culerts, but the residual effect of a new barrier in the landscape would remain.	Major	Long term	Short distance	Major detrimental
Night-time: A view of task lighting would be available to the public footpath. Night-time use is predicted to be very low. A view of vehicle headlights would be available to the public footpath.	Negligible	Long term	Short distance	Minor detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Very large adverse	Very large adverse	Very large adverse	Moderate adverse

1.11 K. North of Bethel Chapel

VIEWING POSITION			
OS Grid Ref: SN 1590 1709	**Post Code (nearest):** SA67 7EG	**Community:** Llanddewi Velfrey	**Distance from Scheme:** 120 m
Viewpoint: View from a private track and public footpath SP19/4/6 to the north of Bethel Chapel. From the roadside verge outside of the bend where view looking uphill and across the north-facing slopes is available. The view is representative of one experienced by users of the private track and public footpath travelling westward. The Scheme would occupy about 108 degree horizontal field of view in a south to westward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 29th March 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
The track marks the change from sloping pastoral fields to steep wooded valley slopes. The view southward is limited by the rising landorm, first floor and rooves of a cluster of buildings at Bethel Chapel are visible, but other buildings are obscured by the landform and/or woodland. The viewer's attention tends to be drawn towards the wooded valley to the north. The track has been cut into the land, it changes from a sunken lane to sidelong cut, a hedge on bank limits views into the field. A view of traffic using the A40 is limited to a gap in-between bethel Chapel and the Vestry. The landscape is rural with an irregular pattern of pastoral farmland, hedgerows and trees, with clusters of dwellings and built elements. The view is partially interrupted by roadside hedges, and a row of overhead power lines and a telecommunication tower are visual detractors.	High	Medium	Medium


Agricultural building
near to The Vestry
Existing A40
at outskirts of
Llandewi Velfrey

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory work - visible change would include the removal of a hedge and mature trees. Earthworks - activities would include the removal of topsoil, the excavation of Bethel Roundabout and the construction of a new access road to Bethel Chapel, Bethel Cottage and the Vestry. There would be a significant change to the landform.	Moderate	Short term	Short distance	Moderate detrimental
Operation Winter Year 1: A view of north facing slopes, light columns at the roundabout and vehicles using the access road to the chapel would be available.	Moderate	Medium term	Short distance	Major detrimental
Operation Summer Year 15: The establishment of the north-facing slopes to resemble the mosaic of pastoral fields and hedges would integrate the slopes into the landscape and lessen the stark contrasts between the new and original features.	Minor	Long term	Short distance	Moderate detrimental
Night-time: A view of task lighting would be available to the public footpath. Night-time use is predicted to be very low.	Negligible	Long term	Short distance	Minor detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Moderate adverse	Large adverse	Moderate adverse	Slight adverse

1.12 L. Rhydywrach

VIEWING POSITION			
OS Grid Ref: SN 1656 1979	**Post Code (nearest):** SA34 0UJ	**Community:** Henllanfallteg	**Distance from Scheme:** 2,875 m
Viewpoint: From a passing-place on an unclassified road located on south facing gently sloping land at the western outskirts of the hamlet of Rhydywrach. The Afon Taf flows to the west and to the south of this location. The view is representative of one experienced by road users and countryside workers travelling westward towards Llanfallteg. The Scheme would occupy approximately 9 degree horizontal field of view, in an indirect south-south-westward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 28th March 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
Pastoral farmland in the foreground rolls gently into the Afon Taf valley. Beyond are the gently-rising north-facing slopes of the Llanddewi Velfrey ridge. Landcover is a mosaic of pastoral fields bounded by hedges and hedgerows with trees, areas of woodland, and dispersed rural dwellings. Parts of the Templeton ridge are visible beyond the Llanddewi Velfrey ridge, including National Grid pylons and wind turbines. Bethel Chapel and The Vestry are visible near to the horizon, and the line of the existing A40 is marked by a roadside hedge. A view of traffic is limited to an occasional glimpse of high-sided commercial vehicles. The dwellings at Awelfa, Arfryn and Penllain are visible, but filtered from view by the canopy of a row of trees. West of Tir-bach the view is interrupted by woodland in the foreground. The landscape is rural, with an irregular pattern of woodland, pastoral farmland, scattered settlements and isolated farms.	Medium	Medium	Medium


Hendre
Cwmmau Wood
Penhendre
Gwyndy Fach
The Vestry and Bethel Chapel
Awelfa
Valley View

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Construction Preparatory work - change noticeable would include the removal of field boundaries in fields between Bethel Chapel and Tir-bach, including a row of trees which filter a view of dwellings located on the horizon to the view. Earthworks - removal of topsoil and excavation of Bethel Roundabout, Llanddewi Velfrey link road and Bethel Cutting visible, as would be the construction of the new access to Bethel Chapel.	Minor	Short term	Long distance	Negligible detrimental
Operation Winter Year 1: The north-facing slopes of the approaches to Bethel Roundabout, Llanddewi Velfrey Link Road and Bethel Cutting would be visible - newly exposed rock would contrast in colour with adjacent fields.	Minor	Medium term	Long distance	Negligible detrimental
Operation Summer Year 15: The establishment of vegetation on the north-facing slopes would integrate the rock cuttings into the surrounding landscape and lessen the contrast between the new and original features.	Negligible	Long term	Long distance	Negligible detrimental
Night-time: A glimpse of task specific lighting at the proposed Bethel roundabout may be available where gaps in roadside hedge-banks allow. The impact of construction lighting would be reduced by the presence of street lighting at in Llanddewi Velfrey village. Vehicle headlights would also be visible on the access road to Bethel Chapel.	Negligible	Long term	Long distance	Negligible detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Neutral

1.13 M. Penback

VIEWING POSITION			
OS Grid Ref: SN 1815 1858	**Post Code (nearest):** SA34 0SR	**Community:** Henllanfallteg	**Distance from Scheme:** 2,515 m
Viewpoint: Broad ridge between Afon Taf and Nant Cwmfelin-boeth accessible by minor road from the A40 at Pont Loerig. Near to boundary between Henllanfallteg and Whitland North communities. View is representative of one experienced by road users and countryside workers travelling southward. The Scheme would occupy an approximately 9 degree horizontal field of view, in an indirect west-south-westward direction.			

SENSITIVITY OF VISUAL RECEPTOR			
Component of view (Photograph taken 28th March 2017)	**Sensitivity of receptor**	**Value attached to view**	**Susceptibility to change**
The pastoral farmland in the foreground rolls gently into the Afon Taf Valley. Beyond the Afon Taf valley are the woodlands of Tre-wern, Cwmmau and Hendre-fach, which when combined give the north-facing slopes of the Llanddewi Velfrey ridge a wooded appearance. Rural buildings are scattered throughout the view that also includes pastoral fields bounded by hedgerows with trees. Bethel Chapel and The Vestry are visible near to the horizon and the line of the existing A40 is marked by roadside vegetation between the chapel and the dwelling at Awelfa, which is identified by a row of conifers on the horizon. Beyond Awlefa the existing A40 is not visible. West of Bethel Chapel the wooded appearance gives way to a mosaic of pastoral farmland with small areas of woodland and hedgerows in-between fields. A row of dwelligns at Glan Preseli mark the broad Llanfallteg Road ridge that suns northward from Llanddewi Velfrey village centre. The landscape is rural, with an irregular pattern of woodland, pastoral farmland, scattered settlements and isolated farms. Several overhead power lines cross the pastoral fields, but these are difficult to distinguish.	Medium	Medium	Medium


Tre-wern
Tre-wern Wood
Garden House
The Vestry and Bethel Chapel
Awelfa
Valley View
Hendre
Pentroydin-fawr

MAGNITUDE OF VISUAL EFFECT				
Change in view	**Size/Scale of visual effect**	**Duration of visual effect**	**Distance of view**	**Magnitude of effect**
Construction: Preparatory work - change noticeable would include the removal of a small area of roadside trees and parts of hedges to west of Bethel Chapel and south of Tir-bach. Earthworks - removal of topsoil and excavation of Bethel Roundabout and Bethel Cutting would be visible in fields to west of Bethel Chapel. New link road to Llanddewi Velfrey and would cut a notch in the horizon. Activities associated with the new access road to Bethel Chapel would be screened by woodland.	Minor	Short term	Long distance	Negligible detrimental
Operation Winter Year 1: The north-facing slopes of the approaches to Bethel Roundabout, Llanddewi Velfrey Link Road and Bethel Cutting would be visible - exposed rock would contrast with adjacent fields. A section of the Llanddewi Velfrey link road surface and traffic would also be visible. Commercial vehicles would be visible at the roundabout.	Minor	Medium term	Long distance	Negligible detrimental
Operation Summer Year 15: The establishment of vegetation on the north-facing slopes would integrate the rock cuttings into the surrounding landscape and lessen the contrast between the new and original features.	Negligible	Long term	Long distance	Negligible detrimental
Night-time: A glimpse of task specific lighting at the proposed Bethel roundabout may be available where gaps in roadside hedge-banks allow. The impact of construction lighting would be reduced by the presence of street lighting at in Llanddewi Velfrey village. Vehicle headlights would also be visible on the link road and at the roundabout.	Minor	Long term	Long distance	Minor detrimental

SIGNIFICANCE OF VISUAL EFFECT			
Construction	**Winter Year 1**	**Summer Year 15**	**Night-time**
Neutral	Neutral	Neutral	Slight adverse

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.5: Visual Effects Schedule – Dwellings and Rural Businesses

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

REFERENCE			VIEWING POSITION					SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECTS		
Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7EY.1	SN 1139 1697	SA67 7EY	Narberth Rural	Cilrath Fawr Cottage	A40	detached, 1 storey	625	Eastward aspect. View of existing A40 interrupted by landform.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme predicted. Operation Summer Year 15 No view of Scheme predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EY.2	SN 1141 1658	SA67 7EY	Narberth Rural	1-2 Blackmoor Hill	A40	semi-detached, 2 storey	510	Northward aspect directly overlooking the existing A40 (T) limited by hedge-bank on top of a road cutting slope to the eastbound lane. Southward view limited by trees within curtilage.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme predicted. Operation Summer Year 15 No view of Scheme predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EY.3	SN 1145 1728	SA67 7EY	Narberth Rural	Cilrath Fawr Farm	A40	detached, 2 storey	775	Mainly north-westward aspect with view of mature trees and private garden. South-eastward view of hedgerow bounded fields and farm buildings overlooks farm yard. View of existing A40 interrupted by landform.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme predicted. Operation Summer Year 15 No view of Scheme predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HQ.1	SN 1157 1847	SA66 7HQ	Clynderwen	Manor Dre	C3034	detached, 2 storey	1,795	Eastward aspect with view of agricultural land, scattered farms and dwellings, private garden contained by hedge-banks and hedgerow trees. Southward view towards A40 interrupted by buildings.	High	Medium	Medium	Construction View of works interrupted by buildings. Operation Winter Year 1 View of Scheme interrupted by buildings. Operation Summer Year 15 View of Scheme interrupted by buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HQ.2	SN 1158 1863	SA66 7HQ	Clynderwen	Brynhyfryd	C3034	detached, 2 storey	1,955	Southward aspect with view of pastoral fields bounded by hedge-banks with occasional trees, and scattered dwellings. Views of the Llanddewi Velfrey ridge are interrupted by an accumulation of field boundaries and woodland.	High	Medium	Medium	Construction View of works interrupted by a series of boundary hedgerows. Operation Winter Year 1 View of Scheme interrupted by a series of hedgerow field boundaries. Operation Summer Year 15 View of Scheme interrupted by a series of hedgerow field boundaries.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HQ.3	SN 1160 1844	SA66 7HQ	Clynderwen	Ty Hir	C3034	detached, 1 storey	1,760	Eastward aspect with view of private garden, single track road and pastoral fields bounded by hedge-banks with occasional trees. Indirect view south-eastward interrupted by an accumulation of trees in hedges and hedgerows.	High	Medium	Medium	Construction View of works interrupted by series of hedgerows and trees. Operation Winter Year 1 View of Scheme interrupted by series of hedgerows and trees. Operation Summer Year 15 View of Scheme interrupted by series of hedgerows and trees.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HB.1	SN 1178 1795	SA66 7HB	Llanddewi Velfrey	Longford House	A478	semi-detached, 2 storey	1,250	Eastward aspect with view of old A478, pastoral fields bounded by a mixture of hedges with trees and informal hedgerow along line of small stream. Indirect view of Llanddewi Velfrey ridge interrupted by landform.	High	Medium	Medium	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme interrupted by landform. Operation Summer Year 15 View of Scheme interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HG.1	SN 1179 1858	SA66 7HG	Clynderwen	1-6 Precelly View	C3034	semi-detached, 2 storey	1,865	Northward/southward aspect. Northward view of Preseli Hills available from high point of broad lowland ridge. Southward view is open and uninterrupted of pastoral fields with scattered farms and agricultural buildings, including those at Longford Farm and Cilrath-fawr. A478 to ridge line just north of Penblewin Roundabout. View of existing A40 interrupted by several field boundary hedgerows and woodland in the vicinity of Caermaenau-Fawr. Eastward view is indirect and interrupted by buildings.	High	High	High	Construction View of works interrupted by vegetation. Operation Winter Year 1 View of Scheme interrupted by a series of field boundary hedgerows and woodland. Operation Summer Year 15 View of Scheme interrupted by a series of field boundary hedgerows and woodland.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HE.1	SN 1184 1824	SA66 7HE	Clynderwen	Weary Team	Weary Team Road	detached, 1 storey	1,525	Southward aspect with view of minor road and hedge-bank limiting middle and long distance views.	High	Low	Medium	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme interrupted by landform Operation Summer Year 15 View of Scheme interrupted by landform	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HB.2	SN 1184 1763	SA66 7HB	Llanddewi Velfrey	Brynhill Farm	A478	detached, 2 storey	935	Westward aspect with direct view of A478. Middle and long distance view limited by roadside hedge-bank. Southward and eastward views interrupted by outbuildings.	High	Low	Medium	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme interrupted by landform. Operation Summer Year 15 View of Scheme interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HE.2	SN 1185 1827	SA66 7HE	Clynderwen	Square & Compass	Weary Team Road	detached, 2 storey	1,570	Westward aspect with view of pastoral fields bounded by hedge-banks with trees. View overlooks old A478. Eastward view limited by hedgerow next to existing A478.	High	Medium	Medium	Construction View of works interrupted by landform and vegetation. Operation Winter Year 1 View of Scheme interrupted by landform and vegetation. Operation Summer Year 15 View of Scheme interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION					SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECTS		
Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7HG.2	SN 1187 1855	SA66 7HG	Clynderwen	Tir y Dderwen	C3034	detached, 1 storey	1,835	Southward aspect with view of pastoral fields bounded by hedge-banks with trees and ditches, agricultural buildings detract from view and interrupt views to south-east. Views of A478 and pastoral landscape available in middle-distance including Cilrath-fawr farm.	High	Medium	Medium	Construction View of works interrupted by a series of field boundary hedgerows and areas of woodland. Operation Winter Year 1 View of Scheme interrupted by a series of field boundary hedgerows and areas of woodland. Operation Summer Year 15 View of Scheme interrupted by a series of field boundary hedgerows and areas of woodland.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HG.3	SN 1191 1859	SA66 7HG	Clynderwen	Brynderwen	C3034	detached, 2 storey	1,875	Northward/southward aspect. Southward view is of northern slopes of Llanddewi Velfrey ridge, featuring pastoral fields and areas of woodland with scattered farms and dwellings. A487 visible where it climbs to Penblewin. View from ground floor is partially interrupted by agricultural buildings.	High	Medium	Medium	Construction View of works theoretically available, but interrupted by a combination of outbuildings, hedgerows and areas of woodland. Operation Winter Year 1 View of Scheme and traffic interrupted by combination of outbuildings, hedgerows and areas of woodland. Operation Summer Year 15 View of Scheme and traffic interrupted by combination of outbuildings, hedgerows and areas of woodland.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.1	SN 1197 1569	SA67 7NX	Narberth Rural	Fronlas, Y Gorlan	A478	semi-detached, 2 storey	920	Eastward aspect with direct view of A487. Distant views limited by roadside hedgerow to east of A487.	High	Low	Medium	Construction Indirect view northward towards works interrupted by series of hedgerows. Operation Winter Year 1 Indirect view northward of Scheme and traffic interrupted by series of hedgerows with trees. Operation Summer Year 15 Indirect view northward of Scheme and traffic interrupted be hedgerows and trees.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HE.3	SN 1197 1858	SA66 7HE	Clynderwen	Llwyn-Aur and Rest Cottage	A478	detached, 2 storey	1,875	Eastward aspect with open and uninterrupted view of pastoral farmland within Afon Taf Vale and north-facing slopes of Llanddewi Velfrey ridge, including Pen-troydin-fawr, Pen-troydin-fach, Glan Preseli, Maes-y-Rhos and Maes-y-ffynnon. View overlooks existing A487.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries (ch 2+400 to 2+800). Earthworks - removal of topsoil, construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), excavation of Pentroydin-fach cutting depth to 15.0m (ch 2+700 to 2+900). Distant view of Scheme would be available including north-facing cutting slope at Pen-troydin-fach (ch.2100-2400), road on embankment near Pen-troydin-fawr (ch.2440-2730), and north-facing cutting slope and overbridge at Llanfallteg Road (ch.2730-2930). Possible view of earthworks to east of Llanfallteg Road where road would be on embankment as it crosses through woodland north of Blaen-pen-troydin (ch.2930-3460). Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. Distant view of commercial vehicles would be available where road is on embankment near Pen-troydin-fawr (ch.2440-2730), and possibly where road is on embankment to north of Blaen-pen-troydin. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish. On the Blaen-pen-troydin embankment woodland planting once established would screen views of traffic, but a glimpse of commercial vehicles would be available on the embankment near Pen-troydin-fawr.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - Negligible -	Neutral	Neutral	Neutral
7NX.2	SN 1197 1572	SA67 7NX	Narberth Rural	Haulfryn	A478	detached, 1 storey	890	Eastward aspect with direct view of A487. Distant views limited by roadside hedgerow to east of A487.	High	Low	Medium	Construction Indirect view northward towards works interrupted by series of hedgerows. Operation Winter Year 1 Indirect view northward of Scheme and traffic interrupted by series of hedgerows with trees. Operation Summer Year 15 Indirect view northward of Scheme and traffic interrupted by series of hedgerows with trees.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.3	SN 1200 1593	SA67 7NX	Narberth Rural	Stonyford Cottage, Y Ffermdy	A478	semi-detached, 1-2 storey	685	Eastward aspect with direct view of A487. Distant views limited by roadside hedgerow to east of A487. Indirect northward view interrupted by neighbouring properties.	High	Low	Medium	Construction View of works interrupted by landform and buildings. Operation Winter Year 1 View of Scheme and traffic interrupted by landform and buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by landform and buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION					SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECTS		
Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7NX.4	SN 1200 1582	SA67 7NX	Narberth Rural	1-2 Leamington Cottages	A478	semi-detached, 2 storey	790	Eastward aspect with direct view of A487. Distant views limited by roadside hedgerow to east of A487.	High	Low	Medium	Construction Indirect view northward towards works interrupted by series of hedgerows. Operation Winter Year 1 Indirect view northward of Scheme and traffic interrupted by series of hedgerows with trees. Operation Summer Year 15 Indirect view northward of Scheme and traffic interrupted by series of hedgerows with trees.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.5	SN 1200 1596	SA67 7NX	Narberth Rural	Rhyd y Cerrig	A478	detached, 1 storey	645	Eastward aspect with direct view of A487. Distant view limited by roadside vegetation and field boundary hedgerows.	High	Low	Medium	Construction Indirect view northward towards works interrupted by landform. Operation Winter Year 1 Indirect view northward of Scheme and traffic interrupted by landform. Operation Summer Year 15 Indirect view northward of Scheme and traffic interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.6	SN 1203 1587	SA67 7NX	Narberth Rural	Stoneybarn, Stonyford	A478	detached, 1-2 storey	750	Westward aspect with direct view of A487. Distant views interrupted by roadside vegetation.	High	Medium	Medium	Construction Indirect view northwards of works interrupted by vegetation. Operation Winter Year 1 Indirect view of Scheme and traffic interrupted by vegetation. Operation Summer Year 15 Indirect view of Scheme and traffic interrupted by vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.7	SN 1203 1587	SA67 7NX	Narberth Rural	Ford Barn	A478	detached, 1 storey	750	Mainly southward aspect. View northward interrupted by neighbouring buildings and streamside vegetation.	High	Medium	Medium	Construction View of works interrupted by neighbouring buildings Operation Winter Year 1 View of Scheme and traffic interrupted by neighbouring buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by neighbouring buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR.1	SN 1206 1876	SA66 7NR	Clynderwen	2 and 4 Bro'r Dderwen	Bro'r Dderwen	detached, 1 storey	2,045	Northward aspect directly overlooking Bro'r Dderwen estate road and dwellings across street. View southward interrupted by garden boundary fence and neighbouring buildings.	High	Low	Medium	Construction View of works interrupted by neighbouring buildings Operation Winter Year 1 View of Scheme and traffic interrupted by neighbouring buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by neighbouring buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR.2	SN 1206 1879	SA66 7NR	Clynderwen	1 and 3 Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,075	Southward aspect directly overlooking Bro'r Dderwen estate road and dwellings across street. View southward interrupted by neighbouring buildings.	High	Low	Medium	Construction View interrupted by neighbouring buildings Operation Winter Year 1 View interrupted by neighbouring buildings. Operation Summer Year 15 View interrupted by neighbouring buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EX.1	SN 1206 1561	SA67 7EX	Narberth Rural	Beechwood Park	A478	complex, 1-2 storey	985	Mainly south-eastward aspect, with north-westward aspect facing A487. View of farm buildings and dwelling at Penblewin available from outdoor spaces.	High	Medium	Medium	Construction View of night-time task lighting at Penblewin Roundabout filtered by vegetation. Operation Winter Year 1 View of street-lighting columns at Penblewin Roundabout and commercial vehicles filtered by vegetation. Operation Summer Year 15 View of street-lighting columns at Penblewin Roundabout and commercial vehicles interrupted by vegetation.	No change No change No change	Short term Medium term Long term	Middle distance Middle distance Middle distance	No change No change No change	Neutral	Neutral	Neutral
7NR.3	SN 1207 1874	SA66 7NR	Clynderwen	6 and 18	Bro'r Dderwen	detached, 1 and 2 storey	2,020	East-west aspect with view overlooking cul-de-sac turning area and neighbouring dwellings.	High	Low	Medium	Construction View of works interrupted by neighbouring buildings Operation Winter Year 1 View of Scheme and traffic interrupted by neighbouring buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by neighbouring buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NX.8	SN 1207 1625	SA67 7NX	Narberth Rural	Penblewin Cottage, Pine Cottage, Whitsun Brook	A478	detached, 1 storey	350	Dwellings have north-south or east-west aspect, but are located near to Pant-y-gorphwys Bridge at the valley floor.	High	Medium	Medium	Construction View of works interrupted by landform and buildings. Operation Winter Year 1 View of Scheme and traffic interrupted by landform and buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by landform and buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7NR.4	SN 1208 1872	SA66 7NR	Clynderwen	8-14 (evens)	Bro'r Dderwen	detached, 1 and 1.5 storey	2,000	Rear of properties have southward aspect with view of pastoral fields and areas of woodland towards northern slopes of Llanddewi Velfrey ridge and Afon Tâf Vale. Longford Farm prominent in views. Views towards Llanddewi Velfrey partially interrupted by group of trees alongside access track to Clunderwen Sewage Works.	High	High	High	Construction Preparatory works - removal of vegetation from field boundaries between Pen-troydin fach and Pen-troydin fawr (ch 2+250 to 2+950), and from areas of woodland north of Blaen-pen-troydin (ch 2+950 to 3+450), partially interrupted by vegetation in foreground. Earthworks - excavation of cuttings and construction of embankments (ch 2+250 to 3+450), partially interrupted by vegetation in foreground. Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes partially interrupted by vegetation. Distant view of commercial vehicles would be available where road is on embankment near Pen-troydin-fawr (ch.2440-2730), and possibly where road is on embankment to north of Blaen-pen-troydin, partially interrupted by vegetation. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish from immediate surroundings. On the Blaen-pen-troydin embankment woodland planting once established would screen views of traffic, but a glimpse of commercial vehicles would be available on the embankment near Pen-troydin-fawr.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - Negligible -	Slight adverse	Slight adverse	Slight adverse
7NX.9	SN 1208 1628	SA67 7NX	Narberth Rural	Pantygorphwys Uchaf	A478	detached, 2 storey	330	Southward aspect, view overlooks neighbouring dwelling towards wooded valley of Afon Marlais at head of Lampeter Vale. Northward view limited by vegetation to property boundary.	High	Medium	Medium	Construction View of works interrupted by an accumulation of vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by an accumulation of vegetation. Operation Summer Year 15 View of Scheme and traffic interrupted by an accumulation of vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HB.3	SN 1209 1832	SA66 7HB	Clynderwen	Rhyd Hir (Longford)	C3221	detached	1,630	Dwelling is surrounded by hedgerows and linear belts of woodland, and is located in a valley floor near to a stream.	High	Medium	Medium	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme and traffic interrupted by landform. Operation Summer Year 15 View of Scheme and traffic interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NY.1	SN 1209 1662	SA67 7NY	Llanddewi Velfrey	Penblewin Farm	A40	detached, 2 storey	40	Dwelling has east/west aspect and is located next to the existing A40. Westward view is of farm yard and agricultural buildings. Light columns visible. View of traffic, road signs and road surface at roundabout available from first floor windows. Further west, view is of pastoral farmland at the head of the Lampeter Vale. Eastward view is open and uninterrupted, of A40 including road surface, vehicles and boundary hedges up to Service area. Road is set within pastoral landscape of south facing gentle slopes of the Llanddewi Velfrey ridge, featuring significant areas of woodland, Pembrokeshire hedge-banks and hedges with trees.	High	Medium	Medium	Construction Preparatory works - removal of hedges west of roundabout, trees north of roundabout, section of Pembrokeshire hedge-banks with trees at (ch 0+180 and ch 0+280). Earthworks - removal of topsoil, construction of attenuation pond (ch 0+280 to 0+380), embankment height to 3.3m (ch 0+020 to 0+400), sidelong cutting depth to 2.3m (ch 0+400 to 0+600). Operation Winter Year 1 Eastbound view of embankment, sidelong cutting, road surface and side road, and road signs. Westbound view of roundabout similar to existing. View of cars and commercial vehicles, traffic reduced on de-trunked A40, which continues to service area and Henllan Lodge. Westbound view unchanged. Operation Summer Year 15 Eastbound view of Scheme screened by proposed woodland planting. View of traffic screened by native woodland planting, traffic reduced on de-trunked A40. Westbound view of roundabout similar to existing.	Moderate Moderate Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Major - Minor +	Moderate adverse	Large adverse	Slight benefit
7NR.5	SN 1209 1880	SA66 7NR	Clynderwen	5-11 (odds) Bro'r Dderwen	Bro'r Dderwen	terraced, 2 storey	2,085	Southward aspect, view of neighbouring properties overlooking estate road.	High	Low	Medium	Construction View of works interrupted by buildings. Operation Winter Year 1 View of Scheme and traffic interrupted by buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7NR.6	SN 1210 1877	SA66 7NR	Clynderwen	20-26 (evens) Bro'r Dderwen	Bro'r Dderwen	terraced, 2 storey	2,055	Mainly northward aspect. Southward aspect view of neighbouring properties, private garden and boundary fence.	High	Low	Medium	Construction View of works interrupted by buildings. Operation Winter Year 1 View of Scheme and traffic interrupted by buildings. Operation Summer Year 15 View of Scheme and traffic interrupted by buildings.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7NX. 10	SN 1211 1622	SA67 7NX	Llanddewi Velfrey	Pantygorphwys Farmhouse	A478	detached, 2 storey	400	Southward and Northward aspect. Northward view of garden and pastoral fields limited by vegetation and gently rising landform north of Afon Marlais.	High	Medium	Medium	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme and traffic interrupted by landform. Operation Winter Year 15 View of Scheme and traffic interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR.7	SN 1211 1880	SA66 7NR	Clynderwen	13 Bro'r Dderwen	Bro'r Dderwen	detached, 1 storey	2,085	Southward aspect. View of neighbouring properties overlooking estate road. Eastward view interrupted by hedge-bank.	High	Low	Medium	Construction View of Scheme interrupted by buildings and vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by buildings and vegetation. Operation Summer Year 15 View of Scheme and traffic interrupted by buildings and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR.8	SN 1214 1874	SA66 7NR	Clynderwen	30 and 32 Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,020	Eastward aspect. View of grassed area (building plot), and neighbouring properties. View of Afon Taf vale and northern slopes of Llanddewi Velfrey ridge featuring mosaic of pastoral farmland and woodland. Indirect and distant view of Llanddewi Velfrey (Glan Preseli and Pentroydin-fach).	High	Medium	Medium	Construction Preparatory works - removal of field boundaries (ch 2+400 to 2+800). Earthworks - removal of topsoil, construction of embankment height to 14.5m (ch 2+400 to 2+700), excavation of cutting depth to 15.0m (ch 2+700 to 2+900). Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. Glimpse of commercial vehicles where road is on embankment. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish from surroundings. Glimpse of commercial vehicles where road is on embankment.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - No change	Neutral	Neutral	Neutral
7HB.4	SN 1214 1703	SA66 7HB	Llanddewi Velfrey	Carmaenau Fawr (rural business)	A478	detached, 2 storey	330	Northward aspect. View southward limited by vegetation in garden, neighbouring field boundaries and rising landform.	High	High	High	Construction View of works interrupted by landform and vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by landform and vegetation. Operation Winter Year 15 View of Scheme and traffic interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7HB.5	SN 1215 1767	SA66 7HB	Llanddewi Velfrey	Rhos-Fach and Well Cottage (rural business)	A478	detached	955	Northward aspect. View of Preseli hills from camp site. Southward view limited by woodland and rising landform.	High	High	High	Construction View of works interrupted by landform and vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by landform and vegetation. Operation Winter Year 15 View of Scheme and traffic interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR.9	SN 1221 1876	SA66 7NR	Clynderwen	44-48 (evens) Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,045	Northward and eastward aspect. Northward views of neighbouring properties overlooking estate road. Eastward view contained by neighbouring properties looks out toward Afon Taf vale and Ffynnon-brodyr farm. Distant and indirect view of Pentroydin-fawr and pastoral/woodland setting.	High	Medium	Medium	Construction Preparatory works - removal of woodland areas (east of ch 2+820). Earthworks - removal of topsoil, excavation of cutting depth to 15.0m (ch 2+700 to 2+900), construction of Llanfallteg road overbridge. Operation Winter Year 1 Distant view of north-facing cutting slope and overbridge. Glimpse of traffic on Llanfallteg road overbridge. No view of traffic in deep cutting. Operation Summer Year 15 Distant view of overbridge interrupted by woodland planting. Earthwork slopes would resemble mosaic of woodland and grassland. View of traffic filtered by vegetation.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral

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7NR. 10	SN 1221 1880	SA66 7NR	Clynderwen	15 and 21-27 (odds), Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,080	Southward aspect. View of neighbouring properties overlooking estate road. Distant and indirect view of northern slopes of Llanddewi Velfrey ridge, including Pentroydin-fach, Glan Preseli and Pen-troydin fawr, within mosaic of grassland and woodland.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries (ch 2+400 to 2+800). Earthworks - removal of topsoil, construction of embankment height to 14.5m (ch 2+400 to 2+700), excavation of cutting depth to 15.0m (ch 2+700 to 2+900). Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. Glimpse of commercial vehicles where road is on embankment and on Llanfallteg Road overbridge. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and difficult to distinguish from surroundings. Glimpse of commercial vehicles where road is on embankment. View of Llanfallteg road overbridge filtered by vegetation.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral
7HB.6	SN 1222 1806	SA66 7HB	Llanddewi Velfrey	Longford Farm (farm dwelling)	A478	detached, 2 storey	1,355	East west aspect. View to east limited by agricultural buildings. View to west is of pastoral fields limited by field boundary hedgerows.	High	Medium	Medium	Construction Indirect view southward interrupted by agricultural buildings and rising landform. Operation Winter Year 1 View of Scheme and traffic interrupted by buildings and landform. Operation Summer Year 15 View of Scheme and traffic interrupted by buildings and landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NR. 11	SN 1223 1873	SA66 7NR	Clynderwen	37 and 39, 50-54 (evens) Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,020	Southward aspect. Direct view of Afon Taf vale and northern slopes of Llanddewi Velfrey ridge, including Pentroydin-fach, Glan Preseli and Pentroydin-fawr. View is a mosaic of woodland and grassland with scattered dwellings. View is partially interrupted by hedge-bank.	High	High	High	Construction Preparatory works - removal of field boundaries and areas of woodland (between ch 2+400 to 3+600). Earthworks - removal of topsoil, construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), Pentroydin-fawr embankment height to 23.5m (ch 2+920 to 3+420), excavation of Pentroydin-fach cutting depth to 15.0m (ch 2+700 to 2+900), Pentroydin-fawr cutting and Bethel cutting (ch 3+420 to 3+750). Construction of Llanfallteg Road overbridge. Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. View along Tir-bach cutting where breach in horizon may be visible. Glimpse of commercial vehicles where road is on embankment and on Llanfallteg Road overbridge. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish. Tir-bach cutting would appear as notch cut out of horizon. Glimpse of commercial vehicles on Pentroydin-fach embankment only.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - Negligible -	Slight adverse	Slight adverse	Slight adverse
7NR. 12	SN 1224 1879	SA66 7NR	Clynderwen	29 and 31 Bro'r Dderwen	Bro'r Dderwen	detached, 2 storey	2,080	Southward and westward aspect. Views of Afon Taf Vale and northern slopes of Llanddewi Velfrey ridge partially interrupted by buildings. Pentroydin-fach, Glan Preseli and Pentroydin-fawr recognisable amongst a mosaic of pastoral farmland and woodland.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries and areas of woodland (between ch 2+400 to 3+600). Earthworks - removal of topsoil, construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), Pentroydin-fawr embankment height to 23.5m (ch 2+920 to 3+420), excavation of Pentroydin-fach cutting depth to 15.0m (ch 2+700 to 2+900), Pentroydin-fawr cutting and Bethel cutting (ch 3+420 to 3+750). Construction of Llanfallteg Road overbridge. Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. View along Tir-bach cutting where breach in horizon may be visible. Glimpse of commercial vehicles where road is on embankment and on Llanfallteg Road overbridge. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish. Tir-bach cutting would appear as notch cut out of horizon. Glimpse of commercial vehicles on Pentroydin-fach embankment only.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - Negligible -	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION					SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECTS		
Ref. Nr.	OS Grid Ref	Post Code	Community	Property	Street	Type of Property	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in View	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During Construction	Winter Year 1	Summer Year 15
7NY.2	SN 1258 1706	SA67 7NY	Llanddewi Velfrey	Bounty Farm, The Lodge	A40	detached, 2 storey	355	Westward aspect. View of rolling landscape with mosaic of woodland and grassland, and scattered rural dwellings, looking over A487 corridor. View southward interrupted by landform and substantial vegetation.	High	High	Medium	Construction Indirect view southward interrupted by landform and vegetation. Winter Year 1 Indirect view southward interrupted by landform and vegetation. Winter Year 15 Indirect view southward interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7NY.3	SN 1262 1702	SA67 7NY	Llanddewi Velfrey	Grosvenor Court	A40	detached, 2 storey	300	Westward aspect. View of rolling landscape with mosaic of woodland and grassland, and scattered rural dwellings, looking over A487 corridor. View southward interrupted by landform and substantial vegetation.	High	High	High	Construction Indirect view southward interrupted by landform and vegetation. Winter Year 1 Indirect view southward interrupted by landform and vegetation. Winter Year 15 Indirect view southward interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.1	SN 1264 1875	SA66 7PL	Clynderwen	Ffynnon Brodyr (farm dwelling)	C3221	detached, 1 and 2 storey	1,935	1 storey has east-west aspect, 2 storey has southward aspect. View of Afon Taf Vale and north slopes of Llanddewi Velfrey ridge, featuring mosaic of grassland, woodland and scattered dwellings.	High	High	High	Construction Preparatory works - removal of field boundaries and areas of woodland (between ch 2+400 to 3+600). Earthworks - removal of topsoil, construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), Pentroydin-fawr embankment height to 23.5m (ch 2+920 to 3+420), excavation of Pentroydin-fach cutting depth to 15.0m (ch 2+700 to 2+900), Pentroydin-fawr cutting and Tir-bach cutting (ch 3+420 to 3+750). Construction of Llanfallteg Road overbridge. Operation Winter Year 1 Distant view of north-facing cutting and embankment slopes. View along Tir-bach cutting where breach in horizon may be visible. Glimpse of commercial vehicles where road is on embankment and on Llanfallteg Road overbridge. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish. Tir-bach cutting would appear as notch cut out of horizon. Glimpse of commercial vehicles on Pentroydin-fach embankment only.	Minor Minor Negligible	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - Negligible - Negligible -	Slight adverse	Slight adverse	Slight adverse
7NY.4	SN 1265 1663	SA67 7NY	Llanddewi Velfrey	Cae'rmaenau-fach	A40	detached, 2 storey	65	East-west aspect, with north gable near to existing A40. View from dwelling is of gently sloping fields and areas of woodland. Roadside hedge screens view of A40 and traffic. From outdoor spaces there is a direct view of the A40 and vehicles available, where not interrupted by boundary wall and timber fence.	High	Medium	Medium	Construction Preparatory works - removal of some Pembrokeshire hedge-banks and trees may be visible (ch 0+500), although likely to be filtered from view by vegetation. Earthworks - construction vehicles may be visible but changes to ground would be screened by vegetation in east and west direction, hedges to north and south of existing A40 retained. Gap in hedge where existing access to Bounty Farm would enable a view of construction activities from outdoor spaces. Operation Winter Year 1 Indirect view of road in sidelong cutting to north where there is a gap in the retained hedge, available from outdoor spaces. Indirect view of traffic available where there is a gap in the retained hedge, available from outdoor spaces. Traffic reduced on de-trunked A40, used as local access, including Henllan, Lampeter Velfrey and Llanddewi Velfrey ridge top only. Operation Summer Year 15 Woodland planting to south side of proposed carriageway would narrow view of road. Former access gap retained to keep visual link between Cae'rmaenau-fach and Bounty Farm access. Woodland planting to south side of proposed carriageway would reduce view of traffic to glimpse.	Minor Negligible No change	Short term Medium term Long term	Short distance Short distance Short distance	Minor - Minor - No change	Slight adverse	Slight adverse	Neutral

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7NY.5	SN 1285 1670	SA67 7NY	Llanddewi Velfrey	Trefangor Farm	A40	detached, 2 storey	45	Direct and uninterrupted northward view of existing A40, including road surface, signs and traffic. View north limited by roadside hedge, although view of fields and rising terrain available from first floor windows.	High	Low	Medium	Construction Preparatory works - removal of some Pembrokeshire hedge-banks and trees may be visible (ch 0+500, 0+590, 0+720 and 0+860), from first floor rooms. Earthworks - construction vehicles visible including changes to ground where Scheme and local access road to Trefangor cemetery would be in sidelong cutting on gently rising ground. Operation Winter Year 1 Direct view of proposed roads in sidelong cutting to north, filtered by hedge from ground floor and outdoor spaces, but available from first floor windows. Direct view of traffic filtered by hedge from ground floor and outdoor spaces, but unfiltered from first floor rooms. Traffic reduced on de-trunked A40, used as local access, including Henllan, Lampeter Velfrey and Llanddewi Velfrey ridge top only. Operation Summer Year 15 Woodland planting to south side of proposed carriageway would interrupt view of changes. Woodland planting to south side of proposed carriageway would interrupt view of traffic. View of fields to north lost.	Moderate Moderate Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Major - Moderate -	Moderate adverse	Large adverse	Moderate adverse
7PL.2	SN 1287 1893	SA66 7PL	Clynderwen	Pen Parc (rural business)	C3221	detached, 1 and 2 storey	2,105	Southward aspect. View of Afon Taf vale and Llanddewi Velfrey ridge available form first floor rooms only. View consists of mosaic of pastoral grassland, woodland and scattered rural dwellings, partially interrupted by landform and filtered by vegetation.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries and areas of woodland (between ch 2+400 to 3+600). Earthworks - construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), excavation of Pentroydin-fach cutting depth to 5.0m (ch 2+100 to 2+440), Pentroydin-fawr cutting and Bethel cutting (ch 3+420 to 3+750). Construction of Llanfallteg Road overbridge. Operation Winter Year 1 Distant view of tops of north-facing cutting and embankment slopes. Glimpse of commercial vehicles where road is on embankment and on Llanfallteg Road overbridge. Operation Summer Year 15 Earthwork slopes would resemble pastoral fields and be difficult to distinguish. Glimpse of commercial vehicles on Pentroydin-fach embankment only.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral
7NY.6	SN 1311 1682	SA67 7NY	Llanddewi Velfrey	Trefangor Cottage	A40	detached, 2 storey	0	Southward aspect. Direct and uninterrupted view of existing A40, contained by roadside hedgerows. View towards gently falling ground to south of A40 of pastoral fields with hedgerows, trees and woodland.	High	Medium	Medium	Dwelling would be demolished to facilitate Scheme							
7NY.7	SN 1323 1694	SA67 7NY	Llanddewi Velfrey	Brominau	A40	detached, 1 storey	90	Southward aspect. Direct view of existing A40 interrupted by trees in garden. Indirect view available from single ground floor window of traffic, filtered by vegetation.	High	Low	Medium	Construction Preparatory works - removal of some Pembrokeshire hedge-banks, trees and Trefangor Cottage may be visible (ch 1+000 to 1+160), removal of trees and bank visible (ch 1+200 to 1+220), partially filtered from view by vegetation. Earthworks - construction vehicles visible, changes to ground would involve removal of topsoil and minor changes to ground levels. Operation Winter Year 1 Indirect view of boundary fences and road surfaces. Garden of property directly affected by proposed works. Indirect view of traffic using cemetery access road and proposed A40 available. Operation Summer Year 15 Linear belt of trees and shrubs in-between cemetery access road and proposed A40 would filter views of road. Linear belt of trees and shrubs in-between cemetery access road and proposed A40 would filter views of traffic.	Moderate Moderate Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Major - Moderate -	Moderate adverse	Large adverse	Moderate adverse

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7NY.8	SN 1327 1682	SA67 7NY	Llanddewi Velfrey	Henllan Lodge	A40	detached, 1 storey	20	Eastward and northward aspect with direct view of A40 and weighbridge lay-by. View contained by woodland.	High	Low	Medium	Construction Preparatory works - removal of some Pembrokeshire hedge-banks, trees and Trefangor Cottage may be visible (ch 1+000 to 1+160), removal of trees and bank visible (ch 1+200 to 1+220), removal of hedge (ch 1+250 to 1+300). Earthworks - construction vehicles visible, changes to ground would involve removal of topsoil and existing road surface including minor changes to ground levels. Realignment of existing A40 to serve as local access, immediately adjacent to gable end. Road pavement - removal of existing and replacement. Operation Winter Year 1 Direct view of road surface, traffic and highway boundary fence. View east contained by woodland. Wider view north limited by gently rising landform and field boundary hedgerows. Direct view of traffic using local access road and proposed A40 would be available. Operation Summer Year 15 Proposed hedge/headlight screen between de-trunked A40/local access road and proposed road would filter views of road. Proposed hedge/headlight screen between de-trunked A40/local access road and proposed road would filter views of cars, but view of commercial/high sided vehicles would remain.	Moderate Moderate Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Moderate - Minor +	Moderate adverse	Moderate adverse	Slight benefit
7NY.9	SN 1331 1729	SA67 7NY	Llanddewi Velfrey	Pencaerminau Farm (farm dwelling)	A40	detached, 2 storey	430	East-west aspect. Southward view towards A40 interrupted by landform. Eastward view is of northern slopes of Llanddewi Velfrey ridge, which includes mosaic of pastoral, woodland and built elements, including Beili-bach, Pentroydin-fach and Pen-troydin fawr.	High	Medium	Medium	Construction Preparatory works - removal of hedgerows with trees near to Pen-troydin-fach and Pen-troydin fawr (between ch 2+200 and 2+900). Elements of Construction site compound may also be visible. Earthworks - construction vehicles visible, construction of Pentroydin-fach embankment height to 14.5m (ch 2+400 to 2+700), excavation of Pentroydin-fach cutting depth to 5.0m (ch 2+100 to 2+450), and Pentroydin-fawr cutting depth to 15.0m (ch 2+700 to 2+900). Structures - construction of Llanfallteg Road overbridge visible. Operation Winter Year 1 Indirect view of north-facing embankment and cutting slopes from Pentroydin-fach to Llanfallteg Road. Glimpse of commercial vehicles at Llanddewi Velfrey West junction and where road is on embankment. Operation Summer Year 15 North facing slopes would resemble pastoral farmland with areas of woodland and blend in with surroundings. Indirect view of traffic reduced by mitigation planting to north of Scheme to glimpse where road is on embankment at Pentroydin-fach.	Moderate Major Minor	Short term Medium term Long term	Middle distance Middle distance Middle distance	Minor - Moderate - Moderate -	Slight adverse	Moderate adverse	Moderate adverse
7NZ.1	SN 1335 1627	SA67 7NZ	Llanddewi Velfrey	Henllan Farm (farm dwelling)	C3205	detached, 2 storey	555	East-west aspect. Northward view towards A40 interrupted by agricultural buildings and substantial woodland.	High	Medium	Medium	Construction Indirect view northward of works interrupted by buildings and vegetation.. Operation Winter Year 1 No view of Scheme. Operation Summer Year 15 No view of Scheme.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PN.1	SN 1336 1947	SA66 7PN	Clynderwen	Glynty Farm	C3220	detached, 2 storey	2,560	Mainly southward aspect with open and uninterrupted view of Taf vale and north facing slopes of Llanddewi Velfrey pastoral landscape.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries between ch 2+300 and 2+900 near to Pentroydin-fach and Pentroydin-fawr. Earthworks - construction of Pentroydin-fach embankment, excavation of Pentroydin-fawr cutting. Structures - construction of Llanfallteg Road overbridge. Operation Winter Year 1 View of north facing embankment slope and top of north facing cutting slope. Glimpse of commercial vehicles on embankment. Operation Summer Year 15 Glimpse of commercial vehicles on Pentroydin-fach embankment.	Minor Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	Negligible - No change No change	Neutral	Neutral	Neutral

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7NZ.2	SN 1347 1627	SA67 7NZ	Llanddewi Velfrey	1-2 Henllan Cottages	C3025	semi-detached, 2 storey	560	North-south aspect. Main view is southward and overlooks head of Lampeter Vale. View northward is of gently rising ground limited by the remnant of parkland plantations.	High	High	High	Construction View northward interrupted by parkland plantation. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PA.1	SN 1363 1687	SA67 7PA	Llanddewi Velfrey	Penrhiw Cottage	A40	detached, 1.5 storey	25	Southward aspect with direct view of A40, partially interrupted by timber fence from ground floor and limited to view through gateway.	High	Low	Medium	Construction Preparatory works - removal of part of roadside plantation where self-sown trees have become established, to enable construction of local access road. Removal of part of roadside plantation would introduce more extensive view of existing road in eastward direction. Earthworks - existing A40 on embankment where it passes through Ffynnon Wood, and road is at grade directly adjacent to Penrhiw Cottage. The Scheme would place the road centre line further away from the dwelling frontage than is existing. Road pavement - direct view of road pavement construction, limited by property boundary timber fence. Operation Winter Year 1 Direct view of road surface, cars and commercial vehicles limited by timber fence. Indirect eastward view of commercial vehicles available. Operation Summer Year 15 Linear belts of trees introduced to screen direct views of vehicles and road surface. Views of Scheme and traffic would be limited to those from outdoor spaces.	Major Minor No change	Short term Medium term Long term	Short distance Short distance Short distance	Major - Moderate - No change	Very large adverse	Large adverse	Neutral
7PL.3	SN 1369 1850	SA67 7PL	Clynderwen	Bryn Dwyrain	C3221	detached, 2 storey	1,535	Mainly northward aspect facing onto local road. Southward view is towards north-facing slopes of Llanddewi Velfrey ridge, featuring pastoral farmland, areas of woodland and scattered rural settlements.	High	Medium	Medium	Construction Preparatory works - removal of field boundary hedgerows and woodland between ch 2+200 and 3+600. Earthworks - Views of excavation of Pentroydin-fach cutting (ch 2+100 to 2+440, depth to 5.0m), Pentroydin-fawr cutting (ch 2+730 to 2+930, depth to 15.0m), and Bethel cutting (ch 3+460 to 3+780, depth to 18.0m), construction of Pentroydin-fach embankment (ch 2+440 to 2+730, height to 14.5m), and Pentroydin-fawr embankment (ch 2+930 to 3+460, height to 14.5m). Structures - View of Llanfallteg Road overbridge and possibly of agricultural underpass at Pentroydin-fach embankment, if not obscured by hedgerow with trees. Operation Winter Year 1 View of north facing slopes of cuttings and embankments with glimpse of commercial vehicles available where road is on embankment. Operation Summer Year 15 North facing slopes of embankments and cuttings would resemble pastoral fields. Woodland planting on slopes would screen views of traffic except for commercial vehicles on Pentroydin-fach embankment, where long distance views of the Preseli Hills are intentionally kept to provide interest for road users.	Moderate Moderate Minor	Short term Medium term Long term	Middle distance Middle distance Middle distance	Minor - Moderate - Moderate -	Slight adverse	Moderate adverse	Moderate adverse
7PA.2	SN 1369 1696	SA67 7PA	Llanddewi Velfrey	Ffynnon, Ffynnon Vestry	A40	semi-detached, 1.5 and 2 storey	90	Eastward aspect with short distant view of Ffynnon Wood edge. View southwards towards A40 interrupted by woodland. Single 1st floor window to south facing gable end of Ffynnon Vestry.	High	Medium	Medium	Construction View southward of works interrupted by woodland and roadside plantation. Glimpse of changes to local access road. Operation Winter Year 1 View of Scheme and traffic interrupted by Ffynnon Wood and roadside plantation. Operation Summer Year 15 View of Scheme and traffic interrupted by Ffynnon Wood and roadside plantation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PA.3	SN 1369 1698	SA67 7PA	Llanddewi Velfrey	Ffynnon Uchaf	A40	detached, 1.5 storey	120	Southward aspect with view of neighbouring dwellings. Ffynnon Wood forms a backdrop. View of A40 interrupted by a combination of buildings and woodland.	High	Medium	Medium	Construction View of works interrupted by buildings and vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by buildings and vegetation. Operation Summer Year 15 View of Scheme and traffic interrupted by buildings and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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7PA.4	SN 1376 1718	SA67 7PA	Llanddewi Velfrey	Parc-y-delyn	A40	detached, 2 storey	280	South to south-westward aspect overlooking wooded river valley and pastoral fields. View of A40 interrupted by landform and woodland.	High	Medium	Medium	Construction View of works interrupted by landform and substantial vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by landform and substantial vegetation. Operation Summer Year 15 View of Scheme and traffic interrupted by landform and substantial vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PN.2	SN 1380 1940	SA66 7PN	Henllanfallteg	Pen-pwll Farm and The Old Coach House (rural business)	C3220	detached, 1 storey	2,330	Southward and eastward aspect organised around a farmyard. Southward view partially interrupted by hedgerow. Eastward view interrupted by modern agricultural building including traditional barn.	Medium	Medium	Medium	Construction Preparatory works - indirect view of removal of field boundaries between ch 2+300 and 2+900 near to Pentroydin-fach and Pentroydin-fawr. Earthworks - indirect view of construction of Pentroydin-fach embankment, excavation of Pentroydin-fawr cutting. Structures - indirect view of construction of Llanfallteg Road overbridge. Operation Winter Year 1 Indirect view of north facing embankment slope and top of north facing cutting slope. Glimpse of commercial vehicles on embankment. Operation Summer Year 15 Indirect glimpse of commercial vehicles on Pentroydin-fach embankment.	Negligible No change No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral
8UP.1	SN 1381 1600	SA67 8UP	Llanddewi Velfrey	Caerau	U6384	detached, 2 storey	855	Southward aspect overlooking Lampeter Vale pastoral landscape. View northward interrupted by landform.	High	High	High	Construction View of works interrupted by landform. Operation Winter Year 1 View of Scheme and traffic interrupted by landform. Operation Summer Year 15 View of Scheme and traffic interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
8UP.2	SN 1382 1567	SA67 8UP	Llanddewi Velfrey	Droselyn	U6384	complex, 1 to 2 storey	1,170	Eastward aspect towards minor road and area of woodland. Views northward interrupted by substantial vegetation.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
8UP.3	SN 1401 1629	SA67 8UP	Llanddewi Velfrey	Stepin	U6384	detached, 2 storey	625	Westward aspect, outward views limited by field boundary hedgerows and areas of woodland. No view of A40.	High	Low	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PA.5	SN 1432 1718	SA67 7PA	Llanddewi Velfrey	Pen-troydin-fach (farm dwelling)	A40	detached, 2 storey	85	East west aspect. Views limited by farm buildings and hedgerows with trees. No view of existing roads.	High	Low	Medium	Construction Preparatory works - indirect view from dwelling of removal of field boundary hedgerows at ch 2+200, 2+320 and 2+440, interrupted by buildings and/or vegetation. Partial views available from outdoor spaces. Earthworks - a view of excavation of Pentroydin-fach cutting and construction of Pentroydin-fach embankment would be interrupted by agricultural buildings and hedgerows with trees. A glimpse of construction vehicles would be available from outdoor spaces, where gaps in-between buildings and trees allow. Structures - view of agricultural underpass at ch 2+630 interrupted by hedgerows with trees. Partial view available from outdoor spaces where gaps in-between trees allow. Operation Winter Year 1 View of Pentroydin-fach cutting interrupted by agricultural buildings. View of north facing slope of Pentroydin-fach embankment interrupted by hedgerows with trees. Partial view available from outdoor spaces where gaps in between trees allow. No view of traffic predicted. Operation Summer Year 15 View of Pentroydin-fach cutting interrupted by agricultural buildings. View of north facing slope of Pentroydin-fach embankment interrupted by hedgerows with trees. Partial view available from outdoor spaces where gaps in between trees allow. No view of traffic predicted..	Negligible Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - Minor - Minor -	Neutral	Slight adverse	Slight adverse

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7PA.6	SN 1433 1703	SA67 7PA	Llanddewi Velfrey	Maesyffynnon	A40	detached, 2 storey	50	North south aspect, mainly southward of Llanddewi Velfrey ridge overlooking existing A40. South-westward views filtered by small group of conifers. Views from ground floor partially interrupted by roadside hedge. South-eastward views filtered by roadside plantation. To the north a view of the Preseli Hills and the Afon Taf vale is available but is partially interrupted by outbuildings and hedgerows from ground floor rooms. Indirect views north-westward are available, overlooking agricultural buildings at Pentroydin-fach. Northward views from first floor rooms overlook outbuildings also.	High	Medium	Medium	<u>Construction</u> Preparatory works - view of removal of field boundaries at ch 2+220 and 2+320 would introduce more extensive westward and northward view. Site compound would be located to west of dwelling and views of it would be filtered by a hedgerow and a small group of conifers. Earthworks - removal of topsoil from field next to dwelling curtilage and neighbouring field to west. Excavation of Pentroydin-fach cutting (ch 2+100 to 2+440, depth to 5m), including false cutting and hedge-bank. View of construction vehicles available. Road pavement - view of road construction interrupted by false cutting and hedge-bank from ground floor rooms. <u>Operation Winter Year 1</u> Indirect view of top of south-facing Pentroydin-fach cutting slope and commercial vehicles to north-west. Cutting directly to north would be deep and commercial vehicles would be hidden. View of cars and road surface interrupted by false cutting and hedge-bank. Traffic reduced in southward view. <u>Operation Summer Year 15</u> With the establishment of shrub planting on the north-facing slopes of Pentroydin-fach cutting, the view of commercial vehicles and earthwork slopes to the north-west would be obscured. Important to maintain long-distant views northward of Preseli Hills over the Scheme.	Moderate Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Moderate - Minor -	Moderate adverse	Moderate adverse	Slight adverse
7PA.7	SN 1435 1696	SA67 7PA	Llanddewi Velfrey	Bronawel, Brynalan	A40	semi-detached, 2 storey	120	Northward aspect, with direct view of existing A40 including road surface, traffic and street lights. Land rises towards ridge on which Maesyffynnon and Maes-yr-Rhos are located which terminates the northward view. Bryn Awel, the westernmost dwelling, also has southward views towards Llanddewi Velfrey ridge and an indirect westward view towards Ffynnon Wood and featuring the existing A40.	High	Medium	Medium	<u>Construction</u> Preparatory works - indirect view of vegetation removal interrupted by roadside and field boundary hedgerows. Site compound visible to north-west. <u>Operation Winter Year 1</u> Reduction of traffic on existing A40. No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	Minor Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Minor - Minor + Minor +	Slight adverse	Slight benefit	Slight benefit
8UR.1	SN 1435 1608	SA67 8UR	Llanddewi Velfrey	Pengaer	U6385	detached, 1.5 storey	945	Located at Llanddewi Gaer (hill fort), northward views from this dwelling are interrupted by an accumulation of trees and gently rising ground.	High	Medium	Medium	<u>Construction</u> No view of works. <u>Operation Winter Year 1</u> No view of Scheme or traffic. <u>Operation Summer Year 15</u> No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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8UR.2	SN 1436 1644	SA67 8UR	Llanddewi Velfrey	Caerwen, Maes y Caeau and Maesyllan	U6385	detached, 1 storey	610	Northward aspect with broad views of Llanddewi Velfrey and A40 road corridor, Afon Taf Vale, New Inn and Efailwen rolling landscape and Preseli Hills. View is limited by hedgerows at Caerwen. The view of the existing A40 includes a glimpse of the road surface and cars to where there are gaps in roadside boundary hedges, a view of commercial vehicles and signage and street lights at Llanddewi Velfrey.	High	High	High	Construction Preparatory works - view of hedgerow removal at Pentroydin-fach (ch 2+220), and site compound. Preparatory works located to west of proposed Llanddewi Velfrey West junction, including at Ffynnon junction, screened from view by an accumulation of woodland and field boundary hedgerows. Works located to east of Pentroydin-fach screened by landform. Earthworks - removal of topsoil and excavation of Pentroydin-fach cutting visible. Construction vehicles visible along section of works from eastern edge of Ffynnon Wood to Pentroydin-fach. Road pavement - part of Llanddewi Velfrey West junction construction visible. Operation Winter Year 1 Llanddewi Velfrey West junction visible including road signs, glimpse of moving traffic available at junction and where road enters Pentroydin-fach cutting . View of road surface and south facing slopes interrupted by false cutting and hedge-bank. New private access road to Pentroydin-fach visible to far side of Scheme mainline. Operation Summer Year 15 Establishment of woodland planting around Llanddewi Velfrey West junction would lessen the view of road surface, signage and traffic visible, although not remove from view entirely. Shrub and woodland planting to earthwork slopes would interrupt views of private access to Pentroydin-fach and traffic using the main Scheme alignment.	Minor Negligible No change	Short term Medium term Long term	Middle distance Middle distance Middle distance	Negligible - Negligible - No change	Slight adverse	Slight adverse	Neutral
7PA.8	SN 1437 1703	SA67 7PA	Llanddewi Velfrey	Maes-yr-Rhos	A40	detached, 1 storey		Mainly north-eastward aspect, overlooking pastoral farmland of Llanddewi Velfrey towards Llanfallteg and Carmarthenshire uplands, and Preseli Hills. View northward overlooking agricultural buildings at Pentroydin-fach available from outdoor spaces is towards the Preseli Hills with Afon Taf vale, New Inn and Efailwen rolling landscapes. Overhead powerlines and poles detract from northward views. Dwelling also has south-westward and south-eastward aspect with views of Llannddewi Velfrey village, Llanddewi Velfrey ridge and the A40 corridor. Views westward interrupted by hedge-banks bounding access road to Pentroydin-fach.	High	Medium	Medium	Construction Preparatory work - removal of field boundary hedgerows at ch 2+320 and 2+440 visible. Earthworks - removal of topsoil and excavation of Pentroydin-fach cutting and construction of Pentroydin-fach embankment. Views of construction activities further east interrupted by hedgerows. Structures - views of Pentroydin-fach underpass and Llanfallteg Road overbridge construction screened by hedgerow to east. Road pavement - view of works at road surface level would be interrupted by landform. Operation Winter Year 1 False cutting and hedge-bank would interrupt views of cars. Glimpse of eastbound commercial vehicles visible where road emerges from cutting onto embankment. Traffic reduced in southward views. Operation Summer Year 15 With the establishment of shrub planting on the north-facing slopes of Pentroydin-fach cutting, the view of commercial vehicles would be obscured. Important to maintain long-distant views northward of Preseli Hills over the Scheme. Traffic reduced in southward views.	Moderate Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Moderate - Slight adverse	Moderate adverse	Moderate adverse	Slight adverse

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7PJ.1	SN 1438 1820	SA67 7PJ	Clynderwen	Castell Dwyrain (farm dwelling)		detached	1,020	East-west aspect, located near to bank of Afon Daulan, a tributary of the Afon Taf and fed by the many springs rising from the Llanddewi Velfrey ridge. Southward views from the dwelling towards the north facing slopes of the Llanddewi Velfrey ridge are interrupted by agricultural buildings and woodland on the Afon Daulan river banks.	High	Medium	Medium	<u>Construction</u> Preparatory work - from outdoor spaces, views of the removal of field boundary hedgerows and woodland between ch 2+200 and 2+900. Earthworks - views of excavation of Pentroydin-fach cutting (ch 2+100 to 2+440, depth to 5.0m), Pentroydin-fawr cutting (ch 2+730 to 2+930, depth to 15.0m), and Bethel cutting (ch 3+460 to 3+780, depth to 18.0m), construction of Pentroydin-fach embankment (ch 2+440 to 2+730, height to 14.5m), and Pentroydin-fawr embankment (ch 2+930 to 3+460, height to 14.5m). Structures - View of Llanfallteg Road overbridge and possibly of agricultural underpass at Pentroydin-fach embankment, if not obscured by vegetation. <u>Operation Winter Year 1</u> View of north facing slopes of cuttings and embankments with glimpse of commercial vehicles available where road is on embankment from outdoor spaces. <u>Operation Summer Year 15</u> North facing slopes of embankments and cuttings would resemble pastoral fields. Woodland planting on slopes would screen views of traffic except for commercial vehicles on Pentroydin-fach embankment, where long distance views of the Preseli Hills are intentionally kept to provide interest for road users.	Moderate Moderate Minor	Short term Medium term Long term	Middle distance Middle distance Middle distance	Minor - Moderate - Moderate -	Slight adverse	Moderate adverse	Moderate adverse
7PA.9	SN 1446 1694	SA67 7PA	Llanddewi Velfrey	Plasnewydd, Tynewydd	A40	detached, 2 storey	160	North-south aspect. View southward is of Llanddewi Velfrey ridge pastoral landscape featuring scattered dwellings and woodland. View northward is of A40 and is terminated by south facing cutting slope and ridge.	High	Medium	Medium	<u>Construction</u> Preparatory works - from outdoor spaces, indirect view of vegetation removal interrupted by roadside and field boundary hedgerows. Site compound visible to west. <u>Operation Winter Year 1</u> Reduction of traffic on existing A40. No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	Negligible Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - Minor + Minor +	Neutral	Slight benefit	Slight benefit
8UR.3	SN 1447 1645	SA67 8UR	Llanddewi Velfrey	Penbanc	U6385	detached, 2 storey	645	Dwelling occupies position on Llanddewi Velfrey ridge and takes in views north to east of Llanddewi Velfrey, New Inn and Efailwen, Taf Vale, Llanboidy and Blaunwaun, and the Preseli Hills. Outdoor spaces also used to take advantage of views available. A hedgerow and trees limit westward views.	High	High	High	<u>Construction</u> Preparatory works - view of hedgerow removal at Pentroydin-fach (ch 2+220), and site compound. Preparatory works located to west of proposed Llanddewi Velfrey West junction, including at Ffynnon junction, screened from view by an accumulation of woodland and field boundary hedgerows. Works located to east of Pentroydin-fach screened by landform. Earthworks - removal of topsoil and excavation of Pentroydin-fach cutting visible. Construction vehicles visible along section of works from eastern edge of Ffynnon Wood to Pentroydin-fach. Road pavement - part of Llanddewi Velfrey West junction construction visible. <u>Operation Winter Year 1</u> View of Llanddewi Velfrey West junction partially interrupted by mature tree, features of view would include road signs, glimpse of moving traffic available at junction and where road enters Pentroydin-fach cutting . View of road surface and south facing slopes interrupted by false cutting and hedge-bank. New private access road to Pentroydin-fach visible to far side of Scheme mainline. <u>Operation Summer Year 15</u> Establishment of woodland planting around Llanddewi Velfrey West junction would lessen the view of road surface, signage and traffic visible, although not remove from view entirely. Shrub and woodland planting to earthwork slopes would interrupt views of private access to Pentroydin-fach and traffic using the main Scheme alignment.	Minor Negligible No change	Short term Medium term Long term	Middle distance Middle distance Middle distance	Negligible - Negligible - No change	Slight adverse	Slight adverse	Neutral

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7PA. 10	SN 1450 1693	SA67 7PA	Llanddewi Velfrey	Efailwen	A40	detached, 1 storey	200	North-south aspect. View southward is of Llanddewi Velfrey ridge pastoral landscape featuring scattered dwellings and woodland. View northward is of A40 and is terminated by south facing cutting slope and ridge. View westward interrupted by neighbouring building.	High	Medium	Medium	Construction No view of construction activities.	No change	No view	No view	No change	Neutral		
												Operation Winter Year 1 Reduction of traffic on existing A40. No view of Scheme or traffic predicted.	Negligible	Medium term	Short distance	Minor +		Slight benefit	
												Operation Summer Year 15 Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	Negligible	Long term	Short distance	Minor +			Slight benefit
7PA. 11	SN 1459 1692	SA67 7PA	Llanddewi Velfrey	Bryndewi, Pen y Bryn	A40	semi-detached, 2 storey	245	North-south aspect. View southward is of Llanddewi Velfrey ridge pastoral landscape featuring scattered dwellings and woodland. View northward is a direct one of A40 and is terminated by south facing cutting slope and ridge.	High	Medium	Medium	Construction No view of construction activities.	No change	No view	No view	No change	Neutral		
												Operation Winter Year 1 Reduction of traffic on existing A40. No view of Scheme or traffic predicted.	Negligible	Medium term	Short distance	Minor +		Slight benefit	
												Operation Summer Year 15 Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	Negligible	Long term	Short distance	Minor +			Slight benefit
0UP.1	SN 1466 1928	SA34 0UP		Llanfallteg House and Llety'r Llwynog	C3220	detached, 2 and 1 storey	2,035	Southward aspect. View of Llanddewi Velfrey ridge and lowland Castelldwyran ridge that separates Afon Daulan and another small tributary to the Afon Taf. Dwellings at Glan Preseli are visible. Pentroydin-fach and Pentroydin-fawr farm are noticeable, although trees on the Castelldwyran ridge partially interrupt the view. South-eastward views interrupted by a belt of trees. View of railway line interrupted by trees.	High	Medium	Medium	Construction Preparatory works - removal of field boundaries between ch 2+300 and 2+900 near to Pentroydin-fach and Pentroydin-fawr partially interrupted by trees on intervening ridge. Earthworks - construction of Pentroydin-fach embankment, excavation of Pentroydin-fawr cutting. Structures - construction of Llanfallteg Road overbridge.	Negligible	Short term	Long distance	No change	Neutral		
												Operation Winter Year 1 View of north facing embankment slope and top of north facing cutting slope. Glimpse of commercial vehicles on embankment.	Negligible	Medium term	Long distance	No change		Neutral	
												Operation Summer Year 15 Glimpse of commercial vehicles on Pentroydin-fach embankment.	No change	Long term	Long distance	No change			Neutral
7PE.1	SN 1468 1853	SA67 7PE	Clynderwen	Glanrhyd Courthouse, Glanrhyd Farm and Caravan	C3221	complex, mixed	1,280	Located near to bank of Afon Daulan, southward views from dwellings towards the north facing slopes of the Llanddewi Velfrey ridge are partially interrupted by woodland on the Afon Daulan river banks.	High	Medium	Medium	Construction Preparatory work - from outdoor spaces, through gaps in vegetation, views of the removal of field boundary hedgerows and woodland between ch 2+200 and 2+900 would be available. Earthworks - views of excavation of Pentroydin-fach cutting (ch 2+100 to 2+440, depth to 5.0m), Pentroydin-fawr cutting (ch 2+730 to 2+930, depth to 15.0m), and Bethel cutting (ch 3+460 to 3+780, depth to 18.0m), construction of Pentroydin-fach embankment (ch 2+440 to 2+730, height to 14.5m), and Pentroydin-fawr embankment (ch 2+930 to 3+460, height to 14.5m). Structures - View of Llanfallteg Road overbridge and possibly of agricultural underpass at Pentroydin-fach embankment, if not obscured by vegetation.	Minor	Short term	Middle distance	Negligible -	Neutral		
												Operation Winter Year 1 View of north facing slopes of cuttings and embankments with glimpse of commercial vehicles available where road is on embankment from outdoor spaces.	Minor	Medium term	Middle distance	Minor -		Slight adverse	
												Operation Summer Year 15 North facing slopes of embankments and cuttings would resemble pastoral fields. Woodland planting on slopes would screen views of traffic except for commercial vehicles on Pentroydin-fach embankment, where long distance views of the Preseli Hills are intentionally kept to provide interest for road users.	Negligible	Long term	Middle distance	Minor -			Slight adverse

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7PA.12	SN 1469 1688	SA67 7PA	Llanddewi Velfrey	Ael-y-Bryn	A40	detached, 1 storey	315	North-south aspect. View southward is of Llanddewi Velfrey ridge pastoral landscape featuring scattered dwellings and woodland. View northward is of A40 and is terminated by south facing cutting slope and ridge. View westward interrupted by neighbouring building. A40 road surface is approximately at roof eaves level.	High	Medium	Medium	Construction No view of construction activities.	No change	No view	No view	No change	Neutral		
												Operation Winter Year 1 Reduction of traffic on existing A40. No view of Scheme or traffic predicted.	Negligible	Medium term	Short distance	Minor +		Slight benefit	
												Operation Summer Year 15 Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	Negligible	Long term	Short distance	Minor +			Slight benefit
7PE.2	SN 1472 1844	SA67 7PE	Clynderwen	Glanrhyd House	C3221	detached, 2 storey	1,180	Located near to bank of Afon Daulan, southward views from dwelling towards the north facing slopes of the Llanddewi Velfrey ridge are partially interrupted by woodland on the Afon Daulan river banks.	High	Medium	Medium	Construction Preparatory work - from outdoor spaces, through gaps in vegetation, views of the removal of field boundary hedgerows and woodland between ch 2+200 and 2+900 would be available. Earthworks - views of excavation of Pentroydin-fach cutting (ch 2+100 to 2+440, depth to 5.0m), Pentroydin-fawr cutting (ch 2+730 to 2+930, depth to 15.0m), and Bethel cutting (ch 3+460 to 3+780, depth to 18.0m), construction of Pentroydin-fach embankment (ch 2+440 to 2+730, height to 14.5m), and Pentroydin-fawr embankment (ch 2+930 to 3+460, height to 14.5m). Structures - View of Llanfallteg Road overbridge and possibly of agricultural underpass at Pentroydin-fach embankment, if not obscured by vegetation.	Minor	Short term	Middle distance	Negligible -	Neutral		
												Operation Winter Year 1 View of north facing slopes of cuttings and embankments with glimpse of commercial vehicles available where road is on embankment from outdoor spaces.	Minor	Medium term	Middle distance	Minor -		Slight adverse	
												Operation Summer Year 15 North facing slopes of embankments and cuttings would resemble pastoral fields. Woodland planting on slopes would screen views of traffic except for commercial vehicles on Pentroydin-fach embankment, where long distance views of the Preseli Hills are intentionally kept to provide interest for road users.	Negligible	Long term	Middle distance	Minor -			Slight adverse
8UR.4	SN 1472 1651	SA67 8UR	Llanddewi Velfrey	Plas Bach and Vaynor Villa	U6385	detached, 1 storey	655	Dwellings occupy position on north facing slope to Llanddewi Velfrey ridge and take in views northward of Llanddewi Velfrey, New Inn and Efailwen, Llanboidy and Blaunwaun, and the Preseli Hills.	High	High	High	Construction Preparatory works - indirect view of hedgerow removal at Pentroydin-fach (ch 2+220), and site compound from outdoor spaces. Works located to east of Pentroydin-fach screened by landform. Earthworks - removal of topsoil and excavation to west of Pentroydin-fach cutting visible. Construction vehicles visible along section of works from eastern edge of Ffynnon Wood to Pentroydin-fach. Road pavement - part of Llanddewi Velfrey West junction construction interrupted by intervening hedgerows and trees.	Minor	Short term	Middle distance	Negligible -	Slight adverse		
												Operation Winter Year 1 View of Llanddewi Velfrey West junction interrupted by hedgerows and trees. Glimpse of moving traffic available where road enters Pentroydin-fach cutting . View of road surface and south facing slopes interrupted by false cutting and hedge-bank. Vehicles using private access road to Pentroydin-fach visible to far side of Scheme mainline.	Negligible	Medium term	Middle distance	Negligible -		Slight adverse	
												Operation Summer Year 15 Establishment of woodland planting around Llanddewi Velfrey West junction would lessen the view of road surface, signage and traffic visible, although not remove from view entirely. Shrub and woodland planting to earthwork slopes would interrupt views of private access to Pentroydin-fach and traffic using the main Scheme alignment.	No change	Long term	Middle distance	No change			Neutral

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7PA. 13	SN 1473 1692	SA67 7PA	Llanddewi Velfrey	Cartref	A40	semi-detached, 2 storey	295	Dwelling located in village centre, with southward aspect having a direct view of A40 including road surface, traffic, street lights, signage and bollards. Northward view limited by ridge.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 Reduction of traffic on existing A40. No view of Scheme or traffic predicted. Operation Summer Year 15 Reduction of traffic on existing A40. No view of Scheme or traffic predicted..	No change Negligible Negligible	No view Medium term Long term	No view Short distance Short distance	No change Minor + Minor +	Neutral	Slight benefit	Slight benefit
7PA. 14	SN 1475 1691	SA67 7PA	Llanddewi Velfrey	1-3 Picton Terrace	A40	terrace, 2 storey	305	Dwellings located in village centre, with southward aspect having a direct view of A40 including road surface, traffic, street lights, signage and bollards. Northward view limited by neighbouring buildings.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 Reduction of traffic on existing A40. No view of Scheme or traffic predicted. Operation Summer Year 15 Reduction of traffic on existing A40. No view of Scheme or traffic predicted.	No change Negligible Negligible	No view Medium term Long term	No view Short distance Short distance	No change Minor + Minor +	Neutral	Slight benefit	Slight benefit
7PG.1	SN 1475 1698	SA67 7PG	Llanddewi Velfrey	1-6 Glan Preseli	C3205	semi-detached, 2 storey	220	Dwellings located to north of village centre and war memorial with east-west aspect. Eastward view is of neighbouring dwellings. Westward view of pastoral landscape of Llanddewi Velfrey available from first floor rooms, otherwise interrupted by hedgerow boundary to garden. Westward view from first floor includes distant view of Preseli hills and rolling landscape of the Eastern Cleddau and Afon Syfni ridges and valleys.	High	Medium	Medium	Construction Earthworks - indirect view of part of Pentroydin-fach embankment available from first floor rooms with glimpse of construction vehicles. Road pavement - Indirect view of road construction available from first floor rooms. Operation Winter Year 1 Indirect view of part of road surface and traffic at Pentroydin-fach embankment available from first floor rooms only, partially interrupted by woodland and field boundary hedgerows. Operation Summer Year 15 View of road surface and traffic screened by woodland planting to south-facing cutting slope.	Negligible Negligible No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - Minor - No change	Neutral	Slight adverse	Neutral
0UP.2	SN 1476 1925	SA34 0UP	Henllanfallteg	Penybryn, Llanfallteg Farm and Llanfallteg West	C3202	detached, 2 and 1 storey	2,015	South to south-eastward aspect, with views towards Bryn Farm of the hill at the eastern end of the Llanddewi Velfrey village, limited by trees and hedgerows.	High	Medium	Medium	Construction Preparatory works - the removal of some trees would be noticeable as they are features of the skyline in southward views. Earthworks - Beginning of excavation at Bethel Roundabout and Bethel Cutting. Operation Winter Year 1 Indirect view of top of north-facing cutting slope at Bethel Cutting and glimpse of vehicles using new access road to Bethel Chapel. Operation Summer Year 15 Earthwork slopes difficult to distinguish from surroundings. Views of vehicles interrupted by vegetation.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral
7PG.2	SN 1476 1702	SA67 7PG	Llanddewi Velfrey	7-10 Glan Preseli	C3205	semi-detached, 2 storey	195	Dwellings located to north of village centre and war memorial with south-east and north-west aspect. South-eastward view is of neighbouring dwellings. North-westward view of pastoral landscape of Llanddewi Velfrey available from first floor rooms, otherwise interrupted by hedgerow boundary to garden, including distant view of Preseli hills and rolling landscape of the Eastern Cleddau and Afon Syfni ridges and valleys.	High	Medium	Medium	Construction Earthworks - Direct view of part of Pentroydin-fach embankment available from first floor rooms including view of construction vehicles. Road pavement - Direct view of road construction available from first floor rooms only. Operation Winter Year 1 Direct view of part of road surface and traffic at Pentroydin-fach embankment available from first floor rooms only, partially interrupted by woodland and field boundary hedgerows. Operation Summer Year 15 View of road surface and traffic screened by woodland planting to south-facing cutting slope.	Minor Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Minor - Moderate - Minor -	Slight adverse	Moderate adverse	Slight adverse

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7PE.3	SN 1476 1735	SA67 7PE	Llanddewi Velfrey	Pentroyden Fawr (farm dwelling)	C3205	detached, 2 storey	100	East-west aspect. Eastward view overlooks Llanfallteg Road towards northern slopes of Llanddewi Velfrey ridge featuring significant woodland, hedgerow field boundaries and scattered farms. Further away are views of rolling Carmarthenshire landscape including Cwmfelin Boeth, Llanboidy and Blaunwaun. Westward view is limited by agricultural buildings but includes gentle slopes of Llanddewi Velfrey ridge, the Afon Taf vale and New Inn and Efailwen uplands. Indirect views of the Preseli Hills are available to the north. To the south, views are limited by the rising landform.	High	Medium	Medium	Construction Preparatory works - removal of hedgerow/hedge-bank field boundaries at ch 2+620 and 2+820 to 2+900 visible. Earthworks - removal of topsoil at Pentroydin-fach embankment and Pentroydin-fawr cutting. Works to divert Llanfallteg Road to enable excavation of cutting and construction of overbridge would be next to garden boundary and visible from outdoor spaces. Construction of Pentroydin-fach embankment would be visible in westward views, from first floor rooms in particular. Structures - view of Llanfallteg Road overbridge construction available from outdoor spaces, view of Pentroydin-fach agricultural crossing available in westward views from first floor rooms. Operation Winter Year 1 View of north facing slope of Pentroydin-fach embankment and commercial vehicles travelling along it would be available in westward views from first floor rooms. View of Llanfallteg Road overbridge available from outdoor spaces. Operation Summer Year 15 View of north facing slope of Pentroydin-fach embankment and commercial vehicles travelling along it would be available in westward views from first floor rooms. View of Llanfallteg Road overbridge available from outdoor spaces.	Moderate Minor Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Moderate - Moderate -	Moderate adverse	Moderate adverse	Moderate adverse
8UR.5	SN 1476 1650	SA67 8UR	Llanddewi Velfrey	Balaclava and Cartrefle	U6385	detached, 2 storey	695	Northward aspect. Located on north-facing slope overlooking a valley that drains into Ffynnon Wood and the ridge on which the existing A40 runs. View northward is long distant and includes a view of the Preseli Hills, but is partially interrupted by buildings and vegetation. Glimpse of commercial vehicles on existing A40.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PE.4	SN 1477 1706	SA67 7PE	Llanddewi Velfrey	Awel Deg	C3205	detached, 2 storey	170	North-east and south-west aspect. Located at northern limit of Llanddewi Velfrey village. Views northward are indirect and available from outdoor spaces include long-distance views of the Preseli Hills, Afon Taf vale, Llanddewi belfry and Llanfallteg pastoral landscape. Views from ground floor rooms are limited by hedges. Single ground floor window at gable end of property has north-west to northward view.	High	Medium	Medium	Construction Preparatory works - removal of hedgerow/hedge-bank field boundaries at ch 2+620 and 2+820 to 2+900 visible from outdoor spaces and first floor rooms. Earthworks - works to divert Llanfallteg Road to enable excavation of cutting and construction of overbridge would be visible from outdoor spaces. Construction of Pentroydin-fach embankment would be visible in north-westward views, from first floor rooms. Structures - view of Llanfallteg Road overbridge construction available from outdoor spaces. Road pavement - indirect view of road surface construction from first floor rooms. Operation Winter Year 1 From first floor rooms, indirect view north-west of Pentroydin-fach embankment including road surface and traffic. View of Llanfallteg Road overbridge available from outdoor spaces. View of works north-eastward interrupted by hedgerows with trees. Operation Summer Year 15 Planting to south-facing slopes of Pentroydin-fach embankment would interrupt the view of road surface, cars and commercial vehicles. View of Llanfallteg Road overbridge available from outdoor spaces. View of works north-eastward interrupted by hedgerows with trees.	Minor Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Minor - Moderate - Minor -	Slight adverse	Moderate adverse	Slight adverse
7PA. 15	SN 1478 1691	SA67 7PA	Llanddewi Velfrey	Penfro	A40	detached, storey	320	Located in village centre with westward aspect. View of existing A40 partially interrupted by Picton Terrace includes road surface, traffic, road signs and street lights and war memorial. View eastward interrupted by garden vegetation.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Minor + Minor +	Neutral	Slight benefit	Slight benefit

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7PG.3	SN 1479 1697	SA67 7PG	Llanddewi Velfrey	11-19 Glan Preseli	C3205	terraced, 2 storey	240	East-west aspect. View westward is of neighbouring properties on opposite side of Llanfallteg Road. View eastward is of sports facilities, pastoral landscape and woodland. No. 11 has north-facing windows on gable-end overlooking village hall car park.	High	Medium	Medium	Construction No view in westward view. View eastward of works interrupted by woodland.. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PA. 16	SN 1480 1689	SA67 7PA	Llanddewi Velfrey	Commercial Cottage, Flat 1-2 Commercial Cottage	A40	flats, 2 storey	340	Located in village centre, next to existing A40 with westward aspect. View of existing A40 includes road surface, traffic, road signs and street lights and war memorial. View eastward interrupted by garden vegetation.	High	Low	Medium	Construction No view of works. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Minor + Minor +	Neutral	Slight benefit	Slight benefit
7PG.4	SN 1481 1704	SA67 7PG	Llanddewi Velfrey	Brynwylfa	C3205	detached, 1 storey	195	East-west aspect with conservatory to north-facing gable end. Views outward limited by hedgerows with trees and hedge-banks, but does include a broad northward view of rural Carmarthenshire and Pembrokeshire as far as the Preseli Hills.	High	Medium	Medium	Construction No view in westward. View northward interrupted by landform. View eastward interrupted by woodland.. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
8UR.6	SN 1483 1656	SA67 8UR	Llanddewi Velfrey	Scapin	U6385	detached, 2 storey	660	East-west aspect, located in valley floor between the two Llanddewi Velfrey ridges. Outward views interrupted by landform and woodland/hedgerows.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
8UR.7	SN 1488 1649	SA67 8UR	Llanddewi Velfrey	Bryntirion and White Lodge	U6385	detached, 2 storey	745	Northward aspect. Located on north-facing slope overlooking a valley that drains into Ffynnon Wood and the ridge on which the existing A40 runs. Long-distant view northward includes a view of the Preseli Hills, but is interrupted by roadside vegetation. Glimpse of commercial vehicles on existing A40.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PH.1	SN 1489 1884	SA67 7PH	Clynderwen	Gower Villa	C3205	detached, 2 storey	1,575	Mainly eastward aspect overlooking Llanfallteg Road, Afon Daulan wooded valley and ponds. View southward interrupted by woodland.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
0UP.3	SN 1490 1921	SA34 0UP	Henllanfallteg	The Furrows and Delfan	C3205	detached, 2 storey	1,930	Mainly eastward aspect overlooking Llanfallteg Road, Afon Taf wooded valley. View southward interrupted by woodland.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PB.1	SN 1491 1678	SA67 7PB	Llanddewi Velfrey	1-4 Llandaff Row	U6385	terraced, 2 storey	460	South-westward aspect with view of Llanddewi Velfrey's southern ridge and valley flowing towards Ffynnon Wood. Views from ground floor interrupted by roadside hedgerow. Glimpse of commercial vehicles available in distant view from first floor rooms where A40 passes Henllan Lodge. From outdoor spaces views of the existing A40 are limited by garden boundary hedges. The A40 is next to the garden boundary of Nos. 1 and 2.	High	Medium	Medium	Construction No view of works predicted, although glow from lighting at site compound would be visible during hours of darkness. Operation Winter Year 1 Glimpse of commercial vehicles available from first floor rooms. Operation Summer Year 15 Glimpse of commercial vehicles available from first floor rooms.	No change No change No change	Short term Medium term Long term	Middle distance Middle distance Middle distance	No change No change No change	Neutral	Neutral	Neutral
8UR.8	SN 1491 1650	SA67 8UR	Llanddewi Velfrey	Llysderi	U6385	detached, 1 storey	750	Northward aspect. Located on north-facing slope towards Llanddewi Velfrey village, the A40 ridge and a valley that drains into Ffynnon Wood. Long-distant view northward includes a view of the Preseli Hills, but is partially interrupted by mature trees. Glimpse of commercial vehicles on existing A40.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PB.2	SN 1493 1674	SA67 7PB	Llanddewi Velfrey	Brynawel, The Old School	U6385	detached, 2 storey	495	South-westward aspect with view of Llanddewi Velfrey's southern ridge and valley flowing towards Ffynnon Wood. Views from ground floor interrupted by roadside hedgerow. Glimpse of commercial vehicles available in distant view from first floor rooms where A40 passes Henllan Lodge. From outdoor spaces narrow view of the existing A40 along minor road.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 Glimpse of commercial vehicles available from first floor rooms. Operation Summer Year 15 Glimpse of commercial vehicles available from first floor rooms.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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8UR.9	SN 1494 1650	SA67 8UR	Llanddewi Velfrey	Mynydd-y-Wawr	U6385	detached, 2 storey	750	Northward aspect. Located on north-facing slope towards Llanddewi Velfrey village, the A40 ridge and a valley that drains into Ffynnon Wood. Long-distant view northward includes a view of the Preseli Hills, but is partially interrupted by mature trees. Glimpse of commercial vehicles on existing A40.	Medium	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.4	SN 1497 1676	SA67 7PL	Llanddewi Velfrey	17 Maes y Dderwen	Maes y Dderwen	detached, 2 storey	515	East-west aspect. Dwelling surrounded by other buildings which limit outward views. From outdoor spaces, views northward to Preseli Hills are available where there are gaps in-between buildings.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.5	SN 1497 1676	SA67 7PL	Llanddewi Velfrey	19 Maes y Dderwen	Maes y Dderwen	detached, 2 storey	485	North-south aspect. Dwelling has northward view of Preseli Hills, Carmarthenshire uplands, Llanddewi Velfrey pastoral landscape and Afon Taf Vale framed by vegetation. View overlooks existing A40, a roadside hedge screens the view of the road surface from ground floor views and outdoor spaces.	High	High	High	Construction No view of works. View of majority interrupted by landform. View of Pentroydin-fawr Embankment (ch 2+930 to 3+4600, screened by woodland. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Minor + Minor +	Neutral	Moderate benefit	Moderate benefit
8UT.1	SN 1497 1651	SA67 8UT	Llanddewi Velfrey	Plascrwn House	Llanddewi Cottages Lane	detached, 1.5 storey	740	Northward aspect. Located on slope facing towards Llanddewi Velfrey village, the A40 ridge and a valley that drains into Ffynnon Wood. Long-distant view northward includes a view of the Preseli Hills, but is partially interrupted by mature trees.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PB.3	SN 1497 1660	SA67 7PB	Llanddewi Velfrey	The Willows	U6385	detached, 1 storey	650	East-west aspect. Located at head of valley that drains into Ffynnon Wood. View westward is of pastoral valley and woodland. View eastward is limited by hedgerow with trees.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PB.4	SN 1498 1663	SA67 7PB	Llanddewi Velfrey	Highfield	U6385	detached, 1 storey	595	South-westward aspect. Views outward limited by roadside hedgerow and trees,	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.6	SN 1498 1670	SA67 7PL	Llanddewi Velfrey	11 and 15 Maes y Dderwen	Maes y Dderwen	detached, 1 storey	530	South-west and north-east aspect. Views outward limited by neighbouring buildings and boundary hedgerows with trees.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
8UT.2	SN 1498 1651	SA67 8UT	Llanddewi Velfrey	Plascrwn Lodge	Llanddewi Cottages Lane	detached, 1 storey	740	Northward aspect. Located on slope facing towards Llanddewi Velfrey village, the A40 ridge and a valley that drains into Ffynnon Wood. Long-distant view northward includes a view of the Preseli Hills, but is partially interrupted by mature trees.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.7	SN 1500 1676	SA67 7PL	Llanddewi Velfrey	20-21 Maes y Dderwen	Maes y Dderwen	detached, 1 and 1.5 storey	485	North-south aspect. View of Preseli Hills, Carmarthenshire uplands, Llanddewi Velfrey pastoral landscape and Afon Taf Vale partially interrupted by vegetation that also screens the view of the road surface from ground floor views and outdoor spaces. No. 20 first floor views overlook service station forecourt.	High	Medium	Medium	Construction No view of works. View of majority interrupted by landform. View of Pentroydin-fawr Embankment (ch 2+930 to 3+4600, screened by woodland. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Negligible + Negligible +	Neutral	Slight benefit	Slight benefit
7PL.8	SN 1503 1663	SA67 7PL	Llanddewi Velfrey	1-10 and 12 Maes y Dderwen	Maes y Dderwen	detached, 1 and 2 storey	565	Aspect facing onto Maes y Dderwen estate road. Outward views limited by neighbouring buildings and hedgerow boundaries with trees.	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PL.9	SN 1505 1671	SA67 7PL	Llanddewi Velfrey	14-18 (evens) Maes y Dderwen	Maes y Dderwen	detached, 2 storey	535	North-south aspect. Northward view of garage buildings interrupted by ornamental species hedge	High	Low	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral

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7PH.2	SN 1505 1872	SA67 7PH	Llanddewi Velfrey	Dolan Park and Felin Bryn	C3205	detached, 1 and 2 storey	1,415	East-west and north-south aspect. Located on north-western side of small hill with Afon Daulan flowing to west and then north where it turns eastward to its confluence with the Afon Taf. Views outward are limited by woodland within the valley floor and field boundary hedgerows. Views southward from the dwellings are interrupted by outbuildings. From outdoor spaces, glimpses of the north-facing slopes of Llanddewi Velfrey ridge are available where there are gaps in-between trees.	High	Medium	Medium	Construction View of works activities interrupted by outbuildings and vegetation. Operation Winter Year 1 View of Scheme and traffic interrupted by outbuildings and vegetation. Operation Summer Year 15 View of Scheme and traffic interrupted by outbuildings and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PD.1	SN 1506 1673	SA67 7PD	Llanddewi Velfrey	The Bungalow	A40	complex, 1 and 2 storey	510	Dwelling located on service station forecourt. Northward aspect with distant view of rural Carmarthenshire and Llanddewi Velfrey pastoral landscape. Gas bottle storage, retail units, vehicles and existing A40 detract from the view	High	Low	Medium	Construction No view of works. Interrupted by landform, buildings and vegetation. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Negligible + Negligible +	Neutral	Slight benefit	Slight benefit
7PD.2	SN 1508 1665	SA67 7PD	Llanddewi Velfrey	Anfield, Smithfield	C3205	detached, 1.5 and 2 storey	550	Southward aspect, located on south facing slopes at head of valley that drains into Afon Marlais in the Lampeter Vale. Views limited by woodland.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7PD.3	SN 1509 1673	SA67 7PD	Llanddewi Velfrey	Coach House, Gables	A40	detached, 2 storey	500	Northward and eastward aspect. View of Preseli Hills, Carmarthenshire uplands, Llanddewi Velfrey pastoral landscape and Afon Taf Vale partially interrupted by vegetation that also screens the view of the road surface from ground floor views and outdoor spaces. North-westward views overlook service station forecourt.	High	Medium	Medium	Construction No view of works. View of majority interrupted by landform. View of Pentroydin-fawr Embankment (ch 2+930 to 3+4600, screened by woodland. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Negligible + Negligible +	Neutral	Slight benefit	Slight benefit
7EL.1	SN 1511 1703	SA67 7EL	Llanddewi Velfrey	Blaen Pentroydin (rural business)	A40	detached, 2 storey	210	Eastward aspect. Outward views limited by woodland and outbuildings. From outdoor spaces, views of neighbouring fields with irregularly shaped boundaries of trees, hedge-banks and woodland are available.	High	Medium	Medium	Construction Views to east and west would be interrupted by the landform. To the north, construction of the Pentroydin-fawr Embankment (ch 2+930 to 3+460) would be screened from view by a combination of the landform and woodland. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EL.2	SN 1520 1672	SA67 7EL	Llanddewi Velfrey	Cross Inn Cottage	A40	detached, 1 storey	475	East-west aspect and located next to existing A40. Indirect and near view of A40 including road surface. Outward views limited by roadside vegetation.	High	Low	Medium	Construction View of works interrupted by vegetation. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	No view Medium term Long term	No view Short distance Short distance	No change Negligible + Negligible +	Neutral	Slight benefit	Slight benefit
7PE.5	SN 1522 1823	SA67 7PE	Llanddewi Velfrey	Bryn Farm	C3205	detached, 2 storey	980	Dwelling has northward and southward aspect, with gables facing eastward and westward. Views southward towards Llanddewi Velfrey interrupted by landform. South-westward views open up to reveal north-facing lower slopes of Llanddewi Velfrey ridge.	High	Medium	Medium	Construction View of works interrupted by landform and vegetation. Operation Winter Year 1 No view of Scheme or traffic interrupted by landform and vegetation. Operation Summer Year 15 No view of Scheme or traffic interrupted by landform and vegetation.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EL.3	SN 1523 1672	SA67 7EL	Llanddewi Velfrey	Cross Hands	A40	detached, 2.5 storey	465	East-west aspect with windows in north-facing gable end at ground and first floors. Dwelling is next to existing A40 and has a direct view of the road surface and traffic. Beyond the A40 is a view of Llanddewi Velfrey pastoral landscape and a glimpse of Preseli Hills and Carmarthenshire uplands in the distance. Eastward and westward views limited by neighbouring buildings.	High	Medium	Medium	Construction No view of works. View of majority interrupted by landform. View of Pentroydin-fawr Embankment (ch 2+930 to 3+4600, screened by woodland. Operation Winter Year 1 Reduction in traffic using de-trunked A40. Operation Summer Year 15 Reduction in traffic using de-trunked A40.	No change Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	No change Negligible + Negligible +	Neutral	Slight benefit	Slight benefit

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7EL.4	SN 1527 1672	SA67 7EL	Llanddewi Velfrey	Highgate and Tegfan	A40	detached, 1 storey	440	Northward aspect with direct view of existing A40 road surface, traffic and street lights. Beyond A40 is a broad view including Llanddewi Velfrey pastoral landscape and distant views of the Preseli Hills and the Pembrokeshire and Carmarthenshire uplands.	High	Medium	Medium	Construction No view of works. View interrupted by landform.	No change	Short term	Short distance	No change	Neutral		
												Operation Winter Year 1 Reduction in traffic using de-trunked A40.	Negligible	Medium term	Short distance	Negligible +		Slight benefit	
												Operation Summer Year 15 Reduction in traffic using de-trunked A40.	Negligible	Long term	Short distance	Negligible +			Slight benefit
7EL.5	SN 1534 1674	SA67 7EL	Llanddewi Velfrey	Ivy Cottage	A40	detached, 2 storey	395	Northward aspect, located next to existing A40 with local road running directly to south side of dwelling. Direct and uninterrupted view of road surface, traffic, road signs, railings and street lights. Beyond the A40 is a view of Llanddewi Velfrey pastoral landscape and a glimpse of Preseli Hills, from which overhead power lines slightly detract.	High	Low	Medium	Construction No view of works. View interrupted by landform.	No change	Short term	Short distance	No change	Neutral		
												Operation Winter Year 1 Reduction in traffic using de-trunked A40.	Negligible	Medium term	Short distance	Negligible +		Slight benefit	
												Operation Summer Year 15 Reduction in traffic using de-trunked A40.	Negligible	Long term	Short distance	Negligible +			Slight benefit
8UR.10	SN 1539 1631	SA67 8UR	Llanddewi Velfrey	Penlan	Llanddewi Cottages Lane	detached, 1 storey	750	North-southward aspect, located on east facing valley side that cuts southward through the Llanddewi Velfrey ridge draining into the Afon malaise in the Lampeter Vale. The valley sides are densely wooded. Views northward are interrupted by the landform and limited to wooded areas.	High	Medium	Medium	Construction No view of works. View interrupted by landform. Operation Winter Year 1 No view of works. View interrupted by landform. Operation Summer Year 15 No view of works. View interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EG.1	SN 1539 1746	SA67 7EG	Llanddewi Velfrey	Castell	A40	detached, 2 storey	265	West-south-westward aspect overlooking a small wooded valley that is a tributary of the Afon Daulan. Pastoral fields bounded by hedgerows and areas of woodland are the main component of southward views. Pentroydin-fawr farm dwelling is visible to the west. Llanfallteg Road follows a broad ridge that runs in a northward direction from the A40. This broad ridge terminates westward views.	High	Medium	Medium	Construction Preparatory works - view of the removal of areas of woodland and hedgerows with trees from ch 2+820 at Pentroydin-fawr to 3+600 to south-west of Tir-bach visible from ground floor and outdoor spaces. Removal of topsoil from 2+820 to 3+600 visible from ground floor and outdoor spaces, in places filtered from view by vegetation. Earthworks - excavation of Pentroydin-fawr cutting (ch 2+730 to 2+930), and Bethel cutting (ch 3+460 to 3+780). Construction of Pentroydin-fawr embankment (ch 3+460 to 3+780). Structures - Construction of Llanfallteg Road overbridge, culvert at ch 3+100, and new pedestrian underpass at ch 3+280.	Major	Short term	Short distance	Major -	Large adverse		
												Operation Winter Year 1 View of north facing slopes of Pentroydin-fawr cutting, Pentroydin-fawr embankment and Bethel-cutting. View of Llanfallteg Road overbridge, watercourse culvert and pedestrian underpass. Glimpse of commercial vehicles available. Cars screened by false cutting.	Major	Medium term	Short distance	Major -		Large adverse	
												Operation Summer Year 15 Views of watercourse culvert and pedestrian underpass screened by vegetation. Parts of Llanfallteg Road overbridge would be screened by vegetation on cutting slopes. North-facing slopes of cuttings graded and planted to integrate with surroundings. North-facing slopes of Pentroydin-fawr embankment planted to resemble pastoral fields with linear belts of trees used to create boundaries to areas of grassland to integrate earthworks and break up the prominent horizontal line visible near to the skyline and screen the view of commercial vehicles.	Moderate	Long term	Short distance	Major -			Large adverse
0UP.4	SN 1542 1892	SA34 0UP	Henllanfallteg	Penderi, Ysgubor and Beudy Bach (rural business - Secluded Bed & Breakfast)	C3205	detached, 1 and 2 storey	1,930	Located on south facing slope of lowland ridge between Afon Taf and railway line. Views towards Bryn Farm of the hill at the eastern end of the Llanddewi Velfrey village.	Medium	Medium	Medium	Construction Preparatory works - the removal of some trees would be noticeable as they are features of the skyline in southward views. Earthworks - Beginning of excavation at Bethel Roundabout and Bethel Cutting.	Negligible	Short term	Middle distance	No change	Neutral		
												Operation Winter Year 1 Indirect view of top of north-facing cutting slope at Bethel Cutting and glimpse of vehicles using new access road to Bethel Chapel.	Negligible	Medium term	Middle distance	Negligible -		Neutral	
												Operation Summer Year 15 Earthwork slopes difficult to distinguish from surroundings. Views of vehicles interrupted by vegetation.	No change	Long term	Middle distance	No change			Neutral

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7EG.2	SN 1548 1683	SA67 7EG	Llanddewi Velfrey	Glenfield	A40	detached, 2 storey	255	Southward aspect with direct and uninterrupted view of A40 available from ground floor. Views beyond A40 limited by roadside hedgerow to south of westbound lane.	High	Low	Medium	Construction Preparatory works - removal of hedgerows to north of existing A40 to enable the construction of the eastern link road into Llanddewi Velfrey visible from outdoor spaces. Earthworks - removal of topsoil and excavation of cutting of proposed link road in field to immediate east of Glenfield visible from outdoor spaces. Road pavement - construction of road surface and sub-surface visible from outdoor spaces.	Minor	Short term	Short distance	Minor -	Slight adverse		
												Operation Winter Year 1 Llannddewi Velfrey link road and traffic visible from outdoor spaces. No direct view of Scheme from dwelling, but reduction in number of vehicles using de-trunked A40 noticeable.	Negligible	Medium term	Short distance	Minor -		Slight adverse	
												Operation Summer Year 15 Establishment of hedgerow to north of Scheme link road would restore the view eastward available from outdoor spaces to one similar to the original. Reduction in number of vehicles using de-trunked A40.	Negligible	Long term	Short distance	Minor +			Slight benefit
7EG.3	SN 1557 1685	SA67 7EG	Llanddewi Velfrey	Arfryn, Croft House and Penllain	A40	detached, 2 storey	185	Northward aspect with direct and uninterrupted views of A40 available from ground floor rooms. Dwellings set at back of pavement, road features visible include road surface, traffic and street lights. View of pastoral fields to north of A40 available from first floor rooms but limited by roadside hedge from ground floor.	High	Low	Medium	Construction Preparatory works - removal of roadside hedge and hedgerow with trees boundary to fields north of A40 to enable the construction of the eastern link road into Llanddewi Velfrey visible from ground floor. From first floor removal of hedgerow with trees will open up distant northward views of Preseli Hills and Carmarthenshire uplands.. Earthworks - removal of topsoil and excavation of cutting of proposed link road in field to north of existing A40 visible. Beginning of excavation of Bethel Cutting (ch 3+460 to 3+780) visible from first floor rooms after removal of vegetation. Road pavement - construction of road surface and sub-surface of link road visible.	Minor	Short term	Short distance	Minor -	Slight adverse		
												Operation Winter Year 1 Llannddewi Velfrey link road and traffic visible. Reduction in number of vehicles using de-trunked A40 would be noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Where roadside hedge to north of existing A40 is retained, it would screen the view of traffic in cutting.	Negligible	Medium term	Short distance	Minor +		Slight benefit	
												Operation Summer Year 15 Llannddewi Velfrey link road and traffic visible. Reduction in number of vehicles using de-trunked A40 would be noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Where roadside hedge to north of existing A40 is retained, it would screen the view of traffic in cutting.	Negligible	Long term	Short distance	Minor +			Slight benefit

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7EG.4	SN 1560 1686	SA67 7EG	Llanddewi Velfrey	1-2 Bryn Helog	A40	semi-detached, 2 storey	175	Northward aspect with direct and uninterrupted views of A40 available from ground floor rooms. Dwellings set back from road edge. Existing road features visible include road surface, traffic and street lights. View of pastoral fields to north of A40 available from first floor rooms but limited by roadside hedge from ground floor.	High	Low	Medium	Construction Preparatory works - removal of hedgerow with trees boundary to fields north of A40 to enable the construction of the eastern link road into Llanddewi Velfrey visible from ground floor. From first floor removal of hedgerow with trees will open up distant northward views of Preseli Hills and Carmarthenshire uplands. Earthworks - removal of topsoil and excavation of cutting of proposed link road in field to north of existing A40 visible from first floor rooms. Beginning of excavation of Bethel Cutting (ch 3+460 to 3+780) visible from first floor rooms after removal of vegetation.	Negligible	Short term	Short distance	Negligible -	Neutral		
												Operation Winter Year 1 Commercial vehicles using Llannddewi Velfrey link road visible from first floor rooms with a reduction in number of vehicles using de-trunked A40 noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Where roadside hedge to north of existing A40 is retained, it would screen the view of traffic in cutting.	Minor	Medium term	Short distance	Moderate +		Moderate benefit	
												Operation Summer Year 15 Commercial vehicles using Llannddewi Velfrey link road visible from first floor rooms with a reduction in number of vehicles using de-trunked A40 noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Where roadside hedge to north of existing A40 is retained, it would screen the view of traffic in cutting.	Minor	Long term	Short distance	Moderate +			Moderate benefit
7EG.5	SN 1563 1688	SA67 7EG	Llanddewi Velfrey	Awelfa	A40	detached, 2 storey	150	Northward aspect with direct and uninterrupted views of A40 available from ground floor rooms. Dwellings set back slightly from road edge. Existing road features visible include road surface, traffic and street lights. View of pastoral fields to north of A40 available from first floor rooms but limited by roadside hedge from ground floor. Views eastward interrupted by ornamental hedge.	High	Low	Medium	Construction Preparatory works - removal of hedgerow with trees boundary to fields north of A40 to enable the construction of the eastern link road into Llanddewi Velfrey visible from ground floor. From first floor removal of hedgerow with trees will open up distant northward views of Preseli Hills and Carmarthenshire uplands. Earthworks - removal of topsoil and excavation of cutting of proposed link road in field to north of existing A40 visible from first floor rooms. Excavation of Llanddewi Velfrey link road and Bethel Roundabout visible from first floor rooms. Important to retain existing roadside hedgerow that would screen views of the proposed roundabout construction.	Negligible	Short term	Short distance	Negligible -	Neutral		
												Operation Winter Year 1 Commercial vehicles using Llannddewi Velfrey link road visible from first floor rooms with a reduction in number of vehicles using de-trunked A40 noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Important to retain roadside hedge to north of existing A40 as it would screen the view of traffic in cutting and at the roundabout.	Minor	Medium term	Short distance	Moderate +		Moderate benefit	
												Operation Summer Year 15 Commercial vehicles using Llannddewi Velfrey link road visible from first floor rooms with a reduction in number of vehicles using de-trunked A40 noticeable. Link road further from dwelling than existing A40, which would be retained as means of access to the six dwellings. Important to retain roadside hedge to north of existing A40 as it would screen the view of traffic in cutting and at the roundabout.	Minor	Long term	Short distance	Moderate +			Moderate benefit

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7EG.6	SN 1565 1723	SA67 7EG	Llanddewi Velfrey	Valley View (Tir-bach)	A40	detached, 2 storey	170	South-eastward aspect. View from dwelling is partially interrupted by outbuildings, and features steeply sloping fields at the head of a steep sided valley, a tributary of the Afon Taf. View of Bethel Chapel interrupted by pockets of woodland and hedgerows. Indirect view south-westward is limited by rising landform and roadside hedge-bank.	High	Medium	Medium	Construction Preparatory works - removal of hedges bounding field to south-west and uphill of dwelling visible from outdoor spaces. Earthworks - removal of topsoil for Bethel Cutting visible from outdoor spaces. View of construction of Bethel Chapel access road partially interrupted by buildings and further filtered by tree canopies. Most prominent feature likely to be Bethel Chapel access where road is on embankment. Beginning of Excavation at Bethel Cutting (ch 3+460 to 3+780) visible from outdoor spaces. Operation Winter Year 1 View of tops of north facing slopes of Bethel Cutting and Bethel Roundabout, and view of north facing embankment slope of access road to bethel Chapel. Glimpse of vehicles using access road to Bethel Chapel also available. Operation Summer Year 15 Establishment of planting on cutting slopes would integrate the earthworks into the surrounding landscape. Areas of dense planting around the access road to Bethel Chapel would help screen the earthwork slopes and integrate them with existing boundary hedgerows and pockets of woodland.	Minor Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Minor - Moderate - Minor -	Neutral	Moderate adverse	Slight adverse
7EG.7	SN 1568 1802	SA67 7EG	Llanddewi Velfrey	Brynhafod	A40	detached, 2 storey	895	North-south aspect. Located on north facing slope of a small hill at head of steep sided wooded valley named Cwm-bryn Wood. Southward views interrupted by landform.	High	Medium	Medium	Construction No view of works, interrupted by landform. Operation Winter Year 1 No view of Scheme or traffic, interrupted by landform. Operation Summer Year 15 No view of Scheme or traffic, interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EG.8	SN 1588 1812	SA67 7EG	Llanddewi Velfrey	Parc y Teg	A40	detached, 2 storey	1,065	North-south aspect. Located on north facing slope of a small hill between two steep sided wooded valleys of Cwm-bryn Wood and Castell-gwyndy Wood. Southward views interrupted by landform.	High	Medium	Medium	Construction No view of works, interrupted by landform. Operation Winter Year 1 No view of Scheme or traffic, interrupted by landform. Operation Summer Year 15 No view of Scheme or traffic, interrupted by landform.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EG.9	SN 1591 1699	SA67 7EG	Llanddewi Velfrey	Bethel Cottage	A40	detached, 2 storey	20	Mainly southward aspect. View northward interrupted by neighbouring building. Views from ground floor interrupted by ornamental hedge. View from first floor rooms is a direct one of the A40, including the older road alignment now used as a lay-by and parking space for Bethel Chapel. More distant southward views are limited by the existing cutting slope of the existing A40 vegetated with scrub and scattered trees. Westward views limited by gently rising ground and garden boundary hedgerow.	High	Low	Medium	Construction Preparatory works - indirect view of hedgerow removal to west of dwelling. Earthworks - indirect view of excavation works to Bethel Roundabout approach and slight raising in level of A40 in front of dwelling. Road Pavement - Direct view of road construction available from first floor rooms. View from ground floor partially interrupted by garden boundary hedge, glimpse available through gateway. Operation Winter Year 1 Direct view of road surface, cars and commercial vehicles available from first floor rooms. Glimpse available through gateway in hedge from ground floor rooms with commercial vehicles visible over hedge. Operation Summer Year 15 Direct view of road surface lessened by establishment of hedge-bank at Scheme roadside. Views of cars and commercial vehicles available from first floor rooms. Glimpse available through gateway in hedge from ground floor rooms with commercial vehicles visible over garden hedge. Dense planting to west of dwelling would interrupt views of Bethel Roundabout.	Minor No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Minor - No change No change	Slight adverse	Neutral	Neutral

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7EG.10	SN 1592 1699	SA67 7EG	Llanddewi Velfrey	The Vestry	A40	detached, 2 storey	30	East-west aspect with northward view from first floor gable end window. Indirect views southward of existing A40 interrupted by Bethel Chapel and Bethel Cottage. Road surface and traffic are visible in the eastward view. Westward view is of steeply sloping fields at the head of the Tir-bach Wood valley, which is partially interrupted by vegetation. The northward view is an open an uninterrupted view of the Preseli Hills, rural Pembrokeshire and rural Carmarthenshire overlooking the steep sided wooded valleys north-east of Llanddewi Velfrey. From outdoor spaces, a wide open and uninterrupted view is available.	High	High	High	<u>Construction</u> Preparatory works - removal of linear belt of trees to A40 roadside from ch 3+850 to 3+900 (eastbound side), would be noticeable from outdoor spaces in westward view. Removal of roadside linear belt of trees and shrubs ch 4+100 to 4+220 (west bound side), would be visible from dwelling in eastward view. Removal of section of hedge-bank to enable construction of proposed Bethel Chapel access road would be visible from outdoor spaces and first floor rooms with northward views. Earthworks - Removal of topsoil in field to west and north of dwelling visible from outdoor spaces and first floor rooms. Slight raising in road level visible in eastward view. Excavation of Bethel Roundabout and earthworks associated with the proposed Bethel Chapel access road visible from first floor rooms and outdoor spaces in westward and northward views. Road pavement - construction of road surface visible in eastward view. Construction of Bethel Chapel access road visible from first floor rooms and outdoor spaces in westward and northward direction. <u>Operation Winter Year 1</u> Eastward view of road surface, cars and commercial vehicles unchanged. Westward, a partial view of the top of the north-facing cutting slope at Bethel Cutting would be available. From first floor rooms, the view would include a section of the roundabout and the new access road to Bethel Chapel where it is on embankment. Northward, a view of the access road would be available from a first floor room and outdoor spaces. <u>Operation Summer Year 15</u> Eastward view unchanged, the removal of a roadside plantation would open up views towards the Fron Wood and Carcodyn Wood valleys. Establishment of shrub planting would interrupt westward views of the roundabout and Chapel access road. Establishment of hedge would integrate Chapel access road with the local road. From first floor rooms with a northward view there would be a slight increase in vehicles accessing Bethel Chapel and the properties accessible from it.	Moderate Minor Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Moderate - Moderate - Minor -	Large adverse	Large adverse	Moderate adverse
7EG.11	SN 1602 1772	SA67 7EG	Llanddewi Velfrey	Castell Mawr (rural business)	A40	detached, 1 storey	730	South-west and north-east aspect. Views outward limited by agricultural buildings, landform and woodland.	Medium	Low	Low	<u>Construction</u> No view of works. <u>Operation Winter Year 1</u> No view of Scheme or traffic. <u>Operation Summer Year 15</u> No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EG.12	SN 1606 1807	SA67 7EG	Llanddewi Velfrey	Cyncoed	A40	detached, 2 storey	1,100	North-east and south-west aspect. Located on north facing slope of a small hill near to steep sided wooded valleys of Castell-gwyndy Wood. Southward views interrupted by landform.	High	Medium	Medium	<u>Construction</u> No view of works. <u>Operation Winter Year 1</u> No view of Scheme or traffic. <u>Operation Summer Year 15</u> No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
0UJ.1	SN 1613 1919	SA34 0UJ	Henllanfallteg	Ddolwernen and Dolwen	C3424	detached 2 and 1.5 storey	2,130	Located on ridge between Llanfallteg East and Rhyd-y-wrach hamlets with south-westward aspect. Dwellings overlook Afon Taf Vale and Carmarthen to Fishguard railway line towards north-eastern wooded slopes of the Llanddewi Velfrey ridge. View is limited by field boundary hedgerows.	High	Medium	Medium	<u>Construction</u> Preparatory works - the removal of some trees would be noticeable as they are features of the skyline in south-westward views. Earthworks - Beginning of excavation at Bethel Roundabout and Bethel Cutting. <u>Operation Winter Year 1</u> Indirect view of tops of north-facing cutting slopes at Bethel Cutting and Bethel Roundabout/Llanddewi Velfrey East approach road. Glimpse of vehicles using new access road to Bethel Chapel. <u>Operation Summer Year 15</u> Earthwork slopes difficult to distinguish from surroundings. Views of vehicles interrupted by vegetation.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change Negligible - No change	Neutral	Neutral	Neutral

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7EG. 13	SN 1617 1707	SA67 7EG	Llanddewi Velfrey	Gwyndy fach and Caravan	A40	detached, 1 storey	85	Caravan has westward aspect and interrupts westward view from Gwyndy bach. Gwyndy bach has north-south aspect. Southward view towards A40 interrupted by an accumulation of hedgerows and roadside plantations. From caravan, there is an indirect view of traffic on the A40 in-between a roadside plantation and the cemetery hedge. Westward views are limited by the cluster of buildings at Bethel Chapel and hedge-banks with trees.	High	Medium	Medium	Construction Earthworks - indirect view of slight raising of road level, through a gap in vegetation. Operation Winter Year 1 Indirect view of traffic through gap in vegetation. Operation Summer Year 15 Indirect view of traffic through gap in vegetation.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - No change No change	Neutral	Neutral	Neutral
7EQ.1	SN 1627 1701	SA67 7EQ	Llanddewi Velfrey	Gwyndy and The Stables	U6385	complex, 1 and 2 storey	55	Buildings set around courtyard. Southward view of existing A40 partially interrupted by outbuildings and vegetation. Westward view of A40 interrupted by roadside plantations.	High	Medium	Medium	Construction View of works interrupted by vegetation. Operation Winter Year 1 View of Scheme and traffic unchanged. Operation Summer Year 15 View of Scheme and traffic unchanged.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EJ.1	SN 1627 1692	SA67 7EJ	Llanddewi Velfrey	Bryncoed	A40	detached, 2 storey	75	North-south aspect. Narrow view along road of A40 and junction available. Wider view interrupted by hedgerow with trees and roadside plantation. Southward view is of Tavernspite ridge overlooking steep wooded valley.	High	Medium	Medium	Construction Preparatory works - indirect view of roadside planting removal, filtered by hedgerow with trees. Earthworks - indirect view of slight raising of road level filtered by hedgerow with trees. View of attenuation pond construction available from outdoor spaces only and filtered by hedgerow. Access road to proposed attenuation pond would use existing field access track and a short section, including field access gate, is directly visible from dwelling. Operation Winter Year 1 View of Scheme and traffic would be filtered by vegetation. Occasional access to surface water attenuation pond for maintenance would be required. Operation Summer Year 15 View of Scheme and traffic would be interrupted by vegetation. Occasional access to surface water attenuation pond for maintenance would be required.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - No change No change	Neutral	Neutral	Neutral
7EQ.2	SN 1638 1716	SA67 7EQ	Llanddewi Velfrey	Pen Hendre	U6385	detached, 1 storey	240	North-south aspect and located at the edge of a plateau overlooking steep sided and wooded valleys that drain northward into the Afon Taf. Views southward and westward towards A40 interrupted by landform, agricultural buildings and vegetation.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EL.6	SN 1640 1712	SA67 7EL	Llanddewi Velfrey	Lletty	A40	detached, 1 storey	235	North-south aspect and located at the edge of a plateau overlooking steep sided and wooded valleys that drain northward into the Afon Taf. Extensive northward view overlooking neighbouring dwelling of Preseli Hills and rural Pembrokeshire. Views southward and westward towards A40 interrupted by landform and vegetation.	High	High	High	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EQ.3	SN 1641 1706	SA67 7EQ	Llanddewi Velfrey	Gwyndyland	U6385	detached, 1 storey	210	North-south aspect and located between old and current alignment of A40. Views outward limited by vegetation and hedge-banks to local road named Fron Hill.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EJ.2	SN 1646 1675	SA67 7EJ	Llanddewi Velfrey	Meadow View	A40	detached, 1 storey	325	South-west and north-east aspect. South-westward view is overlooking Fron and Carcoryn wooded valleys. Indirect view of A40 at Bethel Chapel and hill at eastern approach to Llanddewi Velfrey. Road signs visible.	High	Medium	Medium	Construction Preparatory works - indirect view or view from outdoor spaces of removal of linear belt of trees (ch 4+100 to 4+200 westbound side) and hedgerow at 3+850 to 3+960), partially interrupted by vegetation. Earthworks - Indirect view or view from outdoor spaces of the excavation at eastern approach to Bethel Roundabout, partially interrupted by vegetation. Operation Winter Year 1 Glimpse of road surface and traffic available from outdoor spaces. Operation Summer Year 15 Glimpse of commercial vehicles available from outdoor spaces.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible - No change No change	Neutral	Neutral	Neutral

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7EJ.3	SN 1654 1659	SA67 7EJ	Llanddewi Velfrey	Upper Fron (farm dwelling)	A40	detached, 2 storey	500	South-eastward aspect overlooking Lampeter Vale. Views northward interrupted by landform.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EQ.4	SN 1656 1719	SA67 7EQ	Llanddewi Velfrey	Pencwmmau	U6385	detached, 2 storey	405	North-south aspect and located at the edge of a plateau overlooking steep sided and wooded valleys that drain northward into the Afon Taf. Views southward and westward towards A40 interrupted by landform and vegetation.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EH.1	SN 1657 1708	SA67 7EH	Llanddewi Velfrey	Hafod Las	U6025	detached, 1 storey	375	East-west aspect and located between old and current alignment of A40. Views outward limited by vegetation and hedge-banks to local road named Fron Hill.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EQ.5	SN 1658 1778	SA67 7EQ	Llanddewi Velfrey	Hendre	U6025	detached, 2-3 storey	885	Mainly south-eastward aspect. Located on north facing slope of a small hill near to steep sided wooded valleys of Cwmmau Wood. South-westward views interrupted by landform.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EJ.4	SN 1661 1679	SA67 7EJ	Llanddewi Velfrey	Roft Isaf	A40	detached, 1 storey	440	Southward aspect overlooking Lampeter Vale. Views northward interrupted by landform.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
7EH.2	SN 1663 1707	SA67 7EH	Llanddewi Velfrey	Hill Piece	Fron Hill	detached, 1.5 storey	420	Mainly southward aspect and located between old and current alignment of A40. Views outward limited by vegetation and hedge-banks to local road named Fron Hill. Views from roof loft overlook hedge-banks and existing A40.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
0UJ.2	SN 1664 1907	SA34 0UJ	Henllanfallteg	Cefnfarchen (farm dwelling)	C3424	detached, 2 storey	2,200	Located on Cefnfarchen ridge and overlooking the Afon Taf valley and Carmarthen to Cardigan railway line. South-westward aspect with an uninterrupted view of the north-eastern wooded slopes of the Llanddewi Velfrey ridge.	High	Medium	Medium	Construction Preparatory works - the removal of some trees would be noticeable as they are features of the skyline in south-westward views. Earthworks - Beginning of excavation at Bethel Roundabout and Bethel Cutting. Operation Winter Year 1 Indirect view of tops of north-facing cutting slopes at Bethel Cutting and Bethel Roundabout/Llanddewi Velfrey East approach road. Glimpse of vehicles using new access road to Bethel Chapel. Operation Summer Year 15 Earthwork slopes difficult to distinguish from surroundings. Views of vehicles interrupted by vegetation.	Negligible Negligible No change	Short term Medium term Long term	Long distance Long distance Long distance	No change No change No change	Neutral	Neutral	Neutral
0RG.1	SN 1687 1703	SA34 0RG	Llanddewi Velfrey	Banc y Saeson	Fron Hill	detached, 2 storey	650	Southward aspect overlooking existing A40 where it emerges from deep cutting. Linear belts of roadside trees and areas of woodland interrupt views of the road and traffic from the dwelling.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
0RG.2	SN 1690 1705	SA34 0RG	Llanddewi Velfrey	Trelawney	Fron Hill	detached, 2 storey	685	Southward aspect overlooking existing A40 where it emerges from deep cutting. Linear belts of roadside trees and areas of woodland interrupt views of the road and traffic from the dwelling.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral
0RG.3	SN 1718 1693	SA67 0RG	Llanddewi Velfrey	Fron House and Fron Cottage	Fron Hill	detached, 1 and 3 storey	940	South-eastward aspect overlooking Lampeter Vale. Views from cottage interrupted by house. Views north and westward interrupted by landform and vegetation.	High	Medium	Medium	Construction No view of works. Operation Winter Year 1 No view of Scheme or traffic. Operation Summer Year 15 No view of Scheme or traffic.	No change	No view	No view	No change	Neutral	Neutral	Neutral

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 9.6: Visual Effects Schedule – Countryside Rights of Way

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

REFERENCE			VIEWING POSITION			SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECT		
Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
SP 20/21/1	208295 217447	208513 217025	Llawhaden	Footpath connecting Sunny Hill/Tal-Y-Bont Hill to Ty Newydd on the minor road from Llawhaden bridge to Pont-Shan. Crossing undulating ground within pastoral fields.	3415	Predominantly eastward to southward view of rolling countryside in the Robeston Wathen and Narberth areas. View is open and uninterrupted.	High	High	High	Construction Changes to landscape at Penblewin Roundabout in distance not noticeable. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 27/2/1	210990 215960	212004 215919	Narberth Rural	Bridleway connecting Blaenmarlais on B4313 Redstone Road to Stonyford on A478. Follows a track/sunken lane bounded by hedgerows with mature trees. Wildlife interest in banks and hedges a main feature.	680	Views out limited to field access gates or below tree canopy. Where available views are of pastoral farmland/remnant parkland featuring solitary mature trees.	High	Medium	Medium	Construction View of works interrupted by several hedgerows in-between Redstone Cross and Pant-y-gorphwys Bridge. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 29/9/1	211154 214823	211312 215000	Narberth Urban	Footpath connecting Spring Gardens to Springfield Park in Narberth. Follows Bushy Lane passing the Cricket and Rugby Grounds. Some features of architectural interest and sports activities available to this route.	1760	Views out limited by buildings and garden boundaries. Where gaps allow, views out are of sports pitches.	Medium	Medium	Medium	Construction View of works interrupted by buildings. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 27/1/1	211468 216621	211671 217471	Narberth Rural	Footpath connecting the A40 west of Penblewin Roundabout to the A478 near to Bryn Hill passing through Cilrath-fawr farm yard. Follows metalled track bounded by hedge-banks to Cilrath Fawr, crossing fields thereafter.	440	Views east and west limited by hedge-banks. Distant northward view towards Preseli Hills and Carmarthenshire uplands available.	Medium	High	Medium	Construction Preparatory works - view of removal of trees near to Penblewin Roundabout available at southern end of path near to Blackmoor Hill Farm. Operation Winter Year 1 View of traffic at Penblewin Roundabout available from southern end of path near to Blackmoor Hill Operation Summer Year 15 View of high sided traffic at Penblewin Roundabout available from southern end of path near to Blackmoor Hill Farm.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible detriment No change No change	Neutral	Neutral	Neutral
SP 19/33/1	211671 217471	211831 217573	Llanddewi Velfrey	Footpath continuation of 27/1/1 crossing a field to the east of Cilrath-fawr farm and emerging onto A478 near to Bryn Hill.	800	Views southward limited by rising landform and field boundary hedgerows. Open and uninterrupted views northward towards Preseli hills and Carmarthenshire uplands.	High	High	High	Construction View of works interrupted by several hedges to south and uphill of path. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/34/1	211809 218023	212514 217586	Llanddewi Velfrey	Western part of Bridleway connecting Longford Bridge to Pen-ca'rmaenau. Used as access to Longford Farm, Rhos-fach and Well Cottage. East of Rhos-fach the track is mainly used as access to fields.	890	Views outward limited by hedgerows and mature trees. Where gaps providing access to fields allow, views of the pastoral landscape of the north-facing slopes of Llanddewi Velfrey ridge are available.	Medium	Medium	Medium	Construction View of works interrupted by several hedgerow field boundaries on north-facing slopes of Llanddewi Velfrey ridge. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 9/1/1	211935 215557	212504 215712	Narberth Rural	Western part of Footpath connecting the A478 at Beechwood Park to Henllan Lodge, terminating at the community boundary near to Orielton-fach. Used as access to Whitley Farm and crossing fields thereafter.	980	Where Beechwood Park buildings do not interrupt the view, the Llanddewi Velfrey ridge is visible, featuring a mosaic of woodland and pastoral farmland.	High	High	High	Construction View of works interrupted by several hedgerow field boundaries between A548 at Stonyford and Henllan in addition to plantations south of existing A40. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/32/1	211979 216990	212451 217274	Llanddewi Velfrey	Footpath connecting the A478 north of pinballing Roundabout to fields north of Bounty Farm. Used as access to Carmaenau Fawr and passing through woodland thereafter.	240	Views southward towards Llanddewi Velfrey ridge are interrupted by substantial vegetation. Some views northwards of rolling pastoral landscape available.	Medium	Medium	Medium	Construction View of works interrupted by substantial vegetation and rising landform. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/29/1	212019 215919	213120 216213	Llanddewi Velfrey	Bridleway connecting A478 at Stonyford to Henllan, following old tracks and sunken lanes. Overgrown in parts and difficult to negotiate at time of field survey. Sunken lane provides wildlife interest.	490	Slight ridge to north limits views outward, this is in addition to visual barrier created by banks and hedges. Where gaps allow access to fields, near views of neighbouring areas are available featuring a mosaic of woodland and pastoral farmland.	Medium	Medium	Medium	Construction View of works interrupted by field boundary hedgerows in-between Stonyford and Henllan. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/31/1	212439 217298	211919 217354	Llanddewi Velfrey	Footpath connecting the A478 near to electricity sub-station to fields north of Bounty Farm. Crosses fields and hedgerows.	605	Field boundaries and rising landform to south limit views in that direction. Distant views of Preseli Hills available to north.	High	Medium	Medium	Construction View of works interrupted by woodland and landform. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION			SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECT		
Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
SP 19/31/2	212439 217298	212450 217275	Llanddewi Velfrey	Short section of Footpath connecting 19/31/1, 19/31/3, 19/32/1 and 19/32/2 to the north of Bounty Farm.	580	Field boundaries and rising landform to south limit views in that direction. Distant views of Preseli Hills available to north.	High	Medium	Medium	Construction View of works interrupted by landform and substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/32/2	212439 217300	212514 217586	Llanddewi Velfrey	Footpath, continuation of 19/32/1 crossing fields to the east of Caermaenau-fawr and connecting to Bridleways 19/34/1 and 19/34/2.	605	Field boundaries and rising landform to south limit views in that direction. Distant views of Preseli Hills available to north.	High	Medium	Medium	Construction View of works interrupted by buildings and vegetation at Orielton-fach, elsewhere interrupted by landform. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/28/1	212510 215717	213128 216214	Llanddewi Velfrey	Eastern part of Footpath connecting the A478 at Beechwood Park to Henllan Lodge, beginning at the community boundary near to Orielton-fach. Following farm tracks and crossing fields and hedgerows.	590	Views northward limited by rising landform and substantial vegetation. Available views are predominantly southward of the Afon Marlais valley.	High	Medium	Medium	Construction View of works interrupted by substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/34/2	212514 217586	213081 217342	Llanddewi Velfrey	Eastern part of Bridleway connecting Longford Bridge to Pen-ca'rmaenau. Used as farm track but banks and vegetation restrict access of large agricultural vehicles. Overgrown in parts and difficult to negotiate during field survey.	510	Views outward limited by hedgerows and mature trees. Where gaps providing access to fields allow, views of the pastoral landscape of the north-facing slopes of Llanddewi Velfrey ridge are available.	Medium	Medium	Medium	Construction View of works interrupted by rising landform and substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/31/3	212650 216667	212449 217276	Llanddewi Velfrey	Footpath connecting A40 at Ca'rmaenau-fach to fields north of Bounty Farm. Follows access track to Bounty Farm and crosses fields thereafter.	0	Views eastward and westward to the south of Grosvenor Court are limited by hedge-banks. The view of the existing A40 is filtered by a roadside hedge. Field boundaries running north-south restrict the horizontal field of view of the road and traffic. North of Grosvenor Court the road crosses a ridge which interrupts southward views and opens up northward views towards the Preseli Hills. See Viewpoint E.	Medium	Medium	Medium	Construction Preparatory work - view of the removal of part of a Pembrokeshire hedge-bank with the loss of some mature trees, and removal of topsoil in field next to footpath.. Earthworks - A section of the field would be lost. Operation Winter Year 1 A view of the Scheme and traffic including the local access road to Trefangor Cemetery would be available. Views eastward and westward would be limited by Pembrokeshire hedge-banks. Operation Summer Year 15 There is no proposed planting to screen the Scheme from the footpath.	Moderate Moderate Moderate	Short term Medium term Long term	Short distance Short distance Short distance	Moderate detriment Major detriment Major detriment	Moderate adverse	Large adverse	Large adverse
SP 19/34/3	213081 217342	213093 217338	Llanddewi Velfrey	Short section of Bridleway connecting 19/34/2 and 19/34/4 and Footpaths 19/35/1 and 19/36/2. Farm track surrounded by hedgerows.	505	Views outward limited by hedgerows and mature trees.	Medium	Low	Low	Construction View of works interrupted by substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/35/1	213081 217343	213196 218152	Llanddewi Velfrey	Footpath running from Bridleway 19/34 to the community boundary with Clynderwen at the Afon Daulas. Follows old tracks to a ruin at Rhyd-tomlyd passing through woodland and crossing fields and hedgerows.	510	Views southward limited by rising landform. Views eastward and westward interrupted by substantial vegetation for majority of route. Where path opens out into fields near views of pastoral landscape available.	Medium	Medium	Medium	Construction View of works interrupted by undulating landform and substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/34/4	213093 217338	213096 217087	Llanddewi Velfrey	Bridleway connecting Trefangor Burial Ground to the track running from Longford Bridge to Pen-ca'rmaenau. Follows a lane bounded by hedgerows. Vegetation encroaching onto path making access difficult at time of survey.	255	Views southward limited by rising landform. Views eastward and westward interrupted by substantial vegetation for entirety of route.	Medium	Low	Medium	Construction View of works interrupted by rising landform and substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/36/1	213093 217338	213273 217276	Llanddewi Velfrey	Footpath connecting Bridleway 19/34 to Pen-ca'rmaenau following farm track and bounded by hedgerows.	430	Views out limited by buildings at Pen-ca'rmaenau and trackside vegetation.	Medium	Low	Low	Construction View of works interrupted by agricultural buildings at Pencaerminau. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/29/2	213120 216214	213348 216249	Llanddewi Velfrey	Short section of Bridleway south of Henllan. Follows farm track running between hedgerows, occasionally used as pens for holding livestock and frequently used for movement of livestock.	600	Views out limited by buildings, banks and vegetation.	Medium	Low	Low	Construction View of works interrupted by buildings and vegetation at Henllan. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION			SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECT		
Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
CA 1/25/1	213197 218153	213202 218549	Clynderwen	Footpath running from the community boundary with Llanddewi Velfrey at the Afon Daulas to the road connecting the A548 at Clynderwen to Llanfallteg Road. Crosses fields and passes a ruin at Dyffryn-glas.	1305	Open and uninterrupted southward views of the north-facing slopes of Llanddewi belfry ridge, featuring pastoral farmland, areas of woodland and scattered rural settlements.	High	Medium	Medium	<u>Construction</u> Preparatory works - removal of field boundary hedgerows and woodland on north-facing slopes. Earthworks - excavation of Pentroydin-fach Cutting, Pentroydin-fawr Cutting and Bethel Cutting, construction of Pentroydin-fach Embankment and Pentroydin-fawr embankment. Structures - View of Llanfallteg Road overbridge and possibly of agricultural underpass at Pentroydin-fach embankment, if not obscured by hedgerow with trees. <u>Operation Winter Year 1</u> View of north facing slopes of cuttings and embankments with glimpse of commercial vehicles available where road is on embankment. <u>Operation Summer Year 15</u> North facing slopes of embankments and cuttings would resemble pastoral fields. Woodland planting on slopes would screen views of traffic except for commercial vehicles on Pentroydin-fach embankment, where long distance views of the Preseli Hills are intentionally kept to provide interest for road users.	Moderate Moderate Minor	Short term Medium term Long term	Middle distance Middle distance Middle distance	Minor detriment Moderate detriment Moderate detriment	Slight adverse	Moderate adverse	Moderate adverse
SP 19/36/3	213273 217276	213246 217090	Llanddewi Velfrey	Footpath connecting the access to Trefangor Burial Ground to Pen-ca'rmaenau. Follows the access track to Pen-ca'rmaenau.	240	Views southward limited by rising landform. Uninterrupted views eastward of north-facing slopes of Llanddewi Velfrey ridge. Views northward of Preseli Hills and Carmarthenshire uplands. Views westward limited by hedge-bank. See viewpoint F.	Medium	High	Medium	<u>Construction</u> Preparatory works - removal of hedgerows with trees near to Pen-troydin-fach and Pen-troydin fawr. Elements of Construction site compound may also be visible. Earthworks - construction vehicles visible, construction of Pentroydin-fach embankment, excavation of Pentroydin-fach cutting and Pentroydin-fawr cutting depth. Structures - construction of Llanfallteg Road overbridge visible. <u>Operation Winter Year 1</u> Indirect view of north-facing embankment and cutting slopes from Pentroydin-fach to Llanfallteg Road. Glimpse of commercial vehicles at Llanddewi Velfrey West junction and where road is on embankment. <u>Operation Summer Year 15</u> North facing slopes would resemble pastoral farmland with areas of woodland and blend in with surroundings. Indirect view of traffic reduced by mitigation planting to north of Scheme to glimpse where road is on embankment at Pentroydin-fach.	Moderate Major Minor	Short term Medium term Long term	Middle distance Middle distance Middle distance	Minor detriment Moderate detriment Moderate detriment	Slight adverse	Moderate adverse	Moderate adverse
SP 19/36/2	213274 217277	213816 217163	Llanddewi Velfrey	Footpath between Pen-ca'rmaenau and Parc-y-delyn. Crosses fields and scrub woodland past a ruin at Beili-bach.	255	Near to Pen-ca'rmaenau the path crosses fields and there are views available of the north-facing slopes of Llanddewi belfry ridge to the east. Further east along the path views out are limited by significant vegetation. Views southward are limited by the rising landform.	Medium	Medium	Medium	<u>Construction</u> Preparatory works - removal of hedgerows with trees near to Pen-troydin-fach and Pen-troydin fawr. Elements of Construction site compound may also be visible. Earthworks - construction vehicles visible, construction of Pentroydin-fach embankment, excavation of Pentroydin-fach cutting and Pentroydin-fawr cutting depth. Structures - construction of Llanfallteg Road overbridge visible. Views available from western end of footpath near to Pencaerminau Farm, elsewhere view screened by landform and woodland. <u>Operation Winter Year 1</u> Indirect view of north-facing embankment and cutting slopes from Pentroydin-fach to Llanfallteg Road. Glimpse of commercial vehicles at Llanddewi Velfrey West junction and where road is on embankment. <u>Operation Summer Year 15</u> North facing slopes would resemble pastoral farmland with areas of woodland and blend in with surroundings. Indirect view of traffic reduced by mitigation planting to north of Scheme to glimpse where road is on embankment at Pentroydin-fach.	Minor Moderate Negligible	Short term Medium term Long term	Middle distance Middle distance Middle distance	Negligible detriment Moderate detriment Minor detriment	Neutral	Moderate adverse	Slight adverse
	213346	213913		Footpath crossing a low hill to the south of the		Broad views of south-facing slopes of Llanddewi Velfrey				<u>Construction</u> View of works interrupted by rising landform and substantial vegetation.	No change	No view	No view	No change	Neutral		

REFERENCE			VIEWING POSITION			SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECT		
Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
SP 16/20/1	215340 214746	215915 214978	Lampeter Velfrey	Footpath crossing a low hill to the south of the Lampeter Vale railway line.	1860	Broad views of south-facing slopes of Llanddewi Velfrey ridge and the Lampeter Vale.	High	High	High	Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change	No view No view	No view No view	No change No change		Neutral	Neutral
SP 19/29/3	213349 216249	213429 216257	Llanddewi Velfrey	Short section of Bridleway south of Henllan. Follows farm track running between buildings and hedgerow, occasionally used as pens for holding livestock and frequently used for movement of livestock.	600	Views out interrupted by buildings, banks and vegetation.	Medium	Low	Low	Construction View of works interrupted by agricultural buildings at Henllan. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/27/1	213352 216243	213815 215950	Llanddewi Velfrey	Footpath connecting Henllan to Caerau to the south of Caerau Wood. Crosses fields and hedgerows. Follows south facing slopes.	600	Views northward limited by rising landform and substantial vegetation. Views available predominantly of Lampeter Vale pastoral landscape.	High	High	High	Construction View of works screened by substantial vegetation between Henllan and Stepin. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/37/1	213657 216870	213816 217162	Llanddewi Velfrey	Footpath connecting Ffynnon Chapel to Parc-y-delyn. Follows private track to Ffynnon Farm, then follows northern edge of Ffynnon Wood and mature but gappy hedgerow.	20	Views east and west limited by landform, buildings and woodland. Wildlife interest where path passes through woodland.	Medium	Medium	Medium	Construction Preparatory works - view of removal of roadside plantation available at edge of Ffynnon Wood. Earthworks - changes to embankment at Ffynnon Wood visible. Structures - Construction of new bridleway underpass visible. Changes visible from short section of path near to Ffynnon Chapel and along track to Ffynnon Uchaf, otherwise interrupted by woodland and landform. Operation Winter Year 1 Scheme alignment further away from Chapel than existing A40. Operation Summer Year 15 Native species planting on embankment slopes would screen views of traffic and integrate culvert into embankment.	Moderate Minor Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate detriment Moderate benefit Moderate benefit	Moderate adverse	Moderate benefit	Moderate benefit
SP 19/37/2	213813 217148	214295 217144	Llanddewi Velfrey	Continuation of 19/37/1 from Parc-y-delyn to Pen-troydin-fach crossing fields and following farm tracks.	70	Follows north-facing slopes. Landform and hedgerows limit southward views. View predominantly north towards Preseli Hills.	High	High	High	Construction Preparatory Works - removal of parts of hedgerows visible, but partially interrupted by hedgerows and landform. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible detriment No change No change	Slight adverse	Neutral	Neutral
SP 19/30/1	213980 216317	213699 216844	Llanddewi Velfrey	Footpath connecting A40 at Ffynnon Wood to Stepin and Caerau Gaer. Crosses fields and follows hedgerows and also passes through Ffynnon Wood. Crosses A40 at Ffynnon Chapel and connects to 19/37.	10	Views predominantly northward near to Stepin, of rolling landform between the two ridges, and beyond of Preseli Hills and Carmarthenshire uplands. Lower down the slopes views are limited by woodland and vegetation. Where path is in woodland there is a degree of tranquillity despite nearness of A40.	High	High	High	Construction Footpath stopped up where it would meet works boundary at toe of embankment in Ffynnon Wood. Path then diverted to connect with new Bridleway and cross Scheme in an underpass at Ch 1+680. Existing path climbs road embankment and crosses A40 opposite Ffynnon Chapel. Preparatory works - view of removal of roadside plantation available at edge of Ffynnon Wood. Earthworks - changes to embankment at Ffynnon Wood visible. Structures - Construction of new bridleway underpass and changes to watercourse culverts visible. Operation Winter Year 1 View of embankment available where path emerges out of Ffynnon Wood including new bridleway and underpass. View of cars and commercial vehicles. Operation Summer Year 15 Native species planting on embankment slope to mitigate loss of existing would have been established reducing the view of traffic on the road.	Minor Negligible Negligible	Short term Medium term Long term	Short distance Short distance Short distance	Minor detriment Minor detriment Minor detriment	Moderate adverse	Slight adverse	Slight adverse

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Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
SP 19/38/2	214295 217144	214793 217204	Llanddewi Velfrey	Continuation of 19/372 from Pen-troydin fach to Pen-troyden fawr and Llanfallteg Road. Crossing through farm yard, fields and hedgerows along gentle north-facing slopes.	0	Where crossing fields views northward of Preseli Hills and Carmarthenshire uplands are open and uninterrupted. Views southward are limited by the rising landform and terminate at the Llanddewi Velfrey ridge.	High	High	High	<u>Construction</u> Path diverted slightly where it meet works boundary at Pentroydin-fawr cutting and connect to Llanfallteg Road nearer to Pentroydin-fawr farm. Preparatory works - view of removal of hedgerow field boundaries between Pentroydin-fach and Llanfallteg Road and view of topsoil removal in fields. Earthworks - Excavation of Pentroydin-fawr cutting and construction of Pentroydin-fach embankment visible. Road Pavement - Where path would follow top of Pentroydin-fawr cutting slope a view of the road construction would be available. Structures - Uninterrupted view of agricultural underpass and Llanfallteg Road overbridge construction. <u>Operation Winter Year 1</u> The Pentroydin-fach embankment would be a dominant and imposing feature of southward views. View of structures also available, and road surface and traffic where path nears top of Pentroydin-fawr cutting slope. Northward views toward Preseli Hills retained. <u>Operation Summer Year 15</u> Native species planting on embankment and cutting slopes would integrate them with sloping fields and partially screen visible structures.	Major Major Major	Short term Medium term Long term	Short distance Short distance Short distance	Major detriment Major detriment Major detriment	Very large adverse	Very large adverse	Very large adverse
SP 19/39/1	214323 215886	214023 216245	Llanddewi Velfrey	Bridleway from Caerau Gaer to St David's Church on the southern slopes of the Llanddewi Velfrey ridge. Follows an old track in between hedgerows and next to areas of woodland.	675	Views outward limited by substantial vegetation. Wildlife interest in areas of woodland.	Medium	Medium	Medium	<u>Construction</u> View of works interrupted by substantial vegetation. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/38/1	214384 216966	214295 217144	Llanddewi Velfrey	Footpath from A40 to Pen-troydin-fach. Follows access track/sunken lane to farm and dwellings at Maes-y-ffynnon and Maes-y-Rhos.	0	Views limited by banks and vegetation.	Medium	Low	Low	<u>Construction</u> Footpath stopped up where it would meet the scheme in-between Pentroydin-fach and Maes-y-ffynnon. Path would be diverted eastward following the edge of proposed works and cross the Scheme in an underpass at Ch2+630, thereafter it would follow a hedgerow and small stream to reconnect with path 19/38/2 part way between Pentroydin-fach and Pentroydin-fawr. Preparatory Works - view of removal of hedgerows and topsoil. Earthworks - Uninterrupted view of excavation of Pentroydin-fach cutting and Pentroydin-fach embankment. Road Pavement - Uninterrupted view of road construction in cutting and where it would change to embankment. Structures - Uninterrupted view of construction of agricultural underpass. View of part of Llanfallteg Road overbridge. <u>Operation Winter Year 1</u> False cutting and hedge-bank would interrupt views of cars. View of eastbound commercial vehicles visible where road emerges from cutting onto embankment. <u>Operation Summer Year 15</u> With the establishment of shrub planting on the north-facing slopes of Pentroydin-fach cutting, the view of commercial vehicles would be lessened.	Moderate Moderate Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate detriment Major detriment Moderate detriment	Slight adverse	Moderate adverse	Slight adverse

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SP 19/23/1	214455 216461	214453 216943	Llanddewi Velfrey	Footpath from Pen-banc to A40 near to Plasnewydd and Tynewydd. Crosses shallow valley between the two Llanddewi Velfrey ridges and passes ruins at Clyn-gwyddau and North.	180	Open and uninterrupted views from Pen-banc taking in views north to east of Llanddewi Velfrey, the Preseli Hills and the rivers and valleys in between. Where the path nears the A40 hedgerows and mature trees limit the view. See Representative View G.	High	High	High	<u>Construction</u> Preparatory Works - views of the removal of part of a roadside plantation and hedgerow. Earthworks - activities visible would include the removal of topsoil, excavation of part of Penblewin-fach cutting, the construction of West Llanddewi Velfrey junction and Ffynnon Wood junction. The site compound would also be visible. Views would only be available from the southern end of the path near to Pen-banc as interrupted by vegetation elsewhere. <u>Operation Winter Year 1</u> A view of Western Llanddewi Velfrey junction would be available, and the tops of the slopes and commercial vehicles entering/emerging into/from the Pentroydin-fach cutting. <u>Operation Summer Year 15</u> Scattered trees and new areas of woodland would integrate the Scheme into the landscape and filter views of the road surface and traffic. Cutting and embankment slopes would resemble a mosaic of pastoral fields and hedgerows. Hedge-banks and linear belts of woodland would screen the view of commercial vehicles in Pentroydin-fach cutting.	Minor Negligible No change	Short term Medium term Long term	Middle distance Middle distance Middle distance	Negligible detrimental Negligible detrimental No change	Slight adverse	Slight adverse	Neutral
SP 19/22/2	214483 216223	214446 216448	Llanddewi Velfrey	Section of Footpath connecting Llanddewi Gaer to the minor road near to Pen-banc. Crossing a field and following hedgerows and tracks.	640	Views outward limited by trackside and roadside vegetation. Wildlife interest in woodland around Llanddewi Gaer.	Medium	Medium	Medium	<u>Construction</u> View of works interrupted by substantial vegetation. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/20/7	214846 216144	214992 216534	Llanddewi Velfrey	Byway from Plas-crwn Lodge to Plas-crwn. Follows the edge of areas of woodland/plantations as it crosses the southernmost Llanddewi Velfrey ridge.	720	Arrangement of woodland/plantations directs views eastward initially, then westward after crossing the ridge.	Medium	Medium	Medium	<u>Construction</u> View of works interrupted by buildings and vegetation. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/1/1	214857 216842	215394 217339	Llanddewi Velfrey	Footpath connecting the A40 to fields south of the dwelling at Castell. Passes through a variety of landscape types including cricket pitch, woodland, private garden at Blaen-pen-troydin, then steeply sloping fields with substantial hedgerows. See Representative View J.	0	Views are limited by buildings and woodland west and south of Blaen-pen-troydin, but there is plenty of visual interest along the route. North and east of Blaen-pen-troydin long distant and more open views of Preseli Hills and Carmarthenshire uplands become available.	High	High	High	<u>Construction</u> Footpath stopped up where it would meet Pentroydin-fawr embankment and diverted along works boundary to connect with footpaths 19/2 and 19/3, crossing the line of the Scheme through a pedestrian underpass at CH 3+3-00. North of Scheme footpath would follow toe of Pentroydin-fawr embankment to tie in with the original route. Preparatory work - view of removal of areas of woodland, hedgerows and topsoil. Earthworks - view of excavation at Pentroydin-fawr cutting and construction of Pentroydin-fawr embankment. Road Pavement - view of road construction available from field to north-east of Blaen-pen-troydin. Structures - view of pedestrian underpass construction. View of Llanfallteg Road overbridge construction available from north of Scheme where path connects with 19/3. <u>Operation Winter Year 1</u> Pentroydin-fawr embankment slope and the view of road surface and traffic would be a dominant feature of this view, interrupting the view of the rolling pastoral landscape. Distant views of rural Carmarthenshire would still be available, but the Scheme would be a dominant feature. <u>Operation Summer Year 15</u> New woodland planting would contribute towards integrating the road into the landscape, and screen the view of pedestrian underpass, but the residual effect of a new barrier in the landscape would remain.	Major Major Major	Short term Medium term Long term	Short distance Short distance Short distance	Major detriment Major detriment Major detriment	Very large adverse	Very large adverse	Very large adverse

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SP 19/3/1	215394 217339	215473 217207	Llanddewi Velfrey	Footpath is short connection between 19/1 and 19/2, following a hedgerow.	75	Views of fields bounded by hedgerows available to west.	High	Medium	Medium	<u>Construction</u> Preparatory works - view of the removal of areas of woodland and hedgerows with trees visible. Removal of topsoil from visible. Earthworks - view of excavation of Pentroydin-fawr cutting would create a notch in the broad Llanfallteg Road ridge. View of construction of Pentroydin-fawr embankment would partially interrupt the view of the cutting. Structures - view of Llanfallteg Road overbridge construction.	Major	Short term	Short distance	Major detriment	Large adverse		
										<u>Operation Winter Year 1</u> North facing slope of Pentroydin-fawr embankment would be a dominant feature of southward to westward views. View of south facing Pentroydin-fawr cutting slope and Llanfallteg Road overbridge.	Major	Medium term	Short distance	Major detriment		Large adverse	
										<u>Operation Summer Year 15</u> Establishment of vegetation on Pentroydin-fawr embankment slope would help break up the appearance of the large embankment slope. Native species planting near to the overbridge would help integrate the structure into its surroundings.	Moderate	Long term	Short distance	Major detriment			Large adverse
SP 19/1/2	215394 217339	215530 217392	Llanddewi Velfrey	Footpath is a continuation of 19/1/1 and connects to the private access track to Castell.	165	Views of Castell and surroundings which features pastoral fields and woodland.	High	Medium	Medium	<u>Construction</u> Preparatory works - view of removal of woodland and hedgerows through available through gaps in hedgerows. Earthworks - view of excavation of Pentroydin-fawr cutting would create a notch in the hillside. View of construction of Pentroydin-fawr embankment available in narrow field of view through gaps in hedgerow. Road Pavement - view of road construction in Pentroydin-fawr cutting. Structures - view of Llanfallteg Road overbridge construction.	Minor	Short term	Short distance	Minor detriment	Slight adverse		
										<u>Operation Winter Year 1</u> View of road surface and traffic in Pentroydin-fawr cutting. View of cutting slopes and north-facing embankment slope of Pentroydin-fawr embankment. View of Llanfallteg Road overbridge. All available through gap in hedgerow over a narrow field of view.	Minor	Medium term	Short distance	Moderate detriment		Moderate adverse	
										<u>Operation Summer Year 15</u> Establishment of vegetation on Pentroydin-fawr embankment slope would interrupt views of the road surface and traffic in Pentroydin-fawr cutting, also breaking up the appearance of the large embankment slope. Native species planting near to the overbridge would help integrate the structure into its surroundings. Views available in a narrow field of view through a gap in a hedgerow where path connects with 19/3.	Minor	Long term	Short distance	Moderate detriment			Moderate adverse
SP 19/18/1	215471 216803	215607 216408	Llanddewi Velfrey	Footpath from A40 near to Glenfield to agricultural buildings north of Pant-teg. Follows a private-track bounded by hedge-banks.	25	Views tend to be short distance as are limited by vegetation.	High	Medium	Medium	<u>Construction</u> Preparatory works - view of removal of hedges to the east of Glenfield available where path meets existing A40. Elsewhere view would be interrupted by buildings and vegetation. Earthworks - view of excavation of Llanddewi belfry Link Road available from short section of path at northernmost point. Road Pavement - view of construction of Llanddewi Velfrey Link Road from short section of path at northernmost point.	Negligible	Short term	Short distance	Negligible detriment	Neutral		
										<u>Operation Winter Year 1</u> View of road surface, cars and commercial vehicles, only available where path meets Llanddewi Velfrey link road.	Negligible	Medium term	Short distance	Minor detriment		Slight adverse	
										<u>Operation Summer Year 15</u> View of road surface, cars and commercial vehicles, only available where path meets Llanddewi Velfrey link road. New roadside vegetation established to replace hedges removed.	No change	Long term	Short distance	No change			Neutral

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SP 19/3/2	215473 217207	215490 216829	Llanddewi Velfrey	Footpath connecting A40 at Glenfield to 19/2. Crosses sloping fields and hedgerows. Impassable at site of old Workings during site visit due to vegetation growth.	0	Views of rolling pastoral landscape with hedgerows. Long distant views of Preseli Hills and Carmarthenshire uplands available where hedgerows do not interrupt line of sight.	Low	Medium	Low	Construction Footpath stopped up where it would meet Bethel Cutting and diverted along works boundary to connect with footpaths 19/1 and 19/2, crossing the line of the Scheme through a pedestrian underpass. Preparatory work - view of removal of areas of woodland, hedgerows and topsoil. Earthworks - view of excavation at Bethel Cutting and construction of Pentroydin-fawr embankment. Road Pavement - view of road construction. Structures - view of pedestrian underpass construction. Operation Winter Year 1 Uninterrupted view of road surface and traffic from Bethel Roundabout to Pentroydin-fawr embankment where diverted path follows top of Bethel Cutting. Views further west of Pentroydin-fawr cutting and Llanfallteg Road overbridge would be interrupted by hedgerows and woodland. Operation Summer Year 15 Uninterrupted view of road surface and traffic would lessen in magnitude due to the establishment of native planting on the cutting and embankment slopes. Long distance views of Preseli Hills and Carmarthenshire uplands retained in places.	Major Major Moderate	Short term Medium term Long term	Short distance Short distance Short distance	Major detriment Major detriment Major detriment	Moderate adverse	Moderate adverse	Moderate adverse
SP 19/2/2	215474 217206	215212 216737	Llanddewi Velfrey	Footpath connecting A40 at Cross Inn Cottage to Valley View. Initially follows access track to Blaen-pen-troydin, but then follows sunken lane. Wildlife interest.	0	Open northward views available from south of Blaen-pen-troydin, but then limited by banks and vegetation to field access gate locations.	Medium	Medium	Medium	Construction Footpath stopped up west of Blaen-pen-troydin and diverted through underpass beneath road at Ch.3+300 through Pentroydin-fawr embankment. New connection provided with SP 19/1 and SP 19/3. On north-facing side diversion would follow toe of embankment and a field access track before reconnecting with the sunken lane. Preparatory Work - View of removal of areas of woodland and hedgerow, removal of topsoil. Earthworks - Detour would provide uninterrupted view of the construction of Pentroydin-fawr embankment and new underpass. Structures - New pedestrian underpass visible. Operation Winter Year 1 Uninterrupted view of scheme and traffic available from section of path south of Scheme. On northern side, embankment slope would interrupt the view of traffic, vegetation retained along old lanes would help screen views of Bethel Cutting. Operation Summer Year 15 Native species planting to integrate embankment slopes and for nature conservation would reduce the extent of slopes visible, screen view of traffic.	Major Major Moderate	Short term Medium term Long term	Short distance Short distance Short distance	Major detriment Major detriment Major detriment	Large adverse	Large adverse	Large adverse
SP 19/4/2	215489 217503	215531 217394	Llanddewi Velfrey	Short section of footpath following private access track to Castell.	290	Views limited by hedgerow to west and broad ridge to east.	Medium	Medium	Medium	Construction View of works activities interrupted by hedgerow. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

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SP 19/1/3	215490 217503	215950 217664	Llanddewi Velfrey	Footpath east of Castell following hedgerow and private track. Trackside hedge-bank impassable at time of survey.	350	Views northward limited by hedgerow, and southward by broad ridge, rising ground and hedgerows.	Medium	Medium	Medium	<u>Construction</u> Preparatory Work - removal of areas of woodland, hedges and removal of topsoil to enable works from western end of path only. Earthworks - Early stages of excavation works to Bethel Cutting and later stages of construction works to Pentroydin-fawr Embankment visible, also visible excavation of Pentroydin-fawr cutting. Structures - Construction of Llanfallteg Road Overbridge.	Minor	Short term	Short distance	Minor detriment	Slight adverse		
										<u>Operation Winter Year 1</u> View of tops of north facing slopes of Bethel Cutting and Pentroydin-fawr Embankment. View of north facing slope of Pentroydin-fawr cutting, high sided traffic and Llanfallteg Road overbridge.	Minor	Medium term	Short distance	Moderate detriment		Moderate adverse	
										<u>Operation Summer Year 15</u> Native species planting to integrate embankment slopes and for nature conservation would reduce the extent of slopes visible, screen view of traffic and integrate overbridge with surrounding landscape.	Negligible	Long term	Short distance	Moderate detriment			Slight adverse
SP 19/4/3	215531 217392	215605 217290	Llanddewi Velfrey	Footpath crossing field between Valley View and access track to Castell. Hedgerow at northern end impassable at time of survey.	205	Views southward of Llanddewi Velfrey ridge and north-facing slopes featuring mosaic of woodland, pastoral fields and hedgerows. Northward views of Preseli hills and Carmarthenshire uplands also available.	High	Medium	Medium	<u>Construction</u> Preparatory Work - removal of areas of woodland, hedges and removal of topsoil to enable works. Earthworks - Early stages of excavation works to Bethel Cutting and later stages of construction works to Pentroydin-fawr Embankment visible, also visible excavation of Pentroydin-fawr cutting. Road Pavement - View of road construction at Pentroydin-fawr cutting. Structures - Construction of Llanfallteg Road Overbridge.	Moderate	Short term	Short distance	Moderate detriment	Moderate adverse		
										<u>Operation Winter Year 1</u> View of tops of north facing slopes of Bethel Cutting and Pentroydin-fawr Embankment. View of notch created by Pentroydin-fawr cutting, including road surface, traffic and overbridge.	Moderate	Medium term	Short distance	Major detriment		Large adverse	
										<u>Operation Summer Year 15</u> Native species planting to integrate embankment slopes and for nature conservation would reduce the extent of slopes visible, screen road surface and traffic at Pentroydin-fawr Cutting and reduce visibility of overbridge.	Minor	Long term	Short distance	Moderate detriment			Moderate adverse
SP 19/2/1	215605 217288	215473 217207	Llanddewi Velfrey	Footpath continuation of 19/2 with more open aspect as trackside hedges are frequently maintained.	75	Views southward of Llanddewi Velfrey ridge and north-facing slopes featuring mosaic of woodland, pastoral fields and hedgerows. Northward views of Preseli hills and Carmarthenshire uplands also available.	High	Medium	Medium	<u>Construction</u> Preparatory Work - removal of hedges and removal of topsoil to enable works. Earthworks - Early stages of excavation works to Bethel Cutting and later stages of construction works to Pentroydin-fawr Embankment visible, but partially filtered by vegetation.	Moderate	Short term	Short distance	Moderate detriment	Moderate adverse		
										<u>Operation Winter Year 1</u> View of tops of north facing slopes of Bethel Cutting and Pentroydin-fawr Embankment. View of eastbound commercial vehicles.	Moderate	Medium term	Short distance	Major detriment		Large adverse	
										<u>Operation Summer Year 15</u> Native species planting to integrate embankment slopes and for nature conservation would reduce the extent of slopes visible.	Minor	Long term	Short distance	Moderate detriment			Moderate adverse

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SP 19/4/4	215606 217288	215752 217070	Llanddewi Velfrey	Footpath following private track to Valley View (Tir-bach) and dwellings/rural businesses to north.	50	Bank and hedge to south side of track limits views in that direction. Views northward are of steep sided wooded/mosaic valley (Tir-bach Wood).	High	Medium	Medium	Construction Preparatory works - removal of hedges bounding field to south-west and uphill of track visible. Earthworks - removal of topsoil for Bethel Cutting visible. View of construction of Bethel Chapel access road partially interrupted by trackside hedge on bank. Most prominent feature likely to be Bethel Chapel access where road is on embankment. Beginning of Excavation at Bethel Cutting also visible. Operation Winter Year 1 View of tops of north facing slopes of Bethel Cutting and Bethel Roundabout, and view of north facing embankment slope of access road to Bethel Chapel. Glimpse of vehicles using access road to Bethel Chapel also available. Operation Summer Year 15 Establishment of planting on cutting slopes would integrate the earthworks into the surrounding landscape. Areas of dense planting around the access road to Bethel Chapel would help screen the earthwork slopes and integrate them with existing boundary hedgerows and pockets of woodland.	Moderate Moderate Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate detriment Major detriment Moderate detriment	Moderate adverse	Large adverse	Moderate adverse
SP 19/19/1	215607 216408	215056 216563	Llanddewi Velfrey	Part of Footpath connecting Plas-crwn Lodge to Pant-teg. Tree-lined drive following edge of Pant-teg Wood.	260	Drive follows valley side and descends quickly in a southward direction. Views northward limited by landform and vegetation.	Medium	Medium	Medium	Construction Theoretical view of works interrupted by buildings in Maes Y Dderwen and Stepin. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/4/5	215752 217070	215733 216944	Llanddewi Velfrey	Footpath crossing steeply sloping field that connects A40 to Footpath 19/4/4 and 19/4/6, the access track to Valley View (Tir-bach).	0	Views southward of Llanddewi Velfrey ridge and north-facing slopes pastoral fields and hedgerows. Northward views of Preseli hills, Carmarthenshire uplands and Tir-bach wooded valley predominant.	High	High	High	Construction Footpath stopped up. Operation Winter Year 1 Not applicable. Operation Summer Year 15 Not applicable.	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SP 19/4/6	215752 217070	215924 216992	Llanddewi Velfrey	Continuation of Footpath following private track to Valley View (Tir-bach) and dwellings/rural businesses to north from Bethel Chapel.	0	Bank and hedge to south side of track limits views in that direction. Views northward are of steep sided wooded/mosaic valley (Tir-bach Wood). See Representative View K.	High	Medium	Medium	Construction Preparatory works - Removal of part of hedge, bank and mature trees visible. Earthworks - Removal of topsoil, excavation of Bethel Roundabout and approaches, excavation/construction of new access to Bethel Chapel and dwellings using this track. Significant change of landform. Road Pavement - view of new access road construction. Operation Winter Year 1 New access road, north facing slopes of access road, Bethel cutting and Llanddewi Velfrey link road, lighting columns at the roundabout and traffic using new access road all visible. Operation Summer Year 15 Establishment of mosaic of grassland and native planting would help to integrate the earthwork slopes with the surrounding landscape.	Moderate Moderate Minor	Short term Medium term Long term	Short distance Short distance Short distance	Moderate detriment Major detriment Moderate detriment	Moderate adverse	Large adverse	Moderate adverse
SP 19/14/2	215808 216111	216202 216191	Llanddewi Velfrey	Footpath connecting Pant-teg to Carcoryn Wood on south facing slopes of Llanddewi Velfrey ridge overlooking Lampeter Vale.	785	View northward limited by rising landform and woodland. Overhead power lines a visual detractor of southward views overlooking the Lampeter Vale.	High	Medium	Medium	Construction View northward interrupted by rising landform and Carcoryn Wood. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

REFERENCE			VIEWING POSITION			SENSITIVITY OF VISUAL RECEPTOR				MAGNITUDE OF VISUAL EFFECT					SIGNIFICANCE OF VISUAL EFFECT		
Number	OS Grid Ref Start	OS Grid Ref End	Community	Description	Distance from centre-line (m)	Component of View	Sensitivity of receptor	Value attached to view	Susceptibility to change	Change in view	Size/Scale of visual effect	Duration of visual effect	Distance of view	Magnitude of impact	During construction	Winter Year 1	Summer Year 15
SP 19/4/7	215924 216993	215924 216979	Llanddewi Velfrey	Continuation of Footpath 19/4/7. Short section following track between chapel and vestry.	20	View limited by buildings. Path perpendicular to existing A40.	Medium	Low	Low	Construction Preparatory works - View of roadside planting removal available. Earthworks - View of excavation works to Bethel Roundabout approach and raising in level of road available in a narrow field of view in-between buildings. Road Pavement - View of road construction available in a narrow field of view in-between buildings. Operation Winter Year 1 View of road surface, cars and commercial vehicles available through gap in-between buildings. Operation Summer Year 15 View of road surface and cars lessened by establishment of hedge-bank at Scheme roadside. Views of commercial vehicles available.	Minor No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Minor detriment No change No change	Neutral	Neutral	Neutral
SP 19/17/1	215991 216961	216198 216224	Llanddewi Velfrey	Footpath connecting the A40 opposite to Bethel Chapel cemetery with Carcoryn Wood valley. Initially follows hedgerow field boundaries, then descends into the wooded valley.	0	Views westward limited by vegetation, those northward by the Llanddewi Velfrey ridge. Short distance views available eastward and southward where path follows field boundaries.	Medium	Medium	Medium	Construction Preparatory works - View of roadside planting removal available from northern end of path after emerging from Carcoryn Wood and entering field next to existing A40. Public footpath stopped up and new sections introduced to link with path 19/16 and the existing alignment of the A40. Earthworks - View of raising of road level, and excavation of attenuation pond Operation Winter Year 1 Uninterrupted view of Scheme and traffic including attenuation pond available from short section of path within field next to A40. Operation Summer Year 15 Native species planting to integrate attenuation pond and embankment slope would interrupt the view of the Scheme.	Minor Minor Minor	Short term Medium term Long term	Short distance Short distance Short distance	Minor detriment Moderate detriment Moderate benefit	Slight adverse	Moderate adverse	Moderate benefit
SP 19/5/1	216164 217126	215925 216992	Llanddewi Velfrey	Footpath connecting Bethel Chapel to Gwyndy Fach. Follows private track bounded by hedges.	30	Views outward limited by hedges. View is of pastoral fields with clipped hedge and hedgerow boundaries.	Medium	Medium	Medium	Construction Earthworks - indirect view of raising of road level, available through gaps in trackside hedge and in-between buildings where path meets 19/4. Operation Winter Year 1 Indirect view of traffic, available through gaps in-between buildings and vegetation. Operation Summer Year 15 Indirect view of traffic, through gaps in-between buildings and vegetation.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible detriment No change No change	Neutral	Neutral	Neutral
SP 19/5/2	216164 217126	216216 216988	Llanddewi Velfrey	Footpath connecting track to Gwyndy Fach with A40 at Gwyndy Farm. Follows the line of an old track in-between Gwyndy-fach and Gwyndy Farm. Crosses small fields and meets the A40 at the toe of an embankment.	15	View is of small fields/paddocks bounded by stock-proof fencing with mature trees, roadside planting and agricultural dwellings and buildings.	Medium	Medium	Medium	Construction Earthworks - indirect view of raising of road level, available through gaps in-between roadside plantations, vegetation and buildings. Operation Winter Year 1 Indirect view of traffic, available through gaps in-between buildings and vegetation. Operation Summer Year 15 Indirect view of traffic, through gaps in-between buildings and vegetation.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible detriment No change No change	Neutral	Neutral	Neutral
SP 19/17/2	216198 216225	216201 216192	Llanddewi Velfrey	Continuation of footpath within Carcoryn Wood. Short section connecting 19/14 and 19/17.	750	Between deciduous woodland and conifer plantation. Views outward limited by vegetation and valley sides.	Medium	Low	Low	Construction View of works interrupted by substantial vegetation. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/14/3	216199 216224	216712 216652	Llanddewi Velfrey	Footpath connecting Carcoryn Wood with track to Cwm Saeson and Waundwrgi on the south-facing slopes of the Llanddewi Velfrey ridge, and south of Upper Fron. Once out of the woodland crosses pastoral fields and hedges.	600	Views northward limited by rising landform. Predominant view is southward overlooking Lampeter Vale.	High	Medium	Medium	Construction View of works interrupted by rising landform and Carcoryn Wood. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/17/3	216202 216190	216401 215711	Llanddewi Velfrey	Footpath connecting Carcoryn Wood to Afon Marlais in the Lampeter Vale. Follows steep valley side to the flatter vale, across areas of woodland and grassland.	785	Views northward limited by rising landform and woodland. Eastward and westward limited by valley sides. Predominant view is southward of Lampeter Vale.	High	Medium	Medium	Construction View of works interrupted by Carcoryn Wood. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

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SP 19/6/3	216227 217384	215950 217664	Llanddewi Velfrey	Footpath connecting agricultural buildings at Castell-mawr to Cwmmau Wood. Initially crossing a yard before crossing through woodland along a small stream.	410	Views limited by woodland and landform.	Medium	Medium	Medium	Construction View south-westward interrupted by woodland. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/5/3	216228 217383	216164 217126	Llanddewi Velfrey	Footpath connecting Gwyndy-fach to 19/6, following hedgerows and crossing fields and areas of woodland.	150	Follows a small valley running northward. Views southward limited by rising landform, eastward and westward by woodland and valley sides, and northward by woodland and rolling landform.	High	Medium	Medium	Construction No view of works predicted. Operation Winter Year 1 Theoretical view of high sided vehicles interrupted by hedgerows and buildings. Operation Summer Year 15 Theoretical view of high sided vehicles interrupted by hedgerows and buildings.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/16/1	216295 216965	216713 216653	Llanddewi Velfrey	Footpath connecting A40 near to Bryncoed to track leading to Cwm Saeson and Waundwrgi. Follows access track to Upper Fron passing dwelling on ridge at Meadow View.	90	Access road is bounded by hedges that limit outward views to where there are gaps to allow field access. There is a north-westward view towards Gwyndy Farm and Bryncoed along the road up until the ridge near to Meadow View. Thereafter the path descends into the Lampeter Vale.	Medium	Medium	Medium	Construction Preparatory works - indirect view of removal of linear belt of trees and hedgerow partially interrupted by vegetation. Earthworks - indirect view of the excavation of eastern approach to Bethel Roundabout, partially interrupted by vegetation. Operation Winter Year 1 Glimpse of road surface and traffic available from track in-between Bryncoed and Meadow View. Operation Summer Year 15 Glimpse of commercial vehicles available from track between Bryncoed and Meadow View.	Negligible No change No change	Short term Medium term Long term	Short distance Short distance Short distance	Negligible adverse No change No change	Neutral	Neutral	Neutral
SP 16/1/1	216356 214659	216401 215711	Lampeter Velfrey	Footpath, continuation of 19/17 in Llanddewi Velfrey from the Afon Marlais. Crosses the flat valley floor of Lampeter Vale and the railway following hedgerows and through meadows to Tygwyn Farm where it connects to the Landsker Borderland Trail.	1275	View is of the valley floor featuring areas of woodland, ponds, hedgerows, meadows and agricultural buildings. Views northward of the south-facing valley side featuring a mosaic of woodland and pastoral farmland with scattered dwellings and rural businesses.	High	High	High	Construction View northward interrupted by woodland within Carcoryn Wood. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/6/2	216435 217281	216228 217383	Llanddewi Velfrey	Footpath, continuation of 19/6/3, which crosses a field at the toe of a rounded hill before climbing steeply through Cwmmau Wood to meet the access track to Hendre.	380	View is limited to valley sides featuring pastoral fields and woodland.	Medium	Medium	Medium	Construction View south-westward interrupted by landform and woodland. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/6/1	216635 217242	216437 217280	Llanddewi Velfrey	Footpath, continuation of 19/6/2 from access track to Hendre to old A40 near to ruin at Pen-cwmmau. Climbs steeply through Cwmmau Wood before emerging in a small field sloping northward.	380	View is limited by roadside vegetation and Gwyndy Wood.	Medium	Medium	Medium	Construction View westward interrupted by woodland and roadside hedgerow. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/12/1	216656 217238	216635 217062	Llanddewi Velfrey	Footpath connecting the old A40 at the ruin Pen-cwmmau to Hill Piece on Fron Hill. Crosses a field east of Hafod Forge and Hafod Las.	435	Views limited by hedges and buildings.	Medium	Medium	Medium	Construction View westward interrupted by buildings and hedge. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/11/1	216662 217240	216849 217105	Llanddewi Velfrey	Footpath connecting the old A40 at the ruin Pen-cwmmau to Banc Saeson on Fron Hill. Crosses a field surrounded by hedgerows with trees.	525	Views limited by hedges and woodland.	Medium	Medium	Medium	Construction View westward interrupted by hedgerow and buildings. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/8/1	216721 217616	216440 217279	Llanddewi Velfrey	Footpath connecting 19/6 and access track to Hendre to 19/7 passing the ruin of Clyn-moch. Follows a small stream valley within Cwmmau Wood.	385	Views limited by steep valley sides and woodland.	Medium	Medium	Medium	Construction View westward interrupted by rising landform and woodland. Operation Winter Year 1 No view of Scheme or traffic predicted. Operation Summer Year 15 No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

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SP 19/7/2	216723 217620	215950 217664	Llanddewi Velfrey	Footpath connecting agricultural buildings at Castell-mawr to Bryn-hafod and Parc-teg along a private access track, then crossing fields and following hedgerows to Ty'n-coed/Cyncoed. From there it crosses a wooded valley and fields to connect to Hendre, and then through woodland to connect with 19/8 near to the ruin at Clyn-moch	695	Follows undulating ground featuring hedgerows, woodland and scattered rural dwellings and farm buildings. Views outward limited by hedge-banks where path follows track, but views of the Afon Taf vale become available where the slopes are north-facing.	Medium	High	Medium	<u>Construction</u> Theoretical view of north facing slopes of Pentroydin-fawr embankment and Bethel roundabout available from ridge between Castell-fawr and Brynhafod. View would be interrupted by roadside hedge-bank. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/10/1	216909 217399	217058 217079	Llanddewi Velfrey	Footpath connecting old A40 near to ruin at Pen-yr-allt to Fron Hill near to remains of Fron Quarry. Crosses fields to the east of a low rounded hill.	820	Views outward limited by woodland and hedgerows.	Medium	Medium	Medium	<u>Construction</u> View westward interrupted by hedgerow and gently rising landform. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/7/1	217104 217640	216721 217616	Llanddewi Velfrey	Footpath, continuation of 19/7/2, connecting the ruin at Clyn-moch to the access track to Tre-wern-fach and Machpelah. Crossing fields to north of Cwmmau Wood/Tre-wern Wood.	820	Follows undulating ground surrounded by hedgerows and woodland. Views out limited by landform and substantial vegetation.	High	Medium	Medium	<u>Construction</u> View of works interrupted by woodland. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral
SP 19/9/1	217104 217640	216950 217461	Llanddewi Velfrey	Footpath following private access track through woodland on steep north facing slopes.	885	Views out limited by woodland.	Medium	Low	Low	<u>Construction</u> No view of works predicted. <u>Operation Winter Year 1</u> No view of Scheme or traffic predicted. <u>Operation Summer Year 15</u> No view of Scheme or traffic predicted.	No change No change No change	No view No view No view	No view No view No view	No change No change No change	Neutral	Neutral	Neutral

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 10.1: Report on the Magnetometer Survey

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Archaeology Wales

A40 Llanddewi Velfry to Penblewin Pembrokeshire

Geophysical Survey



DRAFT

By
Andrew Shobbrook & Philip Poucher

Report No. 1638

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Archaeology Wales

A40 Llanddewi Velfrey to Penblewin, Pembrokeshire

Geophysical Survey

Prepared For: Carillion Plc

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Non-Technical Summary

This report results from work carried out by Archaeology Wales Ltd (AW) for Carillion Plc. It draws on the results of a geophysical survey undertaken on the site of a proposed road improvement scheme on land between Penblewin roundabout and the village of Llanddewi Velfrey, Pembrokeshire, SN 14907 16829. The geophysical survey is being undertaken as part of a staged approach of archaeological investigations into the scheme. The survey forms part of the requirements laid out by the Welsh Government in their tender documents concerning the scheme. The results will inform the ongoing Environmental Impact Assessment for the project.

The aim of the geophysical survey was to determine the nature and extent of any buried archaeological features within the proposed corridor of the road improvement scheme. The work was undertaken using a Bartington Grad601 gradiometer.

Survey work was undertaken in a total of 31 separate fields, identifying features throughout the survey area. A number of removed post-medieval field boundaries, readily identifiable from historic map sources, were visible on the survey results, along with evidence of more recent ploughing activity, modern features and natural geological features. These features are considered to be of limited archaeological interest. However, features of potential archaeological interest identified within the proposed development area include possible enclosures near Penblewin, dispersed and uncharacterised small linear and curvilinear features recorded throughout the survey area, and more concentrated clusters of potential activity. One such cluster of activity lies close to Ffynnon, and another towards the eastern end of the scheme, these may be associated with post-medieval quarrying activity. An area of ridge and furrow cultivation lies to the northeast of Blaen-pen-troydin that may represent a relict system of agricultural activity. A cluster of more ephemeral features close to the farmstead of Pen-troydin-fawr are of interest due to possible associations with Bronze Age burnt mounds in the area. Possible ferrous objects are also recorded at the eastern end of the development area, although these may be modern in origin.

The work was carried out to the Standard and Guidance set out by the Chartered Institute for Archaeologists for archaeological geophysical survey (CIfA 2014).

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1 Introduction

1.1 Location and scope of work

1.1.1 In October and November 2017, Archaeology Wales Ltd (AW) carried out a geophysical survey on the site of a proposed road improvement scheme of the A40 between Llanddewi Velfrey and Penblewin in Pembrokeshire, (henceforth – the site), centred on NGR SN 14907 16829 (Figs 1 & 2). The work was carried out at the request of Carillion Plc.

1.1.2 The proposed development area currently consists of a large number of agricultural fields of pasture and arable land, largely bounded by hedgerows. The site covers an area of approximately 30 hectares.

1.1.3 The geophysical survey is being undertaken as part of a staged approach of archaeological investigations into the scheme. The survey forms part of the requirements laid out by the Welsh Government in their tender documents concerning the scheme. The results will inform the ongoing Environmental Impact Assessment for the project.

1.1.4 A Specification for the programme of geophysical survey work was prepared at the request of Carillion Plc (Appendix I). It provided information on the methodology to be employed by AW during a geophysical survey of the site. The Specification was submitted to, and approved by, Dyfed Archaeological Trust – Development Management (DAT-DM), who have been employed as archaeological curators to the scheme. A subsequent Method Statement was also produced by AW detailing the methodology to be employed during the survey work. This was also submitted to DAT-DM prior to the commencement of the survey work.

1.1.5 The work was managed by Phil Poucher, Project Manager, and the site work was undertaken by Andrew Shobbrook, Jennifer Muller, Tom Jamieson and Jerry Bond. The AW Project Number is 2552 and the Site Code LVP/17/GEO.

1.2 Site Description and Geology

1.2.1 The site covers an area across a large number of agricultural fields of pasture and arable land, largely bounded by hedgerows, lying between Bethel Chapel on the A40 the east of Llanddewi Velfrey (SN 1588 1698) and the roundabout at Penblewin to the west (SN 1184 1666). The total area for detailed magnetometry survey amounts to *circa* 30ha in approximately 31 fields (Figures 1-3).

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1.2.2 The eastern part of the scheme curves around to the north of Llanddewi Velfrey, through largely agricultural land, across north facing slopes cut by a small stream valley. The western part of the scheme utilises part of the existing A40 carriageway and part of the agricultural land that runs alongside the road.

1.2.3 The underlying bedrock of the area comprises mudstones of the Slade and Redhill; Portfield; and Haverfordwest Formations. This is partly overlain in one narrow strip by glacio-fluvial deposits, with Till – diamicton, running along some of the drainage channels to the north (BGS 2017).

1.3 Archaeological and Historical Background

1.3.1 A detailed archaeological and historical background to the survey area will be provided in an associated desk-based assessment, currently in preparation (Maynard, forthcoming).

1.3.2 In brief summary a number of burnt mounds, or possible burnt mounds, have been identified along or in close proximity to the route. Such features may be an indicator of Bronze Age activity in the area, and potentially settlement activity.

1.3.3 St David's Parish Church, from which Llanddewi Velfrey got its name, is currently detached from the current village lying to the south. The church itself has medieval origins, and potential early medieval origins, as well as lying in the shadow of Iron Age enclosures. Associated medieval settlement may have concentrated around the church site, with the current settlement of Llanddewi Velfrey being a largely post-medieval development based on the main road through the county.

1.3.4 A number of post-medieval features are identified along, or in close proximity to the route. These largely comprise the former locations of small cottages or buildings, along with quarries, identified from 19th and 20th century historic map sources.

2 Aims and Objectives

2.1 Geophysical Survey

2.1.1 The geophysical survey was undertaken in order to:

- Locate and describe archaeological features that may be present within the development area. The archaeological work was designed to attempt to

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elucidate the presence or absence of archaeological material that might be affected by the scheme, in particular its character, distribution, extent and relative significance.

- Provide sub-surface data to inform any future on-site works.

3 Methodology

3.1 Geophysical Survey

3.1.1 A Bartington Grad601 gradiometer was used to undertake the survey. Previous research has shown that fired, or cut and backfilled archaeological features such as kilns and hearths, ditches and pits often have an anomalously higher magnetic susceptibility than the surrounding subsoil due to burning and biological processes. Differences in magnetic susceptibility within the subsoil and archaeological features can be detected as changing magnetic flux by an instrument such as a gradiometer. Data from this may be mapped at closely spaced regular intervals, to produce an image that may be interpreted to locate buried archaeological features (Clark, 1997, Aspinall *et al*, 2011).

3.1.2 Relatively level fields of low pasture provide ideal locations for this type of survey. The surface of the fields are relatively uniform allowing rapid traverses and readings to be taken at consistent heights above the ground surface, and the upper plough-soil is generally both neither deep enough to mask features cutting into the underlying subsoil, and unlikely to contain a significance amount of material that could interfere with the magnetic readings. The underlying geology of largely mudstone is also unlikely to provide a strong magnetic response that could distort the readings.

3.1.3 Detailed survey was carried out in grids of 30m x 30m along parallel traverses spaced at 1m intervals, recording data points spaced at 0.25m intervals to a maximum instrument sensitivity of 0.1nT in accordance with English Heritage Guidelines. The survey mode was set to bi-directional (traverses walked alternately south-north/north-south). At regular intervals the data was downloaded in the field onto a laptop computer for storage and assessment. The location of the survey area was surveyed using a Geomax GPS Rover unit.

3.2 Data Processing and Presentation

3.2.1 Following the completion of the detailed survey, processing and analysis took place using the TerraSurveyor software package. After downloading, the results were plotted in 2D. The most typical method of visualising the data is as a

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greyscale image. In a greyscale, each data point is represented as a shade of grey, from black to white at either extreme of the data range. A number of standard operations (including destriping and despiking) were carried out to process the data. The mean level of each traverse of data was reduced to zero and all grids matched so that there were no differences between background levels. The data was then analysed using a variety of parameters and styles and the most useful of these were saved as *JPEG images and displayed using Adobe Illustrator software. Due to the presence of strong magnetic anomalies, the data displayed was clipped to a range of between +/-3 nT to +/-10 nT dependent on the survey results, to allow finer details to be discerned. The results of the survey were then overlaid onto a digital map of the study area. This was then used to produce interpretation figures (Figures 4 – 29).

3.2.2 All works were undertaken in accordance with the CIfA's Standards and Guidance for a geophysical survey (2014) and current Health and Safety legislation.

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4 Geophysical Survey Results

4.1 Field G1 (Figures 4 & 5)

4.1.1 This comprised a field of relatively level improved pasture, with a slight southward slope. The survey area was bounded to the south and west by metallic fencing, providing a particularly strong reading on the survey results to the south and southeast, masking any other readings and preventing any effective survey work in this area. The survey was undertaken in a single day, the weather was generally dry and cloudy.

4.1.2 The main feature of note was an L-shaped linear negative feature G1(1) within the southern portion of the field, enclosing an area approximately 20m East-West by 11m North-South. The East-West segment also appears to be flanked by positive readings along its northern edge, with negative readings beyond that. To the southeast readings generally appear to be more negative than the remainder of the surveyed area. These features would suggest an enclosure in the southeast corner of the field. There is no indication of such a feature on readily available historic mapping.

4.1.3 To the north lies a relatively short linear positive feature G1(2). This feature extends approximately 9m into the survey area. Such readings often suggest cut features, but as only a small segments of this feature was revealed within the survey area a full interpretation is not possible.

4.1.4 A number of East-West orientated linear features G1(3) are visible in the southern portion of the survey area, to the west of G1(1). These features appear indicative of the underlying geology and possible ploughing activity.

4.2 Field G2 (Figures 4 & 5)

4.2.1 This comprised a field of improved pasture, grazed by cattle. The ground slopes gradually down from north to south. The field is bounded by hedgerows, infilled with post-and-wire fencing. For much of the western part of the survey area the hedge encroachment and presence of metal in the field boundary meant only a very narrow strip could have been surveyed, with the result likely to have been relatively meaningless across such a narrow area. Overhanging tree branches, and the presence of metallic agricultural equipment and general detritus rendered the southwest corner of the field unsuitable for survey. As the ground fell the southern edge of the field had become waterlogged and boggy, exacerbated by the passage of cattle through this area, making the ground conditions unsuitable for walked surveying. Due to an ingress of cattle into the

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survey area, this field was surveyed over two separate days, weather conditions being generally overcast but dry at the time of survey.

4.2.2 A dipolar linear feature G2(1) extends approximately 25m into the survey area, on a North-South orientation. The readings are generally quite high, although it does appear to fade away. Strong dipolar linear responses such as this are often indicative of modern service runs, or similar modern activity. This feature lies in relatively close proximity to the field entrance, and may therefore be the result of vehicle movements into the field.

4.2.3 Towards the northern end of the field a discrete dipolar reading is recorded G2(2). Such readings are often indicative of buried metallic objects of relatively modern date.

4.2.4 A series of irregular curvilinear features G2(3) were identified throughout the southern part of the survey area, on a largely East-West orientation. These features would appear to represent the natural geology, and were identified in many of the adjacent surveyed areas.

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4.3 Field G3 (Figures 6 & 7)

4.3.1 This comprised a small field of improved pasture, which slopes gradually from the Northwest down to the Southeast. The field was bounded by mature hedgerows, infilled with post-and-wire fencing. A metallic gate gave access to the field from the west, the readings from which obscured readings within the survey area in its vicinity. The southern edge of the field had become quite waterlogged with very soft, uneven ground, unsuitable for walked surveying. This field was surveyed in a single day, the weather was overcast but generally dry at the time of survey.

4.3.2 In the southwest corner of the field a discrete, very strong, dipolar reading G3(1) is recorded. The strength of the reading would suggest a ferrous object, likely to be of modern origin.

4.3.3 In the northwest corner of the surveyed area are a series of irregular readings G3(2), indicative of the underlying natural geology becoming apparent. The southeast edge of this area corresponds to the natural contours within the field. To the southeast the readings become more regular, suggesting a greater build-up of overlying soils.

4.3.4 A number of discrete bipolar readings are recorded throughout the remainder of the field, such readings may be indicative of metallic objects introduced into the topsoil through modern agricultural ploughing.

4.4 Field G4 (Figures 6 & 7)

4.4.1 This comprised a field of improved pasture, grazed by cattle. Ground levels were slightly higher along the eastern part of the field, with the ground then sloping gradually down to the southwest. The field was bounded by a mixture of hedgerows and metal fencing, preventing effective surveying up to the boundaries. An area of imported hardcore had been laid around field entrances in the northwest corner of the field. The survey was undertaken in a single day, weather conditions were damp and overcast.

4.4.2 Irregular readings were recorded throughout this field, which would appear to originate from the underlying geology. Survey results in this area appear to indicate general east-west orientated fractures within the geology. A number of relatively regularly spaced NNW – SSE linear features are also indicated throughout the survey area. This regularity is likely to be the result of agricultural ploughing.

4.4.3 Towards the western end of the field a series of positive linear readings would appear to define a potential enclosure G4(1). The linear readings do however appear to align with the general ploughing and possible geological pattern of responses, but the readings in this specific area are higher, and they also appear to have a 'shadow' of negative readings along one side, making them more distinct from the general background readings.

4.4.4 To the northeast lies a somewhat indistinct positive linear anomaly G4(2), on a northwest-southeast alignment. The readings are somewhat inconclusive, although they do appear to align with a former farm track, visible on aerial photography and late 19th century Ordnance Survey mapping.

4.4.5 In the mid-northern part of the survey area a negative linear anomaly is identified G4(3), orientated ENE-WSW. It would appear to follow a fairly regular pattern visible throughout the field, but the readings generally appear higher than the background readings in this area, and it appears to correspond to the orientation of G4(1).

4.4.6 Towards the eastern end of the survey area lies a roughly square area measuring approximately 22m by 22m G4(4), where the general readings are slightly, but consistently, more negative than the surrounding responses. This area would also appear to be defined by a positive linear anomaly with slightly elevated responses, albeit intermittent, and potentially aligned with ploughing striations. These reading may indicate a former enclosure within the field.

4.4.7 Towards the northern end of the survey area, and close to the northern field boundary, strong dipolar responses indicate a linear feature orientated ENE-

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WSW. The strength and dipolar nature of the responses, particularly in contrast to other features identified on the survey, would suggest this represents either modern services or potentially a fired-clay land drain.

4.5 Field G5 (Figures 8 & 9)

4.5.1 This comprised a relatively level field of improved pasture. It was bounded to the west and south by hedgerow infilled with post-and-wire fencing, and to the east by metal fence alongside a local access road. The field was surveyed in a single day in damp and overcast conditions.

4.5.2 Slight striations were recorded, orientated roughly north-south, and aligned with the field boundaries. These striations would appear to correspond to ploughing marks within the field. No specific features of archaeological interest are noted.

4.6 Field G6 (Figures 8 & 9)

4.6.1 This comprised a field of improved pasture, relatively level with a gradual slope down to the south. The field is bounded by hedgerows, infilled with post and wire fencing, and the field is crossed by overhead powerlines running east-west, with a upright pole set centrally within the field, which lies in the central, northern part of the survey area. The survey was undertaken in a single day, weather conditions were dry and cloudy.

4.6.2 Towards the western side of the field a positive linear anomaly was identified G6(1), running in a roughly northeast to southwest direction across the survey area. The readings from the anomaly were only slightly differentiated from the background readings, but suggest a potential cut feature.

4.6.3 Located in the centre of the survey area was a discrete anomaly consisting of strong dipolar readings G6(2). Such readings are often indicative of metallic objects, often of modern origin. This features lies in relatively close proximity to the location of the upright post supporting the overhead power lines, and it is likely the two are associated.

4.6.4 Located within the eastern part of the survey area a negative linear anomaly G6(3), flanked by adjoining positive linear anomalies, crosses the survey area in a NNW to SSE direction. Such features are often representative of former field boundaries, and this particular feature also runs parallel to existing field boundaries. Historic 19th century map sources indicate a former field boundary did bisect this field on a similar orientation, but these maps located this boundary in the centre of the field, aligning with a kink still visible in the field boundary to

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the north. That particular boundary does not appear on these results, although it does align with the discrete central anomaly G6(2). Linear anomaly G6(3) would lie midway between the central boundary and the existing eastern boundary.

4.7 Field G7 (Figures 8 & 9)

4.7.1. This comprises a field of improved pasture, with ground sloping gradually down to the south towards the road line. The field itself is bounded by hedgerows infilled with post-and-wire fencing. The field is crossed by overhead powerlines, held by an upright post with stays, located within the survey area. Both the post and its stay, and the surrounding field boundaries, produced readings that obscured results taken in their vicinity. The field was surveyed in a single day, weather conditions were dry and cloudy.

4.7.2 Two strong discrete bipolar anomalies were recorded G7(1), both located in close proximity to, and most likely associated with, the location of the upright post and its metallic stays.

4.7.3 A number of slight linear anomalies were identified across the survey area running in a roughly NNW to SSE direction, parallel to the existing field boundaries. Such features are likely to represent evidence of ploughing within the field. Some irregular linear anomalies were identified running in a more east – west direction, typical of natural geological features.

4.8 Field G8 (Figures 10 & 11)

4.8.1 This comprises a field of improved pasture, relatively level with a slight slope down to the south towards the line of the A40. The field is bounded by hedgerows infilled with post-and-wire fencing, and traversed by an overhead powerline, with one upright post located within the survey area. The upright post prevented survey work at its location, but does not appear to have disrupted the readings taken in its vicinity. The wire within the field boundaries did however affect readings taken in their vicinity. The survey was undertaken in a single day, and weather was overcast but dry.

4.8.2 Two linear anomalies were identified towards the centre of the field. The survey area was traversed by a linear negative anomaly G8(1), flanked on either side by adjoining positive anomalies. This ran in a roughly NNW-SSE direction, parallel to existing field boundaries. Such a feature is typical of buried former field boundaries, and in this instance it aligns with a boundary marked on 19th century map sources.

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4.8.3 Adjacent to the west a shorter linear anomaly G8(2) runs partly into the survey area from the north. This anomaly comprises relatively strong positive readings, often indicative of cut features. It runs in a roughly NNW-SSE direction, approximately parallel to feature G8(1). This similarity in alignment would suggest the two features are potentially related.

4.9 Field G9 (Figures 10 & 11)

4.9.1 This comprises a field of improved pasture, with areas of semi-improved pasture and rough ground around the edges, lying to the rear of Trefangor Cottage. The ground is relatively level, with slight southward slopes. The field is bounded by hedgerows, infilled with post-and-wire fencing. An overhead powerline enters the field, and crosses the western part of the survey area to connect with Trefangor Cottage. Areas of rough ground, metallic items and a hardcore laid track lie in the southwest corner of the field around the field entrance from the A40. Large metallic items (cars etc.) lie within the grounds of Trefangor Cottage, but likely to affect readings taken in the vicinity. The field was surveyed in a single day, the weather consisted of light rain.

4.9.2 Close to the western end of the survey a grouping of linear and curvilinear anomalies were identified, although the area available for survey at this point makes interpretation difficult. A negative curvilinear anomaly G9(1) with associated positive readings interspersed along its length crosses into the northwest corner of the survey area. The readings are mixed, but generally only slightly different from the background readings. The proximity to an upright post carrying overhead powerlines may suggest the two are linked, but given the small area visible within the survey it is difficult to interpret.

4.9.3 Adjacent to this is a more linear negative anomaly G9(2) running in a NNW to SSE direction, parallel to the current field boundaries. The similarity in alignment may suggest this feature is related to agricultural activity within the field, possibly ploughing activity or potential an associated field boundary.

4.10 Field G10 (Figures 10 & 11)

4.10.1 This comprises the southern end of a narrow field of improved pasture. The field was bounded by hedgerows infilled with post-and-wire fencing. This fencing affected reading taken in its vicinity. Only a small area was included within the survey, comprising a single 30m grid square, making interpretation difficult. The survey was undertaken in a single day, weather conditions were wet.

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4.10.2 No features of specific interest were noted within the survey area. High readings were evident along the southern edge, presumably from adjacent metallic items to the south.

4.11 Field G11 (Figures 12 & 13)

4.11.1 This comprised a large field of improved pasture, currently grazed by cattle. The field was relatively level, with land sloping gradually to the south and east. The field was bounded by hedgerows to the south, infilled with post-and-wire fencing, and by metal fencing to the west, both of which obscured readings taken in their vicinity. The field was surveyed in a single day, the weather was overcast but dry.

4.11.2 A large general area of mixed results across much of the survey indicates areas where the underlying geology comes closer to the surface. Along the southern edge of the survey site these readings are not predominant, indicating where a greater depth of overlying soils have built up on the slightly lower-lying ground. Two anomalies were identified along the eastern edge of the survey area.

4.11.3 A faint negative linear anomaly G11(1) runs roughly NNW-SSE for a distance of approximately 75m before fading out to the north, and being lost amongst the greater depth of soil to the south. This feature runs in parallel to the existing east and west field boundaries. Such negative readings are sometimes indicative of buried bank material, although potentially, given its location and orientation, it may represent an agricultural feature such as a field drain.

4.11.4 Adjacent to this feature, and lying on the very edge of the surveyed area, is a positive linear anomaly G11(2), with an adjacent negative linear reading. Both responses are fairly strong. There is a suggestion that this may represent the edge of a typical field boundary feature, although clearly the feature is not revealed in full. No former field boundary is indicated on historic map sources, although the anomaly does run in the direction of a former quarry depicted on late 19th century Ordnance Survey mapping.

4.12 Field G12 (Figures 14 & 15)

4.12.1 There is a break in the surveyed area roughly midway along the route of proposed development as the route crosses a local water course and small hamlet known as Ffynnon. Field G12 lies on the south side of the A40 in a field of pasture, currently grazed by sheep, and enclosed in a mixture of hedgerows and post-and-wire fencing. A stream (a continuation of the Ffynnon watercourse) defines

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the southern edge of the field. The ground slopes down to the south towards the stream, becoming relatively steep in places, but largely still suitable for surveying. However the lower-lying ground along the stream banks to the south has become soft boggy ground, with reeds present and overhanging branches from mature trees, making this area unsuitable for surveying. Much of the western part of this survey area has also been fenced off with dense high vegetation growing within, again unsuitable for surveying. The survey was undertaken in a single day, weather conditions were wet.

4.12.2 Only one potential feature was identified within the survey area. A double negative linear anomaly G12(1) was identified at the western edge of the surveyed area, running roughly SSE-NNW up the slope, before turning eastward to run along the more level upper ground at the northern edge of the field. This feature is visible on the ground surface as a farm track or wheel rutting caused by farm machinery approaching a field gate to the south.

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4.13 Field G13 (Figures 14 & 15)

4.13.1 Field G13 lies to the east of Ffynnon and south of Parc-y-delyn farm. It comprises a field of pasture, currently grazed by cattle, bounded by mature hedgerows with a farm access road running along the eastern side, and woodland to the southwest. At the time of survey the field had become very waterlogged due in part to a nearby blocked drain, which rendered a large part of the south and southeast corner of the field unsuitable for survey. The remaining area was surveyed in a single day, the weather was overcast but dry.

4.13.2 A large number of features were apparent within the surveyed area. Running roughly east-west across the surveyed area was a positive linear anomaly G13(1), with adjoining negative readings along its northern edge. This feature appears typical of buried field boundaries, and does appear to correspond to a field boundary visible on late 19th century Ordnance Survey mapping.

4.13.3 A similar linear feature G13(2) adjoins this boundary, and runs roughly north-south. The similarity in reading would suggest this too represents a former field boundary, and again, such a boundary is visible on historic mapping.

4.13.4 To the east a narrow but distinct positive linear anomaly G13(3) is identified, running in a roughly east-west orientation. Such readings are often indicative of cut features, although no corresponding feature is marked on historic mapping.

4.13.5 Along the western edge of the surveyed area a series of three distinct positive linear anomalies G13(4) are identified. All three are parallel, run in a roughly east – west orientation, which also appears both to correspond to the southern

field boundary, and end at feature G13(2), a former field boundary visible on historic mapping. Such readings suggest cut features, potentially related to quarrying activity also recorded in this area on the historic map sources.

4.13.6 To the north lie a series of similar positive linear anomalies G13(5), aligned both east-west and north-south. Again such readings suggest cut features, although their function is not immediately apparent. They would appear to respect G13(1), which is lkely to represent a field boundary visible on historic mapping, but there is no indication of any corresponding activity on the same historic mapping within the field in which they occur.

4.13.7 A curvilinear positive anomaly G13(6) is just visible along the northern edge of the surveyed area. This would appear to correspond to a former field boundary visible on historic map sources.

4.13.8 To the east lie a number of discrete positive anomalies G13(7), more readily visible in areas where the background geological signals are less apparent. These readings would suggest cut features, potentially representing post holes or something similar. In plan they would appear to form a semi-circular arrangement with some outliers, however when overlaid on historic map sources they lie both on the line of former field boundaries and immediately alongside former field boundaries, suggesting a potential relationship between the two.

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4.14 Field G14 (Figures 16 & 17)

4.14.1 This comprised a relatively large field of improved pasture, grazed by cattle, with a slight slope down to the west. The field was bounded by hedgerows with post-and-wire fence infill. Area of wet soft ground had developed around the fringes of the field, most notable along the eastern edge, and in pockets along the northern edge. A JCB stood on the edge of the field to the west, masking readings taken in its vicinity. The survey was undertaken over the course of two days, the weather was cloudy but dry.

4.14.2 A number of linear features have been identified in the central and western part of the field. Running in a northwest to southeast direction is a relatively weak positive linear anomaly G14(1) for a distance of around 80m before it fades away. The northwest end appears to terminate in an area of relatively strong dipolar readings, which may suggest a metallic item, often found to be relatively modern in origin. This feature may therefore represent some form of modern services running across the field.

4.14.3 To the east lie two shorter segments of linear anomalies, both running in a WNW to ESE direction, and on a similar alignment, although providing different

readings. The westernmost segment G14(2) is recorded for around 35m with largely positive readings, often indicative of cut features. The easternmost segment G14(3) is of a similar length but largely formed of two parallel negative anomalies, often indicative of a build-up of material such as a buried bank. This anomaly appear to terminate on the line of a former field boundary, and both features may therefore represent related features such as a removed field boundary or farm trackway. A number of irregular readings, and short irregular linear features, are also indicated in proximity to these feature, but these appear to align with geological activity and are likely to represent readings from the underlying bedrock.

4.14.4 Running down the centre of the field, in an approximately north – south orientation, is a straight linear anomaly G14(4), comprising adjoining positive and negative readings. This feature corresponds closely to the line of a former field boundary visible on historic map sources. To the east of the feature a number of fainter, but similarly aligned linear anomalies are visible, these would appear to represent evidence of ploughing activity.

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4.15 Field G15 (Figures 16 & 17)

4.15.1 This relatively small field of pasture lies to the south of Pentroydin-fach farmstead, and surrounds the cottage of Maes-y-Ffynnon. The field was bounded by hedgerows with post-and-wire infill. A wide area of waterlogged ground lay along the western boundary, unsuitable for surveying, and a small metal slurry tanker lay within the survey area to the north, obscuring readings taken in its vicinity. The survey was undertaken in a single day, weather conditions were dry and bright.

4.15.2 Crossing the central part of the field on an ENE to WSW orientation was a linear anomaly of mixed readings G15(1). Towards the eastern end of the anomaly the readings strong dipolar readings were recorded but these fade to the west, where slight negative readings indicated a continuation of the feature. This feature correspond to a former field boundary visible on historic map sources. The strong readings at the eastern end likely represent modern detritus buried on the line when the boundary was removed.

4.15.3 In the southern part of the field a curvilinear anomaly G15(2) was suggested by slight positive readings. The readings are intermittent and difficult to distinguish, but there is no corresponding feature on historic map sources. High readings along the edge of the surveyed area to the south correspond to the post-and-wire fencing within the southern field boundary.

4.16 Field G16 (Figures 18 & 19)

4.16.1 This field of improved pasture had a gentle slope down to the north, and was bounded by hedgerows with access directly from Pentroydin-fach farmstead to the northwest, and was bounded by Maes-y- Rhos to the southwest. The ground underfoot was generally quite soft, often waterlogged and heavily pitted from the presence of cattle, this made large areas of the field unsuitable for surveying. The area surveyed was completed in a single day, weather conditions were damp and grey.

4.16.2 No features of specific interest were identified within the surveyed area. A series of high responses along the northern edge of the area are likely to have come from farm equipment stored in the northern part of the field.

4.17 Field G17 (Figures 18 & 19)

4.17.1 This field of improved pasture had a gradual slope down to the north. Along the eastern edge of the field ran a small watercourse, emerging from springs within the field. The area around the watercourse, which covered up to half the field, was both waterlogged and covered in high reeds, making much of the eastern half of the field unsuitable for surveying. This field was surveyed in a single day, weather conditions were damp and grey.

4.17.2 Running across the centre of the field is a strong, slightly curvilinear anomaly G17(1). This is identified by strong negative readings, with a shadow of positive readings along the northern edge. Such strong readings are often indicative of modern features, however this feature follows the line of a watercourse, presumably man-made, that runs from the natural springs to the east towards Pentroydin-fach farm, and is marked on late 19th century Ordnance Survey maps. Potentially therefore this anomaly may represent buried water pipes.

4.17.3 A possible curvilinear feature G17(2) has been identified cutting across, or being cut by, this line. This curvilinear feature is represented by positive readings, often indicative of a cut feature.

4.18 Field G18 (Figures 20 & 21)

4.18.1 This large field of improved pasture occupies an area of higher ground to the north of Llanddewi Velfrey, with ground then sloping down to the north towards Pentroydin-fawr farmstead. The field had been grazed by cattle, and was

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bounded by hedgerows with post-and-wire infill. A small watercourse runs along the western field boundary, fed by natural springs along the edge of the field. The ground around this watercourse was soft and unsuitable for survey. The field was surveyed over the course of two days, weather conditions were relatively dry and bright, damp underfoot.

4.18.2 A relatively large number of features were identified or suggested within this field. A linear negative anomaly G18(1) crossed the survey area, for *circa* 160m, running in a NNE to SSW direction, heading in the direction of Pentroydin-fawr farmstead. At the southwest end was a strong dipolar reading, indicative of a metallic object. Anecdotal evidence from the farmer indicates that modern wells are located in the area at the southwest end of this feature, it is likely therefore that this features represents a water pipe providing water to the farmstead.

4.18.3 Running southwest to northeast across the survey area are two linear anomalies. The northernmost of these G18(2) comprises largely negative readings, with positive reading along the southern edge, running for approximately 75m. Such readings are often indicate of material built-up over the underlying subsoils. The southernmost of these features G18(3) has very similar readings, and appears to traverse the surveyed area although there also appears to be a break in the centre, and it fades out to the northeast. This particular feature would appear to correspond to a former field boundary shown on historic map sources.

4.18.4 A final linear anomaly G18(4) is indicated crossing the upper ground at the southern end of the field, running in an east – west direction, with a southward turn at the western end. The feature is predominantly identified by negative linear readings.

4.18.5 In the northwest corner of the survey area the ground levelled out slightly, and the survey results suggest that deeper soil deposits have built up in this area as underlying geological readings are less apparent. Within this area a number of clusters of high readings suggest areas of potential activity. G18(5), G18(6) and G18(7) indicate three area of relatively strong dipolar readings, which can be indicative of ferrous or burnt material.

4.18.6 To the west lies three discrete anomalies G18(8), G18(9) and G18(10) of strong bipolar readings, often indicative of metallic objects or areas of burnt material.

4.18.7 In the northwest corner of the survey area a number of small discrete positive readings G18(11) were recorded. These readings are similar to anomalies recorded throughout the survey area, but in this location there is the suggestion that they form a semi-circular, or curvilinear arrangement, which may therefore not be natural in origin.

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4.19 Field G19a (Figures 20 & 21)

4.19.1 This area incorporates the northern tip of a triangular field alongside a local road to the north of Llanddewi Velfrey. The area is relatively level, and comprises a pasture field bounded by hedgerows infilled with post-and-wire fencing, with a field boundary fencing off an area of trees and undergrowth immediately to the north, unsuitable for surveying.

4.19.2 Positive readings G19a(1) were recorded within the survey area. It is possible that these may indicate a circular feature, but due to the limited area surveyed it is difficult to get an accurate impression of how extensive such readings may be, and whether or not they are natural in origin.

4.20 Field G19b (Figures 20 & 21)

4.20.1 The adjoining field to the east comprised an area of improved pasture, bounded by hedgerows with post-and-wire infill, and areas of woodland and dense scrub to the north and east. The land dropped away sharply to the northeast, with the gradient proving to be unsuitable for surveying. The area was surveyed in a single day, conditions were grey but dry.

4.20.2 An area of generally more negative readings identified a linear feature G19b(1), approximately 7m wide, crossing the northern part of the surveyed area running in a WSW-ENE direction. This feature corresponds to a low raised linear feature visible at ground level, potentially representing a former trackway.

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4.21 Field G19c (Figures 22 & 23)

4.21.1 This area represents a relatively large, irregular-shaped, low-lying field of rough pasture, grazed by cattle. At the time of the survey much of the field was clearly water-logged and livestock-pitted, with high reeds also present within the field. The field entrances proved to be choked with deep mud, preventing access to the field. As a result it was not possible to carry out any survey work within the bounds of this field.

4.22 Field G20 (Figures 22 & 23)

4.22.1 This was an irregularly shaped field of improved pasture grazed by cattle, sloping gradually down to the north and northwest. The field was bounded by mature hedgerows infilled with post-and-wire fencing. A wood-lined stream lay just

beyond the western boundary of the field, and a smaller stream/drain ran along the eastern boundary. The field was traversed by the line of a footpath, although this was not physically defined within the field. The area was surveyed in a single day, conditions were damp.

4.22.2 Traversing the southern edge of the field on an east – west orientation was a linear anomaly G20(1) comprised of both positive and negative readings alongside each other. Such reading are typical of former field boundaries, and this does indeed appear to correspond with a field boundary depicted on late 19th century Ordnance Survey mapping.

4.22.3 A further linear anomaly G20(2) has been identified running on a north – south orientation for approximately 70m down the centre of the survey area, although the readings appear somewhat intermittent in places. The anomaly is largely defined by positive readings flanked on either side by negative readings. Although similar to potential historic field boundaries identified elsewhere, these readings are more indistinct and no corresponding boundaries are depicted on available historic map sources.

4.22.4 Irregular background readings are spread throughout the survey area, likely background geological responses. Potential linear striations in the eastern part of the survey area, on a NNW – SSE orientation may be indications of ploughing activity in the overlying soil layers.

4.23 Field G21a (Figures 22 & 23)

4.23.1 This was a field of improved pasture which sloped down to the north and northwest. Only the southwest corner of the field lay within the survey area, which was bounded by mature hedgerows infilled with post-and-wire fencing. A stream/drain ran along the western boundary, with a wide depression also running along a similar alignment close to the field boundary. Rough and disturbed ground was present in the northwest corner of the survey area, adjacent to a field entrance. Wet ground, overhanging branches and wire present in the field boundary prevented survey work along the western edge of the field. The survey was undertaken in a single day, conditions were overcast but dry.

4.23.2 A linear anomaly G21a(1) was identified crossing the survey area on a NNW-SSE orientation, comprising parallel lines or positive readings, with slightly negative readings in between. This feature is typical of former field boundaries, and appears to correspond to a former field boundary depicted on late 19th century Ordnance Survey mapping.

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4.23.3 A wide positive linear anomaly G21a(2) runs roughly parallel, between G21a(1) and the western field boundary. Such readings often indicate cut features, and this would appear to correspond to a wide linear depression visible on the surface of the field. This may represent a natural former stream course, but would appear to correspond to a feature in the neighbouring field (G21b) to the south that may depict the line of a former trackway.

4.23.4 A possibly further linear anomaly G21a(3) was identified along the southern edge of the survey area. Only a small segment was identified, but this suggested the feature ran parallel to the southern field boundary, and may therefore represent drainage associated with this boundary.

4.24 Field G21b (Figures 22 & 23)

4.24.1 This rectangular field of improved pasture slopes down to the north and northwest. It is accessed via a well-defined trackway to the southeast and is bounded by hedgerows containing mature trees to the east, south and west, with a thick hedgerow of mixed undergrowth to the north, all infilled with post-and-wire fencing. The ground drops away along the western boundary to a sunken drainage channel, or potential former trackway running north – south along the boundary. The field was surveyed in a single day, conditions were damp.

4.24.2 A wide linear feature G21b(1), comprising largely positive readings, traversed the western part of the survey area in a NNW-SSE direction. This would appear to continue the line of feature G21a(2) identified in the field to the north, and may represent a former stream course. Given its linearity however it may also potentially represent the line of a former trackway.

4.24.3 One of the most striking features within this field are a series of clearly defined linear striations G21b(2), of both positive and negative readings, running ENE-WSW. These readings correspond to slight ridges and furrows visible on the surface, and are aligned with the current field boundaries. This would appear to represent remains of ridge and furrow cultivation within the field.

4.25 Field G21c (Figures 24 & 25)

4.25.1 This relatively long thin field of improved pasture was defined to the northeast, east and south by a well-defined trackway. The boundaries comprised hedgerows infilled with post-and-wire fencing, and ground sloped gradually to the northwest. Only the eastern end of the field lay within the survey area, which was surveyed over the course of two days. Weather as overcast but dry.

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4.25.2 A number of linear anomalies G21c(1) were identified, comprised of both positive and negative readings, and orientated ENE – WSW parallel to the field boundaries. As with the field to the north (G21b) these would appear to represent remains of ridge and furrow cultivation continuing into this field.

4.26 Field G22a (Figures 24 & 25)

4.26.1 This unusually shaped field of improved pasture ran across the summit of high ground, with land sloping generally away to the north, getting steeper along the north-western fringe of the field. The field was bounded by hedgerows with post-and-wire infill, which meant only a narrow area was suitable for surveying across much of the central area of the field. The survey was undertaken in a single day, the weather was damp and windy. In assembling the data for this particular survey there is the potential that some inaccuracies may have arisen in the numbering sequence, see G22a(4) below, although the readings themselves appear to have successfully recorded below-ground features.

4.26.2 At the western end of the survey area a linear feature G22a(1) was identified, comprising two parallel positive linear readings, with an internal area of negative readings, all orientated NNW – SSE. Such readings are typical of former field boundaries, and this does appear to correspond to a boundary visible on late 19th century mapping.

4.26.3 Adjacent to this feature are a number of discrete bipolar readings that appear to form a curving line G22a(2). Bipolar responses are often indicative of ferrous objects.

4.26.4 At the northern end of the survey area a bipolar linear reading G22a(3) is visible on the edge of the survey area. The bipolar responses are often indicative of ferrous objects, and in linear form are sometimes found to relate to modern services, for example water pipes.

4.26.5 A strong linear feature G22a(4) is recorded crossing the western part of the survey area on a WSW – ENE orientation. These readings are typical of former field boundaries. The numbering sequence assigned to the gridded survey areas indicate that this feature is located as it is portrayed on Figure 24. However, historic map sources, and indeed aerial photography, would indicate that this feature is in fact located 30m to the north, and continues the line of a feature identified in Field G22b to the east. If, as is suspected, the location of the grid squares containing this feature is inaccurate, than this has not been repeated elsewhere in the survey area. Due to the size and location of all other grid squares containing identified features, they have been located accurately.

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4.26.6 Towards the eastern end of the survey area a thin negative linear response G22a(5) runs in a northwest to southeast direction across the survey area, although fading out to the southeast. Also in this area lie a number of faint linear striations G22a(6) that appear to run parallel to the field boundaries, indicating they are likely to be evidence of ploughing. They appear to end in a similar faint linear feature running perpendicular to them, this would appear to correspond to a former field boundary visible on historic map sources.

4.27 Field G22b (Figures 24 & 25)

4.27.1 This field of improved pasture occupies high ground along its southern edge, then sloping down to the north across much of the field. The survey area is limited to the higher ground along the southern edge of the field. The boundaries comprise hedgerows infilled with post-and-wire fencing. The survey was undertaken in a single day, weather conditions were dry and windy.

4.27.2 A positive linear anomaly G22b(1) extends for approximately 37m into the survey area from its southern edge, crossing the high ground at the southern end of the field. Such positive readings often indicate cut features, such as a ditch or gully. The feature does not appear to extend beyond the southern field boundary.

4.27.3 A linear anomaly G22b(2) crosses the survey area on a WSW – ENE orientation, of a form similar to former field boundaries noted elsewhere, and would appear to correspond to a boundary marked on the mid-19th century tithe map. A strong discrete dipolar response G22b(3) lies on the north side of this probably field boundary. Such strong response are likely to indicate a ferrous object.

4.27.4 A faint negative linear anomaly G22b(4) lies to the north of, and on the same orientation as G22b(2), with a curvilinear area of positive readings towards the western end that appear to be associated. The provenance is uncertain, but similar readings have been known to indicate the location of buried water pipes.

4.27.5 In the northwest corner of the survey area there appears to be a scattering of faint dipolar readings G22b(5). Located on the edge of the survey area it is difficult to be certain if this represents a features, but concentrated areas of such readings are often indicators of spread burnt material.

4.28 Field G22c (Figures 26 & 27)

4.28.1 This improved pasture field occupied a summit of high ground at the eastern end of Llanddewi Velfrey. The field is bounded by hedgerows infilled with post-and-

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wire fencing, and is traversed by overhead powerlines running northeast to southwest across the field. The A40 forms the southeast boundary to the field, a former quarry lies in the western part of the field. The survey area encompassed the eastern and south-eastern part of the field, as well as a strip along the northern boundary. The field had been grazed by sheep, and a watering station stood along the eastern boundary. The field was surveyed in a single day, the weather was overcast but dry.

4.28.2 At the northwest extent of the survey area a short curvilinear anomaly G22c(1) was identified. This consisted of positive readings, typically indicating cut features, but only a potentially small segment of this feature was caught within the surveyed area.

4.28.3 Much of the survey area was dotted with discrete positive and bipolar readings. The spread of such responses would suggest natural features, or the spread of material through the plough-soil, however towards the eastern end of the field were a cluster of particularly strong readings G22c(2). The cluster of positive readings may suggest cut features, or an area of potential activity.

4.28.4 An area of particularly strong negative readings G22c(3) along the eastern edge of the surveyed area corresponds to the location of the metallic watering station.

4.29 Field G22d (Figures 26 & 27)

4.29.1 This field of relatively rough pasture lies immediately adjacent to Glenfield farmstead, and is bounded along its southern edge by the A40. Mature hedgerows infilled with post-and-wire fencing line the other sides of the field. The field was surveyed in a single day, the weather was bright and dry.

4.29.2 A particularly strong bipolar reading G22d(1) lay on the northern edge of the surveyed area. Such strong responses are typically ferrous objects, often modern in origin. This location would appear to be infilling a former pond, visible on historic map sources.

4.29.3 At the western end of the surveyed area lies a possible positive linear reading G22d(2). This extends only a small distance into the surveyed area, therefore interpretations are limited, but there is a suggestion of a near right-angled turn. A series of curvilinear readings along the southern edge of the surveyed area appear natural in origin.

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4.30 Field G22e (Figures 26 & 27)

4.30.1 This field of improved pasture occupies undulating high ground along the northern edge of the A40 to the east of Llanddewi Velfrey. Much of the northern part of the field slopes down to the north, with the gradient being largely unsuitable for survey work. Overhead powerlines cross the field, continuing the line visible in Field G22c to the west. The field is bounded by hedgerows, with post-and-wire fencing along the line of the A40. A footpath traverses the field from north to south but there are no physical above ground features associated with it.

4.30.2 Towards the southwest corner of the field are a number of linear anomalies that cluster around an area where the background readings suggests a build-up of deeper soil overlying the general geological responses. Running southwest to northeast across the western part of the survey area is a linear anomaly G22e(1) comprising alternating positive and negative responses. Such responses are often typical of modern services.

4.30.3 Adjacent to G22e(1) two further linear anomalies, G22e(2) and G22e(3) appear in part to define the northern edge of the area of deeper soil deposits. Both features are largely comprised of positive readings, with an associated shadow of negative readings along G22e(3) in particular. These features appear to correspond to the edge of an earthwork identified on late 19th century OS mapping, indicating the site of a possible quarry.

4.30.4 In the southwest corner of the survey area a further linear anomaly G22e(4) is identified that appears very similar in responses to G22e(1). A short distance to the east a curvilinear anomaly G22e(5) appears to be defined by a series of closely arranged but discrete positive readings. This may be a peculiarity of the readings, but may also suggest a linear arrangement of post holes.

4.30.5 A strong positive discrete anomaly G22e(6), with a strong negative shadow, appears on the southern edge of the survey area. Such strong responses are typical ferrous, and modern in origin. This is presumably associated with a nearby metal gateway in the field boundary.

4.31 Field G23 (Figures 28 & 29)

4.31.1 This field lies on the south side of the A40 to the east of Llanddewi Velfrey. This field of relatively rough pasture occupies an area of higher ground to the northwest, which then slopes away to the southeast, with areas of water-logged and boggy ground around the periphery preventing survey work across the full extent of the survey area. The field is bounded by mature trees and hedgerows,

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with wooden fencing and wire along the A40 that borders the field to the north. Access to the field is from the northeast. The field was surveyed in a single day, weather was overcast but generally dry.

4.31.2 Areas of strong bipolar responses G23(1), G23(2) and G23(3) dominate the survey results in this area. Such strong responses typically depict ferrous objects, often modern in origin, although there were no surface indications as to the origins of these responses and there remains the potential that they could be archaeological in origin.

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5 Interpretation and Discussion

5.1.1 Although ground conditions, in particular areas of waterlogging, undergrowth and the presence of metallic items, prevented a full survey of the entire development area, a large area was surveyed. Background geological responses may serve to mask some more subtle features, however after standard processing techniques were used potential features were identified across many of the surveyed areas, which suggests that significant archaeological remains have not been missed. Geophysical surveys such as this will not however identify all potential archaeological features, and more intrusive archaeological investigations would be required to test the potential interpretations highlighted below.

5.1.2 Towards the western end, near the Penblewin roundabout, background geological responses were picked up in fields G1 to G5, indicating a general east-west joints, potentially enhanced through ploughing activity on a similar alignment. Areas of greater soil depth were also identified. Within field G1 a feature of particular note is G1(1), which suggests a possible enclosure in the southeast corner, potentially focussed on the former crossroads of Penblewin, but one which is not depicted on 19th or 20th century map sources.

5.1.3 Within fields G2 and G3 features are suggested, but they appear to be potentially of limited archaeological interest. In Field G4 a number of potential features of interest were identified, although the magnetic differences within this field were subtle and difficult to pick out amongst the background geology and evidence of more intensive ploughing. Two potential enclosures were identified in G4(1) and G4(5), and a possible linear ditch or boundary in G4(3). No corresponding features are shown on 19th and 20th century mapping, but all do appear to align with ploughing activity in the field, itself aligning with current field boundaries. These alignments make the features uncertain, but also suggests that if real they are likely to be agricultural in nature. The remaining features appear to be of limited archaeological interest.

5.1.4 From field G6 to G11 the background geology is still visible, but the joints are less obvious. Ploughing activity is still discernible however. In field G6 a subtle linear feature G6(1) may be associated with more recent agricultural activity, and G6(2) appears modern in origin. G6(3) is typical of former field boundaries identified throughout the survey area. Although likely to be post-medieval in date, it is not depicted on 19th and 20th century map sources, and would appear (along with boundaries that are depicted on those map sources) to divide the eastern part of the field into relatively narrow strips, characteristic of generally earlier post-medieval and medieval field enclosures. A similar former field boundary is visible in field G8, in G8(1), which also subdivides the current field into narrower strips, although this is marked on historic map sources. A cluster of features in

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the neighbouring field to the east (G9) are difficult to interpret, lying as they do on the edge of the survey area and in proximity to overhead power lines. A continuation of the former subdividing field boundaries may also be depicted in field G11, with two linear features G11(1) and G11(2) on the same alignment identified on the edge of the survey area.

5.1.5 Immediately to the east of Ffynnon, Field G13 produced some very interesting results, although the area suitable for surveying was unfortunately limited. The presence of a nearby quarry would suggest the bedrock alters in this area, and it would appear conglomerates become prevalent amongst the more common mudstones. This change in bedrock may have an impact on the clarity of the survey results but features are particularly clear within this field. A number of former field boundaries, visible on 19th and 20th century map sources, are picked out in the survey in features G13(1), G13(2), G13(6) and potentially G13(7). All other features appear to respect these boundaries, suggesting a likely post-medieval date. The function of these features are not immediately apparent, but they may be agricultural in nature, or may also be associated within the nearby post-medieval quarrying activity.

5.1.6 To the south of the A40, field G12 was of particular interest as it lay adjacent to a stream along which a potential Bronze Age burnt mound (PRN 3723) had been identified. The mound however lay in an area of thick undergrowth, and surveying was not possible in its vicinity, no further features of particular archaeological interest were identified. To the northeast field G14 to G16 appeared to demonstrate the typical pattern of background geology and overlying ploughing evidence seen to the west. Several features identified within Field G14 appear largely agricultural in nature. A former post-medieval field boundary is identified G14(4), with a potential former trackway G14(2) and G14(3) to the west, and ploughing evidence to the east. A further former post-medieval field boundary is identified in the neighbouring field G15(1), but a faint curvilinear feature G15(2) to the south may be of potential archaeological interest as it lacks an obvious explanation. A similar faint curvilinear feature is visible in field G17 (G17(2)).

5.1.7 Fields G17 and G18 were of particular interest due to the recorded presence of possible Bronze Age burnt mounds (PRNs 3726 & 34441) that lay adjacent to springs and a stream that separate the two fields. These unfortunately meant much of the eastern half of G17 was unsuitable for surveying, but a large number of possible features were identified within field G18. The geology was apparent across much of the upper ground, with soil building up over lower levels. Clusters of readings around the fringes of these lower levels, represented by features G18(5 – 10) suggest areas of possible burnt material or ferrous material that could be of interest given the potential burnt mounds in this area. A curious

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arrangement of discrete readings to the northwest in G18(11) are also of potential archaeological interest. A number of linear features are identified on the higher ground, G18(4) appears to be of uncertain provenance, but G18(2) and G18(3) appear likely to be associated with a post-medieval field boundary, and G18(1) with a modern water pipe.

5.1.8 It is possible readings within G19a may be of interest, but too small an area was surveyed for the readings to be effectively analysed in context. A probable trackway in G19b(1) would appear to run down the slope, possibly towards a small farmstead or cottage site shown on the tithe map on the western side of field G19c. This field (G19c) was unfortunately inaccessible, so any features associated with this farmstead/cottage site could not be verified.

5.1.9 Former post-medieval field boundaries are once again identifiable in fields to the east, in both Field G20 and G21a. G20(2) may also indicate a further boundary, not recorded on 19th and 20th century map sources. To the southeast both fields G21b and G21c contained surface evidence of ridge and furrow cultivation, which showed up very clearly on the survey results. These fields also appear to be associated with well-defined, but now little used trackways that appear to be of some antiquity, and the ridge and furrow is not typical of the surrounding agricultural land, it is possible therefore that this may be a relic of an earlier post-medieval, or medieval, field system.

5.1.10 The ridge and furrow does not appear to continue to the southeast of the trackway into Field G22a. A number of former post-medieval field boundaries are depicted in G22a(1), (4) and (6). Other linear features, G22a (2), (3) and (5) are uncharacterised and potentially of archaeological interest, although the readings also suggest these features may be largely modern in origin. To the north, in Field G22b, another post-medieval field boundary is visible in G22b(2), with discrete feature G22b(3) likely to be associated. Two further linear features G22b(1) and (4) may be of archaeological interest. G22b(1) does not appear to extend beyond the field, and may therefore be agricultural in nature, G22b(4) has the appearance of a possible water pipe or drain. G22b(5) may also be of archaeological as a potential area of burning.

5.1.11 To the south a curvilinear feature G22c(1) identified on the edge of the survey area is uncharacterised and therefore of potential archaeological interest. The feature however largely lies outside the proposed development boundaries. To the southeast there appears to be a cluster of activity around the border of Field G22c and Field G22e. An area of potentially deeper soil build-up in the southwest corner of G22e, which may be associated with an area of late post-medieval quarrying activity depicted on late 19th century mapping. It would seem likely that the number of linear features identified in this area, G22e(1 to 5), are also

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associated with this activity. A series of discrete features in the adjacent field to the west, G22c(2), may represent post holes, and may also be associated with quarrying activity although historic mapping would suggest quarrying activity stopped at the field boundary.

5.1.12 An infilled pond is clearly visible in Field G22d, with other potential features lying outside the proposed development area. A number of very strong readings within Field G23 would at first glance suggest modern activity, however this is not evident on the surface of the field and these features may therefore be of some archaeological potential. The readings would however suggest ferrous items.

5.1.13 In light of these findings there are a number of features that have been identified that could not be readily identified, and may therefore be worthy of additional investigations. Features of interest include:

- Possible enclosures G1(1), G4(1) and G4(5).
- The numerous features in Field G13.
- The curvilinear feature G15(2), although this may potentially lay outside the area of proposed development, similarly G17(2).
- The cluster of features on the lower ground with field G18, comprising G18(5) to G18(11).
- The ridge and furrow in fields G21b and G21c are of interest, but difficult to investigate archaeologically. Although the potential trackway G21a(2) and G21b(1) may be of interest.
- Linear features G22a(2), G22a(3) and G22a(5), along with linear features G22b(1) and G22b(4) are uncharacterised, and of potential interest. Possible burnt area G22b(5) may also be of interest.
- An area of quarrying activity and its immediate surrounds are of interest, represented by features G22c(1) and G22e(1 to 5).
- High readings G23 (1 to 3), possible ferrous in nature, in Field G23

5.1.14 Field boundaries, other identified features and areas adjacent to possible archaeological features can be investigated through an Archaeological Watching Brief during construction works.

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6 Bibliography and References

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Clark. A 1997, Seeing Beneath the Soil: Prospecting Methods in Archaeology. Routledge, Stroud

Chartered Institute for Archaeologists. 2014, *Standards and Guidance for a Geophysical Survey*

Ordnance Survey 1889 County Series map, 1st edition 1:2500

Ordnance Survey 1907 County Series map, 2nd edition 1:2500

Websites

British Geological Society online map resource

(http://mapapps.bgs.ac.uk/geologyofbritain/home.html)

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Photo 1: General view of survey area across Field G1. View Northeast.



Photo 2: General view of survey area in Field G15, with the Preseli's in the background. View Northwest.

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Photo 3: General view of survey area in Field G18, containing a possible burnt mound. View North.



Photo 4: General view of survey area in Field G21b, containing ridge and furrow cultivation, with Preseli's in the background. View Northwest.

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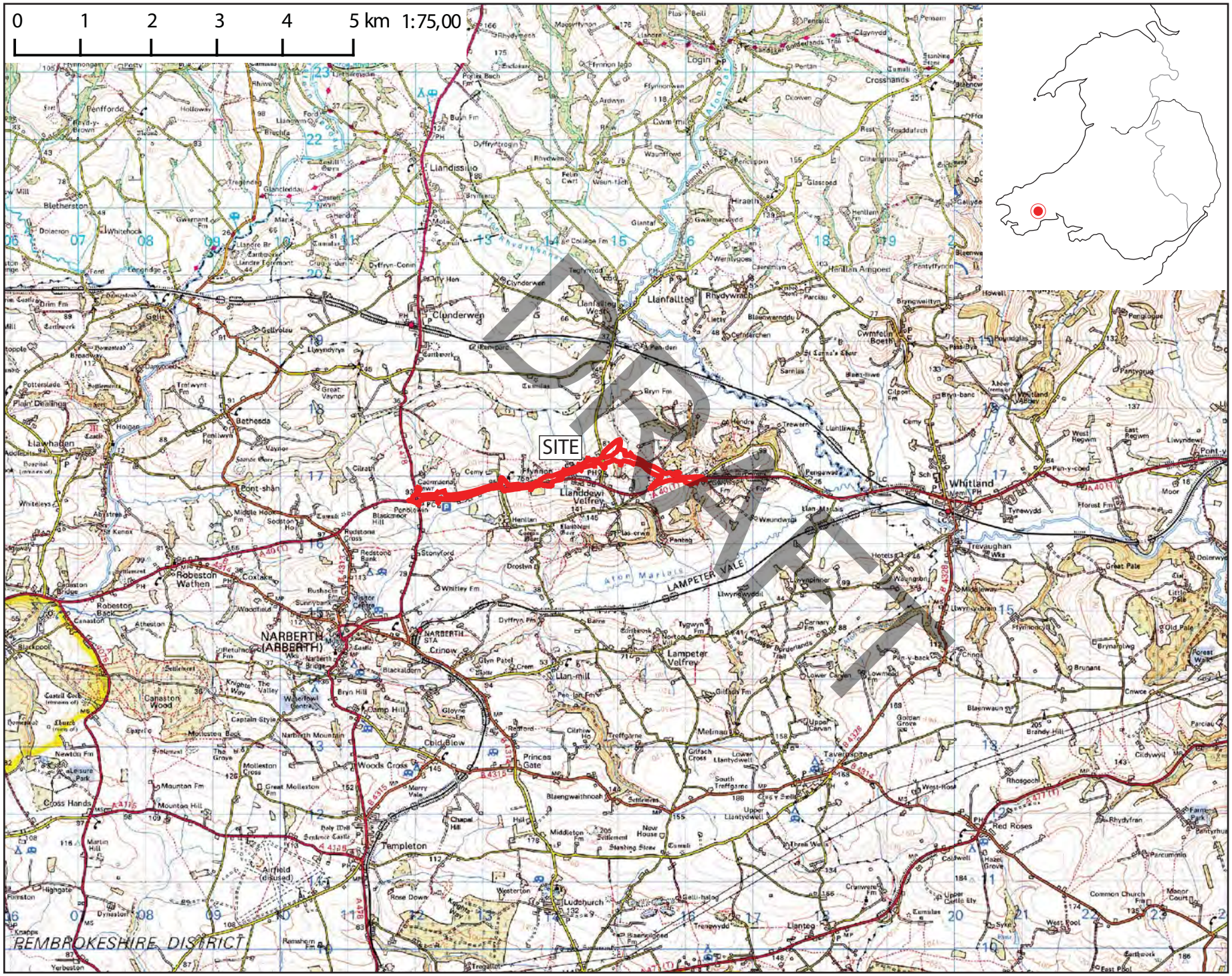

Figure 1: Location map, 1:75,000 @ A4

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ARCHAEOLOGY WALES
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0 100 200 300 400 500 m 1:6,000

Ffynnon

A40

A40

Pen-blewyn

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Figure 2: Geophysical survey area location plan (west).

Date: December 2017

Scale: 1:6000 @ A3

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Approximate outline of development area

Individual geophysical survey areas

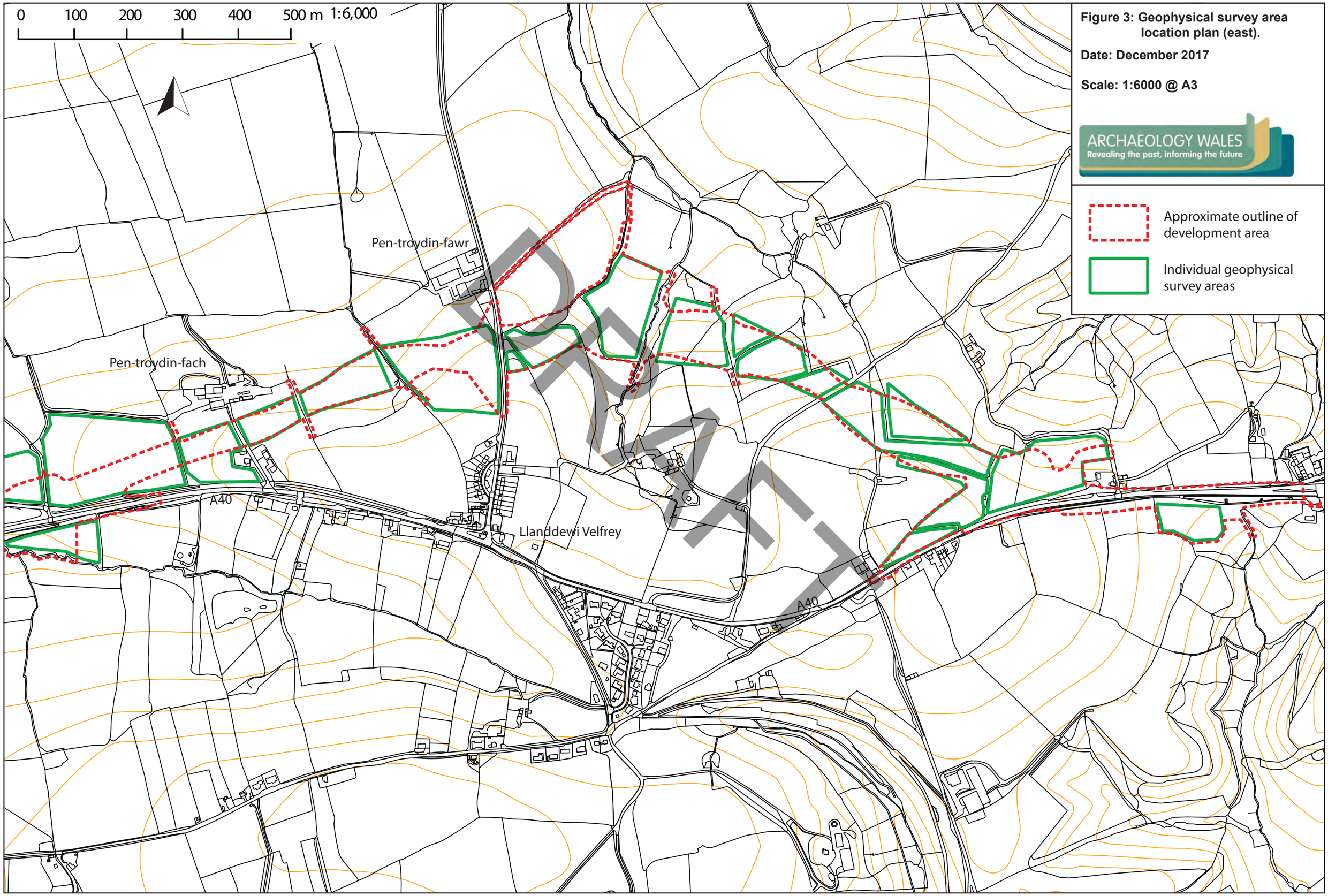
0 100 200 300 400 500 m 1:6,000
Pen-troydin-fawr
Pen-troydin-fach
A40
Llanddewi Velfrey
A40
Figure 3: Geophysical survey area location plan (east).
Date: December 2017
Scale: 1:6000 @ A3
ARCHAEOLOGY WALES
Revealing the past, informing the future
Approximate outline of development area
Individual geophysical survey areas

Figure 4: Geophysical survey results from Fields G1 & G2

Date: November 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Limit of development area

Field G1

Field G2

Field G3

Metal fenceline

Metal fenceline

A478

Overhanging branches

Assorted metallic detritus

Dense undergrowth

Soft uncertain ground

Soft uncertain ground

A40

Metal fenceline

A40

Penblewin Roundabout

Pen-blewyn

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Figure 5: Geophysical survey results from Fields G1 & G2, overlaid with interpration - see main text

Date: December 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Limit of development area

Field G1

Field G2

Field G3

G2(2)

G1(2)

G1(3)

G1(1)

G2(3)

G2(1)

G3(2)

G3(1)

Metal fenceline

Metal fenceline

A478

Overhanging branches

Assorted metallic detritus

Dense undergrowth

Soft uncertain ground

Soft uncertain ground

A40

A40

Penblewin Roundabout

Pen-blewyn

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Figure 6: Geophysical survey results from Fields G3 & G4

Date: December 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Limit of development area

Field G3

Laid hardcore

Field G4

Field G5

Metal fence

Metal fence

Dense Undergrowth

Soft uncertain ground

Metal fence

A40

Car Park

Figure 7: Geophysical survey results from Fields G3 & G4, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Limit of development area

Field G3

Field G4

Field G5

Laid hardcore

G3(2)

G3(1)

G4(6)

G4(3)

G4(2)

G4(1)

G4(5)

Dense Undergrowth

Soft uncertain ground

Metal fence

Metal fence

Metal fence

A40

Car Park

0 20 40 60 80 100 m

Field G5

Field G6

Field G7

Telegraph Post

Metal Fence

Metal Fence

A40

Trefangor Farm

Ca'rmaenau Fach

Limit of development area

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Figure 8: Geophysical survey results from Fields G5, G6 & G7

Date: December 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Field G5

Field G6

Field G7

G6(1)

G6(2)

G6(3)

G7(1)

Telegraph Post

Metal Fence

Metal Fence

A40

Trefangor Farm

Ca'rmaenau Fach

Limit of development area

DRAFT

Figure 9: Geophysical survey results from Fields G5, G6 & G7, overlaid with interpretation - see main text

Date: December 2017

Scale: 1:1000 @ A3

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Revealing the past, informing the future

0 20 40 60 80 100 m

Field G8

Field G9

Field G10

Brominau

Field G7

Upright post

Metal in fence

Metal in fence

Metal in fence

Metal in fence

Metal in fence

Metallic items

Trefangor Cottage

Rough ground, detritus and trackway

A40

Limit of development area

DRAFT

Figure 10: Geophysical survey results from Fields G8, G9 & G10

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G8

Field G9

Field G10

Brominau

Field G7

Upright post

G8(2)

G8(1)

G9(1)

G9(2)

Metal in fence

Metal in fence

Metal in fence

Metal in fence

Metal in fence

Metallic items

Trefangor Cottage

Rough ground, detritus and trackway

A40

Limit of development area

DRAFT

Figure 11: Geophysical survey results from Fields G8, G9 & G10, overlaid with interpretation - see main text.

Date: December 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Field G9

Field G10

Field G11

Brominau

Wire fence

Metal in fence

Metal in fence

Lay-by

A40

A40

Metallic items

Trefangor Cottage

Henllan Lodge

Limit of development area

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Figure 12: Geophysical survey results from Fields G9, G10 & G11

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G11

G11(1)

G11(2)

Brominau

Wire fence

Field G10

Field G9

Metal in fence

Lay-by

A40

Metallic items

A40

Trefangor Cottage

Henllan Lodge

Limit of development area

Figure 13: Geophysical survey results from Fields G9, G10 & G11, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

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0 20 40 60 80 100 m

Field G13

Ffynnon Uchaf

Waterlogged area

Tractor

Disused quarry

Old route (now blocked)

Field G14

A40

Ffynnon Bridge

Area overgrown and fenced off

Field G12

Overhanging trees, reeds and soft ground

Limit of development area

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Figure 14: Geophysical survey results from Fields G12, G13 & G14

Date: December 2017

Scale: 1:1000 @ A3

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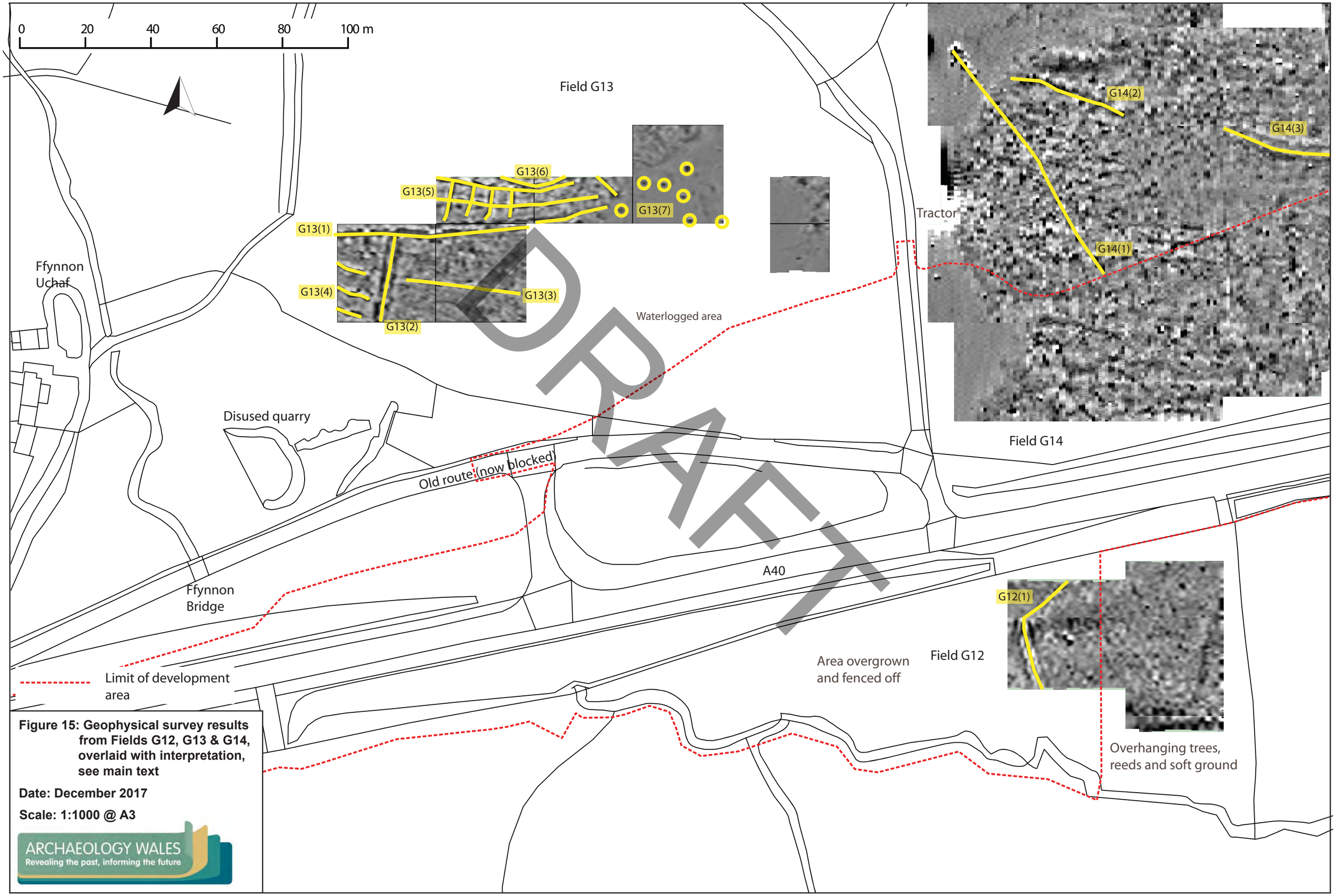

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Figure 15: Geophysical survey results from Fields G12, G13 & G14, overlaid with interpretation, see main text

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Pen-troydin fach

Field G16

Field G14

Field G15

Wet ground

Wet ground

Slurry Tank

Maes-y-ffynnon

Wet, soft ground

Wet, soft ground

JCB

A40

Limit of development area

Figure 16: Geophysical survey results from Fields G14 & G15

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Pen-troydin fach

Field G16

Field G14

Wet ground

Wet ground

Field G15

Slurry Tank

G14(2)

G14(3)

G14(4)

G14(1)

JCB

Wet, soft ground

Maes-y-ffynnon

G15(1)

G15(2)

Wet, soft ground

A40

Limit of development area

Figure 17: Geophysical survey results from Fields G14 & G15, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G18

Field G17

Wet ground, high reeds

Wet ground

Pen-troydin fach

Field G16

Wet, pitted ground

Field G15

Wet, pitted ground

Maes-y-ffynnon

Maes-y-Rhos

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Limit of development area

Figure 18: Geophysical survey results from Fields G16 & G17

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G18

Field G17

Wet ground, high reeds

Wet ground

Pen-troydin fach

Field G16

G17(1)

G17(2)

Wet, pitted ground

Field G15

Wet, pitted ground

Maes-y-ffynnon

Maes-y-Rhos

Limit of development area

Figure 19: Geophysical survey results from Fields G16 & G17, overlaid by interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Pen-troydin fawr

Field G18

Woodland

Woodland

Road

Steep slopes

Field G19b

Dense undergrowth

Field G19a

Field G17

Wet ground

Metal fencing

Limit of development area

Figure 20: Geophysical survey results from Fields G18, G19a & G19b

Date: November 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Pen-troydin fawr

Field G18

G18(1)

G18(11)

G18(10)

G18(7)

G18(9)

G18(6)

G18(8)

G18(5)

G18(2)

G18(3)

G18(4)

Field G17

Wet ground

Road

Metal fencing

Woodland

Woodland

G19b(1)

Steep slopes

Field G19b

Dense undergrowth

G19a(1)

Field G19a

Limit of development area

Figure 21: Geophysical survey results from Fields G18, G19a & G19b overlaid with interpretation, see main text.

Date: November 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G19c

Field innaccesible,
wet/boggy ground
Areas of high reeds

Field G20

Steep
wooded
slopes

Field G21a

Disturbed
ground

Overhanging
branches

Field G21b

Limit of development area

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Figure 22: Geophysical survey results from Fields G19c, G20, G21a & G21b

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G19c

Field innaccesible,
wet/boggy ground
Areas of high reeds

Field G20

Steep
wooded
slopes

G20(2)

G20(1)

Disturbed
ground

Field G21a

G21a(1)

G21a(2)

Overhanging
branches

G21a(3)

G21b(2)

G21b(1)

Field G21b

Limit of development area

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Figure 23: Geophysical survey results from Fields G19c, G20, G21a & G21b, overlaid with interpretation, see main text

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Field G21b

Field G21c

Field G22a

Field G22b

Tir-bach

Field G22a

Field G22c

Field G22e

Limit of development area

Figure 24: Geophysical survey results from Fields G21c, G22a, G22b & G22c

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

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0 20 40 60 80 100 m

Field G21b

Field G21c

G21c(1)

Field G22b

G22b(5)

G22b(4)

G22b(3)

G22b(2)

G22a(3)

G22a(2)

G22a(1)

Field G22a

G22b(1)

G22a(4)

Tir-bach

Field G22a

G22a(5)

G22a(6)

Field G22e

Field G22c

Limit of development area

Figure 25: Geophysical survey results from Fields G21c, G22a, G22b & G22c, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

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0 20 40 60 80 100 m

Field G22a

Field G22e

Steep undulating slopes

Pond

Field G22c

Field G22d

A40

Awelfa

Limit of development area

Figure 26: Geophysical survey results from Fields G22a, G22c, G22d & G22e

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

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Figure 27: Geophysical survey results from Fields G22a, G22c, G22d & G22e, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

0 20 40 60 80 100 m

Steep undulating slopes

Steep undulating slopes

Field G22e

Bethel Cottage

Bethel Chapel

The Vestry

A40

Field G23

Wet, boggy ground

Limit of development area

Figure 28: Geophysical survey results from Fields G22e & G23

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

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0 20 40 60 80 100 m

Steep undulating slopes

Steep undulating slopes

Field G22e

Bethel Cottage

Bethel Chapel

The Vestry

A40

G23(1)

Field G23

Wet, boggy ground

G23(3)

G23(2)

Limit of development area

Figure 29: Geophysical survey results from Fields G22e & G23, overlaid with interpretation, see main text.

Date: December 2017

Scale: 1:1000 @ A3

ARCHAEOLOGY WALES
Revealing the past, informing the future

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Archaeology Wales

APPENDIX I:
Specification

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1 INTRODUCTION

1.1 Project background

This specification has been prepared to guide the work undertaken for a programme of archaeological geophysical survey. This will be carried out on the line of the proposed A40 Llanddewi Velfrey to Penblewin improvement in Pembrokeshire.

The assessment is part of a staged approach of archaeological investigations that are being carried out as part of the early contractor involvement for the scheme by the contractor, Carillion PLC.

The specification and accompanying drawings detail the requirements for geophysical survey of the site as required in the tender documents by the Welsh Government. The results of this survey will inform the Environmental Impact Assessment for the project and may assist in the design of trial trench layout (should it be required).

The proposed works include approximately 33.5ha. of detailed geophysical survey to be carried out across the site.

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1.2 Site description

The site is underlain directly by a solid geology of mudstones of the Slade and Redhill; Portfield; and Haverford Formations. There is one narrow strip of glaciofluvial deposits, while some of the drainage running away from the site contains Till- diamicton, although this is outside the boundary of the site. (http://www.bgs.ac.uk/data/mapViewers/: accessed May 2017).

The eastern portion of the scheme is mostly greenfield construction around the village of Llanddewi Velfrey. The western half of the scheme will use part of the existing carriageway of the A40, and part of the land north of the existing road.

2 ARCHAEOLOGICAL BACKGROUND

There are known areas where burnt mounds are thought to be located. These may indicate adjacent areas with a high potential for prehistoric settlement. Other parts of the route contain a number of historic features, some visible on the tithe and later historic maps.

3 PROJECT OBJECTIVES

3.1 General Objectives

The general survey objectives are detailed below:

- to investigate the archaeological potential of the site;
- assess the presence /absence of potential archaeological anomalies that might be present;
- provide evidence to establish the potential of key target areas that could be investigated by trial trench evaluation;
- to determine the level of risk that the archaeological resource would present to the proposed development;

- to inform the layout of further reconnaissance or evaluation fieldwork or to aid the determination of a suitable mitigation works specification and programme, as necessary.

4 SCOPE OF WORKS

The total area for detailed magnetometry survey amounts to *c* 30ha in approximately 23 fields. This figure may increase or reduce in size as the final design of the road scheme is finalised. Plots G13, G14 and G15 have been increased in area beyond the project limits to accommodate potential areas that are currently being considered for site facilities.

If significant archaeological anomalies are detected or inferred during the survey, then areas might be extended, but only after agreement by the Client.

It may be necessary for the Contractor to undertake a preliminary assessment of ground conditions prior to the commencement of the fieldwork. The Contractor will notify the Client of any areas that in their opinion are unsuitable for survey. Where areas are covered by high crops, or inaccessible for other reasons, the intention is to re-schedule them for a time when access is possible.

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Table 1 Survey Areas

Plot	Area (ha)
G1	0.4068
G2	1.186
G3	0.563
G4	1.768
G5	0.501
G6	0.925
G7	0.595
G8	0.639
G9	0.3452
G10	0.1122
G11	1.036
G12	0.992
G13	1.274
G14	3.598
G15	1.162
G16	0.707
G17	1.286
G18	2.643
G19	3.592
G20	1.837
G21	1.721
G22	5.938
G23	0.746
Total Area	33.5732ha

5 WORKS SPECIFICATION

5.1 General Works

All survey work will be carried out in accordance with this Specification and current good practice (English Heritage 2008, Geophysical Survey in Archaeological Field Evaluation), and the Standard and Guidance for archaeological geophysical survey prepared by the Chartered Institute for Archaeologists (CIfA 2014), and the CIfA Code of Conduct (CIfA 2014); and other current and relevant best practice and standards and guidance (refer to Appendix 1).

The Contractor shall prepare and submit a Method Statement for the works prior to commencement of the fieldwork for approval.

The survey(s) will be undertaken by an experienced operator to provide consistent results regarding pattern recognition and provide initial screening of noise resulting from recent ferrous disturbance and local magnetic pollution.

During the survey a record should be made of surface conditions and sources of modern geophysical interference that might have a bearing on subsequent interpretation of field data.

The survey grid/transects must be established by electronic means using a survey-grade GPS (English Heritage, 2003) or equivalent metric survey device accurately tied to the Ordnance Survey National Grid. This should be internally accurate to ±100 mm, and the grid locatable on the Ordnance Survey 1:2500 map. An estimate of the precision of survey control is to be included in the Method Statement and it will also address how the survey transects will be laid out. If appropriate the Contractor must ensure that any survey stations are tied into permanent landscapes features recorded on the latest Ordnance Survey edition to enable the accurate relocation of archaeological anomalies detected by survey.

5.2 Specific Works

Detailed magnetometer survey will be carried out over the designated survey area using either a Geoscan FM 36 Fluxgate Gradiometer or a Bartington GRAD 601 Fluxgate Gradiometer (or similar electronic instrument). Readings should be taken at 4 readings per metre at 1m traverses within a 1m grid system.

If appropriate, the data should be downloaded at regular intervals on-site into a laptop computer for initial processing and storage. This will ultimately be transferred to a desktop computer for further processing, interpretation and archiving. Geoplot v.3 software (or comparable) will be used to interpolate the data to form an array of regularly spaced values at 0.25m x 1.0m intervals. Continuous tone greyscale images of raw data and an x/y trace plot will also be produced. Palette bars relating the greyscale intensities to anomaly values in ohms will be included with the images.

The raw and processed data should be presented in the report. The processed drawings should be accurately located and presented in relation to the OS base plan and the survey markers should be accurately plotted to aid in the laying out of subsequent evaluation or excavation areas. Interpretation plots shall be included in the report.

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5.3 Data processing

The processing of datasets will be concurrent with the fieldwork and immediately after completion of fieldwork the processing of the remaining data will be completed.

6 COMPLETION OF FIELDWORK

The Contractor shall prepare and submit a Completion Statement to the Client within one working day of completing the survey.

The survey areas will be left in a tidy and workman-like condition and the Contractor will ensure that all materials brought onto site are removed.

7 MONITORING, PROGRESS REPORTS & MEETINGS

The archaeological geophysical survey will be subject to monitoring visits by the Client who will have unrestricted access to the site, site records or any other information. The work will be inspected to ensure that it is being carried out to the required standards and that it will achieve the stated objectives.

Verbal progress reports will be provided to the Client upon request. In addition, progress meetings between the Client the Contractor and any other third party, may be held on site during the works.

8 REPORTING

An Interim Statement of the results of the fieldwork will be prepared and submitted within 2 working days of the completion of the fieldwork.

A fieldwork report will be submitted in draft within 2 weeks of the completion of fieldwork. The preparation of the survey archive and fieldwork report will be undertaken in accordance with this Archaeological Design and relevant archaeological standards and national guidelines (refer to Appendix 1). The report will include the following

- a non-technical summary;
- site location;
- archaeological and historical background;
- full detailed methodology;
- aims and objectives;
- results (to include full description, assessment of condition, quality and significance of the results);
- general and detailed plans showing the location of the results and identifying any areas unsuitable for survey, accurately positioned on an OS base map (to a known scale commensurate with the objectives of the survey);
- colour/grey scale plots to aid interpretation. The plots will be contoured (if appropriate) to allow trends to be shown superimposed over data without obscuring it;
- an interpretative plot(s);

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- an assessment of potential with recommendations for further survey;
- images to illustrate the survey work in progress;
- publication proposals if warranted; and
- a cross-referenced index of the project archive.

The report will comment on the potential for extrapolating the results onto adjacent areas.

An electronic copy of the draft report and drawing/figures will be submitted to the Client who may forward a copy to third parties. This will include the Project Archaeological Curator.

Two bound copies, one unbound master-copy and a digital version of the finalised report will be submitted within 1 week of the receipt of comments on the draft report. The digital report shall comprise a CD containing a complete version of the report in PDF format and separate digital text (in Microsoft Word format) and CAD mapping files (in ESRI GIS or AutoCAD format) and any other illustrations or plates (in appropriate format).

A final report of the survey will also be sent to the regional HER within six months of completion, in accordance with CIfA standard and guidance (2016).

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9 RESOURCES AND TIMETABLE

All archaeological personnel involved in the project should be suitably qualified and experienced professionals. The Contractor shall provide the Client with staff CV's of the project manager, site supervisor and site assistants' CV's. All site assistants should have an appropriate understanding of fieldwork procedures.

The fieldwork programme will commence in October 2017, once permission to carry out the survey has been obtained and the survey will be completed at the earliest opportunity. Repeat visits to the site may be required to take advantage of areas where silage crops have been removed.

The Client will inform the Contractor of the start date for the works and the Contractor will provide the Client with a programme for the works (fieldwork and reporting) within 2 days of the start date.

10 ARCHIVE PREPARATION AND DEPOSITION

The archive of finds and records generated during the fieldwork will be kept secure at all stages of the project. All records and materials produced will be quantified, ordered, indexed and internally consistent. The archive will be produced to the standards outlined in *The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017* (National Panel for Archaeological Archives in Wales 2017).

The Contractor will, prior to the start of fieldwork, liaise with an appropriate accredited repository to obtain agreement in principle to accept the documentary, digital and photographic archive for long-term storage. The Contractor will be responsible for identifying any specific requirements or policies of the recipient repository in respect of the archive, and for adhering to those requirements.

Archaeological material recovered from fieldwork is irreplaceable and data

recorded during fieldwork can and should be copied and additionally held securely in a separate location in line with current best practice until it can be deposited in the recipient repository (National Panel for Archaeological Archives in Wales 2017).

The deposition of the archive forms the final stage for each phase of development at the application site. The Contractor shall provide the Client with copies of communication with the accredited repository and written confirmation of the deposition of the archive. The Client will deal with the transfer of ownership and copyright issues.

The archive should be prepared in line with national guidelines (NPAAW, 2017).

11 CONFIDENTIALLY AND PUBLICITY

The archaeological works may attract the interest of the public and the press. All communication regarding this project is to be directed through the Client. The Contractor will refer all inquiries to the Client without making any unauthorised statements or comments.

The Contractor will not disseminate information or images associated with the project for publicity or information purposes without the prior written consent of the Client.

12 COPYRIGHT

The Contractor shall assign copyright in all reports, documentation and images produced as part of this project to the Client. The Contractor shall retain the right to be identified as the author or originator of the material. This applies to all aspects of the project. It is the responsibility of the Contractor to obtain such rights from sub- contracted specialists.

The Contractor may apply in writing to use or disseminate any of the project archive or documentation (including images). Such permission will not be unreasonably withheld.

The results of the archaeological works shall be submitted to the Client, the Welsh government and its advisors by the Client and will ultimately be made available for public access.

13 ACCESS ARRANGEMENTS AND SITE INFORMATION

Access to the site to carry out archaeological investigations will be arranged / organised by the Client.

Should the Contractor require adjustment to the location of fieldwork interventions or works areas due to local conditions, this shall be agreed with the Client prior to its implementation.

14 INSURANCES AND HEALTH AND SAFETY

The Contractor will provide the Client with details of their public and professional indemnity insurance cover.

The Contractor will have their own Health and Safety policies compiled using national guidelines, which conform to all relevant Health and Safety legislation and

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best practice. A copy of the Contractor's Health and Safety policy will be submitted along with their tender to the Client, who will forward on to the Client.

The Contractor shall prepare Risk Assessments and a project specific Health and Safety Plan and submit these to the Client for approval prior to the commencement of the fieldwork. If amendments are required to the Risk Assessment during the works the Client and any other interested party must be provided with the revised document at the earliest opportunity.

The Contractor shall be responsible for identifying any buried or overhead services and taking the necessary precautions to avoid damage to such services, prior to the fieldwork.

15 GENERAL PROVISIONS

The Contractor will undertake the works in accordance with the specifications issued by the Client and in any subsequent written variations. No variation from, or changes to, the specification will occur except by prior agreement with the Client.

The site will be left in a tidy and workman-like condition and the Contractor will ensure that all materials brought onto site are removed.

The Contractor shall make the minimum of disturbance during the fieldwork and will avoid any unnecessary damage. If appropriate, access for temporary parking and the location of site welfare shall be agreed with the Contractor prior to the commencement of the fieldwork. The provision of welfare facilities shall be the responsibility of the Contractor.

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Appendix 1 □

Archaeological standards and guidelines

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Archaeological Standards and Guidelines

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APPENDIX II:
Archive Cover Sheet

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ARCHIVE COVER SHEET

A40 Llanddewi Velfrey to Penblewin, Pembrokeshire

Site Name:	A40 Llanddewi Velfrey
Site Code:	LVP/17/GEO
PRN:	3723, 3726, 23384, 23385, 34441, 48479, & 48576
NPRN:	-
SAM:	-
Other Ref No:	-
NGR:	NGR SN 14907 16829
Site Type:	Agricultural fields
Project Type:	Geophysical Survey
Project Manager:	Philip Poucher
Project Dates:	October 2017 - January 2018
Categories Present:	-
Location of Original Archive:	AW
Location of duplicate Archives:	RCAHMW, Aberystwyth
Number of Finds Boxes:	-
Location of Finds:	-
Museum Reference:	-
Copyright:	AW
Restrictions to access:	None

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Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 10.2 Gazeteer

A40LVP-RML-EGN-SWI-RP-LE-0014

P02 | S4

18/03/19

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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10 Appendix 10.2

10.1 Gazetteer of Sites within 500m

Table 10.1 – Gazetteer of Sites Table

No	Type	Date	Name	Ref	Source	Comment	Impact	Significance	Easting	Northing
1	Cropmark	Unknown	Henllan	46806	NMR		None	Medium	213660	216600
2	Standing stone	Unknown	Parc Maen Llwyd	8009	NMR		None	Medium	213700	216700
3	Burnt Mound	Bronze Age	Ffynon	3700	HER		None	Medium	213640	216760
4	Cottage	Post Medieval		23390	OS 1908		None	Low	213620	216890
5	Baptist Chapel	Post Medieval	Ffynon	4911	NMR	LBII	None	High	213648	216898
6	Building	Post Medieval		48577	Tithe map		None	Low	213680	216960
7	Quarry	Post Medieval		47032	1&2nd edtn OS		None	Negligible	213670	216980
8	Quarry	Post Medieval		19537	HER		None	Negligible	213800	216950
9	Burnt mound	Bronze Age		3723	HER		Uncertain	Medium	213990	216850
10	Quarry	Post Medieval		19418	HER		None	Negligible	215000	216900
11	Dwelling	Post medieval		48575	Tithe map		None	Low	214247	216948
12	Poorhouse	Post medieval		48574	HER		None	Low	214340	216950
13	Dwelling	Post Medieval	White Apron	23385	HER		None	Low	214245	216981
14	Dwelling	Post medieval		48576	Tithe map		None	Low	214226	216988
15	Cottage	Post medieval	Maen y Ffynon	23384	OS 1908		None	Low	214320	217030

No	Type	Date	Name	Ref	Source	Comment	Impact	Significance	Easting	Northing
16	Gravel pit	Post medieval		47033	1&2nd edtn OS		None	Negligible	214461	217000
17	Blacksmith workshop	Post medieval		23389	OS 1908		None	Negligible	214450	216970
18	Cottage	Post medieval	Green Bush	23383	OS 1908		None	Low	213780	217160
19	Burnt mound	Bronze Age		3726	HER		Yes	Medium	214590	217170
20	Burnt mound	Bronze Age	Pentroydin Fach	3441	HER		Uncertain	Medium	214660	217160
21	Building	Post Medieval		48572	Tithe map		None	Low	214580	216884
22	Public House	Post medieval		23386	HER		None	Low	214740	216900
23	War Memorial	Post Medieval		47233	NMR	LBII	None	High	214765	216897
24	Blacksmith workshop	Post medieval		23387	OS 1908		None	Negligible	214800	216900
25	Public House	Post Medieval	Commercial Inn	33803	HER		None	Low	214810	216890
26	Post Office	Post Medieval		23388	1&2nd edtn OS		None	Low	214810	216890
27	Gravel pit	Post Medieval		47034	HER		None	Negligible	214900	216824
28	Quarry	Post Medieval	Parc Ucha	48838	Tithe map		None	Negligible	215507	216996
29	Chapel	Post Medieval	Bethel	15153	HER		None	Medium	215950	216980
30	Cottage	Post Medieval	Bethel	23367	HER		None	Low	215920	216990
31	Well	Post Medieval	Parc Ffynon	48837	Tithe map		None	Negligible	215860	216970
32	Quarry	Post Medieval		47047	1&2nd edtn OS		None	Negligible	215710	216890
33	Building	Post Medieval		48566	1&2nd edtn OS		None	Low	215620	216880

No	Type	Date	Name	Ref	Source	Comment	Impact	Significance	Easting	Northing
34	Cottage	Post Medieval	Wheelabout	23368	OS 1908		None	Low	215430	216820
35	Promontory Fort	Unknown		4917	HER		None	Unknown	215750	217240
36	Cottage	Post medieval		23363	OS 1908		Uncertain	Low	215400	217300
37	Burnt Mound	Bronze Age	Blaen Pen Troydin	3737	HER		None	Medium	215120	217440
38	Quarry	Post medieval		19532	HER		None	Negligible	211971	216887
39	Road	Post Medieval	Turnpike trust	24218	HER		Yes	Medium	212061	216641
40	Farmstead	Post Medieval	Penblewin	48583	Tithe map		None	Low	212080	216620
41	Soil marks	Unknown		DBA	Survey	Google Earth 19 Apr 09	None	Unknown	212511	216325
42	Farmstead	Post medieval	Ca'rmaenon Fach	48582	Tithe map		None	Low	212660	216630
43	Farmstead	Post medieval	Treforgan Farm	48581	Tithe map		None	Low	212840	216680
44	Dwelling	Post medieval		48580	Tithe map		Yes	Low	213110	216830
45	Dwelling	Post medieval		48579	Tithe map		Yes	Low	213200	216850
46	Building	Post medieval		48578	Tithe map		Yes	Low	213300	216810
47	Lodge	Post Medieval	Park Lodge	19536	HER		None	Low	213280	216840
48	Burial Ground	Post Medieval	Treforgan Farm	34750	HER		None	Medium	213100	217070
49	Dwelling	Post Medieval		47027	1st edtn OS		None	Low	213250	216920
50	Quarry	Post medieval		47028	1st edtn OS		None	Negligible	213341	217029
51	Gravel pit	Post Medieval		47035	HER		None	Negligible	214970	216780
52	Quarry	Post Medieval		DBA	1st edtn OS	Google Earth 25 May 2006, dark patch like possible burnt	None	Negligible	216293	216487

No	Type	Date	Name	Ref	Source	Comment	Impact	Significance	Easting	Northing
						mound, but is the location of quarry pit on 1st Ed OS				
53	Dwelling	Post Medieval	Car Coryn	DBA	Tithe map	Cottage and garden on tithe map plot 27	None	Low	216156	216649
54	Dwelling	Post Medieval	Gwarthy Bach	DBA	Tithe map	Cottage and garden on tithe map plot 24	None	Low	216181	216317
55	Dwelling	Post Medieval	Upper Howly	DBA	Tithe map	Cottage and garden on tithe map plot 349	Yes	Low	214963	217321
56	Farmstead	Post Medieval		DBA	Survey	Standing structure	Yes	Low	212057	216659
57	Old bridge	Post Medieval	Ffynon	DBA	Survey	Standing structure	None	Low	213750	216911
58	Lidar Feature	Unknown		DBA	Lidar		None	Unknown	214146	216889
59	Building	Post Medieval		DBA	1st edtn OS		None	Low	214416	216943
60	Leat (Possible)	Post Medieval		DBA	1st edtn OS		Yes	Negligible	214484	217151
61	Cropmark	Unknown	Penblewin	DBA	Survey	Google Earth	None	Unknown	212124	216504
62	Cropmark	Unknown	Henllan	DBA	Survey	Google Earth Rectangle	None	Unknown	213642	216330
63	Field System	Medieval? / Post Medieval		DBA	1st edtn Os		Minor	Medium	213000	217000
64	Possible enclosure	Unknown	G1(1)	Geophys	Survey		Major	Unknown	212206	216850
65	Possible enclosure	Unknown	G4(1)	Geophys	Survey		Major	Unknown	212371	216695
66	Possible enclosure	Unknown	G4(5)	Geophys	Survey		Major	Unknown	212473	216709
67	Numerous features	Unknown	G13(1-7)	Geophys	Survey		None	Unknown	213814	217004
68	Curvilinear feature	Unknown	G15(2)	Geophys	Survey		None	Unknown	214328	217005

No	Type	Date	Name	Ref	Source	Comment	Impact	Significance	Easting	Northing
69	Curvilinear feature	Unknown	G17(2)	Geophys	Survey		Major	Unknown	214502	217152
70	Multiple features	Unknown	G18(5-11)	Geophys	Survey		Major	Unknown	214635	217225
71	Potential trackway	Unknown	G21a(2)	Geophys	Survey		Major	Unknown	215253	217246
72	Potential trackway	Unknown	G21b(1)	Geophys	Survey		Major	Unknown	215264	217202
73	Possible ridge and furrow	Unknown	G21b(2)	Geophys	Survey		Major	Unknown	215297	217216
74	Linear feature	Unknown	G22a(2)	Geophys	Survey		Major	Unknown	215406	217112
75	Linear feature	Unknown	G22a(3)	Geophys	Survey		Major	Unknown	215476	217146
76	Possible burnt area	Unknown	G22b(5)	Geophys	Survey		Major	Unknown	215515	217141
77	Linear feature	Unknown	G22b(4)	Geophys	Survey		Major	Unknown	215539	217119
78	Linear feature	Unknown	G22b(1)	Geophys	Survey		Major	Unknown	215555	217086
79	Linear feature	Unknown	G22a(5)	Geophys	Survey		Major	Unknown	215648	217044
80	Quarrying area	Unknown	G22c(1)	Geophys	Survey		Major	Unknown	215541	217016
81	Possible ferrous	Unknown	G22e(1)	Geophys	Survey		Major	Unknown	215722	217007
82	Possible ferrous	Unknown	G22e(2)	Geophys	Survey		Major	Unknown	215718	216974
83	Possible ferrous	Unknown	G22e(3)	Geophys	Survey		Major	Unknown	215734	216957
84	Building	Post medieval	Gwindy Farmhouse	6541	NMR	LBII with Walls and railings to Garden	None	High	216287	217020
85	Building	Post medieval	Old Stable Block at Gwindy	6542	NMR	LBII	None	High	216252	217009
86	Homestead	Post medieval		DBA	Tithe map		None	Unknown	215779	217093

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

ES Appendix 10.3 Designated sites within 5km of the project

A40LVP-RML-GEN-SWI-RP-LH-0001

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18/03/19

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Designated Sites within 5km of the Project

1.1 Listed Buildings

Name	Ref	Class	Easting	Northing
Church of St Peter	6055	LBII	215523	214439
Ffynnon Baptist Chapel	6056	LBII	213648	216898
Church of St. Aidan	6062	LBII	207520	217468
Llawhaden Bridge and River Bank Wall	6064	LBII*	207473	217251
Llawhaden Castle	6065	LBII*	207303	217465
Pen Llwyn House	6071	LBII	208859	217683
Vaynor	6072	LBII*	209805	217513
Mounton Chapel	6082	LBII	208085	213257
Castell Coch	6087	LBII	207121	213683
Robeston Wathen Church	6092	LBII	208450	215746
Narbeth Castle	6473	LBII	210978	214392
Milestone by entrance to New Cemetery	6474	LBII	210945	214427
Parish Church of St Andrew	6475	LBII	210839	214428
Plas Farmhouse	6476	LBII	210836	214467
The Coach & Horses Inn	6477	LBII	210904	214797
No.2 High Street	6478	LBII	210901	214790
No.3 High Street	6479	LBII	210900	214784
The Golden Sheaf	6480	LBII	210932	214643
Town Hall	6481	LBII	210926	214622
Pencraig	6482	LBII	210906	214627
Howell Williams Solicitor, County of Pembroke Sherriff's Office	6483	LBII	210903	214635
National Westminster Bank	6484	LBII	210900	214643
Bethesda Baptist Chapel	6485	LBII	210861	214668
Gates to Bathesda Chapel	6486	LBII	210895	214678
Hugh H Morgan	6487	LBII	210966	214616
Megna Indian Takeaway	6488	LBII	210982	214617
Pillar Box	6489	LBII	210997	214606
Whispers	6490	LBII	210997	214585
Olieme House	6491	LBII	211006	214584
No.14 Market Square	6492	LBII	210959	214573
Anthony Maxwell – Photographer	6493	LBII	210953	214585
Anthony Maxwell – Photographer	6494	LBII	210949	214590
War Memorial	6495	LBII	210972	214596
Telephone Call-box by War Memorial	6496	LBII	210975	214582
Lamp Standard by War Memorial	6497	LBII	210975	214586
No.12 Market Square	6498	LBII	210981	214522
The Rutzen Arms P.H.	6499	LBII	211005	214511
Hill House (Chestnut Tree Lodge)	6500	LBII	210883	214816
The Emporium	6501	LBII	210894	214813

Name	Ref	Class	Easting	Northing
Bloomfield	6502	LBII	211001	215080
Bloomfield Terrace	6503	LBII	210901	215062
Bloomfield Terrace	6504	LBII	210907	215069
No.21 Northfield Road	6505	LBII	210891	215047
Blaen Ffynnonau	6506	LBII	211145	215923
Stable attached to Blaen Ffynnonau	6507	LBII	211145	215914
Blaen Marlais	6508	LBII	210972	216010
Barn in Grounds of Blaen Marlais	6509	LBII	211000	215998
Barclay's Bank	6510	LBII	211002	214645
Old Bank House	6511	LBII	211032	214651
Staunton House	6512	LBII	211040	214658
Llwynon	6513	LBII	211052	214632
Annexe adjoining No.61 (Llwynon)	6514	LBII	211059	214634
G.Badham & Sons	6515	LBII	211036	214634
Animal Kitchen	6516	LBII	210912	214797
Greenway Farm	6517	LBII	211656	214662
Cartshed adjoining Greenway Farm	6518	LBII	211653	214653
Stable adjoining Greenway Farm	6519	LBII	211653	214649
Byre at Greenway Farm	6520	LBII	211639	214670
Outhouse at Greenway Farm	6521	LBII	211640	214662
Tabernacle United Reformed Church	6522	LBII	211080	214630
Schoolroom to Tabernacle United Reformed Church	6523	LBII	211083	214611
Blackaldern	6524	LBII	211961	214204
Coach House at Blackaldern	6525	LBII	211933	214206
Parish Boundary Stone	6526	LBII	212107	214395
Milestone on Lane leading off A478 to Cold Blow	6527	LBII	211454	213274
Cilfrath Fach	6528	LBII	211090	216922
Cowhouse at Cilrath Fach	6529	LBII	211057	216939
Lofted Cowhouse at Cilrath Fach	6530	LBII	211076	216950
Stable at Cilrath Fach	6531	LBII	211091	216959
Barn at Cilrath Fach	6532	LBII	211095	216945
Milestone	6533	LBII	209994	215130
Milestone	6536	LBII	211953	214528
Pont Shan	6537	LBII	209383	216824
Sodstone House	6538	LBII	210297	216314
Sodstone Manor	6540	LBII	210209	216556
Gwindy Farmhouse with walls and railings to garden	6541	LBII	216287	217020
Old Stable Block at Gwindy	6542	LBII	216252	217009
Trewern Mansion	6546	LBII	217394	217762
Panteg farmhouse	6547	LBII*	215709	216121
The Former Courthouse	6558	LBII	210974	214546
Llandre-Egremont Farmhouse	9398	LBII	209325	220323
Trevaughan Bridge	9416	LBII	220040	216170

Name	Ref	Class	Easting	Northing
Glanrhyd House	9729	LBII	214721	218439
Offices & Outbuildings to W of Glanrhyd House (also known as The Court House)	9730	LBII	214686	218439
Barn at Glanrhyd	9731	LBII	214661	218513
Glanrhyd Farm	15630	LBII	214688	218533
Llawhaden Village Pound	18796	LBII	207258	217422
Bethesda Congregational Chapel	18797	LBII	209081	217912
Pont Shan	18798	LBII	209383	216827
Gelli Bridge	18799	LBII	208363	219511
Robeston House	18800	LBII	208510	215776
Rock Well	18801	LBII	208438	215925
Allensbank	18974	LBII	211202	213321
Great Molleston Farmhouse	18977	LBII	209702	212387
The Grove	18978	LBII	209353	212945
St. David's Parish Church	18982	LBII	214392	215870
War Memorial	18983	LBII	214766	216897
Fron	18984	LBII	217179	216929
Cyffic and Lampeter Velfrey Parish Boundary Stone	18986	LBII	218185	212645
Milepost in Tavernspite village	18987	LBII	218186	212648
Milepost near Lower Llantydwell	18988	LBII	217104	212372
War Memorial	18989	LBII	215501	214412
Milepost at Glan Rhyd	18990	LBII	215577	212127
Milepost at Gelli-deg	18991	LBII	214155	212548
Carvan Congregational Chapel	18997	LBII	217461	214105
Crinow and Lampeter Velfrey Parish Boundary Stone	18998	LBII	212908	214039
Derry Cottage	18999	LBII	216635	214687
Cyffig Church	24116	LBII*	220810	213933
Llwynybrain Cottage	24953	LBII	219849	215033
Lan	82347	LBII	216843	220428
Llanfallteg Bridge	82348	LBII	215178	219469
Cleddau Railway Bridge (partly in New Moat Community)	82464	LBII	208572	219733
Dovecote at Llandre-Egremont	82465	LBII	209310	220316
Eithin-man	82466	LBII	214019	220519
Grondre House	82467	LBII	211211	217923
Longridge Bridge (Partly in New Moat Community)	82469	LBII	208547	219674
Water house at rear of Glanrhyd House	82473	LBII	214717	218447
Cottage by Nant-y-ffin Hotel	82946	LBII	212184	220784
Llandissilio War Memorial	82947	LBII	212135	221577
Gelli Bridge (partly in Llawhaden community)	83174	LBII	208369	219516
The Old Pharmacy	87564	LBII	210988	214620
Telephone Call-box to SE of St Peter's Church	87566	LBII	215471	214402
Parc Glas	6534	LBII	212854	214359
Coach House & Stables Sodstone House	6539	LBII	210293	216347
Waundwrgi Farmhouse	18985	LBII	217018	216417

Name	Ref	Class	Easting	Northing
St David's Parish Church	18982	LBII	214392	215870
Parish Church of St Teilo	6535	LBII	212755	214375

1.2 Scheduled Ancient Monuments within 5Km of the Project

Name	Ref	Class	Easting	Northing
Earthworks SE of Clyn-Derwen Enclosure	CM065	SAM	212322	218940
Inscribed Stone N of Parciau Farmhouse Inscribed stone	CM069	SAM	217769	219863
Llandre Entrenchment Enclosure	CM089	SAM	209458	220291
Llangan Church Cropmark Enclosure Enclosure	CM264	SAM	217733	218714
Roman Road 250m NE of Pwll-y-Hwyaid Road	CM279	SAM	220134	217283
Crugiau Round Barrows Round barrow	CM309	SAM	212277	220593
Llawhaden Bridge Bridge	PE023	SAM	207463	217254
Llawhaden Castle Castle	PE024	SAM	207292	217452
Llan Burial Chamber Chambered tomb	PE026	SAM	214714	214048
Narberth Castle Castle	PE040	SAM	210985	214394
Blaengwaith-Noah Camp Promontory Fort – inland	PE085	SAM	215164	212357
Llanddewi Gaer Promontory Fort – inland	PE086	SAM	214449	216075
Camp 400m NW of Holgan Promontory Fort – inland	PE102	SAM	207348	218189
Camp 370m NE of Stoneyford Enclosure	PE104	SAM	207122	218453
Camp 200m NE of Stoneyford Promontory Fort	PE105	SAM	207038	218281
Vaynor Gaer Ringwork	PE115	SAM	209425	217114
St Canna's Chair Inscribed stone	PE148	SAM	217708	218747
Redstone Cross Round Barrows Round barrow	PE154	SAM	211015	216416
Caerau Gaer Rath	PE176	SAM	213985	216102
Castell Ringwork	PE177	SAM	215496	214612
Bush Inn Camp Promontory Fort – inland	PE182	SAM	207633	215536
Gelly Earthwork Rath	PE184	SAM	207933	219716
Molleston Camp Enclosure	PE274	SAM	208739	212966
Llan-Marlais Round Barrow Round barrow	PE327	SAM	217848	216352
Crug Swllt Round Barrow Round barrow	PE364	SAM	217709	212314
Pengawse Medieval House Site Manor	PE389	SAM	217658	216889
Pengawse Ring Cairn Ring barrow	PE390	SAM	217199	217201
Narberth Mountain Enclosure Enclosure	PE394	SAM	211334	213034
Clyn Pattel Motte & Bailey Motte	PE412	SAM	212833	214178
Iron Age Hillslope Enclosure in Canaston Wood Enclosure	PE413	SAM	208863	214093
Llangwathan Castle Mound Motte	PE434	SAM	213405	215294
Roman Road 300m East of Bryn Farm Road	PE472	SAM	215539	218280

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Appendix 10.4: Desk Based Assessment

A40LVP-RML-EGN-SWI-RP-LH-0002

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18/03/19

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Desk Based Assessment

A40 Llanddewi Velfrey to Penblewin Improvements



Landsker Archaeology Ltd.

Desk Based Assessment

Project 1702

www.landskerarchaeology.co.uk

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A40 Llanddewi Velfrey to Penblewin Improvements
Desk Based Assessment

1. Summary

Ystyrir bod gwelliant arfaethedig yr A40 Llanddewi Felffre i Benblewin yma yn asesiad desg o wybodaeth archeolegol dros hyd y 4.2km o'r prosiect. Mae'r astudiaeth hwn yn cynnwys yr holl wybodaeth sy'n hysbys am yr ardal

Mae'r cynllun yn gorwedd yn plwyf Llanddewi Felffre, Sir Benfro. O fewn yr ardal astudio 500m ar bob ochr i ffin y Cynllun, nodwyd 86 o asedau. O'r rhain, ceir 31 o asedau o fewn ffin y Cynllun ac fe allent gael eu heffeithio'n ffisegol. Mae weddill y 55 o asedau y tu allan i'r Cynllun ac ni ddylid effeithio arnynt.

The proposed A40 Llanddewi Velfrey to Penblewin improvement is considered here as a desk based assessment of archaeological information on the 4.2km length of the project. The study includes all the information known for the area

The scheme lies with the parish of Llanddewi Velfrey, Pembrokeshire. Within the 500m study area on either side of the Scheme boundary, 86 assets were identified. Of these, 31 assets are found within the Scheme boundary and are potentially physically impacted. The remaining 55 assets are outside the Scheme and should not be impacted.

2. Introduction

The Welsh Government has commissioned improvements to the A40 between Llanddewi Velfrey to Penblewin. This consists of a new build section to the north of Llanddewi Velfrey beginning at the top of Pengawse Hill, before re-joining the existing A40 east of the village and continuing as a new section parallel, and to the north of the existing road continuing to Penblewin roundabout, a distance of 4.2km (figure 1).

Landsker Archaeology Ltd. was asked by Richards, Moorehead and Laing Ltd. (RML) to undertake the Desk Based Assessment and supply other archaeological advice to the project. This specification for the Desk Based Assessment. Dyfed Archaeological Trust – Development Management (DAT-DM) was agreed with the regional curators acting for Cadw and the local planning authorities.

The project was originally awarded to the Carillion group as an early contractor involvement contract in the Spring of 2017. Initial work began on the design and preparation of the Environmental Statement, but ceased with the liquidation of Carillion in January 2018. Work was suspended, but resumed in September 2018 as a contract to complete the design work by Arup and the Environmental Assessment by RML, who were part of the original team.

The overall aims of the project are to understand the nature of archaeological deposits on the site and determine the effect of the proposed development on that archaeological resource. The project will:

Undertake a historic map regression to assist in understanding the development of the landscape
Gather sufficient information to establish the presence or absence, extent, condition, character, quality and date of any archaeological remains
Recommend mitigatory measures for preservation in situ of archaeological deposits
Determine the palaeo-environmental potential of the Scheme area. This will seek to identify potential areas of poor drainage that may have led to the development of peat deposits. The area also lies at the southern limit of the potential glacial erratic train carried eastwards from the igneous extrusions along the Preseli ridge.
Produce and submit a suitable archive
Produce a report that addresses the above.

The project code is Landsker Archaeology P1702.

3. Standards and Conduct

Landsker Archaeology Ltd. fully endorses the Chartered Institute for Archaeologists'

Code of Conduct (2000)
Code of Approved Practise for the Regulation of Contractual Arrangements in Field Archaeology (2000)
Standard and Guidance for the archaeological investigation and recording of standing buildings or structures (1999)
Standard and Guidance for archaeological field evaluation (1999)
Standard and Guidance for Finds and Ecofacts Studies and Curation (1999)

The management of the project will be in accordance with the methods and practice described in *Management of Archaeological Projects*, second edition (English Heritage 1991).

4. Field Procedures

The route of the proposed improvement was walked on foot in the Autumn of 2017 with additional visits during the summer of 2018 to examine the state of the drought and subsequently in December 2018 to specific locations to identify and record new features. Locational information was collected using a Trimble R1 GNSS unit, capable of recording points of interest to an accuracy of one metre. This information was then uploaded to a GIS. Photographs were tagged with a geo-location and added to the GIS.

The study area for historic asset collection was the land take and a corridor 500m beyond the boundary of the proposed Scheme. Where linear or historic landscape features extend beyond the 500m area, the study area was extended in order to provide sufficient context for the understanding of such features.

For designated heritage assets that could be affected as a result of significant change within their settings (e.g. scheduled monuments and listed buildings), the study area has included all such assets within a zone of 5km. The locations of Designated Sites are shown in Figure 3.

Full coverage of the regional HER for the main study area was acquired from the Dyfed Archaeological Trust (DAT), together with details of defined Historic Landscape Character

Areas. Information regarding scheduled monuments, listed buildings and Registered Parks, Gardens and Landscapes of Special Historic Interest was obtained from Cadw and from published sources.

Geophysical survey in the form of fluxgate gradiometer survey was undertaken at a number of locations on the Scheme. The areas were selected for survey on the basis of scheme design and impact; the land use effect on magnetic survey; and overall archaeological potential (Archaeology Wales, 2018).

The LiDAR information contained in the Lle website (lle.gov.wales) was examined and used to provide information on earthworks and topography across the study area.

Available satellite imagery covering the Scheme was acquired from commercial suppliers and examined along with other historic aerial photographs. Historic aerial photographs were examined following a search of data held by the APU of the Welsh Government in Cardiff. A series of RAF vertical photographs from 1946 were geo-referenced and placed on the project GIS.

Limitations

All readily available data required for the assessment were acquired and examined. A key limitation is the presence or absence of buried archaeological remains within the Scheme boundary. Remote sensing methodologies (LiDAR, satellite imaging and geophysical survey) were utilised in order to gain as much information as possible at this stage of potential evidence.

No intrusive archaeological investigation has been undertaken. The assessment of value of each site is based on documentary and site visit information. The actual value of each site may be re-assessed following ground investigation that may give additional information.

5. Desk Based Assessment

The study used available printed and library material including historic map sources. Secondary sources such as published reports were used. Information was gathered for an area encompassing the Scheme defined limits and a wider zone up to 500m from either side of the Scheme boundary. Designated sites (scheduled monuments and listed buildings) were collected for a buffer zone up to 5km wide from the project boundaries

The following sources were examined
The regional Historic Environment Record (HER) held by Dyfed Archaeological Trust
Lists at the National Monuments Record for Wales contained on the Coflein database
Lists of Listed Buildings maintained by Cadw
Lists of Scheduled Monuments maintained by Cadw.
The regional Historic Environment Record (HER) held by Dyfed Archaeological Trust
The NRW LANDMAP website information on Conservation Areas and Historic Landscape Areas
Historic aerial photographs, both vertical and oblique held by the NMR.
Lidar sources contained on the Lle.gov.wales website.

6. Results and Discussion

Baseline Environment

The archaeological and cultural heritage assets contained within the area covered by the route option is varied. Most assets are from the last two hundred years, with a range of sites in the area stretching back through the medieval to the Prehistoric period. A Gazetteer of historical assets in the 500m study area is shown in Table 2. Table 3 shows the sites with an identified impact.

The known archaeological evidence with a brief historical baseline for the 5km zone around the Scheme is presented below. Details of sites identified in the 500m study area are included identified by a reference number in brackets, e.g. (Site 63).

A summary list of sites with an impact and suggested further assessment actions is presented in Table 1.

Site location

The site covers an area across a large number of agricultural fields of permanent pasture land, largely bounded by hedgerows, lying between Bethel Chapel on the A40 the east of Llanddewi Velfrey (SN 1588 1698) and the roundabout at Penblewin to the west (SN 1184 1666). This a length of 4.2km.

The eastern part of the scheme curves around to the north of Llanddewi Velfrey, through largely agricultural land, across north facing slopes cut by a small valley. The western part of the scheme utilises part of the existing A40 carriageway and part of the agricultural land that runs alongside and to the north of the road.

Geology

The underlying bedrock of the area comprises mudstones of the Slade and Redhill; Portfield; and Haverfordwest Formations. This is partly overlain in one narrow strip by glacio-fluvial deposits, with Till – diamicton, running along some of the drainage channels to the north (BGS 2017).

The NRW LANDMAP Geological Landscape Polygon.shp,(accessed at http://lle.gov.wales) gives the following information for the 500m study area:
Narberth - Llanddewi Velfrey PMBRKGL195
Lowland scarp and dip-slope dominated terrain. Prominent block with steep scarp surrounding the N, W and SW of Lampeter Vale and formed of Ordovician and Silurian slates, the latter with thin sandstone bands, Dissected by steep-side cwms, most prominently on the N side. Sedimentary Silurian Sandstone. Slate. Includes nationally important proposed geological SSSI at Pengawse Hill (Ordovician stratigraphy).

Palaeo-environmental potential

There are areas of low-lying ground on either side of the ridge along which the project runs that contain areas of poor drainage that may give rise to the development of peat deposits.
Three areas can be identified as such:
SN 13905 16892 Ffynnon area, south of the road line
SN 14590 17216 Pentroyddin, north of the road
SN 15015 17381 Pentroyddin, north of the road.

The nature of these area is indicated by the fact that all are close to the locations of features identified as burnt mounds (Sites 3, 20 and 37).

The area also lies at the southern limit of the potential glacial erratic train carried southeastwards from the igneous extrusions along the Preseli ridge (Strahan *et al*., 1914). It is possible that glacial erratics may be found within the Scheme during deep excavations. It is also possible that glacial deposits may be encountered within the Scheme working. Recording any such features

Landscape

The NRW LANDMAP Historic Landscape Polygon.shp,(accessed at http://lle.gov.wales) gives the following information for the 500m study area:

Clynderwen PMBRKHL 42473.
This area has been assigned an overall value of moderate, as, although the fieldscape and dispersed settlement pattern shown on the early editions of the OS survives largely intact, the archaeological resource is limited.

Llanddewi Velfrey PMBRKHL46206.
This multi-period landscape has been assigned an overall value of high based on the diversity of its archaeological remains and built heritage.

Palaeolithic and Mesolithic (to 4000 BC)

There is only limited evidence for occupation during the various Palaeolithic periods in Wales. What is known comes from deposits on the coast of Pembrokeshire and Gower. The post-glacial Mesolithic, continued a similar economy and probably used this area. Evidence for this period, however, is also limited and found mostly in coastal locations in Pembrokeshire.

No assets of this period are identified within the 500m study area.

Neolithic (4000 BC to 2200 BC)

Local evidence for the Neolithic is limited to a couple of isolated findspots and the Llan burial chamber in Lampeter Velfrey. During the construction of the A477 Redberth to Sageston bypass, a Neolithic settlement consisting of numerous stakeholes and other features associated with burning was excavated (Page, 2002). Similar evidence for prehistoric sites including those of a Neolithic date, can be expected to be located, although their location is difficult to predict (Griffiths, 2017).

No sites of this period have been identified within the 500m study area.

Bronze Age (2500 BC to 700 BC)

Evidence of Bronze Age use of the area is shown by large numbers of round barrows. These are often found in concentrations such as Redstone west of the study area. These represent a belief in the afterlife shown by the burials within them. Bronze Age society was relatively mobile, with burial sites being a fixed point in the landscape, located on relatively high points. Five

round or ring barrows, designated as Scheduled Ancient Monuments in the surrounding area (outside the 500m study area).
Evidence of domestic use of the area is shown by the frequent discovery of burnt mounds. These are collections of burnt fire shattered stone in a matrix of charcoal rich soil. They are typically found in close association with springs or small watercourses. Radiocarbon dating normally shows them to be of Bronze Age date, although some are earlier and they can be as late as the Post-Roman era. On excavation, these features are usually associated with a small water-filled trough. Experimental archaeology shows that the water can be brought to boiling point by dropping heated stones into the troughs. This can then be used for cooking or possibly, some form of sauna. These sites are very common Wales, Ireland and Scotland. All the features in the study area were found by Ordnance Survey surveyors (Cantrill and Jones, 1911), who identified many in the region during his fieldwork in the early 20th century. It is likely that many more of these common, but not very visible, sites await discovery in the area. Over 50 such sites were found in the recent pipeline across South Wales (Griffiths and Challinor, 2014).

Within the 500m study area, 5 locations are believed to be burnt mounds of this period (Sites 3, 9, 16, 20 and 37).

Iron Age (800 BC to AD 43)

This period is characterised by a more settled economy featuring defended enclosures. These often contained houses that were enclosed by a defensive bank and ditch. Some were formed by building an earth bank across the end of a ridge to create a promontory fort. There are several of these, west of the study area, using the ridges along the meanders of the East Cleddau River Valley (for example, Williams and Mytum, 1998). There are many other similar enclosures known only from cropmarks in the area. The economy of these people is thought to be based on herds of cattle and sheep which required protection. Although these sites originate in the Iron Age, many continue to be used through the Roman period and it is likely that some continued even into the post-Roman period.

Within the 500m study area, there is a single site that is likely to originate in this period, a promontory fort, (Site 35).

Roman (AD 43 to AD 410)

The most obvious evidence of Roman activity in the study area is the line of a road running west from Whitland along the north side of the study area. This was well-constructed with evidence of two periods of construction. It can be traced towards the Roman fort at Wiston, just outside the study area. Though the road is likely to have had its origins in the military period, it indicates strong interest in west Wales. No other sites of Roman date were identified. Some of the Iron Age sites, adjacent to the wider study area, contain excavated evidence of Roman date. This is typical and is probably repeated in similar sites in the study area.

No sites of this period have been identified within the 500m study area.

Early Medieval (AD 410 to AD 1066)

Evidence of the adoption of Christianity can be seen in the inscribed crosses found in several locations dating to the early medieval. Domestic settlement probably continued or re-established itself in the defended enclosures, although new centres of settlement probably began, possibly in the locations used by later farms and, consequently, are difficult to identify.

No sites of this period have been identified within the 500m study area.

Medieval (1066 to 1540)

Llanddewi Velfrey, Lampeter Velfrey and Crinow were part of the commote of Efelffre, a pre-Norman territorial unit, which was the origin of the suffix Velfrey.

The medieval period is characterised by castles and churches with associated settlement that signified a settled landscape with a developed farming system. To the east was Whitland Abbey, which has strong associations with Hywel Dda as he drew up his laws here around 940. It functioned as a Cistercian monastery between the 12th and 16th centuries.

The period saw the early development of market towns such as Narberth, and some of the larger villages began to develop such as Lampeter Velfrey, Clunderwen and Llandissilio. The villages were set in a landscape of long rectangular fields, parts of which can be seen in the present-day landscape (Site 63).

There are no assets directly identified to this period, the village of Llanddewi Velfrey and the field system (Site 63) almost certainly have origins in the period, but no elements can be directly identified to that date.

Post-medieval (1540-1901)

The strong social and cultural division of west Wales, the Landsker line, probably was at its strongest in this period. Though it originates from the settlement of Flemings in South Pembrokeshire in the 12th century, the clearest evidence for the linguistic provision comes from names, records and civil transactions of the later period. The study area is north of the Landsker division and firmly in the Welsh speaking area, as shown by inscriptions on gravestones in the two main chapels, Bethel (Site 29) and Ffynnon (Site 5), close to the proposed road alignment.

Communication routes became prominent across the area in this period. The line of the A40 was adopted as a turnpike between Whitland and Penblewin operated by the Whitland Trust (Site 39). A later development was the railway line from Carmarthen to Haverfordwest, erected in 1854, north of the study area. Whitland was the junction for lines to Pembroke Dock, Tenby, Fishguard and Cardigan. The station became a marshalling yard and was a focal point in the transport of agricultural products to industrial areas. The construction of a milk processing factory gave a huge impetus to the development of the town. This was in contrast the town of Narberth, isolated from both the A40 and the railway, leading to a slower growth.

The village of Llanddewi Velfrey appears to have its origins close to the Church of St David's, which lies approximately 1.1km to the southwest of the modern settlement on the existing A40. During the Victorian period, it moved more toward the line of the present day A40 as shown by historic maps. This resulted in the development of a strip settlement along the A40.
Within the 500m study area, 53 assets were identified from this period (Sites 4-8, 10-18, 21-34, 36, 38-40, 42-57, 59, 60, 63, 84-86).

Features of Unknown Date

There are a number of assets identified as 'unknown' date. These probably date from the Post-medieval. The assets are cropmarks (Sites 1, 61, 62); a standing stone (Site 2); soil marks (Site 41) and a LiDAR feature (Site 58).

The geophysical survey identified 20 features that are of possible archaeological origin. These are of unknown date, although some align with the field layout, so could be of similar age. The features are identified as possible enclosures (Sites 64, 65, 66); numerous features (Site 67);

curvilinear features (Sites 68, 69); multiple features (Site 70); potential trackways (Sites 71, 72); possible ridge and furrow (Site 73); linear features (Sites 74, 75, 77, 78, 79); possible burnt area (Site 76); quarrying area (Site 80) and possible ferrous material (Sites 81, 82, 83).

Physical impact

Within the 500m buffer zone on either side of the Scheme boundaries, identified as the study area, 86 sites were identified. 55 sites are not physically impacted by the Scheme, 31 sites appear to be physically impacted. The sites with an impact are summarised in Table 1, with a more detailed in Table 3.

There is a high potential that intrusive works on either option may uncover previously unrecognised archaeological deposits. The potential for previously unrecorded archaeology has not been quantified at this stage, but is likely to be adverse.

7. Post-fieldwork methodology

Archiving

The archaeological document archive will include all reports, fieldwork records, notebooks, plans, photographs and digital records as defined in *Management of Archaeological Projects* para 5.4 and Appendix 3 (English Heritage, 1991).

The project archive will conform to the conditions for the acceptance of project archives for long term storage outlined in The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017.

This action will be completed following receipt of comments and is planned for 1 July 2019.

8. Conclusions

The desk based assessment has identified a range of site within the study area. These range from the bronze age through field systems with their origin in the medieval and on to dwellings of the post medieval, which form the majority of sites. Four sites have been identified as burnt mounds which probably indicate adjacent Bronze Age settlement. Religious sites are indicated by two chapels and a number of graveyards and memorials.

The primary feature found through the study area is the line of the turnpike trust road, which may follow a long established route, now used as the A40.

The geophysical survey identified a large number of features that may be of archaeological origin. A high proportion of these appear to align with field boundaries that have since been removed. The nature of these features will need to be examined through a programme of intrusive fieldwork to identify the nature of any archaeological features present here. The scale and extent of this programme of work will need to be agreed with the Dyfed Archaeological Trust-Development Management. A summary list of suggested action is presented in Table 1.

Table 1. Summary of impacted sites and suggested further action

Site	Description	Action
9	Burnt mound	Further assessment
19	Burnt mound	Further assessment
20	Burnt mound	Further assessment
36	Cottage	Further assessment
39	Turnpike trust road.	Recording during watching brief
44	Cottage (Trefangor)	Building recording
45	Dwelling	Further assessment
46	Building .	Further assessment
55	Cottage and garden	Further assessment. Detailed landscaping design may remove the impact from this site
56	Standing building (Penblewin)	Building recording
60	Boundary, possible leat	Further assessment
63	Field system	Recording during watching brief
64	Geophysical survey G1(1) Possible enclosure	Further assessment
65	Geophysical survey G4(1) Possible enclosure	Further assessment
66	Geophysical survey G4(5) Possible enclosure	Further assessment
67	Geophysical survey G13(1-7) Numerous features	Further assessment
68	Geophysical survey G15(2) Curvilinear feature	Further assessment
69	Geophysical survey G17(2) Curvilinear feature	Further assessment
70	Geophysical survey G18(5-11) Multiple features	Further assessment
71	Geophysical survey G21a(2) Potential trackway	Further assessment
72	Geophysical survey G21b(1) Potential trackway	Further assessment
74	Geophysical survey G22a(2) Linear feature	Further assessment
75	Geophysical survey G22a(3) Linear feature	Further assessment
76	Geophysical survey G22b(5) Possible burnt area	Further assessment
77	Geophysical survey G22b(4) Linear feature	Further assessment
78	Geophysical survey G22b(1) Linear feature	Further assessment
79	Geophysical survey G22a(5) Linear feature	Further assessment
80	Geophysical survey G22c(1) Quarrying area	Further assessment
81	Geophysical survey G22e(1) Possible ferrous	Further assessment
82	Geophysical survey G22e(2) Possible ferrous	Further assessment
83	Geophysical survey G22e(3) Possible ferrous	Further assessment

9. References

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Websites

https://www.archwilio.org.uk

https://www.coflein.gov.uk/

https://places.library.wales/browse/

10. Gazetteers

Table 2. All identified sites within the 500m study area.

No	Type	Date	Name	HER	Source	Impact	Easting	Northing	Current status
1	Cropmark	Unknown	Henllan	46806	NMR	None	213660	216600	Unknown
2	Standing stone	Unknown	Parc Maen Llwyd	8009	NMR	None	213700	216700	Unknown
3	Burnt Mound	Bronze Age	Ffynnon	3700	HER	None	213640	216760	Unknown
4	Cottage	Post Medieval		23390	OS 1908	None	213620	216890	Standing
5	Baptist Chapel	Post Medieval	Ffynnon	4911	NMR	None	213648	216898	LBII, Standing
6	Building	Post Medieval		48577	Tithe map	None	213680	216960	Standing
7	Quarry	Post Medieval		47032	HER	None	213670	216980	Unknown
8	Quarry	Post Medieval		19537	HER	None	213800	216950	Standing
9	Burnt mound	Bronze Age		3723	HER	Uncertain	213990	216850	Unknown
10	Quarry	Post Medieval		19418	HER	None	215000	216900	Unknown
11	Dwelling	Post medieval		48575	Tithe map	None	214247	216948	Standing
12	Poorhouse	Post medieval		48574	HER	None	214340	216950	Standing
13	Dwelling	Post Medieval	White Apron	23385	HER	None	214245	216981	Standing
14	Dwelling	Post medieval		48576	Tithe map	None	214226	216988	Standing
15	Cottage	Post medieval	Maen y Ffynnon	23384	OS 1908	None	214320	217030	Standing
16	Gravel pit	Post medieval		47033	HER	None	214461	217000	Unknown
17	Blacksmith workshop	Post medieval		23389	OS 1908	None	214450	216970	Unknown
18	Cottage	Post medieval	Green Bush	23383	OS 1908	None	213780	217160	Unknown
19	Burnt mound	Bronze Age		3726	HER	Yes	214590	217170	Unknown
20	Burnt mound	Bronze Age	Pentroydin Fach	3441	HER	Uncertain	214660	217160	Unknown
21	Building	Post Medieval		48572	Tithe map	None	214580	216884	Unknown
22	Public House	Post medieval		23386	HER	None	214740	216900	Standing
23	War Memorial	Post Medieval		47233	NMR	None	214765	216897	LBII, Standing
24	Blacksmith workshop	Post medieval		23387	OS 1908	None	214800	216900	Unknown
25	Public House	Post Medieval	Commercial Inn	33803	HER	None	214810	216890	Unknown
26	Post Office	Post Medieval		23388	HER	None	214810	216890	Unknown
27	Gravel pit	Post Medieval		47034	HER	None	214900	216824	Unknown
28	Quarry	Post Medieval	Parc Ucha	48838	Tithe map	None	215507	216996	Unknown
29	Chapel	Post Medieval	Bethel	15153	HER	None	215950	216980	Unknown
30	Cottage	Post Medieval	Bethel	23367	HER	None	215920	216990	Standing

No	Type	Date	Name	HER	Source	Impact	Easting	Northing	Current status
31	Well	Post Medieval	Parc Ffynon	48837	Tithe map	None	215860	216970	Unknown
32	Quarry	Post Medieval		47047	HER	None	215710	216890	Levelled
33	Building	Post Medieval		48566	HER	None	215620	216880	Standing
34	Cottage	Post Medieval	Wheelabout	23368	OS 1908	None	215430	216820	Standing
35	Promontory Fort	Unknown		4917	HER	None	215750	217240	Unknown
36	Cottage	Post medieval		23363	Tithe map	Uncertain	215400	217300	Levelled. Structure visible on 1946 RAF aerial photograph
37	Burnt Mound	Bronze Age	Blaen Pen Troydin	3737	HER	None	215120	217440	Unknown
38	Quarry	Post medieval		19532	HER	None	211971	216887	Unknown
39	Road	Post Medieval	Turnpike trust	24218	HER	Yes	212061	216641	Unknown
40	Farmstead	Post Medieval	Penblewin	48583	Tithe map	None	212080	216620	Standing
41	Soil marks	Unknown		DBA	Survey	None	212511	216325	Google Earth 19 Apr 2009. Unknown
42	Farmstead	Post medieval	Ca'rmaenon Fach	48582	Tithe map	None	212660	216630	Standing
43	Farmstead	Post medieval	Treforgan Farm	48581	Tithe map	None	212840	216680	Standing
44	Dwelling	Post medieval		48580	Tithe map	Yes	213110	216830	Standing
45	Dwelling	Post medieval		48579	Tithe map	Yes	213200	216850	Unknown
46	Building	Post medieval		48578	Tithe map	Yes	213300	216810	Unknown
47	Lodge	Post Medieval	Park Lodge	19536	HER	None	213280	216840	Standing
48	Burial Ground	Post Medieval	Treforgan Farm	34750	HER	None	213100	217070	Standing
49	Dwelling	Post Medieval		47027	1st edtn	None	213250	216920	Standing
50	Quarry	Post medieval		47028	1st edtn	None	213341	217029	Unknown
51	Gravel pit	Post Medieval		47035	HER	None	214970	216780	Unknown
52	Quarry	Post Medieval		DBA	1st edtn	None	216293	216487	Google Earth 25 May 2006, dark patch that looks like possible burnt mound, but is the location of quarry pit on 1st Ed OS. Unknown
53	Dwelling	Post Medieval	Car Coryn	DBA	Tithe map	None	216156	216649	Cottage and garden on tithe map plot 27. Unknown
54	Dwelling	Post Medieval	Gwarthy Bach	DBA	Tithe map	None	216181	216317	Cottage and garden on tithe map plot 24. Unknown
55	Dwelling	Post Medieval	Upper Howly	DBA	Tithe map	Yes	214963	217321	Cottage and garden on tithe map plot 349. Unknown
56	Farmstead	Post Medieval		DBA	Survey	Yes	212057	216659	Standing structure. Standing

No	Type	Date	Name	HER	Source	Impact	Easting	Northing	Current status
57	Old bridge	Post Medieval	Ffynnon	DBA	Survey	None	213750	216911	Standing structure. Standing
58	Lidar Feature	Unknown		DBA	Lidar	None	214146	216889	Standing
59	Building	Post Medieval		DBA	1st edtn	None	214416	216943	Standing
60	Leat (Possible)	Post Medieval		DBA	1st edtn	Yes	214484	217151	Unknown
61	Cropmark	Unknown	Penblewin	DBA	Survey	None	212124	216504	Google Earth. Unknown
62	Cropmark	Unknown	Henllan	DBA	Survey	None	213642	216330	Google Earth Rectangle. Unknown
63	Field System	Medieval? / Post Medieval		DBA	1st edtn	Minor	213000	217000	Largely surviving
64	Possible enclosure	Unknown	G1(1)	Geophysics	Survey	Major	211975	216664	Unknown
65	Possible enclosure	Unknown	G4(1)	Geophysics	Survey	Major	212371	216695	Unknown
66	Possible enclosure	Unknown	G4(5)	Geophysics	Survey	Major	212473	216709	Unknown
67	Numerous features	Unknown	G13(1-7)	Geophysics	Survey	None	213814	217004	Unknown
68	Curvilinear feature	Unknown	G15(2)	Geophysics	Survey	None	214328	217005	Unknown
69	Curvilinear feature	Unknown	G17(2)	Geophysics	Survey	Major	214502	217152	Unknown
70	Multiple features	Unknown	G18(5-11)	Geophysics	Survey	Major	214635	217225	Unknown
71	Potential trackway	Unknown	G21a(2)	Geophysics	Survey	Major	215253	217246	Unknown
72	Potential trackway	Unknown	G21b(1)	Geophysics	Survey	Major	215264	217202	Unknown
73	Possible ridge and furrow	Unknown	G21b(2)	Geophysics	Survey	Major	215297	217216	Unknown
74	Linear feature	Unknown	G22a(2)	Geophysics	Survey	Major	215406	217112	Unknown
75	Linear feature	Unknown	G22a(3)	Geophysics	Survey	Major	215476	217146	Unknown
76	Possible burnt area	Unknown	G22b(5)	Geophysics	Survey	Major	215515	217141	Unknown
77	Linear feature	Unknown	G22b(4)	Geophysics	Survey	Major	215539	217119	Unknown
78	Linear feature	Unknown	G22b(1)	Geophysics	Survey	Major	215555	217086	Unknown
79	Linear feature	Unknown	G22a(5)	Geophysics	Survey	Major	215648	217044	Unknown
80	Quarrying area	Unknown	G22c(1)	Geophysics	Survey	Major	215541	217016	Unknown
81	Possible ferrous	Unknown	G22e(1)	Geophysics	Survey	Major	215722	217007	Unknown
82	Possible	Unknown	G22e(2)	Geophysics	Survey	Major	215718	216974	Unknown

No	Type	Date	Name	HER	Source	Impact	Easting	Northing	Current status
	ferrous								
83	Possible ferrous	Unknown	G22e(3)	Geophysics	Survey	Major	216089	216910	Unknown
84	Building	Post Medieval	Gwindy Farmhouse with Walls and railings to Garden	6541	HER	None	216287	217020	LBII. Standing
85	Building	Post Medieval	Old Stable Block at Gwindy	6542	HER	None	216252	217009	LBII. Standing
86	Homestead	Post Medieval	Homestead	DBA	Tithe map	None	215779	217093	Homestead on Tithe Map, plot 298. Unknown

Table 3. Description of historical assets directly affected by construction activity

Site no.:	9
NGR:	213990 216850
Source:	DAT HER 3723
Description:	Burnt mound identified in 1911 by Cantrill and Jones. No evidence is visible for this feature
Impact:	Moderate. Site is located on edge of the Scheme boundary, but may not be correctly identified, and could indicate further similar features
Recommended Action:	Further assessment
Site no.:	19
NGR:	214590 217170
Source:	DAT HER 3726
Description:	Burnt mound, identified by Cantrill and Jones in 1911. No evidence is visible at this location.
Impact:	Moderate. Site lies under the centre of an embankment. This site may indicate further similar features.
Recommended Action:	Further assessment.
Site no.:	20
NGR:	214660 217160
Source:	DAT HER 34441
Description:	Burnt mound on Pentroydin Fach, identified in survey in 1997. The site was reported to be heavily damaged then, while there is no evidence for the site seen during the field survey. There are no above ground indications of a feature in this field, but the nature of the site means that further similar features may be present.
Impact:	Uncertain. The given grid reference is outside the Scheme boundary.
Recommended Action:	Further assessment.
Site no.:	36
NGR:	215400 217300
Source:	DAT HER 23363
Description:	Cottage shown on Tithe map and OS 1908. Some faint marks are visible on satellite images. (Figures 13,).
Impact:	Uncertain. The known extent of the site is outside the Scheme boundary.
Recommended Action:	Further assessment and preventative measures to ensure the site is not impacted.
Site no.:	39
NGR:	212061 216641
Source:	DAT HER 24218

Description:	Turnpike trust road. A toll bar was recorded at Penblewin.
Impact:	Moderate. The character of the original road was totally changed by later road improvements. There are sections of an earlier road alignment in various areas, west of Llanddewi Velfrey, in the Ffynnon area and in the lay-by, west of Ffynnon. These may follow the line of the original turnpike but have been transformed by road improvements. There are no structures indicating a toll bar at Penblewin. This area has also seen large scale disturbance from works relating to the roundabout. (Figures 7, 8, 15, 16, 23, 24).
Recommended Action:	Recording of any features exposed during construction watching brief
Site no.:	44
NGR:	213110 216830
Source:	DAT HER 48580
Description:	Trefangor Cottage. Dwelling shown on tithe map and extant as a standing building. (Figures 23, 25).
Impact:	Major. This building will need to be demolished as part of construction of the Scheme.
Recommended Action:	Building recording to level 2 standard (Historic England, 2016).
Site no.:	45
NGR:	213200 216850
Source:	DAT HER 48579
Description:	Dwelling shown on tithe map, plot 808. This area lies in the verge of the existing A40. No features are visible. (Figure 5).
Impact:	This area lies within the new road alignment. It is unclear what evidence for the site will have survived previous road improvements.
Recommended Action:	Further assessment
Site no.:	46
NGR:	213300 216810
Source:	DAT HER 48578
Description:	Building shown on tithe map, plot 656. This structure lies in woodland east of the roadway to Henllan. (Figure 5).
Impact:	Moderate. This lies within woodland and was not accessible at the time of the survey. No evidence for a building was visible.
Recommended Action:	Further assessment
Site no.:	55
NGR:	214963 217321
Source:	DBA
Description:	Cottage and garden shown on tithe map, plot 349. Nothing is visible on satellite images and the area was thickly covered by rushes at the time of

	the field visit. (Figure 5).
Impact:	The site lies on the edge of the Scheme land take. This area should be outside the main fill of the road in this area but could be included in landscaping and drainage works.
Recommended Action:	Further assessment, review design options for this area
Site no.:	56
NGR:	212057 216659
Source:	DBA
Description:	Standing building on the north side of the A40 at Penblewin. The tithe map shows a single enclosure here, while the first edition Ordnance Survey shows several buildings forming a rectangle. The 1946 RAF vertical photograph shows that the southern building has been removed as part of road widening. Building walls extant, but totally derelict and over grown with trees. (Figures 14, 15, 16).
Impact:	Major. The Scheme will result in total demolition of structures in this area.
Recommended Action:	Building recording to level 2 standard (Historic England, 2016).
Site no.:	60
NGR:	214484 217151
Source:	DBA
Description:	Boundary, not shown on tithe map, but present on first edition Ordnance Survey. The feature is visible on satellite images as a terraced feature leading towards Pentroydin Fach Farm. Possible leat.
Impact:	Major. The feature lies under the embankment of the road at this point and will be largely destroyed.
Recommended Action:	Further assessment.
Site no.:	63
NGR:	Found throughout the project
Source:	DBA
Description:	Field system that extends to the parishes to the north. The origin of the system may be from the early medieval period, but has continued to be used with modifications through to the present day. The features comply with the criterion used to describe important hedgerows as described in the Hedgerow Regulations 1997. (Figures 5, 6).
Impact:	Small components of the field system will be removed to allow construction. The bulk of the field system will continue to exist and form a living component of the landscape.
Recommended Action:	Basic recording during construction.
Site no.:	64
NGR	212206 216850

Source	Geophysical survey G1(1)
Description	Possible enclosure
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	65
NGR	212371 216695
Source	Geophysical survey G4(1)
Description	Possible enclosure
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	66
NGR	212473 216709
Source	Geophysical survey G4(5)
Description	Possible enclosure
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	67
NGR	213814 217004
Source	Geophysical survey G13(1-7)
Description	Numerous features. G13 (3) lies on the line of a field boundary visible on 1946 aerial photography.
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	68
NGR	214328 217005
Source	Geophysical survey G15(2)
Description	Curvilinear feature
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	69
NGR	214502 217152
Source	Geophysical survey G17(2)
Description	Curvilinear feature
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	70
NGR	214635 217225

Source	Geophysical survey G18(5-11)
Description	Multiple features. G18 (3) lies on the line of a field boundary visible on the 1946 RAF aerial photographs.
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	71
NGR	215253 217246
Source	Geophysical survey G21a(2)
Description	Potential trackway
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	72
NGR	215264 217202
Source	Geophysical survey G21b(1)
Description	Potential trackway
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	73
NGR	215297 217216
Source	Geophysical survey G21b(2)
Description	Possible ridge and furrow
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	74
NGR	215406 217112
Source	Geophysical survey G22a(2)
Description	Linear feature
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	75
NGR	215476 217146
Source	Geophysical survey G22a(3)
Description	Linear feature
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	76
NGR	215515 217141

Source	Geophysical survey G22b(5)
Description	Possible burnt area
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	77
NGR	215539 217119
Source	Geophysical survey G22b(4)
Description	Linear feature
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	78
NGR	215555 217086
Source	Geophysical survey G22b(1)
Description	Linear feature Features G22b (1) and (2) lie in an area where there appear to be similar cropmark features on the 1946 RAF aerial photographs. These are in a similar orientation, but do not match directly.
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	79
NGR	215648 217044
Source	Geophysical survey G22a(5)
Description	Linear feature, lies on the line of a field boundary visible on the 1946 RAF aerial photographs.
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	80
NGR	215541 217016
Source	Geophysical survey G22c(1)
Description	Quarrying area
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	81
NGR	215722 217007
Source	Geophysical survey G22e(1)
Description	Possible ferrous
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.

Site no.:	82
NGR	215718 216974
Source	Geophysical survey G22e(2)
Description	Possible ferrous
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.
Site no.:	83
NGR	215734 216957
Source	Geophysical survey G22e(3)
Description	Possible ferrous
Impact	The bulk of the recorded features will be removed by construction activity
Recommended Action	Evaluation trenching to determine nature and age of the feature, followed by further mitigation excavation as required.

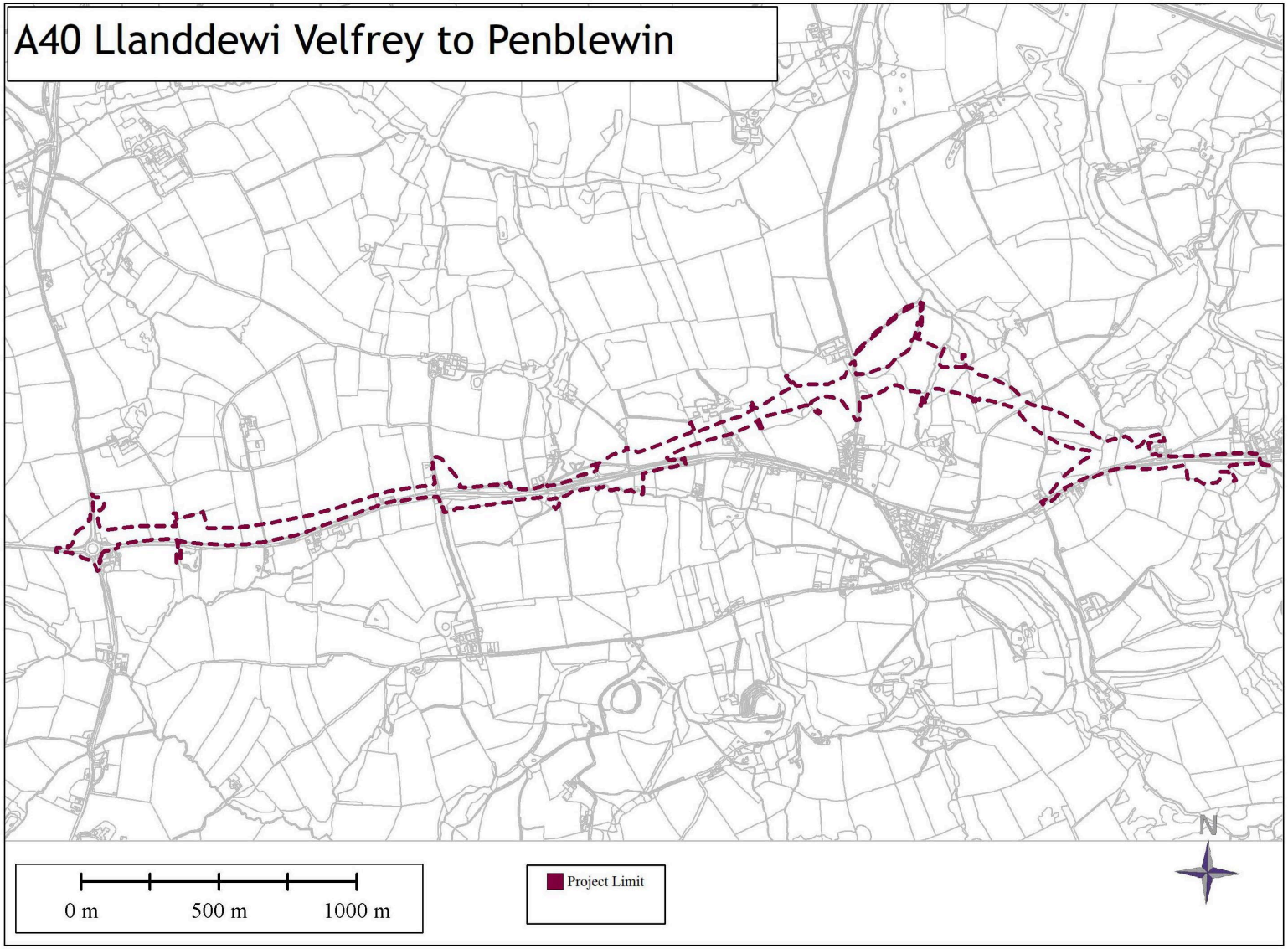

Figure 1 Project Limit Outline

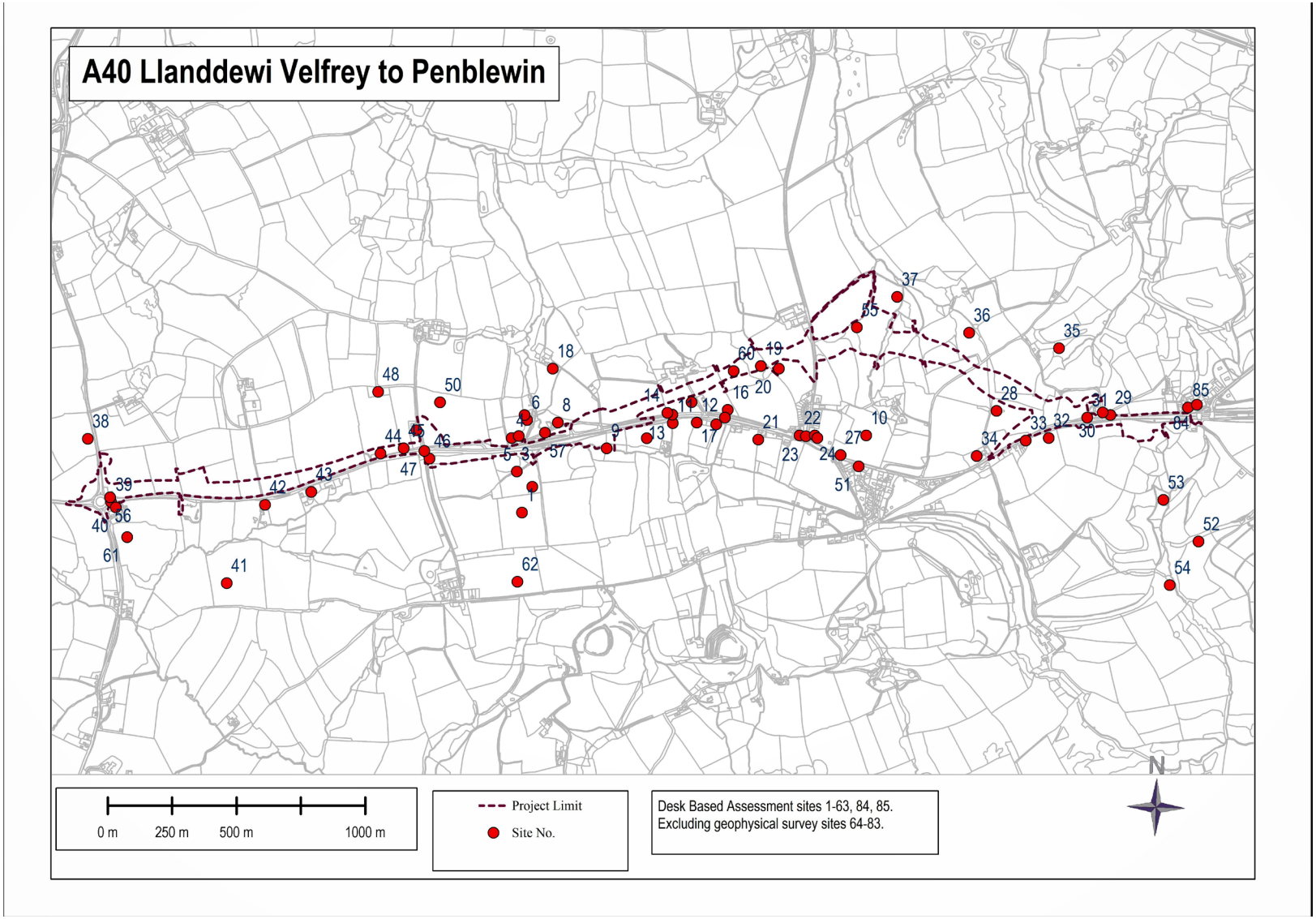

Figure 2 Desk Based Assessment sites 1-63, 84, 85.

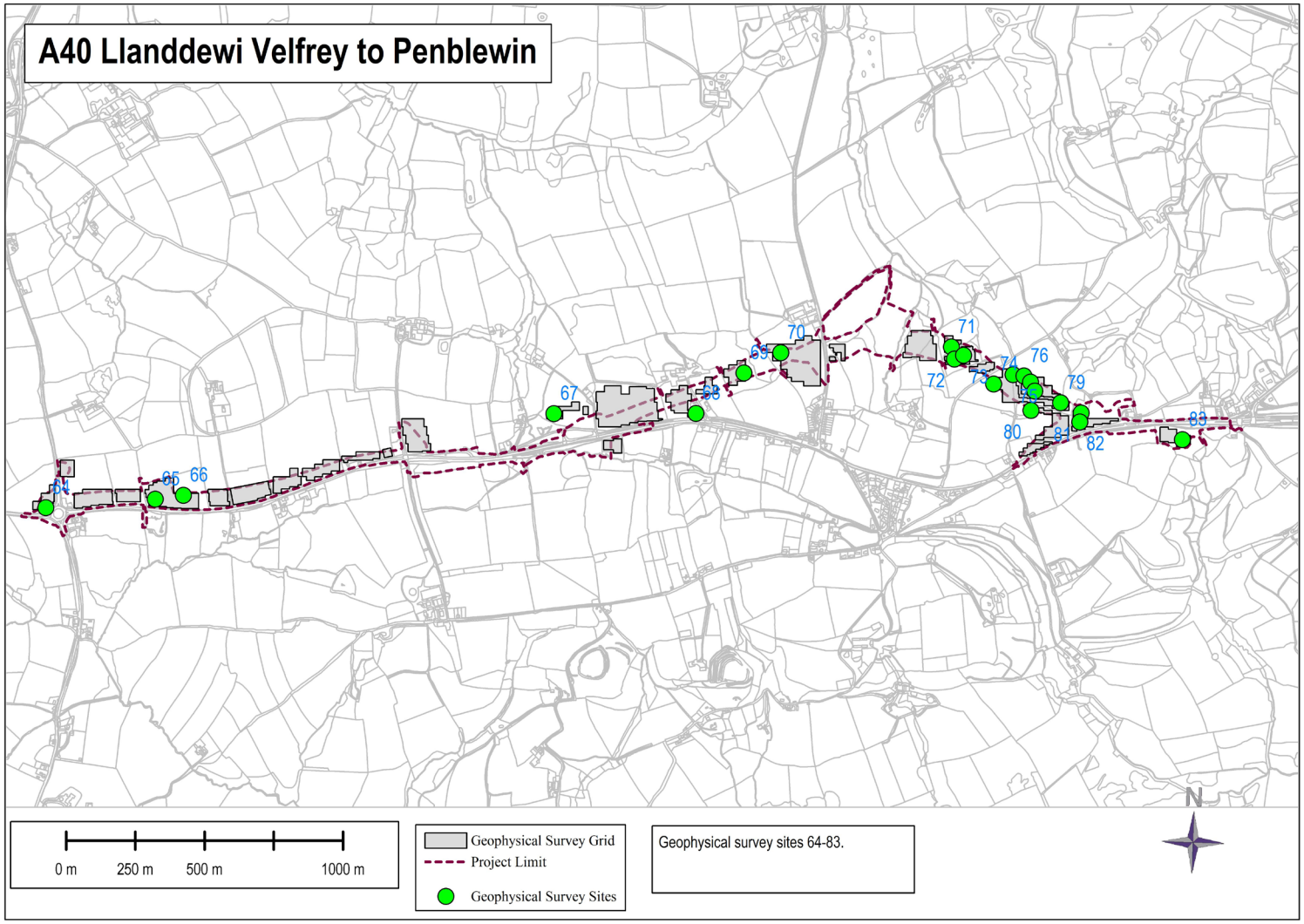

Figure 3 Geophysical survey sites 64-83.

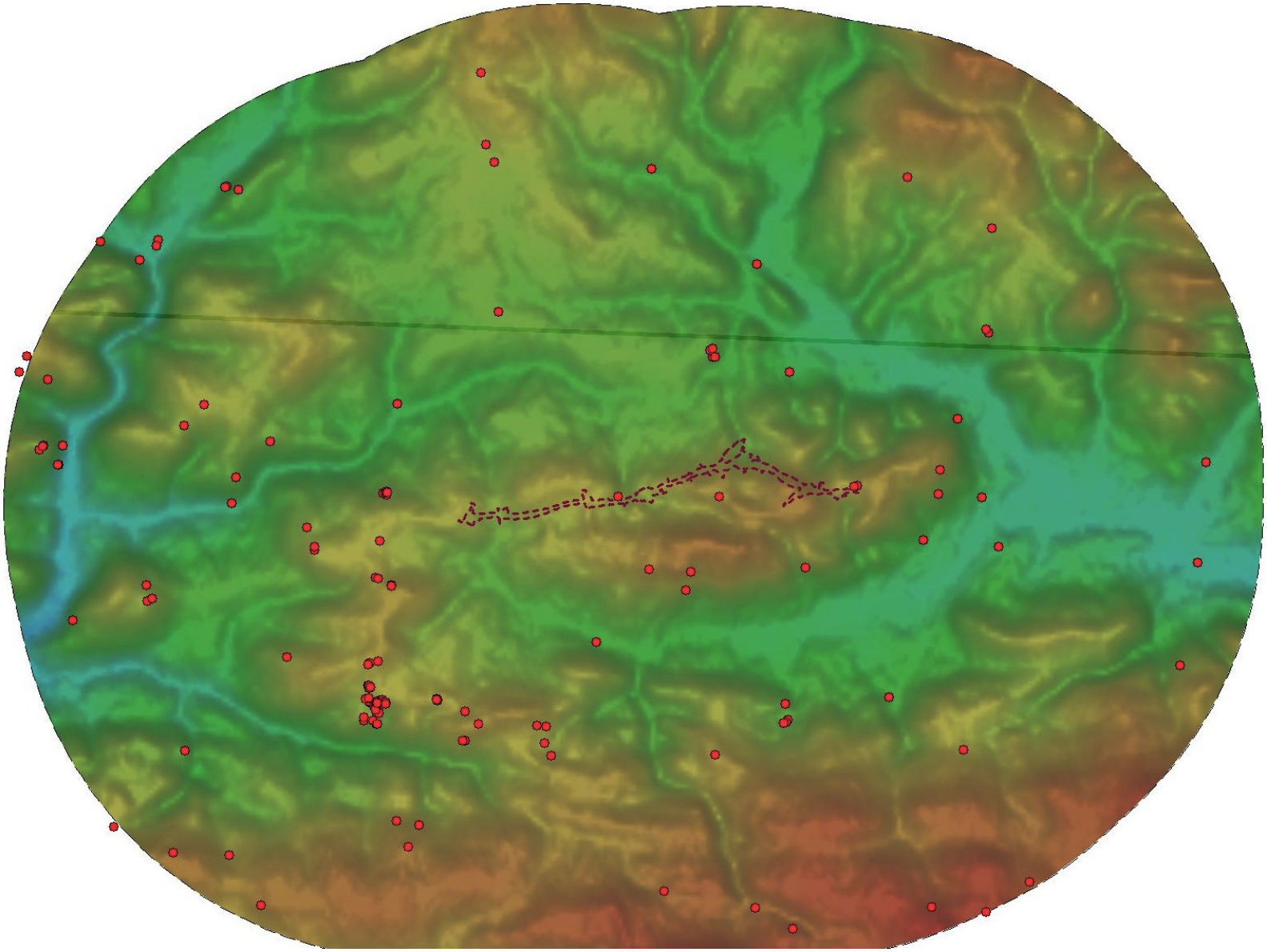

Figure 4 Designated Sites within 5km buffer zone around the Project.

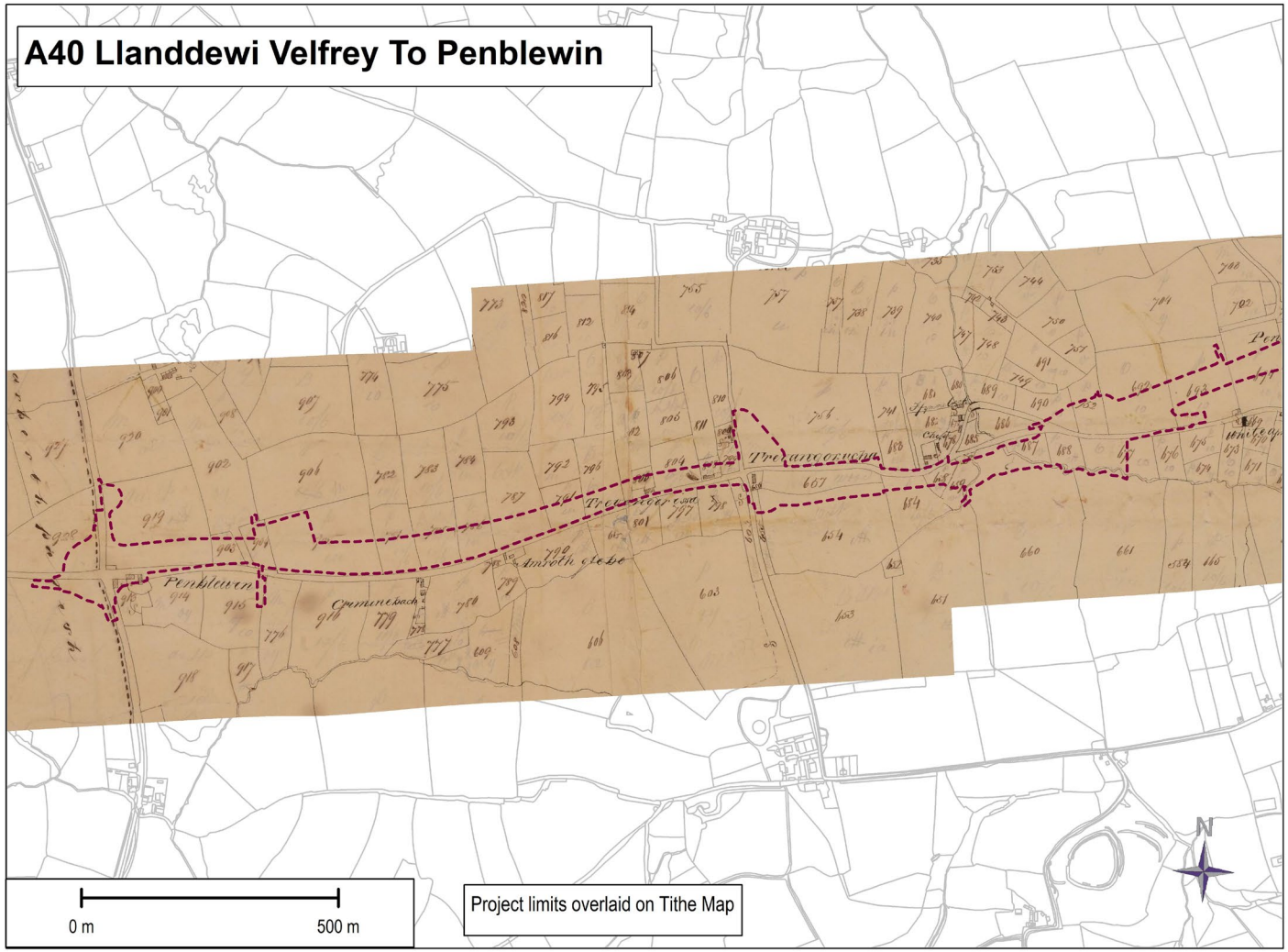

Figure 5 Project limits overlaid on Tithe Map. West end of project

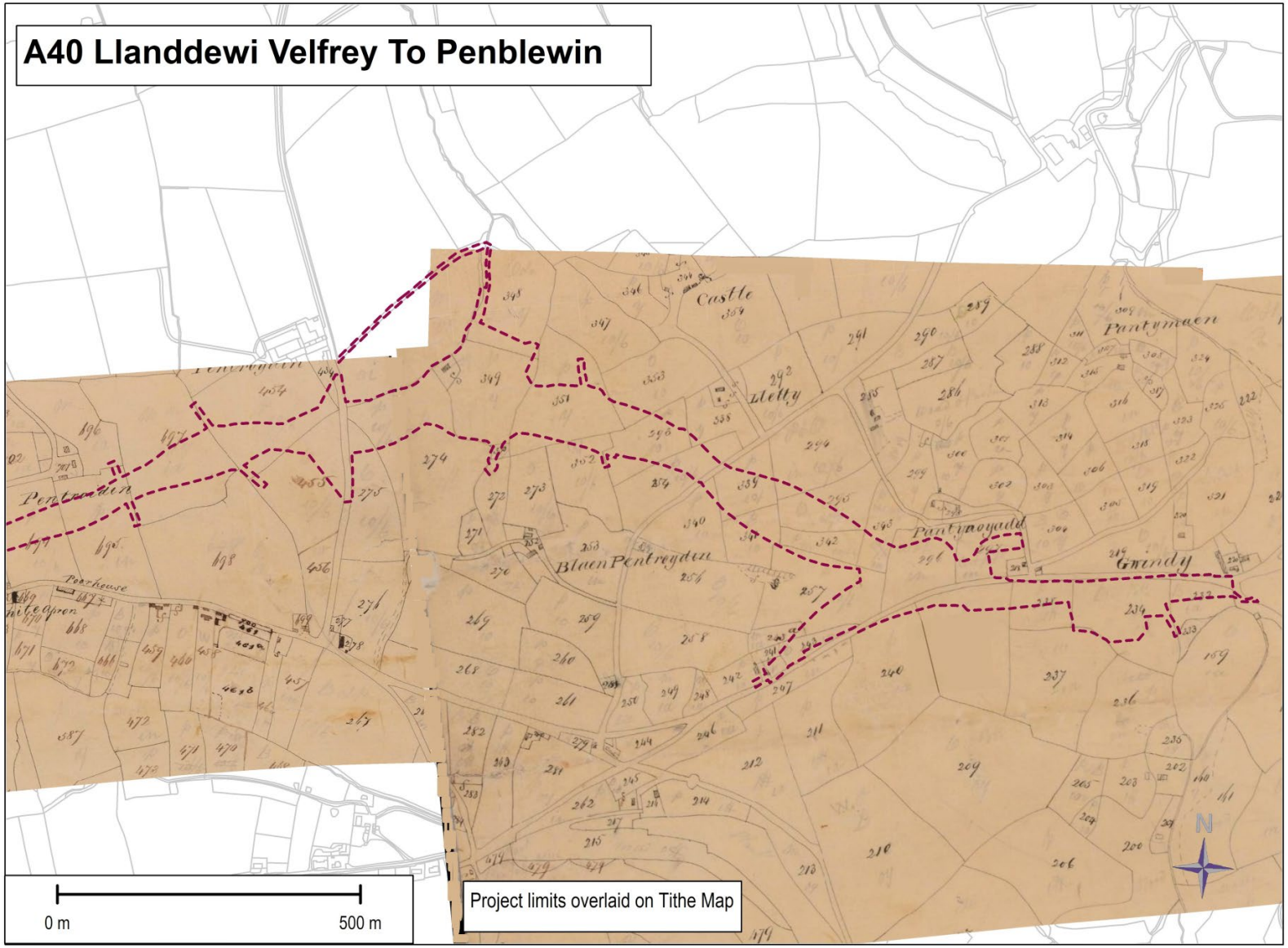

Figure 6 Project limits overlaid on Tithe Map. East end of project.

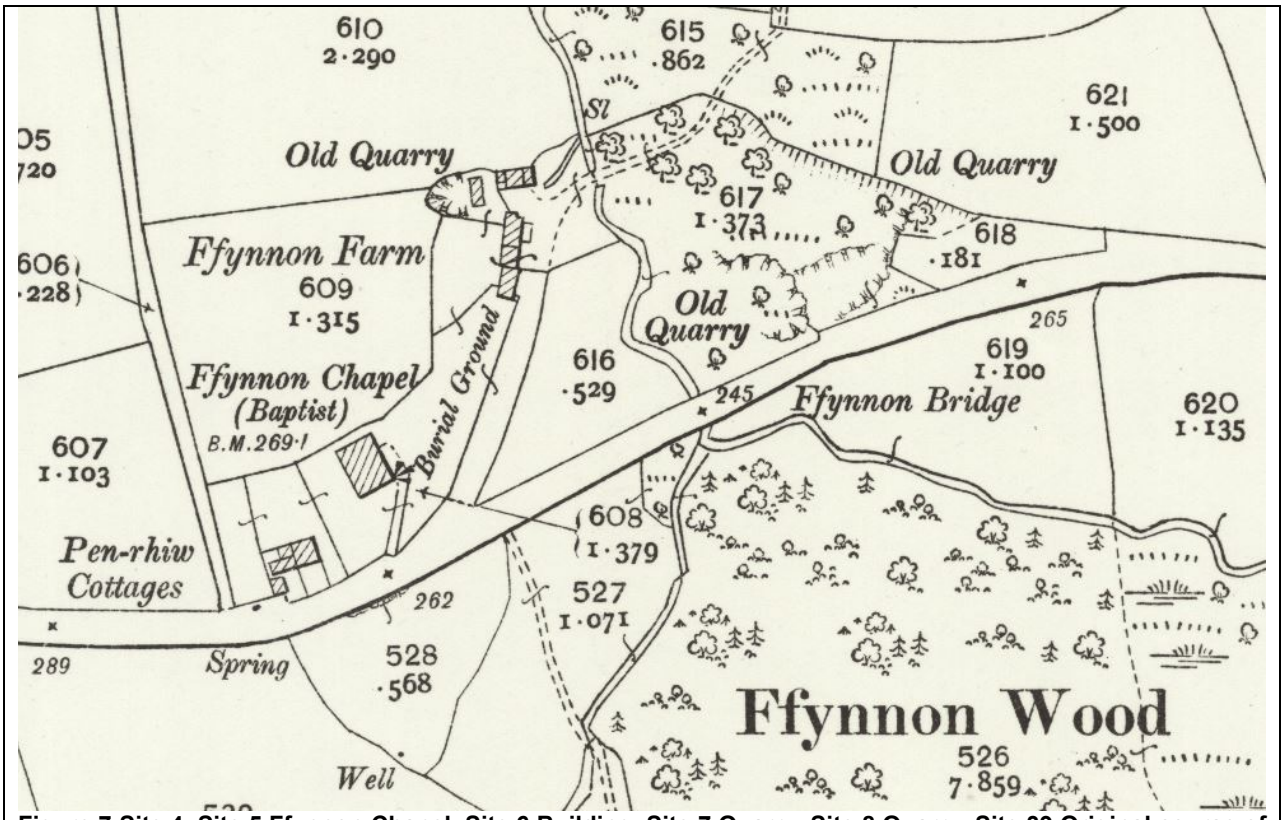

Figure 7 Site 4, Site 5 Ffynnon Chapel, Site 6 Building, Site 7 Quarry, Site 8 Quarry, Site 39 Original course of road, Site 57 Bridge. Source OS 1889.

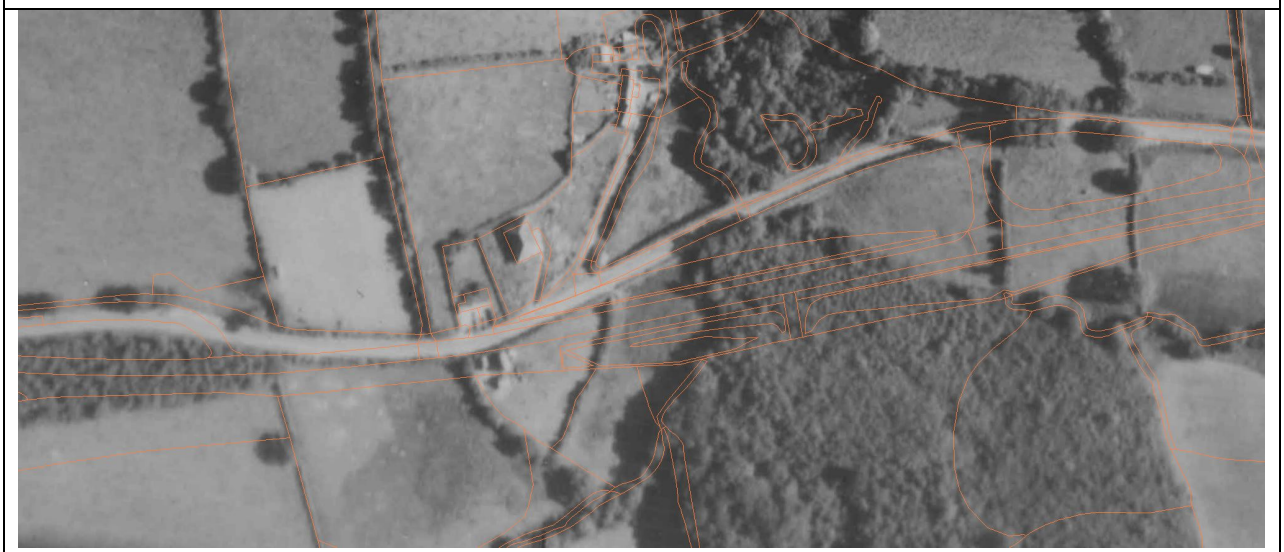

Figure 8 Site 4, Site 5 Ffynnon Chapel, Site 6 Building, Site 7 Quarry, Site 8 Quarry, Site 39 Original course of road, Site 57 Bridge. Rectified photograph RAF 1946 with modern mapping overlain.



Figure 9 Site 5 Ffynnon Chapel.



Figure 10 Site 23 Llanddewi Velfrey War Memorial.



Figure 11 Site 29 Bethel Chapel.



Figure 12 Site 30 Bethel Cottage

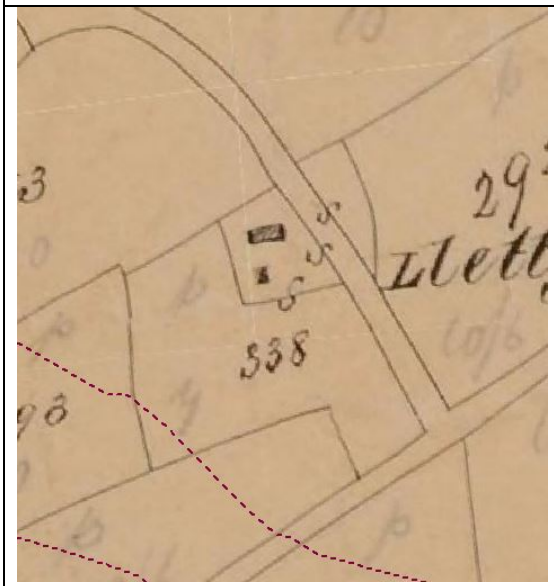

Figure 13 Site 36 Lletty Cottage from tithe map.



Figure 14 Site 56 Farmstead, north side of road at Penblewin.



Figure 15 Penblewin area. Site 39 Original route of road, Site 40 Penblewin Farm, Site 56 Farmstead. Source OS 1889.



Figure 16 Penblewin area. Site 39 Original route of road, Site 40 Penblewin Farm, Site 56 Farmstead. Source rectified photograph RAF 1946 with modern mapping overlain.



Figure 17 Site 47 Park Lodge.

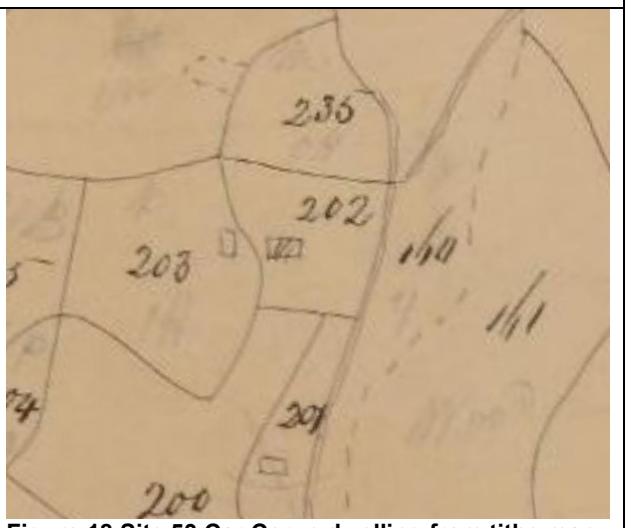

Figure 18 Site 53 Car Coryn dwelling from tithe map.

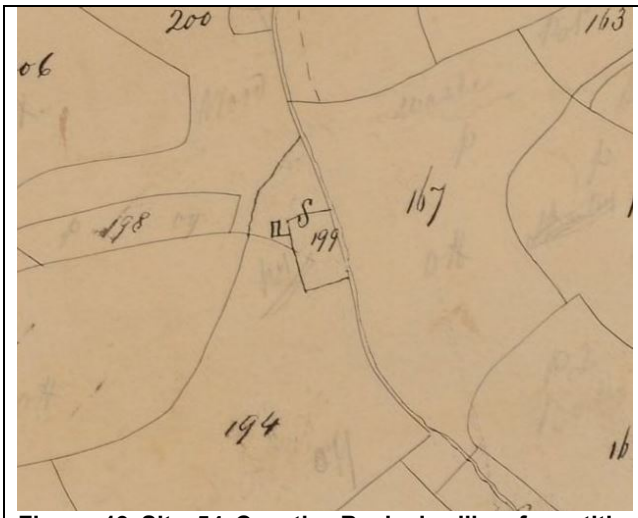

Figure 19 Site 54 Cwarthy Bach dwelling from tithe map.



Figure 20 Site 55 Upper Howly dwelling from tithe map.



Figure 21 Site 57 Bridge on original A40 road.

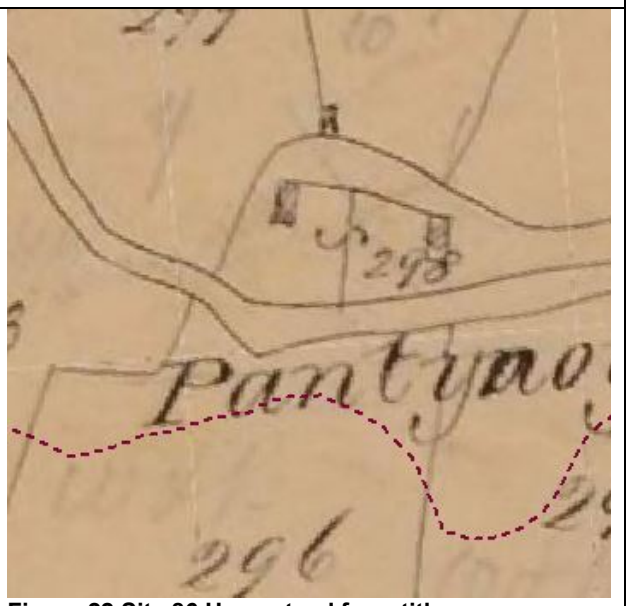

Figure 22 Site 86 Homestead from tithe map.

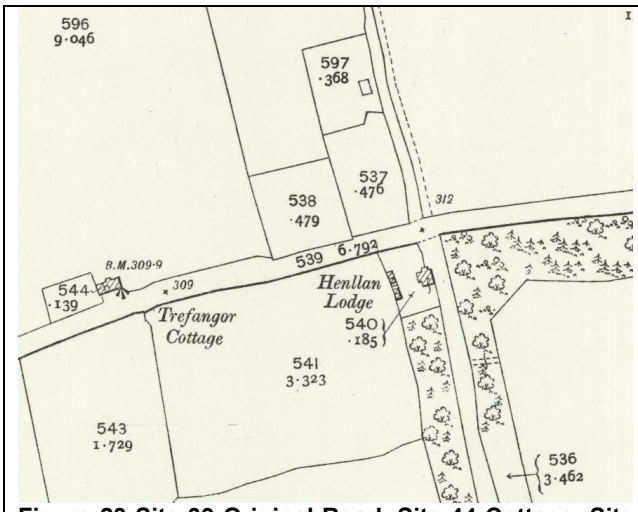

Figure 23 Site 39 Original Road, Site 44 Cottage, Site 45 Cottage, Site 46 Building, Site 47 Henllan Lodge, Site 49 Cottage. Source OS 1889.

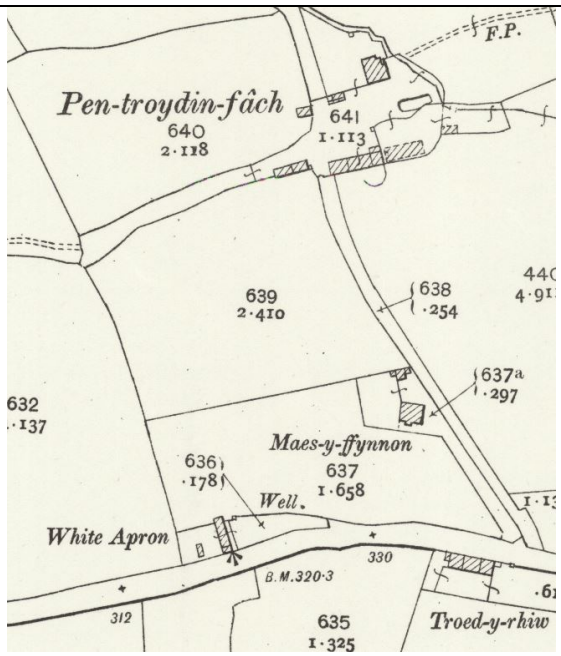

Figure 24 Site 13 Cottage (White Apron), Site 14 Dwelling, Site 15 Cottage, Site 39 Original Road. Source OS 1889.



Figure 25 Site 44 Cottage (Trevangor).

11. Appendices

12. Appendix 1 Aerial photographs

List of aerial photographs

Vertical Photographs				
WO No	**Sortie**	**Date**	**Org**	**Print**
4604	106G UK 1625	07/07/1946	RAF	2203-2210, 5217-5222
4619	106G UK 1423	15/04/1946	RAF	4058-4061, 3058-3061
4633	106G UK 1472	04/05/1946	RAF	4366-4370, 3375-3379
6418	OS 64 2210	23/09/1964	Ordnance Survey	
6956	58 RAF 9679	10/06/1969	RAF	119-120
7187	OS 71 336	07/07/1971	Ordnance Survey	117-119
8160	39 RAF 5699	27/08/1981	RAF	31
8301	JA Story	06/06/1983	JAStory (NRSC)	5783, 28-32
8720	OS 87 086	04/07/1987	Ordnance Survey	
9635	OS 96 065	03/05/1996	Ordnance Survey	54-60
200029	Getmapping	01/01/2000	Getmapping	
200901	Nextperspectives	01/01/2009	Nextpersepctives	
201301	Nextperspectives	01/01/2013	Bluesky	
Oblique Photographs				
CUCP AQF1		29/10/1966		Road line near White Apron
CUCAP CZ35		30/06/1949		Panorama near Llanddewi Velfrey looking north

13. Appendix 2 Tithe map field names

Tithe map field names. Source: https://places.library.wales/browse/

No.	Parish	Name	Comment
219	Llanddewi	Meeting house and parc maen	
238	Llanddewi	Elves Coch	Within Scheme
239	Llanddewi	Alchwrban issa	
240	Llanddewi	Alchwrban ucha	
243	Llanddewi	Llain	Strip (trans)
253	Llanddewi	Parc ych lawty	
254	Llanddewi	Bresl castell	Within Scheme
256	Llanddewi	Park quarry issa	
257	Llanddewi	Park quarry ucha	
258	Llanddewi	Park dan wheel a bont	
259	Llanddewi	Werglodd	
260	Llanddewi	Gwaun fach	Heath (trans)
261	Llanddewi	Brest mil ty beuny	
268	Llanddewi	Brest	
269	Llanddewi	Park glas	Green Field (trans)
273	Llanddewi	Parc wrth gowyn gigging maes	
274	Llanddewi	The Croft	
275	Llanddewi	Park y efel issa	
276	Llanddewi	Park yr efel ucha	
282	Llanddewi	Parc clawty	
294	Llanddewi	Parc uch Llawr ty	
295	Llanddewi	Llain	Within Scheme
296	Llanddewi	Brest ucha	Within Scheme
297	Llanddewi	Brest issa	Within Scheme
298	Llanddewi	Homestead	
299	Llanddewi	Parc ffynnon	Well Field (trans)
300	Llanddewi	Meadow	
302	Llanddewi	Parc scibor	Barn Field (trans)
304	Llanddewi	Parc ffynnon	
305	Llanddewi	Parc ucha	
318	Llanddewi	Parc drissi	
319	Llanddewi	Parc ucha	
339	Llanddewi	Talwen	Within Scheme
340	Llanddewi	Parc brisk	
341	Llanddewi	Upper Talwen	Within Scheme
342	Llanddewi	Llain	Within Scheme
343	Llanddewi	Llain issa	

No.	Parish	Name	Comment
348	Llanddewi	Lower howly	Within Scheme
349	Llanddewi	Upper howly and Cottage and Garden	Within Scheme
351	Llanddewi	Parc drifty	Within Scheme
352	Llanddewi	Brist	Within Scheme
435	Llanddewi	Parc Pwll Cliff	
436	Llanddewi	Parc yr hendy	
447	Llanddewi	Parc dan yr ydlan	
448	Llanddewi	Parc y Bryn	
451	Llanddewi	Rhos	
452	Llanddewi	Parc ydel	
454	Llanddewi	Parc ffynnon	Within Scheme
455	Llanddewi	Parc ylan	Within Scheme
456	Llanddewi	Cottage and field	
457	Llanddewi	Cottage and field	
584	Llanddewi	Llain marchog	Knight's strip (trans)
587	Llanddewi	_	
588	Llanddewi	_	
598	Llanddewi	Maes y caeau house & slang	
603	Llanddewi	parc piece y parc	
605	Llanddewi	Parc hefaugor	
606	Llanddewi	Parc waun fawr	
609	Llanddewi	Waun y cefn	
610	Llanddewi	Waun y cefn	
611	Llanddewi	Legos fawr	
612	Llanddewi	Pant y gorffes	
651	Llanddewi	Parc maen llwydd	
653	Llanddewi	Parc fron yr hos	
654	Llanddewi	Rhos helagors	
656	Llanddewi	Plantation	
657	Llanddewi	Plantation	Within Scheme
659	Llanddewi	Waun y cwidd	Within Scheme
660	Llanddewi	Parc clyn madog	
665	Llanddewi	Waun y lleithin	
667	Llanddewi	Poor house & garden	
668	Llanddewi	Poor House Land	
669	Llanddewi	Homestead Garden	
671	Llanddewi	Parc gwaun	
672	Llanddewi	Parc evel	
673	Llanddewi	Parc domen	
674	Llanddewi	Park clovers issa	

No.	Parish	Name	Comment
675	Llanddewi	Parc clovers ucha	
676	Llanddewi	Parc clovers main	
677	Llanddewi	Parc clovers bach	Within Scheme
678	Llanddewi	Meeting house and yard	
680	Llanddewi	Parc bach	
681	Llanddewi	Parc Clovers	
682	Llanddewi	Parc hycruedd	
683	Llanddewi	Parc cuch	
684	Llanddewi	Waun	Within Scheme
686	Llanddewi	Parc quarry	
687	Llanddewi	Parc bach	Within Scheme
688	Llanddewi	Parc bach	Within Scheme
690	Llanddewi	Parc clovers ucha	
691	Llanddewi	Parc Mawr	
692	Llanddewi	Pan y bach	Within Scheme
693	Llanddewi	Pan white Apron	Within Scheme
694	Llanddewi	Pan pwll Cliff	Within Scheme
695	Llanddewi	Pan ynch y ty	Within Scheme
696	Llanddewi	Werllodd dan y ty	
697	Llanddewi	Pan y ffynnon	Within Scheme
698	Llanddewi	Pan y llan	
702	Llanddewi	Pan y lloi	
703	Llanddewi	Pan hen	
704	Llanddewi	Pan y fron	
737	Llanddewi	Llain vain	
738	Llanddewi	Parc newydd	
739	Llanddewi	Parc fordd	
740	Llanddewi	Parc yr allt	
741	Llanddewi	Parc llain	
749	Llanddewi	Llain main	
750	Llanddewi	Parc vlode	
752	Llanddewi	Wayn fordd	Within Scheme
755	Llanddewi	Parc Dick Harris	
756	Llanddewi	Parc y law	Within Scheme
757	Llanddewi	Parc lawr ty	
773	Llanddewi	Long field	
774	Llanddewi	Parc Harfon	
775	Llanddewi	Parc lan	
776	Llanddewi	Bounty moor	
777	Llanddewi	Close	

No.	Parish	Name	Comment
778	Llanddewi	Homestead	
779	Llanddewi	_	
780	Llanddewi	_	
781	Llanddewi	_	Within Scheme
782	Llanddewi	_	
783	Llanddewi	_	
784	Llanddewi	_	
785	Llanddewi	_	Within Scheme
786	Llanddewi	_	Within Scheme
787	Llanddewi	_	Within Scheme
788	Llanddewi	Homestead	
789	Llanddewi	Green	
790	Llanddewi	Long park	
791	Llanddewi	Peggys field	Within Scheme
792	Llanddewi	Square Park	
793	Llanddewi	White Park	
794	Llanddewi	Clover Park	
795	Llanddewi	Thistle Park	
796	Llanddewi	Furzy Park	
797	Llanddewi	Furzy Park	
798	Llanddewi	Furzy Park	
799	Llanddewi	Burgage	Within Scheme
800	Llanddewi	House and Byrgage	Within Scheme
801	Llanddewi	Park dan fordd	
802	Llanddewi	Park ganol	
803	Llanddewi	Park rhodig	
804	Llanddewi	Park war fordd	Within Scheme
805	Llanddewi	_	
806	Llanddewi	Park ucha	
808	Llanddewi	House and Garden	Within Scheme
810	Llanddewi	Park ucha	
811	Llanddewi	Park mel y ty	
812	Llanddewi	Llain wen	
816	Llanddewi	Cae Ucha	
820	Llanddewi	Cae issa	
900	Llanddewi	Garden	
901	Llanddewi	Small Wood	
902	Llanddewi	Walk meadow	
903	Llanddewi	meadow	Within Scheme
904	Llanddewi	meadow	Within Scheme

No.	Parish	Name	Comment
905	Llanddewi	Parc ridin	Within Scheme
906	Llanddewi	Parc ridin	
907	Llanddewi	Parc gwyn	
908	Llanddewi	Walk fach	
909	Llanddewi	Parc gwyn moor	
910	Llanddewi	Burgage	
913	Llanddewi	Homestead	
914	Llanddewi	Glyncoch Meadow	
915	Llanddewi	Clyncoch	
916	Llanddewi	The Moor	
917	Llanddewi	Moor	
918	Llanddewi	Clyncoch Moor	
919	Llanddewi	Meadow	Within Scheme
920	Llanddewi	Quarry bach meadow	
1219	Narberth	Upper Midline	
1220	Narberth	Upper Moor	
1221	Narberth	Lower Moor	
1222	Narberth	Lower Midline	
1225	Narberth	Upper North Field	
1229	Narberth	Lower Field	
1230	Narberth	Cottage and Field	
1231	Narberth	road Field	
1232	Narberth	Little Field	
1234	Narberth	Field	
1235	Narberth	Cottage and garden	
1236	Narberth	_	
1237	Narberth	Big field	
1238	Narberth	Lower Field	
1239	Narberth	Upper Field	
1240	Narberth	Upper Big Field	
1241	Narberth	Croftsway Field	
1242	Narberth	Further Field	
1243	Narberth	Field	
1244	Narberth	Field	
1245	Narberth	Field	
1246	Narberth	Field	
1266	Narberth	Cottage and fields	
1269	Narberth	Croft	
1270	Narberth	Croft fach	
1610	Narberth	Middle park	

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Appendix 13.1: Traffic Data

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13.1 Do Minimum and Do Something Traffic Data Tables

Table 13.1 Baseline and Do Minimum Traffic Data

Road ID	Base 2016			DM 2021			DM2036		
	24 hr AADT	% HGV	Speed (kph)	24 hr AADT	% HGV	Speed (kph)	24 hr AADT	% HGV	Speed (kph)
1	11107	5.5	80.3	11881	5.2	79.8	13439	4.8	78.7
2	10807	5.3	67.6	11574	5.0	67.3	13165	4.7	66.5
3	10940	5.3	57.6	11792	4.9	57.1	13788	4.5	56.0
4	11520	5.1	58.3	12398	4.8	57.8	14394	4.4	56.6
5	10912	5.5	80.7	11685	5.2	80.2	13289	4.8	79.0
6	11301	5.1	81.8	12172	4.8	81.2	14182	4.4	79.7
7	11112	5.2	59.0	11970	4.9	58.6	13953	4.5	57.5
8	11155	5.2	48.4	12023	4.9	47.8	14049	4.5	46.3
9	11045	5.3	85.6	11908	5.0	80.2	13931	4.5	78.7
10	10757	5.4	83.8	11521	5.1	83.3	13104	4.7	82.3
11	10941	5.3	88.0	11795	5.0	87.5	13797	4.5	86.4
12	11681	5.2	43.6	12503	4.9	42.7	14174	4.6	40.7
13	10962	5.3	81.3	11818	4.9	76.5	13825	4.5	74.9
14	136	4.7	37.5	146	4.5	37.2	164	4.2	36.2

Road ID	Base 2016			DM 2021			DM2036		
	24 hr AADT	% HGV	Speed (kph)	24 hr AADT	% HGV	Speed (kph)	24 hr AADT	% HGV	Speed (kph)
15	2305	1.1	37.0	2470	1.0	36.7	2795	0.9	35.8
16	1239	0.7	36.2	1328	0.7	35.9	1502	0.6	35.4
17	4404	2.9	58.9	4712	2.8	58.9	5314	2.6	58.8
18	5763	4.7	60.9	6158	4.5	60.9	6943	4.2	61.0
19	856	5.0	21.9	915	4.8	21.7	1036	4.4	21.2
20	768	0.3	35.5	822	0.3	35.2	922	0.2	34.3
21	216	2.7	32.0	232	2.5	31.8	261	2.4	31.4
22	27	0.2	48.0	30	0.2	48.0	34	0.2	48.0
23	54	3.8	30.3	58	3.5	30.3	68	3.2	30.2
24	77	2.2	46.7	83	2.1	46.6	96	1.9	46.7
25	63	1.1	39.7	68	1.0	39.3	80	0.9	38.5
26	11003	5.2	78.8	11860	4.9	78.5	13868	4.5	77.5
27	11003	5.2	58.7	11860	4.9	58.3	13868	4.5	57.3
28	11103	5.2	83.7	11960	4.9	83.2	13941	4.5	81.9
29	5704	5.0	20.0	6143	4.7	20.0	7143	4.4	20.0
30	5816	5.1	48.0	6255	4.8	48.0	7251	4.4	48.0

Table 13.2 Do Something Traffic Data

	DS 2021			DS2036		
ID	**24 hr AADT**	**% HGV**	**Speed (kph)**	**24 hr AADT**	**% HGV**	**Speed (kph)**
1	5,582	5	74	6,542	5	72
2	5,903	5	68	6,893	4	67
3	5,957	5	83	6,954	4	82
4	6,114	5	92	7,113	5	91
5	601	2	69	657	2	68
6	111	1	28	127	1	27
7	11,881	5	80	13,439	5	79
8	11,574	5	66	13,165	5	66
9	442	3	61	518	2	61
10	1,021	4	52	1,158	4	52
11	11,685	5	80	13,289	5	79
12	111	1	86	127	1	86
13	601	2	63	657	2	63
14	654	2	45	753	2	45
15	11,908	5	80	13,931	5	79
16	11,521	5	83	13,104	5	82
19	11,800	5	88	13,803	5	86
20	12,503	5	43	14,174	5	41
21	11,818	5	76	13,825	5	75

	DS 2021			DS2036		
ID	**24 hr AADT**	**% HGV**	**Speed (kph)**	**24 hr AADT**	**% HGV**	**Speed (kph)**
22	146	4	37	164	4	36
23	2,470	1	37	2,795	1	36
24	1,328	1	36	1,502	1	35
25	4,712	3	58	5,314	3	58
26	6,158	4	58	6,943	4	58
27	915	5	24	1,036	4	24
28	822	0	39	922	0	39
29	251	3	34	286	2	34
30	30	0	48	34	0	48
31	40	6	34	43	7	33
32	83	2	47	96	2	47
33	49	2	44	55	1	44
34	5,787	5	83	6,754	5	82
35	5,787	5	57	6,754	5	56
36	491	3	45	573	2	45
37	18	0	34	20	0	34
38	5,788	5	84	6,783	4	82
39	5,788	5	25	6,783	4	24
40	6,064	5	83	7,077	5	82
41	6,064	5	83	7,077	5	82

	DS 2021			DS2036		
ID	**24 hr AADT**	**% HGV**	**Speed (kph)**	**24 hr AADT**	**% HGV**	**Speed (kph)**
42	2,966	5	20	3,468	5	20
43	5,582	5	84	6,542	5	83
44	5,582	5	92	6,542	5	92
45	5,787	5	83	6,754	5	82
46	6,066	5	66	7,059	5	64
47	6,114	5	77	7,113	5	76
48	5,957	5	61	6,954	4	60
49	3,554	5	20	4,065	4	20

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Appendix 13.2: Processing of Monitored Data

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13.2 Processing of Monitored Data

13.2.1 Due to programme constraints, air quality monitoring has only been possible for a six-month period.

13.2.2 To process the monitored data to be representative of an annual mean, a process of annualisation has been undertaken following LAQM.TG16. Annualisation has been undertaken using the nearest background/urban background continuous monitors with acceptable data capture (>90%) for 2017. These continuous monitoring locations are all part of the Automatic Urban and Rural monitoring Network (AURN). One of the continuous monitoring locations is within 50 miles of the Scheme (as required by LAQM.TG16), however a further two continuous monitoring locations more than 50 miles from the Scheme have also been used. An annualisation factor has been derived by comparing the period mean (the period for which Scheme specific monitoring data is available) with annual mean concentrations monitored at the continuous monitors for 2017. This allows seasonal variation in NO_2 concentrations to be accounted for in processing the Scheme specific monitoring data. Monitored NO_2 concentrations are generally higher in the winter months compared to the summer months. Annualising monitored data to be representative of a 2017 annual mean is appropriate as the baseline assessment scenario has been undertaken for 2017.

13.2.3 The choice of continuous monitors and the process of annualisation is shown in Table A3.

13.2.4 An annualisation factor of 1.3 is indicative of the Scheme specific monitoring results used being based on summer/autumn months where lower NO_2 concentrations are likely to have been monitored.

Table 13.1 Derivation of Annualisation Factor

Continuous Monitor	Period Mean (µg/m^3) (11/05/17 – 18/12/2017)	Data Capture (%) during period	2017 Annual Mean (µg/m^3)	2017 Data Capture (%)	Ratio (Annual Mean/Period Mean)
Cardiff Centre	16.2	98.8%	20.2	99.0%	1.3
Cwmbran	9.0	94.1%	12.1	96.8%	1.3
Narberth	2.1	94.5%	3.0	97.4%	1.4
Port Talbot	12.9	94.8%	15.9	96.2%	1.2
				Annualisation Factor	**1.3**

13.2.5 Diffusion tubes were co-located with the continuous monitoring location at Princes Gate, Narberth, to allow a local bias-adjustment factor to be derived. A bias-adjustment factor takes into account the uncertainty associated with a passive monitoring method such as diffusion tubes.

13.2.6 The local bias-adjustment spreadsheet[1] published by Defra has been used to determine the local bias-adjustment factor. Figure A1 shows that a local bias-adjustment factor of 0.64 has been used to process the Scheme specific monitoring data.

[1] Defra, Local Air Quality Management, https://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html [Accessed November 2018]

Figure 13.1 Derivation of local bias adjustment factor

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	11/05/2017	14/06/2017	3.2	3.0	3.5	3	0.3	9	0.7
2	14/06/2017	18/07/2017	4.1	4.0	4.6	4	0.4	8	0.9
3	18/07/2017	15/08/2017	3.0	2.8	2.9	3	0.1	5	0.4
4	15/08/2017	15/09/2017	2.7	2.4	2.4	2	0.2	8	0.5
5	15/09/2017	16/10/2017	2.6	1.9	2.1	2	0.4	16	0.9
6	16/10/2017	17/11/2017	4.4	4.4	4.3	4	0.1	1	0.1
7	17/11/2017	18/12/2017	2.8	3.2	3.4	3	0.3	9	0.7
8									
9									
10									
11									
12									
13									

It is necessarg to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
2.2	89.1	Good	Good
2.5	97.9	Good	Good
1.6	93.9	Good	Good
1.7	92.2	Good	Good
2	98.790323	Good	Good
3	96.325459	Good	Good
2	98.52349	Good	Good
Overall survey -->		Good precision	Good Overall

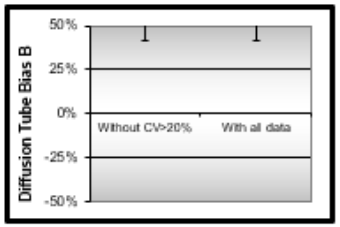
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 7 out of 7 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 7 periods of data	
Bias factor A	0.64 (0.58 - 0.71)
Bias B	57% (41% - 74%)
Diffusion Tubes Mean:	3 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	2 µgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	2 (2 - 2) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 7 periods of data	
Bias factor A	0.64 (0.58 - 0.71)
Bias B	57% (41% - 74%)
Diffusion Tubes Mean:	3 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	2 µgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	2 (2 - 2) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

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Appendix 13.3: Modelled NO2 Results (Standard Approach)

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Table 13 2 Magnitude of Change for Annual Mean NO_2 Concentrations 2

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13.3 Modelled NO_2 Results (Standard Approach)

13.3.1 Table 13.1 and 13.2 shows the predicted NO_2 results using the standard approach, which does not account for delays in the improvement of vehicle NOx emissions from the UK fleet. Predicted pollutant concentrations in the future are therefore lower using this method. The impact descriptor also changes, compared to that reported in 13.10, at some receptors.

13.3.2 The results presented in section 13.10, are worst-case as these take account of the lack of improvement in vehicle emissions for future assessment years and therefore result in higher annual mean NO_2 concentrations.

Table 13 1 Predicted Annual Mean NO_2 Concentrations using the Standard Method

Receptor ID	Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)				
	2017 Base	2021 DM	2021 DS	2036 DM	2036 DS
1	17.7	13.9	14.0	8.4	8.4
2	12.4	9.7	6.5	5.8	4.3
3	13.6	10.7	6.1	6.6	4.1
4	11.5	9.1	8.6	5.7	5.4
5	10.3	8.2	6.8	5.3	4.5
6	5.5	4.5	5.1	3.1	3.5
7	12.2	9.7	4.9	6.1	3.4
8	11.9	9.4	4.4	5.9	3.1
9	9.3	7.4	4.2	4.8	3.0
10	4.3	3.6	4.3	2.7	3.0
11	19.3	15.2	4.1	9.2	3.0
12	18.1	14.2	4.1	8.7	2.9
13	10.5	8.3	8.1	5.3	5.2
14	6.5	5.2	5.3	3.6	3.6

Table 13 2 Magnitude of Change for Annual Mean NO_2 Concentrations

Receptor ID	Change in Annual Mean NO_2 Concentration (µg/m^3)			
	2021 Magnitude of Change	Impact Descriptor	2036 Magnitude of Change	Impact Descriptor
1	0.1	Negligible	<0.1	Negligible
2	-3.2	Moderate Beneficial	-1.6	Minor Beneficial
3	-4.6	Major Beneficial	-2.6	Moderate Beneficial
4	-0.5	Negligible	-0.3	Negligible
5	-1.4	Minor Beneficial	-0.8	Minor Beneficial
6	0.7	Minor Adverse	0.4	Negligible
7	-4.8	Major Beneficial	-2.7	Moderate Beneficial
8	-5.0	Major Beneficial	-2.8	Moderate Beneficial
9	-3.2	Moderate Beneficial	-1.8	Minor Beneficial
10	0.6	Minor Adverse	0.3	Negligible
11	-11.1	Major Beneficial	-6.3	Major Beneficial
12	-10.1	Major Beneficial	-5.8	Major Beneficial
13	-0.2	Negligible	-0.1	Negligible
14	0.1	Negligible	0.1	Negligible

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Appendix 14.1: Glossary of Noise and Vibration Terminology

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Table 14 1 Some typical noise levels are given below: 3

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14.1 Glossary of noise and vibration terminology

Decibel

14.1.1 The ratio of sound pressures, which we can hear, is a ratio of 10^6 (one million: one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

dB(A)

14.1.2 The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz.

14.1.3 In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Equivalent continuous sound level

14.1.4 Another index for assessment for overall noise exposure is the equivalent continuous sound level, L_{eq}. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.

Statistical noise levels

14.1.5 For levels of noise that vary widely with time, for example road traffic noise, it is necessary to employ an index which allows for this variation. The L_{10}, the level exceeded for ten per cent of the time period under consideration, has been adopted in this country for the assessment of road traffic noise. The L_{90}, the level exceeded for ninety per cent of the time, has been adopted to represent the background noise level. The L_1,

the level exceeded for one per cent of the time, is representative of the maximum levels recorded during the sample period. A weighted statistical noise levels are denoted L_{A10}, dBL_{A90} etc. The reference time period (T), is normally included, e.g. $dBL_{A10, 5min}$ or $dBL_{A90, 8hr}$.

Maximum noise level

14.1.6 This is generally expressed as the maximum A-weighted noise level (L_{Amax}) and represents the maximum instantaneous noise level that occurred with the monitoring period. Certain assessment criteria recommend maximum noise levels to avoid disturbance as well as limits for longer-term averaged noise exposures.

Frequency

14.1.7 The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes, the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.

Sound pressure level

14.1.8 The sound power emitted by a source results in pressure fluctuations in the air, which are heard as sound.

14.1.9 The sound pressure level (L_p) is 10 times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2×10^{-5}Pa (the threshold of hearing).

14.1.10 Thus L_p (dB) = 10 log $(P1/P_{ref})^2$ where P_{ref}, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa).

14.1.11 The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dB(A) or more and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Vibration

14.1.12 Vibration may be expressed in terms of displacement, velocity and acceleration. Velocity and acceleration are most commonly used when assessing structure borne noise or human comfort issues respectively. Vibration amplitude may be quantified as a peak value, or as a root mean squared (rms) value.

14.1.13 Vibration amplitude can be expressed as an engineering unit value e.g. 1 mms^{-1} or as a ratio on a logarithmic scale in decibels:

14.1.14 Vibration velocity level, dB = 20 log (V/V_{ref}) (where the preferred reference level, V_{ref}, for vibration velocity = 10^{-9} ms^{-1}).

14.1.15 The decibel approach has advantages for manipulation and comparison of data.

Typical noise levels

Table 14 1 Some typical noise levels are given below:

Noise level, dB(A)	**Example**
130	Threshold of pain
120	Jet aircraft take-off at 100m
110	Chain saw at 1m
100	Inside disco
90	Heavy lorries at 5m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heater at 1m
40	Living room

Noise level, dB(A)	Example
30	Theatre
20	Remote countryside on still night
10	Sound insulated test chamber
0	Threshold of hearing

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 14.2: Baseline Noise Survey Results

A40LVP-ARP-ENV-SWI-RP-LA-0003

P01 | S3

02/10/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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14.2 Baseline noise survey results

Measurement procedure

Site location

14.2.1 Arup undertook noise surveys to determine the existing noise climate around the proposed A40 improvement Scheme at Llanddewi Velfrey. Noise measurements were taken by Stephen Evans MEng AMIOA of Arup on 24 and 25 May 2017.

Measurement locations

14.2.2 The measurement locations were chosen to record typical ambient noise levels at representative noise sensitive receptors around the proposed Scheme. The measurement locations are shown below in Figure 14.1.

Figure 14.1 Baseline noise measurement locations



14.2.3 There were 13 measurement locations, summarised as follows:

a) Location 1 (attended) – on the south side of Bethel Cottage;

b) Location 2 (attended) – on the pavement to the north side of Arfryn alongside the existing road;

c) Location 3 (attended) – to the south of the main residence at Valley View;

d) Location 4 (attended) – to the south of Castell;

e) Location 5 (attended) – to the north-eastern side of the main residence at Willow Tree School for Dogs (Blaen Pentroydin);

f) Location 6 (unattended logger) – to the south of Pentroydin Farm at approximately the same level as the bedroom windows of the farmhouse;

g) Location 7 (attended) – on the south-western side of Awel Deg;

h) Location 8 (attended) – to the northern side of Maes Y Ffynnon;

i) Location 8a (attended) – to the southern side of Maes Y Ffynnon;

j) Location 9 (attended) – to the southern side of Penrhiw Cottage;

k) Location 10 (attended) – to the northern side of Henllan Lodge;

l) Location 11 (unattended logger) – to the north of Trefangor Farm;

m) Location 12 (attended) – to the eastern side of the farmhouse at Penblewin Farm.

Attended survey period

14.2.4 Attended measurements were taken on 24th and 25th May 2017 between 09:00 and 17:00.

Survey methodology

14.2.5 The measurements were made with the measurement microphone mounted using a tripod 1.2m – 1.5m above ground level with the diaphragm parallel to the ground. Measurements at location 6 were taken under acoustically free field conditions (i.e. at least 3.5m from any acoustically reflecting surface other than the ground). All other measurements were taken 1m from the façade of the respective property.

14.2.6 The measurement locations were chosen to provide typical ambient noise levels at representative noise sensitive receptors around the proposed Scheme.

14.2.7 The weather conditions during the survey were within the limits specified in BS7445-1:2003. The weather was warm and dry with minimal cloud cover and mainly light winds, with the occasional gust of up to $3ms^{-1}$.

Attended survey method

14.2.8 ttended measurements at locations 1-8 and 12 followed the shortened measurement procedure described in CRTN to obtain the $L_{A10,18hr}$. Three fifteen minute measurements were taken, representative of each full one hour period[1], during three consecutive hours between 10:00 hrs and 17:00 hrs on normal weekday. Measurements at location 8a were five minutes in duration; the primary purpose of this additional measurement location was to pick up the difference in level between the south facing and north facing façades of this property as Scheme effects are likely to be different on each façade.

14.2.9 easurements at locations 9 and 10 were taken for 15 minutes at each location simultaneously with measurements taken by the logger at location 11. The noise levels at these receptors are all dominated by the same source of traffic on the A40 and therefore would be expected to show similar variations in level throughout the 18 hour day.

14.2.10 For each noise measurement, the noise climate, wind speed and direction, and the measured noise levels were all recorded and noted. The meter was set to automatically store the L_{Aeq}, L_{Amin}, L_{Amax}, L_{A10} and L_{A90} indices. Measurements were made with a fast (0.125s) time constant.

Unattended survey method

14.2.11 Unattended measurements were taken by noise loggers at locations 6 and 11. Measurements were taken in five minute samples for a total of 31:25 (hh:mm) at location 6 and 30:45 at location 11. The meter was set to automatically store the L_{Aeq}, L_{A10}, L_{A90} and $L_{Amax,F}$ indices. Measurements were made with a fast (0.125s) time constant.

Measurement equipment

14.2.12 Measurements were carried out using equipment as detailed in Table 1. The sound level meters and microphones are Type 1, conforming to BS EN 61672-1: 2003. The calibration of the sound level meters, pre-amplifier and microphone chains were checked before and after use, to confirm that there was no significant drift in meter response at the calibrator frequency and level. All sound level meters used for this

[1] As per the minimum sampling times set out in paragraph 41.2 of CRTN.

survey are regularly calibrated and this calibration is traceable to international standards.

Table 14.1 Measurement equipment used for the survey

Measurement Equipment	Manufacturer	Type Number	Serial Number
Class 1 sound level meter (logger)	Rion	NL-52	00120480
½" diameter condenser microphone	Rion	UC-59	03152
Pre-amplifier	Rion	NH-25	10479
Sound pressure calibrator	Rion	NC-74	35015346
Class 1 sound level meter (logger)	Rion	NL-52	00264533
½" diameter condenser microphone	Rion	UC-59	09681
Pre-amplifier	Rion	NH-25	64658
Sound pressure calibrator	Rion	NC-74	34467730
Class 1 sound level meter	Brüel & Kjær	2250	2818079
½" diameter condenser microphone	Brüel & Kjær	4189	2799527
Calibrator	Brüel & Kjær	4231	3015465

Measurement observations

14.2.13 During attended measurements the dominant noise source was road traffic on the A40. Other notable noise sources were distant farm vehicles and aircraft.

Measurements results

Noise survey results summary

14.2.14 Measured noise levels at all locations are summarised in Table 2 to 4 below.

Table 14.2 Summary of attended measurements

Location	Sound level, dB (façade)			
	$L_{A10,18h}$[1]	Range of $L_{A10,15min}$	Range of $L_{A90,15min}$	Range of $L_{Aeq,15min}$
1	68	69-70	40-46	64-66
2	79	79-80	47-52	75-77
3	52	52-53	44-46	49-50
4	52	49-56	42	46-52
5	44	43-46	34-39	41-43

Location	Sound level, dB (façade)			
	$L_{A10,18h}$[1]	Range of $L_{A10,15min}$	Range of $L_{A90,15min}$	Range of $L_{Aeq,15min}$
7	43	43-46	35-39	41-44
8	51	52-53	41-44	49-50
8a[2]	64	65-66	47-51	61-63
9	72	74	51	69
10	75	77	45	72
12	61	62-63	52-54	59-60

Notes:

[1] $L_{A10,18hr}$ values are derived as the arithmetic average the three consecutive $L_{A10,15min}$ values for each location minus 1dB(A).

[2] Measurements taken at location 10a were five minutes in duration

Table 14.3 Summary of logger measurements taken at location 6

Time period	Sound level, dB (free field)		
	L_{Aeq} (range)	L_{A10} average (range)	L_{A90} range
Day (07:00-19:00)	56 (41-69)	56 (41-74)	30-57
Evening (19:00-23:00)	50 (35-58)	49 (36-63)	24-46
Night (23:00-07:00)	45 (19-58)	40 (21-63)	17-47

Notes:

Overall L_{Aeq} values are the logarithmic (energy) average of the five-minute measurements for the respective time periods

Daytime measurements at this location were affected by non-typical events at the nearby farm and hence are not considered to be representative of the noise climate at this location. For this reason an overall $L_{A10,18hr}$ is not presented

Table 14.4 Summary of logger measurements taken at location 11

Time period	Sound level, dB (façade)			
	L_{Aeq} (range)	$L_{A10,18hr}$	L_{A10} average (range)	L_{A90} range
Day (07:00-19:00)	74 (70-77)	77	79 (76-80)	36-60
Evening (19:00-23:00)	71 (67-73)		74 (66-78)	25-54
Night (23:00-07:00)	67 (22-74)		60 (26-79)	15-50

Notes:

Overall L_{Aeq} values are the logarithmic (energy) average of the five-minute measurements for the respective time periods

[1] The $L_{A10,18hr}$ has been derived from the arithmetic average the $L_{A10,5min}$ values for the period 06:00-24:00 hours.

Figure 14.2 Logged measurements at Location 6

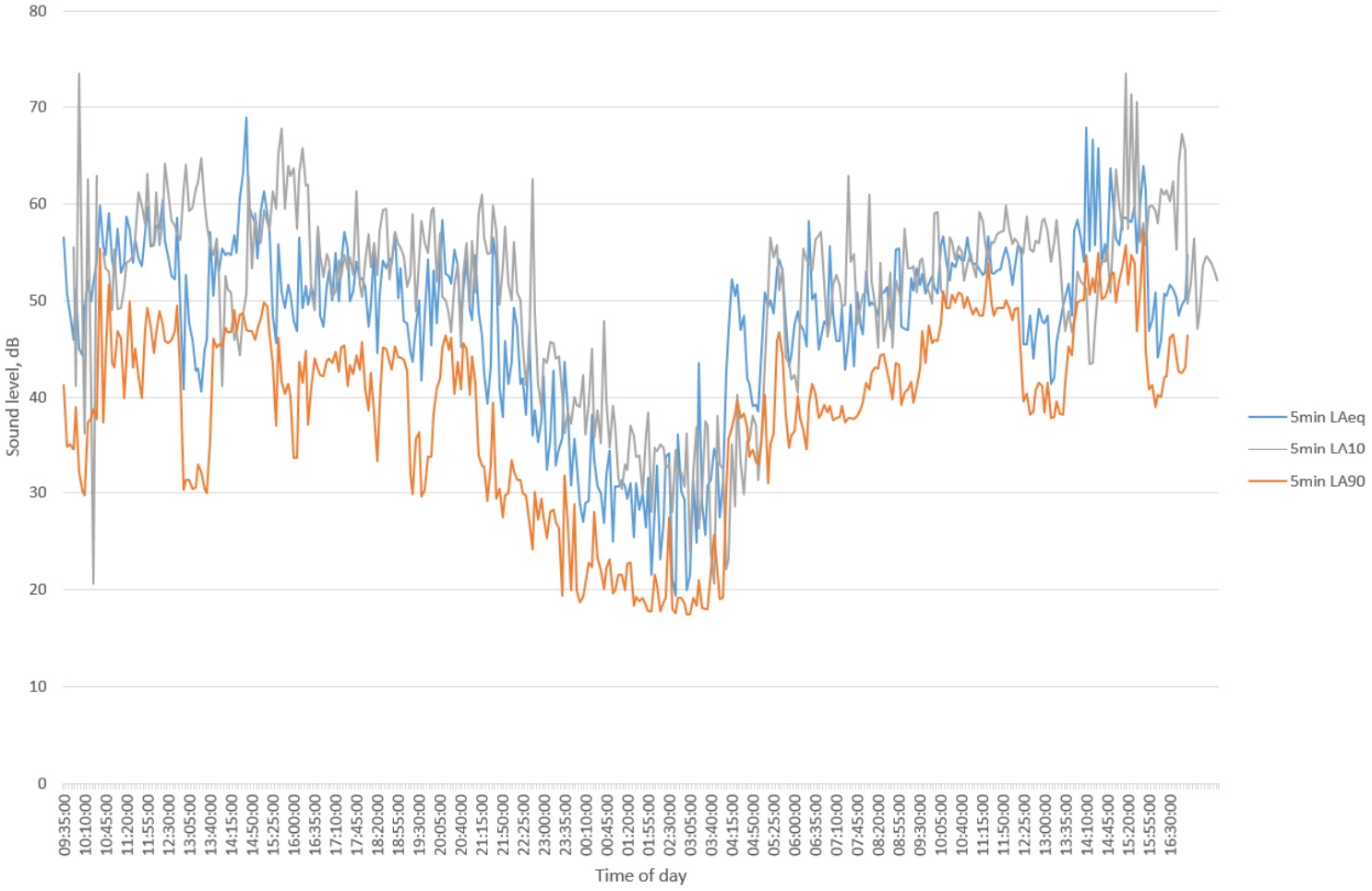
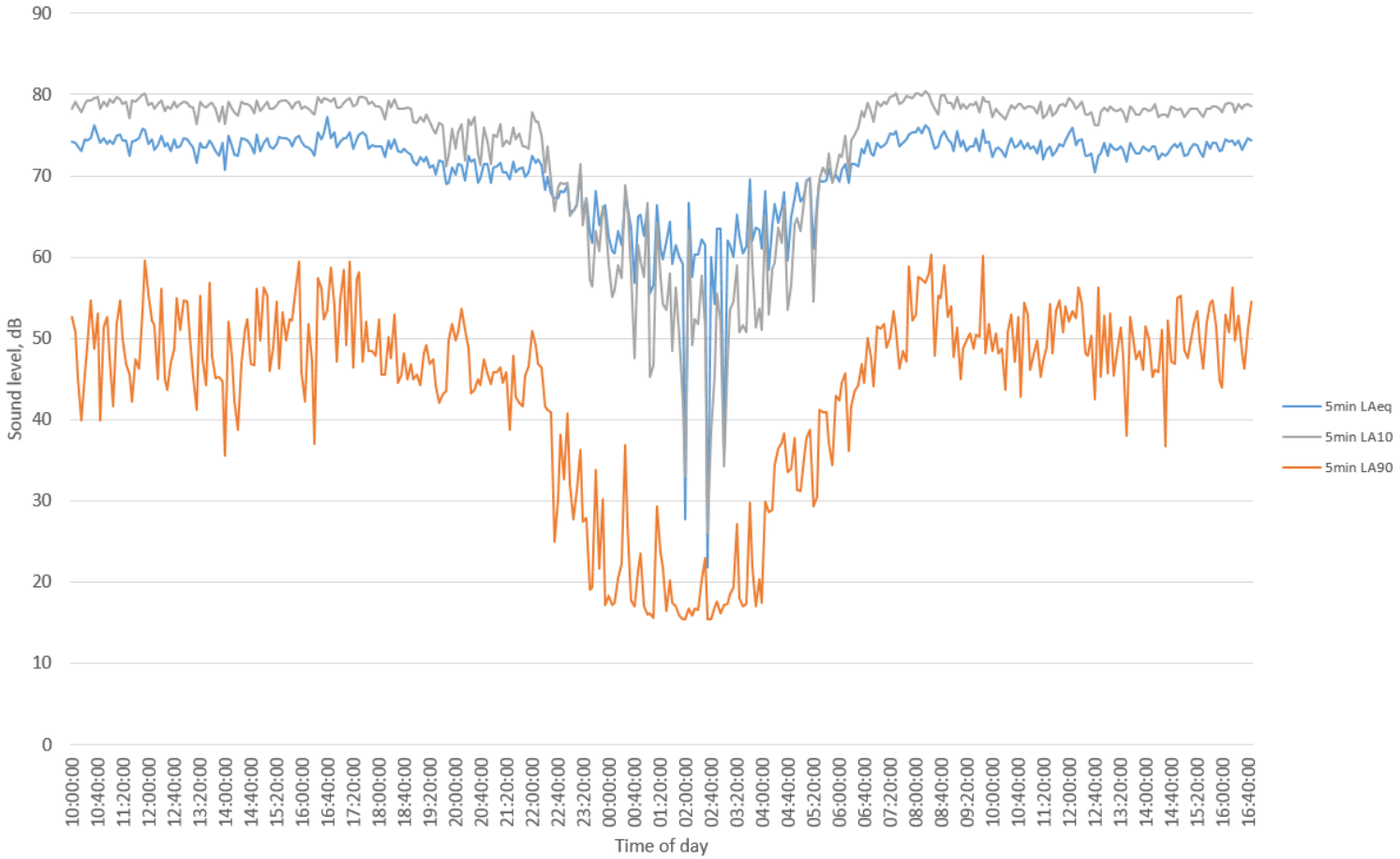


Figure 14.3 Logged measurements at Location 11



Full survey results at attended survey locations

Table 14.5 Attended measurement results at **Location 1** –at the south side of Bethel Cottage

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
24/05/2017	14:10	14:25	0	N/A	64	83	30	69	40	Road traffic noise from A40 dominant. Occasional noise from occupants of house
24/05/2017	15:15	15:30	0.2	Variable	66	79	30	70	46	Road traffic noise from A40 dominant.
24/05/2017	16:10	16:25	0.3	Variable	64	81	34	69	45	Road traffic noise from A40 dominant.

Table 14.6 Attended measurement results at **Location 2** – on the pavement to the north side of Arfryn alongside the existing road

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
24/05/2017	13:45	14:00	1.5	Variable	75	95	36	79	50	Road traffic noise from A40 dominant. Occasional noise from tractors
24/05/2017	14:45	15:00	0	N/A	76	91	33	80	47	Road traffic noise from A40 dominant.
24/05/2017	15:45	16:00	0	N/A	77	96	35	80	52	Road traffic noise from A40 dominant.

Table 14.7 Attended measurement results at **Location 3** to the south of the main residence at Valley View

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
25/05/2017	13:15	13:30	1.5	S	50	69	38	53	45	Road traffic noise from A40 dominant. Some noise from creaking gates.
25/05/2017	14:15	14:30	1.6	Variable	49	59	39	52	44	Road traffic noise from A40 dominant. Some noise from creaking gates.
25/05/2017	15:15	15:30	1	S	50	61	41	53	46	Road traffic noise from A40 dominant. Some noise from creaking gates.

Table 14.8 Attended measurement results at **Location 4** – to the south of Castell

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
25/05/2017	13:40	13:55	1	Variable	50	66	38	53	42	Road traffic noise from A40 dominant. Other noise sources included birdsong and occasional aircraft.
25/05/2017	14:40	14:55	2	Variable	46	62	39	49	42	Road traffic noise from A40 dominant. Distant farm vehicles also audible
25/05/2017	15:40	15:55	1.5	Variable	51	67	39	56	42	Road traffic noise from A40 dominant. Other noise sources included aircraft and birdsong

Table 14.9 Attended measurement results at **Location 5** – to the north-eastern side of the main residence at Willow Tree School for Dogs (Blaen Pentroydin)

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
24/05/2017	11:15	11:30	0.4	NW	43	60	31	46	39	Noise sources included road traffic noise from A40, birdsong and occasional aircraft.
24/05/2017	12:15	12:30	0.1	NW	43	60	35	45	38	Noise sources included road traffic noise from A40 and occasional farm traffic.
24/05/2017	13:15	13:30	0	N/A	40	62	27	43	34	Noise sources included road traffic noise from A40, birdsong and occasional aircraft.

Table 14.10 Attended measurement results at **Location 7** – on the south-western side of Awel Deg

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
24/05/2017	10:45	11:00	0	N/A	44	58	35	46	39	Road traffic noise from A40 dominant. Other noise sources included birdsong and quiet noise from house.
24/05/2017	11:45	12:00	1.5	N	41	63	33	44	37	Road traffic noise from A40 dominant.
24/05/2017	12:45	13:00	1.5	N	41	64	32	43	35	Road traffic noise from A40 dominant.

Table 14.11 Attended measurement results at **Location 8** – to the northern side of Maes Y Ffynnon

Date	**Time**		**Wind**		**Noise Level, dB**					**Comments**
	Start	**Finish**	**Speed (ms^{-1})**	**Direction**	**L_{Aeq}**	**L_{Amax}**	**L_{Amin}**	**L_{A10}**	**L_{A90}**	
25/05/2017	10:35	10:50	1.5	SE	50	63	36	53	44	Noise sources included road traffic from A40, wind in trees and birdsong.
25/05/2017	11:40	11:55	1.6	SE	49	67	37	51	42	Road traffic noise from A40 dominant.
25/05/2017	12:35	12:50	3	SSE	49	60	35	52	41	Road traffic noise from A40 dominant. Other noise sources included farm vehicles

Table 14.12 Attended measurement results at **Location 8A** – to the southern side of Maes Y Ffynnon

Date	**Time**		**Wind**		**Noise Level, dB**					**Comments**
	Start	**Finish**	**Speed (ms^{-1})**	**Direction**	**L_{Aeq}**	**L_{Amax}**	**L_{Amin}**	**L_{A10}**	**L_{A90}**	
25/05/2017	10:55	11:00	1.5	Variable	61	71	45	65	51	Road traffic from A40 dominant
25/05/2017	12:00	12:05	2.1	S	63	72	45	66	51	Road traffic from A40 dominant
25/05/2017	12:55	13:00	1.6	S	61	71	40	65	47	Road traffic from A40 dominant

Table 14.13 Attended measurement results at **Location 9 –** to the southern side of Penrhiw Cottage

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
25/05/2017	09:35	09:50	1	Variable	69	82	44	74	51	Road traffic from A40 dominant

Table 14.14 Attended measurement results at **Location 10** – to the northern side of Henllan Lodge

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
25/05/2017	09:10	09:25	0.7	SSE	72	86	39	77	45	Road traffic from A40 dominant

Table 14.15 Attended measurement results at **Location 12** – to the eastern side of the farmhouse at Penblewin Farm

Date	Time		Wind		Noise Level, dB					Comments
	Start	Finish	Speed (ms^{-1})	Direction	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	
25/05/2017	10:10	10:25	1.5	SE	60	72	44	63	53	Road traffic noise from A40 dominant.
25/05/2017	11:10	11:25	2.5	SE	59	72	44	62	52	Road traffic noise from A40 dominant. Other noise sources included farm vehicles
25/05/2017	12:10	12:25	1.7	S	60	75	47	62	54	Road traffic noise from A40 dominant.

No.	Parish	Name	Comment
1611	Narberth	Big Park	
243a	Llanddewi	Meadow	

14. Appendix 3 Designated sites

Name	Cadw Ref	Status	Easting	Northing	500m Study Area
Camp 200m NE of Stoneyford Promontory Fort	PE105	SAM	207038	218281	
Castell Coch	6087	LBII	207121	213683	
Camp 370m NE of Stoneyford Enclosure	PE104	SAM	207122	218453	
Llawhaden Village Pound	18796	LBII	207258	217422	
Llawhaden Castle Castle	PE024	SAM	207292	217452	
Llawhaden Castle	6065	LBII*	207303	217465	
Camp 400m NW of Holgan Promontory Fort – inland	PE102	SAM	207348	218189	
Llawhaden Bridge Bridge	PE023	SAM	207463	217254	
Llawhaden Bridge and River Bank Wall	6064	LBII*	207473	217251	
Church of St. Aidan	6062	LBII	207520	217468	
Bush Inn Camp Promontory Fort – inland	PE182	SAM	207633	215536	
Gelly Earthwork Rath	PE184	SAM	207933	219716	
Mounton Chapel	6082	LBII	208085	213257	
Gelli Bridge	18799	LBII	208363	219511	
Gelli Bridge (partly in Llawhaden community)	83174	LBII	208369	219516	
Rock Well	18801	LBII	208438	215925	
Robeston Wathen Church	6092	LBII	208450	215746	
Robeston House	18800	LBII	208510	215776	
Longridge Bridge (Partly in New Moat Community)	82469	LBII	208547	219674	
Cleddau Railway Bridge (partly in New Moat Community)	82464	LBII	208572	219733	
Molleston Camp Enclosure	PE274	SAM	208739	212966	
Pen Llwyn House	6071	LBII	208859	217683	
Iron Age Hillslope Enclosure in Canaston Wood Enclosure	PE413	SAM	208863	214093	
Bethesda Congregational Chapel	18797	LBII	209081	217912	
Dovecote at Llandre-Egremont	82465	LBII	209310	220316	
Llandre-Egremont Farmhouse	9398	LBII	209325	220323	
The Grove	18978	LBII	209353	212945	
Pont Shan	6537	LBII	209383	216824	
Pont Shan	18798	LBII	209383	216827	
Vaynor Gaer Ringwork	PE115	SAM	209425	217114	
Llandre Entrenchment Enclosure	CM089	SAM	209458	220291	
Great Molleston Farmhouse	18977	LBII	209702	212387	
Vaynor	6072	LBII*	209805	217513	
Milestone	6533	LBII	209994	215130	
Sodstone Manor	6540	LBII	210209	216556	
Coach House & Stables Sodstone House	6539	LBII	210293	216347	
Sodstone House	6538	LBII	210297	216314	

Name	Cadw Ref	Status	Easting	Northing	500m Study Area
Plas Farmhouse	6476	LBII	210836	214467	
Parish Church of St Andrew	6475	LBII	210839	214428	
Bethesda Baptist Chapel	6485	LBII	210861	214668	
Hill House (Chestnut Tree Lodge)	6500	LBII	210883	214816	
No.21 Northfield Road	6505	LBII	210891	215047	
The Emporium	6501	LBII	210894	214813	
Gates to Bathesda Chapel	6486	LBII	210895	214678	
National Westminster Bank	6484	LBII	210900	214643	
No.3 High Street	6479	LBII	210900	214784	
Bloomfield Terrace	6503	LBII	210901	215062	
No.2 High Street	6478	LBII	210901	214790	
Howell Williams Solicitor, County of Pembroke Sherriff's Office	6483	LBII	210903	214635	
The Coach & Horses Inn	6477	LBII	210904	214797	
Pencraig	6482	LBII	210906	214627	
Bloomfield Terrace	6504	LBII	210907	215069	
Animal Kitchen	6516	LBII	210912	214797	
Town Hall	6481	LBII	210926	214622	
The Golden Sheaf	6480	LBII	210932	214643	
Milestone by entrance to New Cemetery	6474	LBII	210945	214427	
Anthony Maxwell – Photographer	6494	LBII	210949	214590	
Anthony Maxwell – Photographer	6493	LBII	210953	214585	
No.14 Market Square	6492	LBII	210959	214573	
Hugh H Morgan	6487	LBII	210966	214616	
Blaen Marlais	6508	LBII	210972	216010	
War Memorial	6495	LBII	210972	214596	
The Former Courthouse	6558	LBII	210974	214546	
Lamp Standard by War Memorial	6497	LBII	210975	214586	
Telephone Call-box by War Memorial	6496	LBII	210975	214582	
Narbeth Castle	6473	LBII	210978	214392	
No.12 Market Square	6498	LBII	210981	214522	
Megna Indian Takeaway	6488	LBII	210982	214617	
Narberth Castle Castle	PE040	SAM	210985	214394	
The Old Pharmacy	87564	LBII	210988	214620	
Pillar Box	6489	LBII	210997	214606	
Whispers	6490	LBII	210997	214585	
Barn in Grounds of Blaen Marlais	6509	LBII	211000	215998	
Bloomfield	6502	LBII	211001	215080	
Barclay's Bank	6510	LBII	211002	214645	
The Rutzen Arms P.H.	6499	LBII	211005	214511	
Olieme House	6491	LBII	211006	214584	

Name	Cadw Ref	Status	Easting	Northing	500m Study Area
Redstone Cross Round Barrows Round barrow	PE154	SAM	211015	216416	
Old Bank House	6511	LBII	211032	214651	
G.Badham & Sons	6515	LBII	211036	214634	
Staunton House	6512	LBII	211040	214658	
Llwynon	6513	LBII	211052	214632	
Cowhouse at Cilrath Fach	6529	LBII	211057	216939	
Annexe adjoining No.61 (Llwynon)	6514	LBII	211059	214634	
Lofted Cowhouse at Cilrath Fach	6530	LBII	211076	216950	
Tabernacle United Reformed Church	6522	LBII	211080	214630	
Schoolroom to Tabernacle United Reformed Church	6523	LBII	211083	214611	
Cilfrath Fach	6528	LBII	211090	216922	
Stable at Cilrath Fach	6531	LBII	211091	216959	
Barn at Cilrath Fach	6532	LBII	211095	216945	
Blaen Ffynnonau	6506	LBII	211145	215923	
Stable attached to Blaen Ffynnonau	6507	LBII	211145	215914	
Allensbank	18974	LBII	211202	213321	
Grondre House	82467	LBII	211211	217923	
Narberth Mountain Enclosure Enclosure	PE394	SAM	211334	213034	
Milestone on Lane leading off A478 to Cold Blow	6527	LBII	211454	213274	
Byre at Greenway Farm	6520	LBII	211639	214670	
Outhouse at Greenway Farm	6521	LBII	211640	214662	
Cartshed adjoining Greenway Farm	6518	LBII	211653	214653	
Stable adjoining Greenway Farm	6519	LBII	211653	214649	
Greenway Farm	6517	LBII	211656	214662	
Coach House at Blackaldern	6525	LBII	211933	214206	
Milestone	6536	LBII	211953	214528	
Blackaldern	6524	LBII	211961	214204	
Parish Boundary Stone	6526	LBII	212107	214395	
Llandissilio War Memorial	82947	LBII	212135	221577	
Cottage by Nant-y-ffin Hotel	82946	LBII	212184	220784	
Crugiau Round Barrows Round barrow	CM309	SAM	212277	220593	
Earthworks SE of Clyn-Derwen Enclosure	CM065	SAM	212322	218940	
Parish Church of St Teilo	6535	LBII	212755	214375	
Clyn Pattel Motte & Bailey Motte	PE412	SAM	212833	214178	
Parc Glas	6534	LBII	212854	214359	
Crinow and Lampeter Velfrey Parish Boundary Stone	18998	LBII	212908	214039	
Llangwathan Castle Mound Motte	PE434	SAM	213405	215294	
Ffynnon Baptist Chapel	6056	LBII	213648	216898	Site 5
Caerau Gaer Rath	PE176	SAM	213985	216102	

Name	Cadw Ref	Status	Easting	Northing	500m Study Area
Eithin-man	82466	LBII	214019	220519	
Milepost at Gelli-deg	18991	LBII	214155	212548	
St David's Parish Church	18982	LBII	214392	215870	
St. David's Parish Church	18982	LBII	214392	215870	
Llanddewi Gaer Promontory Fort – inland	PE086	SAM	214449	216075	
Barn at Glanrhyd	9731	LBII	214661	218513	
Offices & Outbuildings to W of Glanrhyd House (also known as The Court House)	9730	LBII	214686	218439	
Glanrhyd Farm	15630	LBII	214688	218533	
Llan Burial Chamber Chambered tomb	PE026	SAM	214714	214048	
Water house at rear of Glanrhyd House	82473	LBII	214717	218447	
Glanrhyd House	9729	LBII	214721	218439	
War Memorial	18983	LBII	214766	216897	
Blaengwaith-Noah Camp Promontory Fort – inland	PE085	SAM	215164	212357	
Llanfallteg Bridge	82348	LBII	215178	219469	
Telephone Call-box to SE of St Peter's Church	87566	LBII	215471	214402	
Castell Ringwork	PE177	SAM	215496	214612	
War Memorial	18989	LBII	215501	214412	Site 23
Church of St Peter	6055	LBII	215523	214439	
Roman Road 300m East of Bryn Farm Road	PE472	SAM	215539	218280	
Milepost at Glan Rhyd	18990	LBII	215577	212127	
Panteg farmhouse	6547	LBII*	215709	216121	
Old Stable Block at Gwindy	6542	LBII	216252	217009	Site 85
Gwindy Farmhouse with walls and railings to garden	6541	LBII	216287	217020	Site 84
Derry Cottage	18999	LBII	216635	214687	
Lan	82347	LBII	216843	220428	
Waundwrgi Farmhouse	18985	LBII	217018	216417	
Milepost near Lower Llantydwell	18988	LBII	217104	212372	
Fron	18984	LBII	217179	216929	
Pengawse Ring Cairn Ring barrow	PE390	SAM	217199	217201	
Trewern Mansion	6546	LBII	217394	217762	
Carvan Congregational Chapel	18997	LBII	217461	214105	
Pengawse Medieval House Site Manor	PE389	SAM	217658	216889	
St Canna's Chair Inscribed stone	PE148	SAM	217708	218747	
Crug Swllt Round Barrow Round barrow	PE364	SAM	217709	212314	
Llangan Church Cropmark Enclosure Enclosure	CM264	SAM	217733	218714	
Inscribed Stone N of Parciau Farmhouse Inscribed stone	CM069	SAM	217769	219863	
Llan-Marlais Round Barrow Round barrow	PE327	SAM	217848	216352	
Cyffic and Lampeter Velfrey Parish Boundary Stone	18986	LBII	218185	212645	

Name	Cadw Ref	Status	Easting	Northing	500m Study Area
Milepost in Tavernspite village	18987	LBII	218186	212648	
Llwynybrain Cottage	24953	LBII	219849	215033	
Trevaughan Bridge	9416	LBII	220040	216170	
Roman Road 250m NE of Pwll-y-Hwyaid Road	CM279	SAM	220134	217283	
Cyffig Church	24116	LBII*	220810	213933	

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 14.3: Construction Noise and Vibration Data

A40LVP-ARP-ENV-SWI-RP-LA-0004

P01 | S3

02/10/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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14.3 Construction noise and vibration data

Noise assessment assumed equipment

14.3.1 Details of the equipment assumed in the construction noise assessment is provided in Table 14.1. Information regarding the likely number and type of equipment to be used, percentage on-time and activities was obtained from Carillion. Sound power levels for representative equipment was obtained from BS 5228-1 where available or from an alternative suitable source.

Table 14.1 Assumed equipment for each activity of the construction process

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
A1	Site Clearance & Mobilisation - West Roundabout	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
		Hard Material Clearance	Tracked Excavator	1	40	106	BS5228 Table C 2-3	102	
A2		Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
	Site Clearance & Mobilisation - West Section	Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
A3	Site Clearance & Mobilisation - Demolition of House	Demolition of House - Excavator	Tracked Excavator	1	40	106	BS5228 Table C 2-3	102	107
		Demolition of House - Dumptruck	Articulated Dump Truck (Tipping Fill	1	40	109	BS5228 Table C 2-33	105	
A4	Site Clearance & Mobilisation - Bridleway Underpass	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
A5	Site Clearance & Mobilisation - Centre	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
A6	Site Clearance & Mobilisation - CH 1900-2850	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
A7	Site Clearance & Mobilisation - Bridge 2850	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
A8	Site Clearance & Mobilisation - CH 2850 3900	Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	115
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	
		Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
A9		Tree felling - Chainsaws	Chain Saw	2	10	114	BS522 Table D 2-14	107	116
		Tree felling - Excavators	Tracked Excavator	2	40	106	BS5228 Table C 2-3	105	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
	Site Clearance & Mobilisation - East Roundabout	Chipping	Tracked Chipper - trimmed hardwood	2	10	120	HSE[1] Type F of Table 3	113	
		Grubbing	Dozer	1	20	106	BS5228 Table C 2-13	99	
		Transporting material	Lorry	3	40	108	BS5228 Table C 2-34	109	
A10	Earthworks - West Roundabout	Excavator	Tracked Excavator	2	56	101	BS5228 Table C 2-24	101	109
		Bulldozer	Dozer	1	56	106	BS5228 Table C 2-13	103	
		Dump Truck	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	1	56	102	BS5228 Table C 2-32	99	
A11	Earthworks - West Section	Excavator	Tracked Excavator	1	56	103	BS5228 Table C 2-16	100	112
		Bulldozer	Dozer	1	56	109	BS5228 Table C 2-12	106	
		Dump Truck	Articulated Dump Truck	2	56	109	BS5228 Table C 5-16	109	
		Roller	Roller	1	56	101	BS5228 Table C 2-38	98	
A12	Earthworks - Bridleway Underpass	Excavator	Tracked Excavator	1	56	101	BS5228 Table C 2-24	98	109
		Bulldozer	Dozer	1	56	106	BS5228 Table C 2-13	103	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Dump Truck	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
A13	Earthworks - Centre	Excavator	Tracked Excavator	1	56	101	BS5228 Table C 2-24	98	109
		Bulldozer	Dozer	1	56	106	BS5228 Table C 2-13	103	
		Dump Truck	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
A14	Earthworks - CH1900-2850	Excavator	Tracked Excavator	1	56	103	BS5228 Table C 2-16	100	112
		Bulldozer	Dozer	1	56	109	BS5228 Table C 2-12	106	
		Dump Truck	Articulated Dump Truck	2	56	109	BS5228 Table C 5-16	109	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
A15	Earthworks - Bridge 2850	Excavator	Tracked Excavator	1	56	103	BS5228 Table C 2-16	100	112

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Bulldozer	Dozer	1	56	109	BS5228 Table C 2-12	106	
		Dump Truck	Articulated Dump Truck	2	56	109	BS5228 Table C 5-16	109	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
A16	Earthworks - CH2850-3900	Excavator	Tracked Excavator	1	56	103	BS5228 Table C 2-16	100	112
		Bulldozer	Dozer	1	56	109	BS5228 Table C 2-12	106	
		Dump Truck	Articulated Dump Truck	2	56	109	BS5228 Table C 5-16	109	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
A17	Earthworks - East Roundabout	Excavator	Tracked Excavator	1	56	101	BS5228 Table C 2-24	98	109
		Bulldozer	Dozer	1	56	106	BS5228 Table C 2-13	103	
		Dump Truck	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
		Roller	Roller	2	56	101	BS5228 Table C 2-38	101	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	2	56	102	BS5228 Table C 2-32	102	
A18	Drainage - West Roundabout	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	105
		Dump Truck	Dumper	1	40	104	BS5228 Table C 4-4	100	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
A19	Drainage - West Section	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104
		Dump Truck	Dumper	1	40	104	BS5228 Table C 4-4	100	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
A20	Drainage - Bridleway Underpass	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104
		Dump Truck	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
A21	Drainage - Centre	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104
		Dump Truck	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
A22	Drainage - CH1900-2850	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Dump Truck	Dumper	1	40	104	BS5228 Table C 4-4	100	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
A23	Drainage - CH2850-3900	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104
		Dump Truck	Dumper	1	40	104	BS5228 Table C 4-4	100	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
A24	Drainage - East Roundabout	Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	104
		Dump Truck	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
		Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
		Tipper Lorry	Articulated Dump Truck (Tipping Fill)	1	40	102	BS5228 Table C 2-32	98	
A25	Structures - Bridleway Underpass CH1300	Formwork & Reinforcement - Crane	Mobile Telescopic Crane	1	20	95	BS5228 Table C 4-46	88	105
		Formwork & Reinforcement - Concrete Pump	Concrete Mixer Truck (Discharging) & Concrete Pump (Pumping)	1	20	103	BS5228 Table C 4-28	96	
		Formwork & Reinforcement - Lorries	Large Lorry Concrete Mixer	2	20	105	BS5228 Table C 4-21	101	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Backfill - Excavator	Tracked Excavator	1	20	101	BS5228 Table C 2-24	94	
		Backfill - Roller	Vibratory Roller	1	20	103	BS5228 Table C 5-20	96	
		Backfill - Dumper	Dumper	2	20	104	BS5228 Table C 4-4	100	
A26	Structures - Bridge 2850	Formwork & Reinforcement - Crane	Mobile Telescopic Crane	1	40	99	BS5228 Table C 4-41	95	108
		Formwork & Reinforcement - Concrete Pump	Concrete Mixer Truck (Discharging) & Concrete Pump (Pumping)	1	40	103	BS5228 Table C 4-28	99	
		Formwork & Reinforcement - Lorries	Large Lorry Concrete Mixer	2	40	105	BS5228 Table C 4-21	104	
		Backfill - Excavator	Tracked Excavator	1	40	101	BS5228 Table C 2-24	97	
		Backfill - Roller	Vibratory Roller	1	40	103	BS5228 Table C 5-20	99	
		Backfill - Dumper	Dumper	1	40	104	BS5228 Table C 4-4	100	
A27	Pavement - West Roundabout	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
		Planing	Road Planer	1	20	110	BS5228 Table C 5-7	103	
A28	Pavement - West Section	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
A29	Pavement - Bridleway Underpass	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
		Planing	Road Planer	1	20	110	BS5228 Table C 5-7	103	
A30	Pavement - Centre	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
		Planing	Road Planer	1	20	110	BS5228 Table C 5-7	103	
A31	Pavement - CH1900-2850	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
A32	Pavement - CH2850-3900	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
A33	Pavement - East	Road Surfacing	Asphalt Paver (+Tipper Lorry)	1	20	105	BS5228 Table C 5-31	98	111
		Transporting material	Lorry	1	20	108	BS5228 Table C 2-34	101	
		Road Surfacing	Vibratory Roller	1	20	108	BS5228 Table C 5-21	101	
		Joint cutting	Backhoe Mounted Hydraulic Breaker	1	20	116	BS5228 Table C 5-1	109	
		Cleaning	Road Sweeper	1	20	104	BS5228 Table C 4-90	97	
A34	Haul route on site - West Roundabout	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A35	Haul route on site - West Section	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A36	Haul route on site - Bridleway Underpass	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A37	Haul route on site - Centre	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A38	Haul route on site - CH 1900-2850	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A39	Haul route on site - Bridge 2850	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101

Ref	Activity Name	Activity Sub-name (if applicable)	Equipment	Number	% on-time	L_w (dB(A))	Source	Plant Level corrected for number and on-time L_w dB(A)	Activity Level L_w dB(A)
A40	Haul route on site - CH 2850-3900	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101
A41	Haul route on site - East roundabout	Haul	Lorry	1	20	108	BS5228 Table C 2-34	101	101

[1] Noise emissions and exposure from mobile wood chippers (Health and Safety Executive, 2008)

Vibration assessment assumed equipment

14.3.2 Details of the equipment assumed in the construction vibration assessment is provided in Table 14.2. Information regarding the potential vibratory rollers to be used for the compaction was obtained from Bomag datasheets supplied by Carillion. Where the datasheet contains more than one vibratory roller, the worst case one has been assessed,

Table 14.2 Possible compactor equipment, key variables and related construction activity

Equipment (Bomag)	**Number of vibrating drums, N_d**	**Amplitude low/high* frequency operation, A, mm**	**Width of drum, L_d, m**	**Activity**
BW 124 DH, single drum roller 4 tonnes	1	1.7 / 0.85	1.2	Drainage, backfill (structures)
BW 216 DH-5, single drum roller 18 tonnes	1	2.1 / 1.1	2.13	Earthworks, pavement
Parameter ranges: N_d – 1 or 2; A – 0.4 to 1.72mm; L_d – Width of drum, 0.75 to 2.2m. * The amplitude for low frequency operation has been assumed in the assessment to provide a worst case				

Construction Schedule

14.3.3 Details of the schedule assumed in the construction noise and vibration assessment is provided in Table 14.3. Information regarding the schedule of construction activities was provided from Carillion.

Table 14.3 Construction schedule

Ref	Activity Name	Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020
A1	Site Clearance & Mobilisation - West Roundabout	x													
A2	Site Clearance & Mobilisation - West Section	x													
A3	Site Clearance & Mobilisation - Demolition of House	x													
A4	Site Clearance & Mobilisation - Bridleway Underpass	x													
A5	Site Clearance & Mobilisation - Centre	x													
A6	Site Clearance & Mobilisation - CH 1900-2850	x													
A7	Site Clearance & Mobilisation - Bridge 2850	x													

Ref	Activity Name	Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020
A8	Site Clearance & Mobilisation - CH 2850 3900	x													
A9	Site Clearance & Mobilisation - East Roundabout	x													
A10	Earthworks - West Roundabout					x	x	x	x	x	x	x			
A11	Earthworks - West Section			x	x	x	x	x	x	x					
A12	Earthworks - Bridleway Underpass				x	x	x	x							
A13	Earthworks - Centre				x	x	x	x							
A14	Earthworks - CH1900-2850			x	x	x									
A15	Earthworks - Bridge 2850			x	x										
A16	Earthworks - CH2850-3900			x	x	x	x	x	x	x					
A17	Earthworks - East Roundabout				x	x	x			x	x				
A18	Drainage - West Roundabout					x	x	x	x	x	x	x			
A19	Drainage - West Section									x	x	x			
A20	Drainage - Bridleway Underpass					x	x	x	x	x	x				
A21	Drainage - Centre					x	x	x	x	x	x				

Ref	Activity Name	Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020
A22	Drainage - CH1900-2850					x	x	x							
A23	Drainage - CH2850-3900									x	x	x			
A24	Drainage - East Roundabout						x	x			x				
A25	Structures - Bridleway Underpass CH1300		x	x	x	x	x	x	x	x	x				
A26	Structures - Bridge 2850	x	x	x	x	x	x	x	x	x	x	x			
A27	Pavement - West Roundabout				x	x	x	x	x	x	x				
A28	Pavement - West Section											x	x	x	x
A29	Pavement - Bridleway Underpass											x	x	x	x
A30	Pavement - Centre											x	x	x	x
A31	Pavement - CH1900-2850					x	x	x							
A32	Pavement - CH2850-3900									x	x	x			
A33	Pavement - East						x	x			x				
A34	Haul route on site - West Roundabout	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A35	Haul route on site - West Section	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A36	Haul route on site - Bridleway Underpass	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Ref	Activity Name	Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
		Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020
A37	Haul route on site - Centre	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A38	Haul route on site - CH 1900-2850	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A39	Haul route on site - Bridge 2850	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A40	Haul route on site - CH 2850-3900	x	x	x	x	x	x	x	x	x	x	x	x	x	x
A41	Haul route on site - East roundabout	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Predicted construction noise levels at receptors

14.3.4 The results of the construction noise calculations for each receptor can be seen in Table 14.4.

Table 14.4 Predicted monthly construction façade noise level, $dBL_{Aeq,daytime}$

Receptor	Month													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Feb 2019	Mar 2019	Apr 2019	May 2019	Jun 2019	Jul 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020
R1 Penblewin Farm	72	59	65	68	70	70	70	70	70	70	68	59	59	59
R2 Trefangor Farm	68	59	59	59	60	68	60	59	59	61	59	65	59	59
R3 Henllan Lodge	82	77	77	79	78	77	77	77	80	77	78	74	73	77
R4 Penrhiw Cottage	76	67	67	68	72	68	70	68	67	67	68	74	68	67
R5 Maes Y Ffynnon	65	56	57	64	57	64	56	56	56	56	56	56	56	56
R6 Pentroydin Farm	63	56	61	61	56	56	56	56	56	56	56	49	49	49
R7 Blaen Pentroydin	51	42	44	45	48	52	48	45	46	51	45	42	42	42
R8 Bethel Cottage	80	65	65	74	74	78	76	65	74	78	65	65	65	65

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 14.4: Operational Noise Results

A40LVP-ARP-ENV-SWI-RP-LA-0005

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15/03/19

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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14.4 Operational noise results

Predicted noise levels at dwellings – Daytime $L_{A10,18hr}$

14.4.1 Results are listed in post-code order followed by alphabetical order based on the the address.

Table 14.1 Daytime $L_{A10,18hr}$ predicted noise levels

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
508	CARMAENAU FAWR, CLUNDERWEN, SA66 7HB	47.8	47.7	48.8	48.1	1	-0.1	0.3	1
1274	1 BRYN HELOG, BRYN HELOG, NARBERTH, SA67 7EG	53	53.4	43.7	43.7	-9.3	0.4	-9.3	1
1271	2 BRYN HELOG, NARBERTH, SA67 7EG	47.3	47.9	37.7	38.8	-9.6	0.6	-8.5	1
1279	ARFRYN, NARBERTH, SA67 7EG	70.3	70.9	47.2	48	-23.1	0.6	-22.3	1
1268	AWELFA, NARBERTH, SA67 7EG	58	58.5	45.4	45.2	-12.6	0.5	-12.8	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1296	BETHEL CHAPEL HOUSE, BETHEL COTTAGE, NARBERTH, SA67 7EG	51	51.5	49.9	50.7	-1.1	0.5	-0.3	1
71	CASTELL, NARBERTH, SA67 7EG	37.8	38.2	44.9	46.3	7.1	0.4	8.5	1
1286	CROFT HOUSE, NARBERTH, SA67 7EG	58.8	59.4	44.1	44.5	-14.7	0.6	-14.3	1
1291	GLENFIELD, NARBERTH, SA67 7EG	55	55.8	44.3	45.4	-10.7	0.8	-9.6	1
454	GWYNDY FACH, NARBERTH, SA67 7EG	44.3	42.2	43.7	43.5	-0.6	-2.1	-0.8	2
1283	PENLLIAN, NARBERTH, SA67 7EG	49.8	50.2	40.9	41.2	-8.9	0.4	-8.6	1
1249	THE VESTRY, NARBERTH, SA67 7EG	57	55.3	54.5	54.1	-2.5	-1.7	-2.9	1
67	VALLEY VIEW, NARBERTH, SA67 7EG	39.5	39.7	44.7	46.5	5.2	0.2	7	1
443	HAFOD FORGE, NARBERTH, SA67 7EH	48	45.4	48.2	46.4	0.2	-2.6	-1.6	1
480	HILL PIECE, NARBERTH, SA67 7EH	55.3	52.9	55.4	52.9	0.1	-2.4	-2.4	1
541	BRYNCOED, NARBERTH, SA67 7EJ	61.7	59	61.7	59.2	0	-2.7	-2.5	1
527	MEADOW VIEW, NARBERTH, SA67 7EJ	45.5	43.1	45.5	43.1	0	-2.4	-2.4	1
526	ROFT ISAF, NARBERTH, SA67 7EJ	44	41.6	44	41.6	0	-2.4	-2.4	1
547	UPPER FRON, NARBERTH, SA67 7EJ	40.5	38.3	40.3	38	-0.2	-2.2	-2.5	1
65	BLAEN PENTROYDIN, NARBERTH, SA67 7EL	41.3	42	45.8	46.9	4.5	0.7	5.6	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1406	CROSS HANDS HOUSE, NARBERTH, SA67 7EL	65.6	66.5	49.7	50.4	-15.9	0.9	-15.2	1
1407	CROSS INN, NARBERTH, SA67 7EL	59.5	60.5	45.3	46	-14.2	1	-13.5	1
1245	HIGHGATE, NARBERTH, SA67 7EL	50.4	51.3	44.1	44.7	-6.3	0.9	-5.7	1
1256	IVY COTTAGE, NARBERTH, SA67 7EL	56.4	57	45.7	46.2	-10.7	0.6	-10.2	1
475	LLETTY, NARBERTH, SA67 7EL	49.3	46.9	49	47	-0.3	-2.4	-2.3	1
1258	TEGFAN, NARBERTH, SA67 7EL	50.2	51.1	44.5	45	-5.7	0.9	-5.2	1
458	GWYNDY, NARBERTH, SA67 7EQ	51	48.4	50.7	48.7	-0.3	-2.6	-2.3	2
479	GWYNDYLAND, NARBERTH, SA67 7EQ	52.2	49.6	52.3	50.5	0.1	-2.6	-1.7	1
485	PEN HENDRE, NARBERTH, SA67 7EQ	41.9	39.6	41.5	39.6	-0.4	-2.3	-2.3	1
447	PENCWMMAU, NARBERTH, SA67 7EQ	43.9	41.5	44	41.5	0.1	-2.4	-2.4	1
51	1 BLACKMOOR HILL, BLACKMOOR HILL, NARBERTH, SA67 7EY	67	64.4	67	64.6	0	-2.6	-2.4	1
55	2 BLACKMOOR HILL, NARBERTH, SA67 7EY	68.6	66.1	68.6	66.2	0	-2.5	-2.4	1
39	BLACKMOOR HILL, NARBERTH, SA67 7EY	65.6	63.4	65.6	63.5	0	-2.2	-2.1	1
569	PANTYGORPHWYS COTTAGE, STONEYFORD, NARBERTH, SA67 7NX	67.4	67.9	67.3	67.7	-0.1	0.5	0.3	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
552	PANTYGORPHWYS HOUSE, STONEYFORD, NARBERTH, SA67 7NX	65.8	66.3	65.6	66.1	-0.2	0.5	0.3	1
579	PINE COTTAGE, STONEYFORD, NARBERTH, SA67 7NX	61.8	62.3	61.6	62.1	-0.2	0.5	0.3	1
571	STONEYFORD, NARBERTH, SA67 7NX	58	58.5	57.8	58.3	-0.2	0.5	0.3	1
582	WHITSUN BROOK, STONEYFORD, NARBERTH, SA67 7NX	66.7	67.2	66.6	67.1	-0.1	0.5	0.4	1
518	BOUNTY FARM, NARBERTH, SA67 7NY	45.9	46.1	45.7	45.9	-0.2	0.2	0	2
363	BRO MINAU, NARBERTH, SA67 7NY	57.1	54.7	55.6	55.3	-1.5	-2.4	-1.8	1
558	CAE'RMAENAU-FACH, NARBERTH, SA67 7NY	51.8	50.4	49.2	47.7	-2.6	-1.4	-4.1	1
505	GROSVENOR COURT, NARBERTH, SA67 7NY	49	48.8	50	49.2	1	-0.2	0.2	1
356	HENLLAN LODGE, NARBERTH, SA67 7NY	61.6	59.1	60.3	58.8	-1.3	-2.5	-2.8	1
566	PENBLEWIN FARM, NARBERTH, SA67 7NY	57.6	58.1	54.5	53.4	-3.1	0.5	-4.2	1
375	PENCAERMINAU FARM, NARBERTH, SA67 7NY	37.3	35	36.9	37.6	-0.4	-2.3	0.3	1
562	TREFANGOR FARM, NARBERTH, SA67 7NY	57.6	55.3	49.6	48.3	-8	-2.3	-9.3	1
349	1 HENLLAN COTTAGES, NARBERTH, SA67 7NZ	47.4	47.8	47.4	47.9	0	0.4	0.5	1
348	2 HENLLAN COTTAGES, NARBERTH, SA67 7NZ	47.6	48	47.6	48.1	0	0.4	0.5	1
352	HENLLAN FARM, NARBERTH, SA67 7NZ	46.4	44.8	46.1	44.8	-0.3	-1.6	-1.6	1
1177	1 PICTON TERRACE, PICTON TERRACE, NARBERTH, SA67 7PA	52.6	53	52.4	53	-0.2	0.4	0.4	1
1057	2 COMMERICAL FLATS, THE FLATS, NARBERTH, SA67 7PA	64.8	65.5	51.6	52.4	-13.2	0.7	-12.4	5

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1022	AEL-Y-BRYN, AEL Y BRYN, NARBERTH, SA67 7PA	53.5	53.7	44	44.6	-9.5	0.2	-8.9	1
1137	BRONAWEL, NARBERTH, SA67 7PA	63	61	51.4	52.3	-11.6	-2	-10.7	1
1146	BRYNALAN, NARBERTH, SA67 7PA	61.8	60.9	50.9	51.5	-10.9	-0.9	-10.3	1
1163	BRYNDEWI, NARBERTH, SA67 7PA	55.6	55.9	45.4	46.2	-10.2	0.3	-9.4	1
1173	BRYNSIRIOL, PICTON TERRACE, NARBERTH, SA67 7PA	50.2	50.7	47.7	48.3	-2.5	0.5	-1.9	1
1170	CHAMELIS, NARBERTH, SA67 7PA	56.6	57.1	47	47.6	-9.6	0.5	-9	1
1158	EFAIL WEN BUNGALOW, EFAIL WEN, NARBERTH, SA67 7PA	49.9	50.4	42	42.7	-7.9	0.5	-7.2	1
330	FFYNNON, NARBERTH, SA67 7PA	59.5	57	55.6	56.2	-3.9	-2.5	-3.3	1
335	FFYNNON CHAPEL LLANDEWI VELFRY, NARBERTH, SA67 7PA	63.8	61.3	59.6	59.9	-4.2	-2.5	-3.9	1
325	FFYNNON UCHAF, NARBERTH, SA67 7PA	47.7	45.2	46.7	47.3	-1	-2.5	-0.4	1
331	FFYNNON VESTRY, NARBERTH, SA67 7PA	61.6	59.1	57.4	58	-4.2	-2.5	-3.6	1
626	MAESYFFYNNON, NARBERTH, SA67 7PA	45.7	45.1	56	57.4	10.3	-0.6	11.7	1
634	MAES-YR-RHOS, NARBERTH, SA67 7PA	55.2	55.7	54.7	55.1	-0.5	0.5	-0.1	1
371	PARC-Y-DELYN, NARBERTH, SA67 7PA	42.8	40.7	41.8	43	-1	-2.1	0.2	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1168	PENBRYN, NARBERTH, SA67 7PA	54.2	54.1	44.9	45.6	-9.3	-0.1	-8.6	1
1052	PENFRO, NARBERTH, SA67 7PA	54.9	55.4	53.3	54	-1.6	0.5	-0.9	1
342	PENRHIW COTTAGE, PENRHIW, NARBERTH, SA67 7PA	60.4	57.9	57.1	57.1	-3.3	-2.5	-3.3	1
1176	PICTON VILLE, PICTON TERRACE, NARBERTH, SA67 7PA	48.7	49.2	43.3	43.9	-5.4	0.5	-4.8	1
1149	PLASNEWYDD, NARBERTH, SA67 7PA	56.8	55.5	48.2	49.1	-8.6	-1.3	-7.7	1
1017	TUDOR HOUSE, NARBERTH, SA67 7PA	55.6	56.1	46	46.5	-9.6	0.5	-9.1	1
1154	TYNEWYDD, NARBERTH, SA67 7PA	56.6	56	47.8	48.8	-8.8	-0.6	-7.8	1
1059	1 LLANDAFF ROW, NARBERTH, SA67 7PB	61.5	62.1	52.4	53	-9.1	0.6	-8.5	1
1063	2 LLANDAFF ROW, NARBERTH, SA67 7PB	59.7	60.3	52	52.6	-7.7	0.6	-7.1	1
1067	3 LLANDAFF ROW, NARBERTH, SA67 7PB	58.8	59.3	51.9	52.5	-6.9	0.5	-6.3	1
1068	4 LLANDAFF ROW, NARBERTH, SA67 7PB	52	52.8	48.7	49.3	-3.3	0.8	-2.7	1
1085	BRYNAWEL, NARBERTH, SA67 7PB	48.9	49.5	48.3	48.8	-0.6	0.6	-0.1	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1000	HIGHFIELD, NARBERTH, SA67 7PB	50.4	50.4	49.6	50.1	-0.8	0	-0.3	1
1081	OLD SCHOOL, NARBERTH, SA67 7PB	48.2	49	45.5	46.1	-2.7	0.8	-2.1	1
990	WILLOWS, NARBERTH, SA67 7PB	46.2	46.8	46.2	46.7	0	0.6	0.5	1
1386	ANFIELD, NARBERTH, SA67 7PD	48.8	49.6	39.8	40.9	-9	0.8	-7.9	1
1372	COACH HOUSE, NARBERTH, SA67 7PD	52.2	53.1	39.2	39.9	-13	0.9	-12.3	1
1370	GABLES, NARBERTH, SA67 7PD	43.2	44.1	35.1	36.1	-8.1	0.9	-7.1	1
1366	SMITHFIELD, NARBERTH, SA67 7PD	42.7	43.3	40.9	41.4	-1.8	0.6	-1.3	1
1382	THE BUNGALOW, PRESELI FILLING STATION, NARBERTH, SA67 7PD	48	48.9	39.1	40.1	-8.9	0.9	-7.9	1
599	AWEL DEG, NARBERTH, SA67 7PE	48.8	49.3	53.1	53.9	4.3	0.5	5.1	1
608	PENTROYDIN FAWR, NARBERTH, SA67 7PE	38.6	38.6	43.5	44	4.9	0	5.4	1
1180	1 GLAN PRESELI, NARBERTH, SA67 7PG	56	56.5	54.1	54.7	-1.9	0.5	-1.3	1
596	10 GLAN PRESELI, NARBERTH, SA67 7PG	47.9	48.4	49.7	50.2	1.8	0.5	2.3	1
1032	11 GLAN PRESELI, NARBERTH, SA67 7PG	51.7	52.1	52.4	53	0.7	0.4	1.3	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1034	12 GLAN PRESELI, NARBERTH, SA67 7PG	55.3	55.7	55.2	55.7	-0.1	0.4	0.4	1
1036	14 GLAN PRESELI, NARBERTH, SA67 7PG	55.3	55.7	55.2	55.7	-0.1	0.4	0.4	1
1040	15 GLAN PRESELI, NARBERTH, SA67 7PG	55.5	56	55.1	55.7	-0.4	0.5	0.2	1
1042	16 GLAN PRESELI, NARBERTH, SA67 7PG	50.3	50.8	50.7	51.5	0.4	0.5	1.2	1
1044	17 GLAN PRESELI, NARBERTH, SA67 7PG	56.6	57.1	55.1	55.6	-1.5	0.5	-1	1
1047	18 GLAN PRESELI, NARBERTH, SA67 7PG	57.1	57.6	55.1	55.6	-2	0.5	-1.5	1
1049	19 GLAN PRESELI, NARBERTH, SA67 7PG	57.6	58.1	55.1	55.6	-2.5	0.5	-2	1
1185	2 GLAN PRESELI, NARBERTH, SA67 7PG	54.7	55.2	53.6	54.2	-1.1	0.5	-0.5	1
1186	3 GLAN PRESELI, NARBERTH, SA67 7PG	53	53.5	52.6	53.2	-0.4	0.5	0.2	1
1190	4 GLAN PRESELI, NARBERTH, SA67 7PG	48.4	48.8	48.6	49.3	0.2	0.4	0.9	1
637	5 GLAN PRESELI, NARBERTH, SA67 7PG	52.6	53.1	52.2	52.8	-0.4	0.5	0.2	1
618	6 GLAN PRESELI, NARBERTH, SA67 7PG	46.9	47.3	49.8	50.3	2.9	0.4	3.4	1
625	7 GLAN PRESELI, NARBERTH, SA67 7PG	48.7	49.2	48.7	49.2	0	0.5	0.5	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
621	8 GLAN PRESELI, NARBERTH, SA67 7PG	49.3	49.8	50.9	51.5	1.6	0.5	2.2	1
595	9 GLAN PRESELI, NARBERTH, SA67 7PG	47.4	47.9	49	49.4	1.6	0.5	2	1
614	BRYNWYLFA, GLAN PRESELI, NARBERTH, SA67 7PG	45.3	45.9	49.5	50.9	4.2	0.6	5.6	1
1344	1 NARBERTH, SA67 7PL	49.7	49.9	47.7	48.3	-2	0.2	-1.4	1
1351	10 NARBERTH, SA67 7PL	41.1	41.2	36.8	37.8	-4.3	0.1	-3.3	1
1237	11 NARBERTH, SA67 7PL	48.1	47.8	44.3	45	-3.8	-0.3	-3.1	1
1328	12 NARBERTH, SA67 7PL	40.3	40.9	35.4	36.3	-4.9	0.6	-4	1
1336	14 NARBERTH, SA67 7PL	41.1	41.7	34.5	35.5	-6.6	0.6	-5.6	1
1213	15 NARBERTH, SA67 7PL	46.9	47.5	44.2	44.9	-2.7	0.6	-2	1
1318	16 BRYN TEG, NARBERTH, SA67 7PL	42.2	42.7	36.2	37.2	-6	0.5	-5	1
1225	17 NARBERTH, SA67 7PL	46	46.6	40.6	41.3	-5.4	0.6	-4.7	1
1312	18 NARBERTH, SA67 7PL	43	43.6	36.7	37.7	-6.3	0.6	-5.3	1
1224	19 CALAMAR, NARBERTH, SA67 7PL	46.2	47.1	38.2	39	-8	0.9	-7.2	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1358	2 NARBERTH, SA67 7PL	47.3	47.7	45.8	46.3	-1.5	0.4	-1	1
1211	20 KARROW, NARBERTH, SA67 7PL	46.6	47.4	38.5	39.6	-8.1	0.8	-7	1
1231	21 NARBERTH, SA67 7PL	50.4	51.3	40.7	41.7	-9.7	0.9	-8.7	1
1204	3 NARBERTH, SA67 7PL	47.2	47.2	46	46.6	-1.2	0	-0.6	1
1299	4 NARBERTH, SA67 7PL	42.4	43	40.9	41.5	-1.5	0.6	-0.9	1
1330	5 NARBERTH, SA67 7PL	46.9	46.9	45.1	45.7	-1.8	0	-1.2	1
1347	6 EDEN, NARBERTH, SA67 7PL	43.1	42.8	39.7	40.6	-3.4	-0.3	-2.5	1
1320	7 CYSGOD Y COED, NARBERTH, SA67 7PL	47	46.9	42.9	43.7	-4.1	-0.1	-3.3	1
1342	8 NARBERTH, SA67 7PL	40.9	41.1	37.3	38.2	-3.6	0.2	-2.7	1
1306	9 NARBERTH, SA67 7PL	45.9	45.7	41.8	42.6	-4.1	-0.2	-3.3	1
1012	BALACLAVA, NARBERTH, SA67 8UR	47.3	47.9	46.1	46.8	-1.2	0.6	-0.5	1
1098	BRYNTIRION, NARBERTH, SA67 8UR	37.4	37.7	34.2	35.3	-3.2	0.3	-2.1	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1128	CAERWEN, NARBERTH, SA67 8UR	45.8	46.3	45.7	46.2	-0.1	0.5	0.4	1
1005	CARTREFLE, NARBERTH, SA67 8UR	48	48.6	48	48.6	0	0.6	0.6	2
1094	LLYSDERI, NARBERTH, SA67 8UR	37.8	38.2	35.5	36.3	-2.3	0.4	-1.5	1
1118	MAES Y CAEAU, NARBERTH, SA67 8UR	46.7	47.2	46.6	47.1	-0.1	0.5	0.4	1
1136	MAESYLLAN, NARBERTH, SA67 8UR	46.5	47	46.4	47	-0.1	0.5	0.5	1
1089	MYNYDD-Y-WAWR, MYNYDD Y WAWR, NARBERTH, SA67 8UR	46.2	46.9	43.2	43.8	-3	0.7	-2.4	1
1143	PENBANC, NARBERTH, SA67 8UR	40.3	40.5	39	39.7	-1.3	0.2	-0.6	1
1023	PLAS BACH, NARBERTH, SA67 8UR	48.1	48.6	48	48.6	-0.1	0.5	0.5	1
1001	SCAPPIN, NARBERTH, SA67 8UR	44.5	45.1	40.9	41.6	-3.6	0.6	-2.9	1
1013	VAYNOR VILLA, NARBERTH, SA67 8UR	47	47.5	46.8	47.4	-0.2	0.5	0.4	1
1101	WHITE LODGE, NARBERTH, SA67 8UR	37.1	37.4	34	35.1	-3.1	0.3	-2	1
1396	PENLAN, NARBERTH, SA67 8UT	33.9	34.1	30.6	31.4	-3.3	0.2	-2.5	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1108	PLASCRWN COTTAGE, PLASCRWN MANSION, NARBERTH, SA67 8UT	31.8	31.8	29.1	30.2	-2.7	0	-1.6	1
1195	PLASCRWN HOUSE, NARBERTH, SA67 8UT	38.7	39.2	36.8	37.6	-1.9	0.5	-1.1	1
993	PLASCRWN LODGE, NARBERTH, SA67 8UT	46.3	47	43.9	44.6	-2.4	0.7	-1.7	1
1194	PLASCRWN MANSION, NARBERTH, SA67 8UT	31.7	31.7	28.7	29.9	-3	0	-1.8	1
1106	THE COACH HOUSE, PLASCRWN MANSION, NARBERTH, SA67 8UT	38.5	38.9	34.6	35.7	-3.9	0.4	-2.8	1
1206	THE GRANARY, PLASCRWN MANSION, NARBERTH, SA67 8UT	31.6	31.7	28.8	30	-2.8	0.1	-1.6	1

Predicted noise levels at dwellings – Night-time L_{night}

Table 14.2 Night-time L_{night} predicted noise levels

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
508	CARMAENAU FAWR, CLUNDERWEN, SA66 7HB	36.8	36.7	37.6	37	1.0	0.1	0.6	1
1274	1 BRYN HELOG, BRYN HELOG, NARBERTH, SA67 7EG	41.4	41.8	33.1	33.1	-8.5	0.3	-8.5	1
1271	2 BRYN HELOG, NARBERTH, SA67 7EG	36.3	36.8	27.7	28.6	-8.9	0.3	-8.3	1
1279	ARFRYN, NARBERTH, SA67 7EG	57	57.5	36.2	36.9	-21.2	0.3	-20.5	1
1268	AWELFA, NARBERTH, SA67 7EG	45.9	46.4	34.6	34.4	-11.4	0.3	-11.7	1
1296	BETHEL CHAPEL HOUSE, BETHEL COTTAGE, NARBERTH, SA67 7EG	39.6	40.1	38.6	39.4	-1.1	0.4	-0.4	1
71	CASTELL, NARBERTH, SA67 7EG	27.7	28.1	34.1	35.4	6.1	0.3	6.9	1
1286	CROFT HOUSE, NARBERTH, SA67 7EG	46.6	47.2	33.4	33.8	-13.4	0.4	-13.1	1
1291	GLENFIELD, NARBERTH, SA67 7EG	43.2	43.9	33.6	34.6	-9.8	0.4	-9.1	1
454	GWYNDY FACH, NARBERTH, SA67 7EG	33.6	31.7	33.1	32.9	-0.7	-1.8	-1.0	2
1283	PENLLIAN, NARBERTH, SA67 7EG	38.5	38.9	30.5	30.8	-8.1	0.3	-8.1	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1249	THE VESTRY, NARBERTH, SA67 7EG	45	43.5	42.8	42.4	-2.4	-1.6	-2.7	1
67	VALLEY VIEW, NARBERTH, SA67 7EG	29.3	29.5	34	35.6	4.5	0.0	5.1	1
443	HAFOD FORGE, NARBERTH, SA67 7EH	36.9	34.6	37.1	35.5	0.3	-2.2	-1.3	1
480	HILL PIECE, NARBERTH, SA67 7EH	43.5	41.3	43.6	41.3	0.0	-2.3	-2.1	1
541	BRYNCOED, NARBERTH, SA67 7EJ	49.3	46.8	49.3	47	0.1	-2.1	-1.9	1
527	MEADOW VIEW, NARBERTH, SA67 7EJ	34.7	32.5	34.7	32.5	0.0	-2.2	-2.1	1
526	ROFT ISAF, NARBERTH, SA67 7EJ	33.3	31.2	33.3	31.2	-0.1	-1.9	-1.8	1
547	UPPER FRON, NARBERTH, SA67 7EJ	30.2	28.2	30	27.9	-0.1	-1.9	-2.0	1
65	BLAEN PENTROYDIN, NARBERTH, SA67 7EL	30.9	31.5	34.9	35.9	3.8	0.4	4.5	1
1406	CROSS HANDS HOUSE, NARBERTH, SA67 7EL	52.8	53.6	38.5	39.1	-14.5	0.4	-13.9	1
1407	CROSS INN, NARBERTH, SA67 7EL	47.3	48.2	34.5	35.1	-12.9	0.4	-12.4	1
1245	HIGHGATE, NARBERTH, SA67 7EL	39.1	39.9	33.4	34	-6.0	0.3	-5.4	1
1256	IVY COTTAGE, NARBERTH, SA67 7EL	44.5	45	34.9	35.3	-9.8	0.3	-9.2	1
475	LLETTY, NARBERTH, SA67 7EL	38.1	35.9	37.8	36	-0.3	-1.9	-1.9	1
1258	TEGFAN, NARBERTH, SA67 7EL	38.9	39.7	33.8	34.2	-5.4	0.3	-4.8	1
458	GWYNDY, NARBERTH, SA67 7EQ	39.6	37.3	39.4	37.6	-0.3	-2.2	-1.9	2

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
479	GWYNDYLAND, NARBERTH, SA67 7EQ	40.7	38.4	40.8	39.2	0.1	-2.2	-1.5	1
485	PEN HENDRE, NARBERTH, SA67 7EQ	31.4	29.4	31.1	29.4	-0.3	-2.0	-2.0	1
447	PENCWMMAU, NARBERTH, SA67 7EQ	33.2	31.1	33.3	31.1	0.0	-2.2	-2.1	1
51	1 BLACKMOOR HILL, BLACKMOOR HILL, NARBERTH, SA67 7EY	54	51.7	54	51.9	0.0	-1.9	-1.9	1
55	2 BLACKMOOR HILL, NARBERTH, SA67 7EY	55.5	53.2	55.5	53.3	0.0	-2.0	-2.0	1
39	BLACKMOOR HILL, NARBERTH, SA67 7EY	52.8	50.8	52.8	50.9	0.0	-1.7	-1.7	1
569	PANTYGORPHWYS COTTAGE, STONEYFORD, NARBERTH, SA67 7NX	54.4	54.8	54.3	54.7	-0.1	0.5	0.5	1
552	PANTYGORPHWYS HOUSE, STONEYFORD, NARBERTH, SA67 7NX	53	53.4	52.8	53.2	-0.1	0.5	0.5	1
579	PINE COTTAGE, STONEYFORD, NARBERTH, SA67 7NX	49.3	49.8	49.2	49.6	0.0	0.6	0.6	1
571	STONEYFORD, NARBERTH, SA67 7NX	45.9	46.4	45.7	46.2	-0.1	0.6	0.6	1
582	WHITSUN BROOK, STONEYFORD, NARBERTH, SA67 7NX	53.8	54.2	53.7	54.1	0.0	0.6	0.5	1
518	BOUNTY FARM, NARBERTH, SA67 7NY	35	35.2	34.9	35	-0.1	0.4	0.3	2
363	BRO MINAU, NARBERTH, SA67 7NY	45.1	43	43.8	43.5	-1.7	-2.3	-1.5	1
558	CAE'RMAENAU-FACH, NARBERTH, SA67 7NY	40.3	39.1	38	36.7	-2.2	-1.0	-3.5	1
505	GROSVENOR COURT, NARBERTH, SA67 7NY	37.8	37.6	38.7	38	1.0	0.1	0.5	1
356	HENLLAN LODGE, NARBERTH, SA67 7NY	49.2	46.9	48	46.6	-1.6	-2.2	-2.4	1
566	PENBLEWIN FARM, NARBERTH, SA67 7NY	45.6	46	42.8	41.8	-2.6	0.5	-3.5	1
375	PENCAERMINAU FARM, NARBERTH, SA67 7NY	27.3	25.2	26.9	27.6	0.3	-2.2	1.4	1

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562	TREFANGOR FARM, NARBERTH, SA67 7NY	45.6	43.5	38.4	37.2	-7.9	-2.2	-8.2	1
349	1 HENLLAN COTTAGES, NARBERTH, SA67 7NZ	36.4	36.8	36.4	36.8	-0.2	0.5	0.5	1
348	2 HENLLAN COTTAGES, NARBERTH, SA67 7NZ	36.6	36.9	36.6	37	-0.1	0.5	0.6	1
352	HENLLAN FARM, NARBERTH, SA67 7NZ	35.5	34	35.2	34	-0.4	-1.8	-1.3	1
1177	1 PICTON TERRACE, PICTON TERRACE, NARBERTH, SA67 7PA	41.1	41.4	40.9	41.4	-0.4	0.4	0.1	1
1057	2 COMMERICAL FLATS, THE FLATS, NARBERTH, SA67 7PA	52.1	52.7	40.2	40.9	-12.2	0.4	-11.5	5
1022	AEL-Y-BRYN, AEL Y BRYN, NARBERTH, SA67 7PA	41.9	42.1	33.3	33.9	-8.8	0.0	-7.3	1
1137	BRONAWEL, NARBERTH, SA67 7PA	50.4	48.6	40	40.8	-10.7	-2.0	-9.0	1
1146	BRYNALAN, NARBERTH, SA67 7PA	49.3	48.5	39.5	40.1	-10.1	-0.9	-8.5	1
1163	BRYNDEWI, NARBERTH, SA67 7PA	43.8	44	34.6	35.3	-9.5	0.2	-8.2	1
1173	BRYNSIRIOL, PICTON TERRACE, NARBERTH, SA67 7PA	38.9	39.4	36.7	37.2	-2.6	0.4	-2.0	1
1170	CHAMELIS, NARBERTH, SA67 7PA	44.7	45.1	36	36.6	-8.9	0.5	-8.0	1
1158	EFAIL WEN BUNGALOW, EFAIL WEN, NARBERTH, SA67 7PA	38.6	39.1	31.5	32.2	-7.5	0.4	-6.4	1
330	FFYNNON, NARBERTH, SA67 7PA	47.3	45	43.8	44.3	-3.5	-2.3	-2.3	1

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335	FFYNNON CHAPEL LLANDEWI VELFRY, NARBERTH, SA67 7PA	51.1	48.9	47.4	47.6	-3.9	-2.3	-2.7	1
325	FFYNNON UCHAF, NARBERTH, SA67 7PA	36.7	34.4	35.8	36.3	-1.0	-2.2	1.3	1
331	FFYNNON VESTRY, NARBERTH, SA67 7PA	49.2	46.9	45.4	45.9	-3.8	-2.3	-2.7	1
626	MAESYFFYNNON, NARBERTH, SA67 7PA	34.9	34.3	44.1	45.4	8.9	-0.6	10.6	1
634	MAES-YR-RHOS, NARBERTH, SA67 7PA	43.4	43.9	43	43.3	-0.7	0.4	0.0	1
371	PARC-Y-DELYN, NARBERTH, SA67 7PA	32.3	30.4	31.3	32.4	-1.1	-2.0	1.0	1
1168	PENBRYN, NARBERTH, SA67 7PA	42.5	42.4	34.1	34.8	-8.6	-0.1	-6.9	1
1052	PENFRO, NARBERTH, SA67 7PA	43.1	43.6	41.7	42.3	-1.8	0.4	-1.2	1
342	PENRHIW COTTAGE, PENRHIW, NARBERTH, SA67 7PA	48.1	45.8	45.1	45.1	-3.1	-2.3	-1.9	1
1176	PICTON VILLE, PICTON TERRACE, NARBERTH, SA67 7PA	37.6	38	32.7	33.2	-5.2	0.4	-4.4	1
1149	PLASNEWYDD, NARBERTH, SA67 7PA	44.8	43.7	37.1	37.9	-7.8	-1.1	-5.7	1
1017	TUDOR HOUSE, NARBERTH, SA67 7PA	43.8	44.2	35.1	35.6	-9.0	0.5	-8.4	1
1154	TYNEWYDD, NARBERTH, SA67 7PA	44.7	44.1	36.8	37.6	-8.0	-0.4	-6.2	1
1059	1 LLANDAFF ROW, NARBERTH, SA67 7PB	49.1	49.6	40.9	41.4	-8.5	0.3	-7.8	1

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1063	2 LLANDAFF ROW, NARBERTH, SA67 7PB	47.5	48	40.5	41.1	-7.2	0.4	-6.4	1
1067	3 LLANDAFF ROW, NARBERTH, SA67 7PB	46.6	47.1	40.4	41	-6.5	0.4	-5.7	1
1068	4 LLANDAFF ROW, NARBERTH, SA67 7PB	40.5	41.2	37.6	38.1	-3.3	0.4	-2.7	1
1085	BRYNAWEL, NARBERTH, SA67 7PB	37.7	38.3	37.2	37.6	-0.7	0.6	-0.1	1
1000	HIGHFIELD, NARBERTH, SA67 7PB	39.1	39.1	38.4	38.8	-1.0	0.0	-0.2	1
1081	OLD SCHOOL, NARBERTH, SA67 7PB	37.1	37.8	34.7	35.2	-2.8	0.3	-2.2	1
990	WILLOWS, NARBERTH, SA67 7PB	35.3	35.8	35.3	35.8	-0.2	0.6	0.5	1
1386	ANFIELD, NARBERTH, SA67 7PD	37.6	38.4	29.5	30.5	-8.4	0.3	-7.6	1
1372	COACH HOUSE, NARBERTH, SA67 7PD	40.7	41.5	29	29.6	-11.8	0.3	-11.2	1
1370	GABLES, NARBERTH, SA67 7PD	32.6	33.4	25.3	26.2	-6.9	0.2	-6.0	1
1366	SMITHFIELD, NARBERTH, SA67 7PD	32.2	32.7	30.5	31	-1.9	0.3	-1.0	1
1382	THE BUNGALOW, PRESELI FILLING STATION, NARBERTH, SA67 7PD	36.9	37.7	28.9	29.8	-8.2	0.4	-7.5	1
599	AWEL DEG, NARBERTH, SA67 7PE	37.6	38.1	41.5	42.2	3.7	0.5	4.4	1

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608	PENTROYDIN FAWR, NARBERTH, SA67 7PE	28.5	28.5	32.9	33.3	4.1	-0.1	4.8	1
1180	1 GLAN PRESELI, NARBERTH, SA67 7PG	44.1	44.6	42.4	43	-2.0	0.5	-1.4	1
596	10 GLAN PRESELI, NARBERTH, SA67 7PG	36.8	37.3	38.5	38.9	1.5	0.5	2.2	1
1032	11 GLAN PRESELI, NARBERTH, SA67 7PG	40.3	40.6	40.9	41.4	0.3	0.4	0.9	1
1034	12 GLAN PRESELI, NARBERTH, SA67 7PG	43.5	43.9	43.4	43.9	-0.3	0.4	0.3	1
1036	14 GLAN PRESELI, NARBERTH, SA67 7PG	43.5	43.9	43.4	43.9	-0.3	0.4	0.3	1
1040	15 GLAN PRESELI, NARBERTH, SA67 7PG	43.7	44.1	43.3	43.9	-0.7	0.4	-0.1	1
1042	16 GLAN PRESELI, NARBERTH, SA67 7PG	39	39.4	39.4	40.1	0.1	0.4	0.7	1
1044	17 GLAN PRESELI, NARBERTH, SA67 7PG	44.7	45.1	43.3	43.8	-1.8	0.4	-1.1	1
1047	18 GLAN PRESELI, NARBERTH, SA67 7PG	45.1	45.6	43.3	43.8	-2.2	0.5	-1.5	1
1049	19 GLAN PRESELI, NARBERTH, SA67 7PG	45.6	46	43.3	43.8	-2.7	0.4	-2.0	1
1185	2 GLAN PRESELI, NARBERTH, SA67 7PG	43	43.4	42	42.5	-1.2	0.4	-0.7	1
1186	3 GLAN PRESELI, NARBERTH, SA67 7PG	41.4	41.9	41.1	41.6	-0.7	0.5	-0.1	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1190	4 GLAN PRESELI, NARBERTH, SA67 7PG	37.3	37.6	37.5	38.1	-0.1	0.3	0.6	1
637	5 GLAN PRESELI, NARBERTH, SA67 7PG	41.1	41.5	40.7	41.2	-0.7	0.3	-0.1	1
618	6 GLAN PRESELI, NARBERTH, SA67 7PG	35.9	36.3	38.5	39	2.5	0.5	3.2	1
625	7 GLAN PRESELI, NARBERTH, SA67 7PG	37.6	38	37.6	38	-0.2	0.5	0.5	1
621	8 GLAN PRESELI, NARBERTH, SA67 7PG	38.1	38.5	39.5	40.1	1.3	0.4	1.9	1
595	9 GLAN PRESELI, NARBERTH, SA67 7PG	36.4	36.8	37.8	38.2	1.1	0.4	1.9	1
614	BRYNWYLFA, GLAN PRESELI, NARBERTH, SA67 7PG	34.5	35	38.3	39.5	3.6	0.4	4.3	1
1344	1 NARBERTH, SA67 7PL	38.5	38.6	36.7	37.2	-2.0	0.1	-1.2	1
1351	10 NARBERTH, SA67 7PL	30.7	30.8	26.8	27.7	-3.8	-0.3	-2.5	1
1237	11 NARBERTH, SA67 7PL	37	36.8	33.6	34.2	-3.8	-0.5	-2.6	1
1328	12 NARBERTH, SA67 7PL	30	30.5	25.6	26.4	-4.5	0.0	-3.5	1
1336	14 NARBERTH, SA67 7PL	30.7	31.3	24.8	25.7	-5.7	0.1	-4.4	1
1213	15 NARBERTH, SA67 7PL	35.9	36.5	33.5	34.1	-2.8	0.3	-2.1	1
1318	16 BRYN TEG, NARBERTH, SA67 7PL	31.7	32.2	26.3	27.2	-5.3	0.1	-4.0	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1225	17 NARBERTH, SA67 7PL	35.1	35.7	30.3	30.9	-5.2	0.1	-4.5	1
1312	18 NARBERTH, SA67 7PL	32.4	33	26.8	27.7	-5.7	0.0	-4.4	1
1224	19 CALAMAR, NARBERTH, SA67 7PL	35.3	36.1	28.1	28.8	-7.6	0.2	-6.9	1
1358	2 NARBERTH, SA67 7PL	36.3	36.7	34.9	35.4	-1.6	0.1	-0.7	1
1211	20 KARROW, NARBERTH, SA67 7PL	35.7	36.4	28.4	29.4	-7.3	0.3	-6.2	1
1231	21 NARBERTH, SA67 7PL	39.1	39.9	30.4	31.3	-8.9	0.3	-8.2	1
1204	3 NARBERTH, SA67 7PL	36.2	36.2	35.1	35.7	-1.4	-0.2	-0.5	1
1299	4 NARBERTH, SA67 7PL	31.9	32.4	30.5	31.1	-1.5	0.3	-0.8	1
1330	5 NARBERTH, SA67 7PL	35.9	35.9	34.3	34.9	-2.2	-0.4	-1.2	1
1347	6 EDEN, NARBERTH, SA67 7PL	32.5	32.3	29.5	30.3	-3.3	-0.5	-2.0	1
1320	7 CYSGOD Y COED, NARBERTH, SA67 7PL	36	35.9	32.3	33.1	-3.8	-0.4	-2.6	1
1342	8 NARBERTH, SA67 7PL	30.5	30.7	27.3	28.1	-3.3	-0.2	-2.0	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1306	9 NARBERTH, SA67 7PL	35	34.9	31.3	32.1	-3.8	-0.7	-2.6	1
1012	BALACLAVA, NARBERTH, SA67 8UR	36.3	36.8	35.2	35.8	-1.4	0.5	-0.6	1
1098	BRYNTIRION, NARBERTH, SA67 8UR	27.4	27.7	24.5	25.5	-3.2	-0.1	-2.2	1
1128	CAERWEN, NARBERTH, SA67 8UR	34.9	35.4	34.9	35.3	-0.2	0.6	0.6	1
1005	CARTREFLE, NARBERTH, SA67 8UR	36.9	37.5	36.9	37.5	-0.1	0.7	0.7	2
1094	LLYSDERI, NARBERTH, SA67 8UR	27.7	28.1	25.7	26.4	-2.4	0.1	-1.5	1
1118	MAES Y CAEAU, NARBERTH, SA67 8UR	35.8	36.2	35.7	36.1	-0.3	0.5	0.5	1
1136	MAESYLLAN, NARBERTH, SA67 8UR	35.6	36	35.5	36	-0.3	0.5	0.6	1
1089	MYNYDD-Y-WAWR, MYNYDD Y WAWR, NARBERTH, SA67 8UR	35.3	35.9	32.6	33.1	-3.0	0.4	-2.3	1
1143	PENBANC, NARBERTH, SA67 8UR	30	30.2	28.8	29.5	-1.6	-0.1	-0.8	1
1023	PLAS BACH, NARBERTH, SA67 8UR	37	37.5	36.9	37.5	-0.2	0.6	0.6	1
1001	SCAPPIN, NARBERTH, SA67 8UR	33.8	34.3	30.5	31.2	-3.6	0.3	-2.8	1

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1013	VAYNOR VILLA, NARBERTH, SA67 8UR	36	36.5	35.8	36.4	-0.3	0.6	0.6	1
1101	WHITE LODGE, NARBERTH, SA67 8UR	27.1	27.4	24.3	25.3	-3.1	-0.1	-2.1	1
1396	PENLAN, NARBERTH, SA67 8UT	24.2	24.4	21.3	22	-3.7	-0.2	-3.8	1
1108	PLASCRWN COTTAGE, PLASCRWN MANSION, NARBERTH, SA67 8UT	22.3	22.3	19.9	20.9	-7.1	-0.4	-7.1	1
1195	PLASCRWN HOUSE, NARBERTH, SA67 8UT	28.6	29	26.8	27.6	-2.1	0.2	-1.2	1
993	PLASCRWN LODGE, NARBERTH, SA67 8UT	35.4	36	33.2	33.9	-2.4	0.4	-1.6	1
1194	PLASCRWN MANSION, NARBERTH, SA67 8UT	22.3	22.3	19.6	20.6	-7.2	-0.4	-7.2	1
1106	THE COACH HOUSE, PLASCRWN MANSION, NARBERTH, SA67 8UT	28.4	28.7	24.9	25.9	-7.3	-0.2	-7.6	1
1206	THE GRANARY, PLASCRWN MANSION, NARBERTH, SA67 8UT	22.2	22.3	19.6	20.7	-7.1	-0.4	-7.1	1

Predicted noise levels at other sensitive receptors

Table 14.3 Daytime $L_{A10,18hr}$ predicted noise levels

Receiver ID	Address	Do-Minimum Baseline Year (2020)	Do-Minimum Future Year (2035)	Do-Something Baseline Year (2020)	Do-Something Future Year (2035)	Short Term Noise Change (Baseline Year)	Long Term DM Noise Change (Baseline Year to Future Year)	Long Term DS Noise Change (DM Baseline Year to DS Future Year)	No. of Dwellings at location
1263	BETHEL CHAPEL, NARBERTH, SA67 7EQ	60.2	58.1	56.7	56.6	-3.5	-2.1	-3.6	0
1006	LLANDDEWI VELFREY CRICKET CLUB, NARBERTH, SA67 7PG	50.7	51.5	47.3	48.7	-3.4	0.8	-2.0	0
605	LLANDDEWI VELFREY VILLAGE HALL, NARBERTH, SA67 7PG	44.2	44.7	50.1	51.5	5.9	0.5	7.3	0

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Walking, Cycling and Horse Riding Assessment Report

A40LVP-ARP-ENM-SWI-RP-TR-0002

P05 | S4

26/11/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 The Project

1.1 Context

1.1.1 In December 2004, the Welsh Government announced the outcome of the A40 West of St Clears study into the consideration of both single carriageway and dual carriageway improvements to the A40 between St Clears and Haverfordwest. This study came about as a result of a number of previous reports that all concluded that the A40 needed improvement.

1.1.2 In February 2017, the Welsh Government appointed Carillion, with Arup and RML (the 'Carillion Team') as their technical and environmental advisors, to develop the design of the proposed A40 Llanddewi Velfrey to Penblewin Improvements up to publication of draft Orders.

1.1.3 Carillion entered liquidation in January 2018. The Welsh Government subsequently appointed Arup, supported by RML, to continue the development of the design up to publication of draft Orders and to support the Welsh Government through the Statutory process.

1.2 Project history

1.2.1 In December 2004 the Minister announced the publication of his Addendum to the 2002 Trunk Road Forward Programme (TRFP) and this included two major single carriageway improvement schemes for the A40 west of St Clears. The improvements would use the 2+1 configuration allowing overtaking on the two-lane direction, prohibited in the one-lane direction and would be delivered in the following phases:

1. A40 Penblewin - Slebech Park
2. A40 Llanddewi Velfrey - Penblewin.

1.2.2 The first of these projects, Penblewin - Slebech Park, was completed in March 2011.

1.2.3 In July 2013, Edwina Hart AM CStJ MBE, Minister for Economy, Science and Transport, published a written statement outlining her priorities for Transport. The statement included the following:

"Improving the A40 has been identified as a priority by the Haven Waterway Enterprise Zone Board and I intend to undertake further development of previously proposed improvements."

1.2.4 On 12 November 2014, in providing an update on the closure of the Murco Refinery in Milford Haven, the Minister made an oral Statement in Plenary:

"In terms of transport links, I have instructed my officials to accelerate to the fullest extent possible the programme for delivering improvements at Llanddewi Velfrey."

1.2.5 In June 2015, in a written statement on the A40 Improvement Study the Minister noted: *"It is my intention to progress delivery of the A40 Llanddewi Velfrey to Penblewin scheme as soon as possible…"*

1.3 The problems

1.3.1 Consultation with key stakeholders, including the local authority, Welsh Government Departments and the Regional Transport Planner has identified the following problems:

1. The road is substandard and where overtaking provision does exist it is currently not spread along the length of the A40 and as such there are long lengths in each direction with no safe overtaking opportunities.
2. Limited overtaking opportunities lead to poor journey time reliability and driver frustration.
3. Occasional convoys of heavy goods vehicles from the ferry ports and slow moving agricultural vehicles contribute to periods of platooning and journey time unreliability, which is exacerbated with limited overtaking opportunities.
4. Seasonal spikes in traffic volumes along the A40 especially during the summer months leads to slow moving traffic causing journey time unreliability, which is exacerbated with limited overtaking opportunities.
5. The community of Llanddewi Velfrey is severed by the A40, which: reduces accessibility, increases risks of non-motorised user accidents and results in noise and air pollution.
6. There are many side road junctions and direct accesses to properties and agricultural fields off the A40, which contributes to operational problems along the road.

7. A mix of traffic types using the road, contributing to journey time unreliability and driver frustration, risky manoeuvres and collision incidents.
8. A lack of strategic public transport connectivity in Pembrokeshire generally means there is a dependence on the private car for inter-urban connections.

1.4 Scheme objectives

1.4.1 A number of transport planning objectives were developed iteratively during previous development work and engagement on the A40 project, aiming to address one or more of the identified problems. During the early stages of Key Stage 3 the problems and objectives were refreshed during a focused workshop event with key stakeholders to take into account the WelTAG 2017 guidance and Well-being of Future Generations (Wales) Act well-being goals. The Scheme objectives are:

O1 To enhance network resilience and improve accessibility along the east-west transport corridor to key employment, community and tourism destinations.

O2 To improve prosperity and provide better access to the county town of Haverfordwest, the Haven Enterprise Zone and the West Wales ports at Fishguard, Milford Haven and Pembroke Dock.

O3 To reduce community severance and provide health and amenity benefits.

O4 To reduce the number and severity of collisions.

O5 To promote active travel by cycling, horse-riding and walking to provide opportunities for healthy lifestyles.

O6 To deliver a scheme that promotes social inclusion and integrates with the local transport network to better connect local communities to key transport hubs.

O7 Deliver a project that is sustainable in a globally responsible Wales, taking steps to reduce or offset waste and carbon.

O8 Give due consideration to the impact of transport on the environment and provide enhancement when practicable.

1.5 Terminology

1.5.1 For clarity, the following abbreviations are used throughout this report:

- WCHR – this abbreviation has been used for both 'Walking, Cycling and Horse-Riding' and 'Walkers, Cyclists and Horse-Riders'
- PRoW – 'Public Right of Way' i.e. singular
- PRoWs – 'Public Rights of Way' i.e. plural.

1.5.2 Other abbreviations are described within the report as required.

1.6 Purpose of this report

1.6.1 The aims of this WCHR Assessment Report are:

a) To gain an appropriate understanding of all the relevant existing facilities for pedestrians, cyclists and equestrians in the local area

b) To provide background users with information that can be referred to throughout the design process

c) To identify opportunities for improvement for users

1.6.2 This WCHR Assessment Report has been undertaken in accordance with HD42/17 – *Walking, Cycling and Horse-Riding Assessment and Review.* This Assessment Report concludes with the identification of opportunities for improvement for consideration by the wider design team throughout the design process.

1.6.3 This assessment of WCHR is the first part of a two-stage process and takes place during preliminary design. The second stage, the review, shall continue throughout the design of the project.

1.7 Study Area

1.7.1 Drawing A40LVP-ARP-ENM-SWI-DR-C-0004 in Appendix A shows the approximate study area for this assessment. The Lead Assessor has set a 5km assessment area, based on the scale of the scheme and associated HD42/17 guidance.

1.8 Site Visit

1.8.1 A site visit was conducted on 21 November 2017. The site visit consisted of walking along pedestrian, cycling and equestrian routes in the local area and driving through areas of interest in the wider study area. Notes made during the visit recorded the apparent level of use, condition / suitability of each route and potential improvements. The weather was poor, with drizzle / rain throughout the day and wet underfoot.

1.8.2 Photographs taken during the site visit support the text in this report, to help illustrate any potential issues that the proposed Scheme may have an impact on.

2 Route Description

2.1 Overview

2.1.1 The Scheme would provide a 2+1 carriageway configuration between Llanddewi Velfrey and Penblewin, allowing overtaking on the two-lane sections, and prohibited overtaking in the one-lane sections.

2.1.2 On the eastern half of the Scheme, a new bypass is proposed to the north of Llanddewi Velfrey between Bethel Chapel and Ffynnon Wood. On the western section of the Scheme, between Ffynnon and Penblewin roundabout, the road will run alongside and to the north of the existing A40. The existing A40 will remain for access to properties and local roads.

2.1.3 The existing section of the A40 that would be bypassed with the proposed Scheme would be detrunked. The detrunked section would become the responsibility of the local authority.

2.1.4 For the purposes of identifying geographic locations, the Scheme has been divided into four areas as follows (east to west):

1. Llanddewi Velfrey East Roundabout
2. Llanddewi Velfrey Bypass
3. Ffynnon to Penblewin
4. Penblewin Roundabout.

2.2 Llanddewi Velfrey East Roundabout

2.2.1 The Llanddewi Velfrey East roundabout is located at the eastern section of the Scheme. This is where the new carriageway would tie into the existing A40 at Fron Hill. The roundabout is located to the north of the existing A40, directly west of Bethel Chapel. A southern arm would provide access to Llanddewi Velfrey. Access to the north of the A40, to Bethel Chapel and other properties, will be provided via a northern arm.

2.3 Llanddewi Velfrey Bypass

2.3.1 The proposed A40 continues in a north westerly direction from the proposed roundabout, passing to the north of Llanddewi Velfrey village. It passes beneath the local road leading to Llanfallteg, which will cross the alignment on an overbridge. The route passes to the south of Pen-troydin-fawr farm.

2.3.2 As the route passes under Llanfallteg Road, it curves around and travels in a south westerly direction, south of Pen-troydin-fach farm to where it converges with the existing A40. The Western Llanddewi Velfrey Junction is proposed at this location, which takes the form of a staggered T junction. Access is provided to Llanddewi Velfrey and properties and farms located at Ffynnon, from southern and northern junction arms respectively.

2.4 Ffynnon to Penblewin

2.4.1 At Ffynnon Wood, west of the proposed junction, the proposed A40 would run quasi-online to the existing carriageway, utilising the existing embankment whilst passing through Ffynnon Wood.

2.4.2 As the route passes to the west of Ffynnon Chapel, the route crosses to the north of the existing A40, where it would run parallel to the existing road, until it reaches the Penblewin roundabout. The existing A40 carriageway from Ffynnon Chapel to Penblewin roundabout would be detrunked and would be diverted to connect to the existing lane adjacent to Henllan Lodge to provide local highway network connectivity. A new local road would be constructed to the north of the A40 to provide local access to properties, farms and the Trefangor Burial ground.

2.5 Penblewin Roundabout

2.5.1 The Penblewin roundabout is located at the western end of the Scheme and would provide a junction between: the A40, A478 to Narberth and A478 to Clunderwen. The roundabout would be reconstructed and enlarged to allow for both the existing and proposed A40 to tie in. The existing A40 that would be detrunked as part of the Scheme, would provide local access and access to the retained rest area.

2.6 Public Rights of Way Network

2.6.1 Listed below are the route types definitions from the UK Government which are considered PRoW and located within the study area of this WCHR Assessment Report Assessment. All PRoWs are highways and are shown on the 'Definitive Maps' held by highway authorities. Existing PRoW in the vicinity of the Scheme are shown on plan A40LVP-ARP-ENM-SWI-DR-C-0004, contained within Appendix A.

2.6.2 Footpath - If the path is used by pedestrians only, it is a footpath. Footpaths are usually tracks, and are rarely surfaced or lit. They are open to walkers, runners and users of mobility vehicles. This is different from a footway (the pavement alongside a road), in that it means the whole width of the highway.

2.6.3 Bridleway - Bridleways are legally protected routes that the public can use on foot or on horseback. Cyclists are permitted to use the bridleways, although through the Countryside Act 1968 there is no obligation to facilitate the cyclists on the routes and they must give way to other users. Horse drawn vehicles are not permitted.

2.6.4 Byway Open to All Traffic (BOAT) - These are open to all forms of traffic: pedestrians, horse riders, cyclists and car and other motor vehicle drivers, however rarely have a sealed surface. The definition was created under the Wildlife and Countryside Act 1981. Restricted Byways prohibit the use of mechanically propelled vehicles.

General Condition

2.6.5 There are a variety of links available for Walkers, Cyclists and Horse-Riders within the study area. However, a number of routes do not cross the existing A40. These routes are a variety of types and would host a range of WCHR. The existing A40 presents the only major obstruction to north-south routes for WCHR. Consequently, some routes tend to run on an east-west alignment.

2.6.6 The densities of Public Rights of Way are similar north and south of the existing A40. Where the densities of the PRoW do increase however is at towns and villages located within the study area, most notably in and around Llanddewi Velfrey, Clunderwen and Narberth. Initial observations into the conditions of the PRoW within the study area are mixed. Some routes are overgrown with vegetation and

unpassable, while others are fully operational and used frequently. Better analysis can be made after presentation of the WCHR Survey and Public Information Exhibition data.

Discussion and Summary

2.6.7 There are a variety of links available for WCHRs within the study area. The density of routes is greatest to the north and south of the existing A40, due to the greater number of east-west facilities, and the severance of north-south routes by the A40. Overall there are very few Bridleways and Byways (including restricted byways), which limits opportunities for equestrian and cycle users, however there is one bridleway route which crosses the A40 at Henllan Lodge. No WCHR routes are explicitly identified for east-west movement along the Scheme and the existing A40 is currently the only direct route.

2.6.8 There is a sub-standard footpath adjacent to the westbound lane along the length of the existing A40 through the village of Llanddewi Velfrey. There is no adjacent provision for the eastbound lane. Whilst there are a number of routes leading north and south from the A40, there is only one dedicated crossing point within the village

2.6.9 On both sides of the existing A40, the density of PRoW for the exclusive use of WCHRs is relatively sparse and spread out over the landscape. This probably reflects that most routes having followed the land boundaries for landowners in the area. The connections provided tend to connect places of residence with places of work.

3 Policy and Legislation Review

3.1 Overview

3.1.1 This section provides an overview of the WCHR policies and strategies relevant to the study area. This includes an overview of Carmarthenshire County Council's policies as the adjacent county's boundary is within the Scheme study area.

3.2 National Policy and Legislation

People, Places, Futures – The Wales Spatial Plan (2008)

3.2.1 The Wales Spatial Plan (WSP) was originally adopted in 2004 as the 20-year plan for sustainable development in Wales. It was updated in 2008 and provides the 'overarching framework and integration tool for Wales.' It underpins the future improvement of regional and national strategic planning for transport.

3.2.2 There are five guiding themes which set out the National Framework. The key themes are based on:

1. Building sustainable communities
2. Promoting a sustainable economy
3. Valuing our environment
4. Achieving sustainable accessibility and
5. Respecting distinctiveness.

3.2.3 Among the key challenges identified within the WSP is to integrate sustainable transport solutions with community and development planning to improve accessibility.

3.2.4 **Wales Transport Strategy – One Wales: Connecting the Nation (2008)**

3.2.5 The Wales Transport Strategy (WTS), One Wales: Connecting the Nation, was published in 2008. The document outlines how the transport policy approach is more responsive than previous strategies in its delivery of the Welsh Government's wider policy agenda and has attempted to be flexible to reflect different regional circumstances.

3.2.6 The stated goal of the strategy is for Wales to promote sustainable transport networks that safeguard the environment, while strengthening Wales' economic and social life.

3.2.7 The transport strategy identifies a series of high-level sustainable transport themes and sets out the steps to their delivery, including:

1. Achieving a more effective and efficient transport system
2. Achieving greater use of the more sustainable and healthy forms of travel and
3. Minimising demands on the transport system.

3.2.8 The Strategy also outlines the Welsh Government's aspiration to reduce the impact of transport on greenhouse gas emissions. A set of specific long-term outcomes are identified to enable transport to contribute to economic, social and cultural life. In relation to this report these include:

1. Outcome 4: Healthy lifestyles – encouraging healthy lifestyles by higher levels of walking and cycling.
2. Outcome 5: Safety and security of travel – improving the actual and perceived safety of travel by reducing injury accident rates as well as perceived safety for all modes of transport.
3. Outcome 8: Reliable transport system by improving the efficient, reliable and sustainable movement of people.
4. Outcome 10: Visitor attractions, green spaces and the countryside by providing people with the opportunity to access the countryside and key visitor attractions, including modal choice.

Road Safety Framework for Wales (2013)

3.2.9 This supersedes the Road Safety Strategy, which successfully achieved and exceeded the targeted reductions in casualties for all road users in Wales in 2010.

3.2.10 The 2013 framework sets out the Welsh Government's priorities for road safety and focuses on casualty reduction targets. Compared to the averages for 2004-2008, its targets are:

1. 40% reduction in the total number of people killed and seriously injured on Welsh roads by 2020

1. 25% reduction in the number of motorcyclists killed and seriously injured on Welsh roads by 2020 and
2. 40% reduction in the number of young people (aged 16-24) killed and seriously injured on Welsh roads by 2020.

Active Travel (Wales) Act (2013) and Active Travel Action Plan (2014)

3.2.11 The Active Travel (Wales) Act gained royal assent on 4 November 2013. It legislates for the provision of travel routes designed for cycling and walking and in particular, makes provision:

1. For approved maps of existing active travel routes and related facilities in a local authority's area
2. For approved integrated network maps of the new and improved active travel routes and related facilities needed to create integrated networks of active travel routes and related facilities in a local authority's area
3. Requiring local authorities to have regard to integrated network maps in preparing transport policies and to secure that there are new and improved active travel routes and related facilities
4. Requiring the Welsh Ministers to report on active travel in Wales
5. Requiring the Welsh Ministers and local authorities, in the performance of functions under the Highways Act 1980, to take reasonable steps to enhance the provision made for walkers and cyclists and to have regard to the needs of walkers and cyclists in the exercise of certain other functions and
6. Requiring the Welsh Ministers and local authorities to exercise their functions under the Act to promote active travel journeys and secure new and improved active travel routes and related facilities.

3.2.12 The Act created new duties for local authorities in Wales and the Welsh Ministers. It also gives the Welsh Ministers the power to issue guidance on the location, nature and condition of active travel routes and facilities to ensure they are suitable for use. Such guidance was published in the form of guidance notes.

3.2.13 Welsh Ministers have identified built-up areas with a population greater than 2,000 people in which the Active Travel Act would apply. Narberth is named as such and is located within the WCHR study area. Beyond the extent of the study area, Haverfordwest, St. Clears,

Tenby and Saundersfoot are the named settlements in close proximity to the study area.

3.2.14 The Design Guidance relating to the Active Travel (Wales) Act 2013 sets out guidance for those involved in the planning, design, approval, construction and maintenance of Active Travel routes and associated facilities in Wales. This aims to inform the development of a network of walking and cycling routes that serve a variety of purposes and connect key locations such as workplaces, hospitals, schools and shopping areas.

3.2.15 The Design Guidance document is intended to ensure that the requirements of the Active Travel Act are applied consistently and appropriately. Advice in the guidance must be considered when designing active travel routes on trunk roads. The active travel Design Guidance would primarily influence the A40 Llanddewi Velfrey to Penblewin Scheme by informing the design of crossings and related WCHR facilities. Where designers consider that compliance with the advice contained in this design guidance would conflict with a mandatory clause in the Design Manual for Roads and Bridges (DMRB), this should be addressed through the Welsh Government's departures process.

3.2.16 For all non-trunk road networks, the Design Guidance must be considered by local authorities when designing active travel routes even where this conflicts with the current local authority design standards.

Planning Policy Wales, Edition 8 (2016)

3.2.17 Planning Policy Wales (PPW8) sets out the land use planning policies of the Welsh Government. It seeks to promote resource efficient settlement patterns that minimise land take and urban sprawl, especially through preferences for the full and effective re-use of previously developed land and buildings.

3.2.18 Section 8 of PPW8 refers to the Welsh Government's aims to extend choice in transport and secure accessibility in a way which supports sustainable development and helps to tackle the causes of climate change by encouraging a more effective and efficient transport system, with greater use of the more sustainable and healthy forms of travel and minimising the need to travel. Paragraph 8.1.1 of PPW8

states that this would be achieved through integration:

1. Within and between different types of transport
2. Between transport measures and land use planning
3. Between transport measures and policies to protect and improve the environment and
4. Between transport measures and policies for education, health, social inclusion and wealth creation.

3.2.19 The main change between PPW8 and the previous version of Planning Policy Wales published in July 2014 (PPW7) is that Chapter 4 (Planning for Sustainability) was updated to take into account the Well-being of Future Generations (Wales) Act 2015 and that Chapter 8 (Transport) was updated to take into account the Active Travel (Wales) Act 2013.

3.2.20 With respect to the Well-being of Future Generations (Wales) Act 2015, the amendments insert information on the provisions of the Act, including the seven well-being goals and the sustainable development principle. The description of legislative requirements for sustainable development in the planning system has also been updated. The changes also illustrate how the Welsh Government's planning policy objectives link to the well-being goals.

3.2.21 TAN 16 'Sport, Recreation and Open Space' (2009) provides technical guidance in relation to sport, recreation and open space to supplement policy set out in PPW. In relation to public rights of way, the contribution of safe footpaths and cycle routes is highlighted, as is the need to protect and maintain these recreational and tourist resources.

Sustrans: National Cycle Network (NCN)

3.2.22 Sustrans is a charity comprising of engineers, educators, experts and advocates who make the case for better and safer cycling spaces in the built environment.

3.2.23 They have developed the National Cycle Network, a series of safe, traffic-free paths and quiet on-road routes that connect to every major town and city and pass within 2 miles of 75 per cent of UK homes.

3.2.24 They believe high quality public space that supports cycling and

walking routes and networks is an essential part of creating cohesive, happy and successful communities. Early involvement of local people is essential in designing unique, memorable places that are responsive to their needs, and draws on local knowledge and creativity, ensures a long lasting legacy.

3.2.25 To aid designers, Sustrans have produced a suite of technical design notes and design manuals that aim to provide detailed technical advice on key issues around on and off highway cycle infrastructure.

3.3 Local Policy

3.3.1 Local Planning Authorities in Wales must prepare a prescribed collection of documents which set out planning policies in their local authority area. The following described documents are those which contain guidance relevant to WCHR in relation to this Scheme.

Local Development Plans

3.3.2 The Planning and Compulsory Purchase Act 2004 requires each local planning authority in Wales to prepare a Local Development Plan (LDP, the Plan), with the objective of contributing to the achievement of sustainable development.

3.3.3 Both Pembrokeshire County Council and Carmarthenshire County Council state aspirations of increasing use of Active Travel within their respective LDPs.

South West Wales Local Transport Plan 2015-2020

3.3.4 A modification to The Transport Act 2000, (as amended by the Transport (Wales) Act 2006), allows local authorities to produce a joint Local Transport Plan to replace Regional Transport Plans which were a requirement of the Wales Transport Strategy. The WCHR study area is wholly within the South West Wales Local Transport Plan, which covers the area for Pembrokeshire, Carmarthenshire, Neath Port Talbot and the City and County of Swansea.

3.3.5 The Local Transport Plan Policies include:

Policy KS3 – Improve walking and cycling links within and between key settlements, as part of delivering the Active Travel Act (ATA) Action Plan

Policy IT3 – Work with agencies and organisations to reduce barriers to more sustainable travel behaviour and develop sustainable travel information which meets the ATA requirements on promotion

Policy E1 – work collaboratively to ensure that new development is located where there is sustainable access. For existing land allocations, the emphasis will be on securing realistic alternatives to single car occupancy as part of the development process and to meet ATA requirements.

3.3.6 The Local Transport Plan Schemes of note in the vicinity of the WCHR study area include:

- Haverfordwest to Narberth Cycle Route – safe walking and cycling route between the towns linking with National Cycle Network (NCN), Pembrokeshire Trail and Bluestone Centre. Delivery 2015-2020
- Active Travel Act Schemes - schemes to be worked up through consultation process (including Narberth). Delivery 2015-2020
- Active Travel Act Schemes – continued progress on the development of schemes (including schemes in Narberth). Delivery 2020-2030
- Access Improvements to Rail Stations – continued progress on walking, cycling and public transport access improvements to the county's rail stations. Delivery 2020-2030
- Whitland Station Enhancements – Delivery 2020-2030

PRoW Improvement Plans

3.3.7 Under Section 60 of the Countryside and Rights of Way Act 2000 (the 'CROW' Act), every local authority is required to prepare and publish a Rights of Way Improvement Plan (ROWIP) for the management, provision and promotion of the public rights of way in their areas. The aims of each plan are to extend the network and improve the connectivity of the routes, to improve accessibility for all users and to improve local awareness of the PRoW Network within each area.

3.3.8 Welsh Government legislative guidance highlights that ROWIPs should assess amongst other things:

3.3.9 The extent to which local PRoW meet the present and likely future needs of the public.

3.3.10 The opportunities provided by local PRoW and in particular by footpaths, cycle tracks, bridleways and restricted byways for exercise and other forms of outdoor recreation, enjoyment of the local countryside and accessibility to blind or partially-sighted persons, and others with mobility problems.

3.3.11 The remainder of this section summarises the key documents for each of the local authorities which are affected by this Scheme and their content in relation to guidance informing on WCHR.

Pembrokeshire PRoW Improvement Plan

3.3.12 Pembrokeshire County Council and the Pembrokeshire Coast National Park Authority agreed to prepare a joint ROWIP. This plan identifies, prioritises and plans for improvements to the rights of way network in Pembrokeshire, and was approved by Pembrokeshire County Council on 30 June 2008 and by the Pembrokeshire Coast National Park Authority on 15 July 2008.

3.3.13 Part 1 of the plan involved an assessment of local rights of way. It set out the main characteristics of the network in Pembrokeshire and examined a number of key topics, including:

1. The extent to which the network currently meets existing user needs and is likely to meet future user needs
2. The ability of the network to serve the requirements of those with special needs and
3. The role of rights of way in providing opportunities for public access and countryside recreation.

3.3.14 Table 1 below shows the components of the Pembrokeshire PRoW network, currently 2,353km (1462 miles) long.

Table 1 Characteristics of the PRoW network in Pembrokeshire

Types of route	Pembrokeshire (all routes)	Management delegated to the National Park Authority	Managed by Pembrokeshire County Council
Footpaths	1,853km 78.8% of the network	841km	1012km
Bridleways	466km 19.8% of the network	185km	281km
Restricted Byways (formerly known as Roads Used as Public Paths)	13km 0.6% of the network	8km	5km
Byways Open to All Traffic (BOATs)	20km 0.8% of the network	8km	12km

3.3.15 Part 2 of the plan is a statement of action. It summarises the main conclusions from the ROWIP Assessments, Background Documents and Report on Key Issues and the Way Forward. Six objectives for the ROWIP action plan were set that would guide the long-term management and development of the rights of way network. They are:

1. Objective A – to maintain an accessible network of public paths
2. Objective B – to provide a more continuous network that meets the requirements of all users
3. Objective C – to develop a safer network of paths
4. Objective D – to provide an up-to-date and digitised definitive map
5. Objective E – to increase community involvement in improvement and management of public paths and
6. Objective F – to improve promotion, understanding and use of the network of public paths.

3.3.16 The ROWIP is now coming into the final stages of its development. Stage 5 would involve a 12-week consultation period from mid-October 2017 to the end of January 2018. During this time, comments can be made regarding the new draft ROWIP.

3.3.17 Finally, Stage 6 of the ROWIP is the formal issue of the document following adjustments and comments from Stage 5. The document would become freely available to the general public online and hard copies available upon request.

3.3.18 **Carmarthenshire PRoW Improvement Plan**

3.3.19 The Carmarthenshire ROWIP covers all the County with the exception of that section (largely the Black Mountain) which forms part of the Brecon Beacons National Park. There is currently an agency agreement between Carmarthenshire County Council and the Brecon Beacons National Park who manage and maintain the rights of way network that falls within the Park's boundary. Table 2 shows the components of the Carmarthenshire public rights of way network, currently 2,237km (1397 miles) long.

Table 2 - Characteristics of the Public Rights of Way network in Carmarthenshire

Classification	Number of Routes	Total Length (km)	% of network length
Footpath (On foot only)	2981	2087km (1304 miles)	93.3%
Bridleway (On foot, on horseback, on pedal cycle)	122	85km (53 miles)	3.8%
Byways Open to All traffic (BOATs)	92	64km (40 miles)	2.9%
Total	**3195**	**2236km (1397 miles)**	**100%**

3.3.20 A series of themes and aims which form the basis for the ROWIP were developed following a review of the rights of way network.

3.3.21 The Key Themes are:

1. Improving, maintaining and promoting the availability of the network to a wider range of users
2. Appreciating the economic, environmental and health benefits of an improved access network for the enjoyment of countryside access for all and raising the profile of Carmarthenshire for all types of legitimate countryside access and
3. Working together to achieve long term improvements.

3.3.22 There are five Main Aims. There is some overlap and integration between these aims and actions, but the sub-divisions provide a summarised basis for future direction:

1. Ensure that the right of way network is easy to use and enjoyable
2. Provide a reliable, accurate, up to date and widely available Definitive Map & Statement
3. Ensure that opportunities for other countryside access are easy to use and enjoyable

4. Continue to work in partnership with all relevant, interested parties to achieve improved facilities for Countryside Access and
5. Promotion - maintain and improve the range and quality of public information and make it more widely available in appropriate formats.

3.4 Summary

3.4.1 As set out in earlier sections of this report, the Welsh Government decided to proceed with the A40 Llanddewi Velfrey to Penblewin Improvements in early 2017. The Welsh Government's aims and objectives are set out in Section 1.4 of this report.

3.4.2 The Scheme Objectives align to national, regional and local transport planning policies in terms of supporting economic growth, connectivity, accessibility and complementing sustainable travel including walking and cycling for local trips. These objectives encourage the development of links for Active Travel and align with the Well-being of Future Generations Act goals.

3.4.3 The policies detailed above are considered in the development of the Scheme specific opportunities for WCHR that are set out in Section 11 of this report.

4 Collision Data

4.1 Traffic Collision Overview

4.1.1 All personal injury collisions on public roads that are reported to the police are recorded using the STATS19 collision reporting form. Information on collision data within a study area specific to this project has been obtained for a five-year period between 2011 and 2015, the most recent timeframe for which data is available.

4.1.2 The collision reports include the following information:

a) Collision year
b) Collision reference
c) Number of vehicles involved
d) Number of casualties
e) Maximum severity of injuries
f) Severity of injury to each individual casualty
g) Date of the collision
h) Time of the collision
i) Collision location
j) A brief description of the incident
k) Type of road and speed limit
l) Whether incident occurred in darkness or daylight
m) Weather conditions
n) Road surface condition and
o) Details regarding vehicles involved including vehicle type, direction of travel, whether any skidding occurred and whether the vehicle exited the carriageway.

4.1.3 The Initial Traffic and Accident Data Report, (document A40LVP-ARP-VTR-SWI-RP-TR-0002) presents the details of all collisions within the traffic study period of 2011-2015. The traffic study area covers the A40 carriageway from a point 500m west of Redstone Cross to a point 500m east of the Blackbridge roundabout, Whitland. It also includes 500m of all side road approaches to the A40.

4.2 WCHR Collision Data

4.2.1 There was one recorded WCHR casualty within the traffic study area in the 2011 to 2015 five-year period. This involved a cyclist and occurred near Blackbridge Roundabout, Whitland (approximately 5km east of the scheme).

4.2.2 There were no recorded collisions involving pedestrians or equestrians within the traffic study area during the five-year study period.

4.2.3 Additional data for the 5km WCHR Assessment study area was obtained from the www.crashmap.co.uk website on 22 November 2017. Crashmap uses data collected by the police about road traffic collisions. The data is approved by the National Statistics Authority and reported on by the Department of Transport each year.

4.2.4 This data was obtained for the period 2011-2016. Table 3 summarises the collision data for the whole 5km WCHR study area. The collision datasheets obtained from the www.crashmap.co.uk website are included within Appendix B.

Table 3 - Summary of WCHR Study Area Collision Data

Users	Collisions			Casualties		
	Fatal	Serious	Slight	Fatal	Serious	Slight
Walkers	-	3	5	-	3	5
Cyclists	-	-	1	-	-	1
Horse-Riders	-	-	-	-	-	-

4.2.5 Apart from the single collision involving a cyclist which is described in 4.2.1 above, all other collisions within the WCHR study area involved pedestrians. Drawing A40LVP-ARP-ENM-SWI-DR-C-0006 in Appendix B displays the locations of these accidents.

4.2.6 Drawing A40LVP-ARP-ENM-SWI-DR-C-0006 in Appendix B shows that 66% of the collisions within the WCHR study area occurred in Narberth town centre. Narberth town centre is an urban area with narrow one-way streets and high traffic volumes, especially during the summer months. All these conditions increase the risk of WCHR collisions, as shown from the data obtained. All the serious injury accidents involved in WCHR collisions occurred in Narberth town centre.

4.2.7 One collision occurred in Whitland which is also classed as an urban area, therefore the risk of collision is higher.

4.2.8 The remaining collision occurred on the A478 south of Penblewin roundabout, immediately south of the Scheme study area. This collision involved a pedestrian walking along the side of the road with their back to the traffic.

4.2.9 Overall, the collision data for the traffic study area does not indicate that pedestrians, cyclists or horse-riders are unduly at risk. 77% of WCHR collisions occurred in urban settlements within the study area and, whilst of general concern, would not be affected by the Scheme.

4.2.10 The presence of available PRoW and local trip generators (campsites etc.) in the vicinity of the collision on the A478, and its proximity to the Scheme, means that there may be an opportunity to reduce the risk of collision at this location.

5 Public Transport

5.1 Accessibility

5.1.1 The availability and convenience of access to the start/end points of public transport journeys forms a key consideration in the context of a WCHR assessment.

5.1.2 Maintaining accessibility to public transport services is critical in ensuring communities can access key local facilities. It also ensures that there are viable alternatives to car use for journeys that may be regarded as too far or too hazardous to be undertaken in their entirety by WCHR.

5.2 National Rail

5.2.1 The railway lines and stations located within the WCHR study area are listed in Table 4.

Table 4 - Railway stations within the Study Area

Station	National Rail Line
Whitland	West Wales Line – Mainline
Clunderwen	West Wales Line- Milford Haven & Fishguard branches
Narberth	West Wales Line – Pembroke branch

5.2.2 These stations offer direct rail services to Carmarthen and Swansea, where connections may be made to travel further afield. Whitland serves direct trains travelling to Pembroke Dock, Milford Haven and Fishguard Harbour to the west.

5.2.3 Both Narberth and Clunderwen are request stops. Nine services a day serve Narberth in both directions, whilst 15 serve Clunderwen. Whitland, located where the Pembroke and Milford Haven branches merge, is the busier of the stations with 25 services a day in each direction (eastbound and westbound).

5.2.4 Whitland train station is the only one of the three that offers cycle parking facilities, with 20 uncovered storage spaces available. None of the stations listed in Table 4 offer welfare facilities.

5.2.5 There are no scheduled bus services that connect Llanddewi Velfrey to these rail stations. Journeys from the village to these stations by

WCHR is considered unlikely due to availability and condition of routes, and storage facilities at the stations.

5.3 Bus Services

5.3.1 A single scheduled bus service operates along the A40 serving the village of Llanddewi Velfrey, which is the 322-service connecting Haverfordwest and Carmarthen. This operates three times a day, with a fourth daily service operating a limited route between Haverfordwest and Whitland only.

5.3.2 The photographs shown below (Figure 1 and Figure 2) show the bus stops located within Llanddewi Velfrey. Shelters are provided with timetables displayed prominently. No cycling facilities are provided and the buses do not permit the carriage of cycles.



Figure 1: Bus shelter on westbound carriageway



Figure 2: Bus shelter on eastbound carriageway

5.3.3 Connections further afield may be made from Haverfordwest or Carmarthen. National Express operate a once daily service between Haverfordwest and London, also calling at Carmarthen. Whilst the timetables align for travel from Llanddewi Velfrey to Haverfordwest or Carmarthen and onto London, scheduled bus times do not align for the return journey.

5.3.4 Whilst Bwcabus operate a demand based service in Pembrokeshire and Carmarthenshire, this service does not cover the area of Llanddewi Velfrey.

6 Trip Generators

6.1 Trip Generators

6.1.1 The surrounding area within the WCHR study area is primarily agricultural, however there are small pockets of urban areas, such as the towns of Narberth and Whitland.

6.1.2 There are a wide variety of trip generators within the WCHR study area, which can generally be defined as follows:

a) Places of Worship

b) Post Offices, Shops and Shopping Centres

c) Hospitals, Medical Surgeries

d) Restaurants, Cafés, Takeaways and Public Houses

e) Bus Stops and Stations

f) Railway Stations

g) Schools, Colleges, Nurseries, Playgroups and Community Centres

h) Leisure Centres and Sports Facilities Parks and Recreational Areas

i) Offices and Industrial Employment Sites

j) Allotments

k) Tourist sites, monuments and viewpoints.

6.1.3 Drawing A40LVP-ARP-ENM-SWI-DR-C-0002, included in Appendix C, has been prepared to visually represent the locations of all established trip generators within the study area.

6.1.4 As expected, there is a greater density of trip generators within the more urban areas, such as: Narberth and Whitland, when compared to the surrounding rural areas. A number of clusters surround small settlement areas such as Robeston Wathen, Clunderwen, Llanddewi Velfrey and Llanfallteg. Major tourist attractions in the local area include Oakwood Theme Park, Bluestone National Park Resort, Herons Brook Retreat and Llawhaden Castle.

6.1.5 Table 5 lists the trip generators considered to attract most WCHR within the immediate vicinity of the Scheme.

Table 5 – Trip generators within the immediate vicinity of the Scheme

Trip Generators	
Bethel Chapel	Rest Area
Ffynnon Chapel	Petrol Station / Village Store
Trefangor Burial Ground	Village Hall
Eastbound Bus Shelter	Village Playing Field
Westbound Bus Shelter	St. David's Church
Restaurant / Public House	

6.1.6 It was noted during the site visit that the Chameli's Restaurant / Public House was closed, however there is potential that this would be re-opened. As such, it has been included within this WCHR Assessment.

6.1.7 There are no known future trip generators planned for the immediate vicinity of the study area.

7 Site Visit

7.1.1 A site visit was undertaken on Tuesday 21 November 2017 between 0900 and 1400 during daylight hours. The site visit took the form of walking along available WCHR facilities within the immediate vicinity of the Scheme. Other WCHR facilities within the WCHR study area were also visited during the site visit.

7.1.2 The weather during the site visit was wet and overcast, with light rain in the morning, turning heavier as the day advanced. The road and path surfaces were very wet.

7.1.3 For most of the existing length of A40, the A40 carriageway has a grass verge, with footway provision within the extents of Llanddewi Velfrey village running along the southern side of the A40. It is generally an intimidating environment for pedestrians due to the volume of traffic (especially Heavy Goods Vehicles), speed of traffic and the proximity to the highway.

7.1.4 The volume and speed of the traffic also makes the A40 through Llanddewi Velfrey unattractive for use by cyclists. There are no dedicated cycle routes within the WCHR study area.

7.1.5 The primary findings of the site visit were as follows:

a) No other users of any of the PRoW were observed during the site visit, and none of the PRoW surveyed showed any evidence of regular use.

b) Only one dedicated crossing facility was observed within Llanddewi Velfrey, even though there are several PRoW and trip generators located on the northern side of the A40. This can be seen in Figure 3.



Figure 3 Pedestrian crossing located adjacent to Llanddewi Velfrey War Memorial

c) Whilst wet underfoot, the bridleways located between the A487 south of Penblewin and Henllan Farm, between Trefangor Burial Ground and the A478 north of Penblewin were in good condition and suitable for use by equestrian users and walkers. This can be seen in Figure 4.



Figure 4 - Bridleway at Henllan Farm

d) There was evidence of deliberate damage to signs indicating the presence / direction of the bridleway. The crossing point over the A40 was also unattractive due to the volume and speed of traffic. This can be seen in Figure 5



Figure 5 Left: Damage to bridleway signs Right: A40 crossing point

e) The PRoW were generally muddy underfoot and whilst pleasant for occasional recreational use in dry weather, would generally be unsuitable for continued regular use. This can be seen in Figure 6.



Figure 6 Public Rights of Way were generally muddy underfoot

f) PRoW located through fields north and south of the A40 were generally poorly signed, with no evidence of use. This can be seen in Figure 7.



Figure 7 Public Right of Way passing through a field

g) There was evidence of stockpiling of gravel immediately in front of the green lane leading north from Blaen-pen-troydin as well as branches deliberately dug into the ground along the adjoining bridleway. This can be seen in Figure 8. Information gathered from discussions at the Public Exhibitions confirmed that, even though the designation for the lane is a footpath only, this lane was used occasionally by small motor vehicles, therefore this stockpile may have been placed to discourage this practice.



Figure 8 Left: A gravel pile partially blocking a Public Right of Way and Right: Branches dug into ground partially blocking a Public Right of Way

h) The footway along the A40 was very narrow in areas, and was also occasionally blocked by highway infrastructure (signs / light posts etc.) This can be seen in Figure 9



Figure 9 Narrow footway blocked by highway infrastructure

8 Consultation with Key Stakeholders

8.1 Public Information Exhibitions

8.1.1 Public Information Exhibitions (PIEs) were held prior to the site visit to engage with the local community along the A40 Llanddewi Velfrey to Penblewin Improvement Scheme. The exhibition presented information about the Scheme with posters and brochures.

8.1.2 The Exhibitions were held between 10am and 8pm at Llanddewi Velfrey Village Hall on 25 and 27 April 2017 and 8 and 10 October 2017.

8.1.3 As well as being open to the public, key stakeholders were invited to encourage participation with a list of invitees to the PIE included in Appendix F.

8.1.4 The attendances at the PIE are listed in Table below.

Table 6 - Exhibition Attendance

Date	Location	Opening Times	Attendance	Attendance /Hour
25 April 2017	Llanddewi Velfrey Village Hall	10am - 8pm	104	13
27 April 2017	Llanddewi Velfrey Village Hall	10am - 8pm	70	8.75
8 October 2017	Llanddewi Velfrey Village Hall	10am - 8pm	78	7.8
10 October 2017	Llanddewi Velfrey Village Hall	10am - 8pm	70	7

8.1.5 During the PIEs, responses were received in relation to WCHRs connected to the Scheme. A template of the PIE Comment Form is in included in Appendix G.

8.1.6 The feedback identified that WCHR provision was of interest to a number of local residents with many interested in how the old A40 could be modified to improve connectivity and WCHR recreational use.

8.1.7 The public footpaths located to the east of the Scheme were discussed with several of the locals. It was noted that footpath SP19/2/2 is used and is an attractive route. The other local footpaths SP19/1/1, and SP19/3/2 were identified as being largely unused, overgrown and not accessible.

8.1.8 Qualitative data was received from the PIE with four participants requesting provision for cyclists, pedestrians and equestrians along the existing A40.

8.1.9 A representative from the British Horse Society attended the Exhibition, who highlighted that the current A40 formed a barrier to equestrian users from travelling north/south between the designated bridleways and the country lanes. The representative was strongly in favour of an underpass solution adjacent to Henllan Lodge. However, three participants to the PIE stated Henllan Bridleway Underpass did not provide value and could not see the justification for its inclusion.

8.2 Other / ongoing engagement

8.2.1 The provision of PRoW has been discussed in meetings with Pembrokeshire County Council with the latest consultation occurring in January 2018 in which the council expressed their support for the proposals.

8.2.2 Stakeholder engagement is ongoing, with the aim to involve those user groups who were unable to attend the PIEs. The Scheme design is ongoing and it is appropriate that the stakeholders be given an opportunity to comment on the emerging proposals. Statutory consultation, programmed for March 2018, will allow for formal submission of comments.

9 Existing Facilities Along the A40

9.1 Pedestrian

9.1.1 Along the existing A40, a footway (varying from 0.7m to 2.5m wide) is provided from Fron Hill to the property known as Efailwen. The remainder of the study area comprises of grass verges next to the highway.

9.1.2 An uncontrolled pedestrian crossing is provided adjacent to Llanddewi Velfrey War Memorial.

9.1.3 A number of public footpaths exist within the WCHR study area. These include:

- SP19/1
- SP19/2
- SP19/3
- SP19/4
- SP19/5
- SP19/18
- SP19/19
- SP19/23
- SP19/30
- SP19/31
- SP19/32
- SP19/36
- SP19/37
- SP19/38

9.2 Cyclist

9.2.1 There are no dedicated cycle facilities within the extents of the WCHR study area. It is acknowledged that cyclists can use bridleways, which are discussed in further detail below.

9.3 Equestrian

9.3.1 There are no equestrian facilities along the existing A40.

9.3.2 There are two bridleways passing through the WCHR study area. These are:

- SP19/29
- SP19/34

10 Survey Data

10.1 WCHR Surveys

10.1.1 WCHR surveys were carried out in May 2017. User counts and face-to-face interviews were undertaken between the hours of 0700 and 1900.

10.1.2 An engagement strategy was adopted aiming to maximise participation with the identified stakeholders. The template of the Survey Questionnaire is available in Appendix D.

10.1.3 The survey data covers 10 locations across the study area, as can be seen on Drawing A40LVP-ARP-ENM-SWI-DR-C-0001, included in Appendix D. Table 7, below gives the detail of the surveys undertaken.

Table 7 Survey results

WCHR Survey Site	Location	Survey Date	Weather	Comments
Site 1	Penblewin Roundabout	Wednesday 17 May 2017	Over cast with scattered showers. High of 14°C. Low 11°C.	No WCHRs were observed, resident of the cottage on the south-east corner of the roundabout told the enumerator on this site that they had never seen a pedestrian walk around the roundabout in their many years living in the property.
		Saturday 20 May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	
Site 2	Bounty Farm, A40	Sunday 21 May 2017	Overcast with light showers Highs 18°C lows of 14°C.	No WCHRs were seen throughout the survey time at this site.
		Thursday 25 May 2017	Sunny with cloudy spells High of 25°C Lows of 17°C.	
Site 3	Pen-Ca'rmaenau Farm Access Road	Thursday 18th May 2017	Cloudy Highs of 14°C low 10°C.	No WCHRs were seen throughout the survey time at this site.
		Sunday 21st May 2017	Overcast with light showers Highs 18°C lows of 14°C.	

WCHR Survey Site	Location	Survey Date	Weather	Comments
Site 4	Ffynnon Chapel	Thursday 18th May 2017	Cloudy Highs of 14°C low 10°C .	A resident told the enumerator that they have never seen some one use the footpath since they moved in 2 years previously.
		Saturday 20th May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	
Site 5	Pen-troydin-fach	Thursday 18th May 2017	Cloudy Highs of 14°C low 10°C.	No WCHRs were seen throughout the survey time at this site.
		Sunday 21st May 2017	Overcast with light showers Highs 18°C lows of 14°C.	
Site 6	PRoW (SP19/2/1)	Wednesday 17th and	Over cast with scattered showers Highs of 14°C lows 11°C	No WCHRs were seen on footpath throughout the survey time at this site.
		Saturday 21st May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	
Site 7	PRoW (SP19/2/1-SP19/3/1 Junction)	Wednesday 17th May 2017	Over cast with scattered showers Highs of 14°C lows 11°C.	No WCHRs were seen on footpath throughout the survey time at this site.
		Saturday 20th May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	
Site 8	PRoW (SP19/4/5)	Saturday 20th May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	No WCHRs were seen on footpath throughout the survey time at this site.
		Wednesday 24th May 2017	Sunny Highs of 18°C lows of 15°C.	
Site 9	Bethel Chapel	Sunday 21st May 2017	Overcast with light showers Highs 18°C lows of 14°C.	No WCHRs were seen on the footpath throughout the survey times at this site.

WCHR Survey Site	Location	Survey Date	Weather	Comments
		Wednesday 24th May 2017	Sunny Highs of 18°C lows of 15°C.	
Site 10	A40-Llanfallteg Road Junction	Saturday 20th May 2017	Over cast with scattered showers Highs of 14°C lows of 10°C.	The only site where interviews were taken. 2 interviews were completed for this survey site, 2 interviews were also refused. Therefore, a total of four face-to-face interviews were recorded.
		Thursday 25th May 2017	Sunny with cloudy spells High of 25°C Lows of 17°C.	

10.1.4 Upon completion of the face-to-face interviews, a total of four were recorded. Two interviews were completed successfully and two interview opportunities were refused by the participant. All four interviews were conducted at WCHR Survey Site 10.

10.1.5 Those who participated in the interviews provided responses to the questions asked and, in some cases, shared wider views and opinions relevant to the proposals. Responses were grouped into the respective WCHR Survey Sites.

10.1.6 A summary table of the data collected from the two successful face-to-face interviews is available in Appendix E.

10.2 Summary and Conclusions

10.2.1 Ten WCHR Survey Sites were chosen based on maintaining connectivity of the existing PRoW network and consideration of movement between the settlements surrounding and between Llanddewi Velfrey.

10.2.2 There is a comprehensive PRoW network in the south-east of Pembrokeshire and in the proximity to the A40 corridor. From the initial feedback obtained from the PIEs on the usage of WCHR routes in the area of the Scheme, it was expected that WCHR would be active. However, the interviews undertaken as part of the Survey has not provided backup this up. Only Survey Site 10, located in Llanddewi Velfrey, was the only site to return data and interviews.

10.2.3 The Weather conditions for the surveys were generally overcast with showers during the surveys with some sunny spells. The rain showers may have had a minor impact on WCHR activity. The surveys were carried out over varying days of the week and for 12-hour periods.

10.2.4 Some key feedback from the Public Information Exhibitions relates to the proposed Henllan Bridleway Underpass. The proximity of the underpass to the existing bridleway network was questioned along with the usage of the existing bridleways. The results of the WCHR assessment backs up the anecdotal evidence of their low use. The underpass provision and location should therefore be carefully considered.

10.2.5 Feedback from the PIEs provided anecdotal evidence of use of the PRoW network in the study area. It confirmed which WHCR routes are well used and which are not. WCHR provision was of interest to a number of local residents with many interested in how the old A40 could be modified to improve connectivity and WCHR recreational use.

11 User Opportunities

11.1.1 This section highlights opportunities relevant to the highway Scheme that the wider project team should consider throughout the progression of the Scheme design. This is in addition to any further opportunities that may arise through the ongoing development of the design.

11.1.2 Seven opportunities were identified during the course of this WCHR Assessment that could improve the service offered to WCHR:

Strategic Opportunities

1. Maintain existing PRoW and WCHR North/South route connectivity between Penblewin and Ffynnon and specifically maintain routes crossing the existing A40 at Henllan Lodge, severed by the new A40 proposals.
2. Ensure a safe and attractive route for Cyclists, Pedestrians and Equestrians parallel to the proposed corridor of the A40 (east-west).
3. Promote the use of existing neglected WCHR routes by consolidating and improving attractiveness, safety and environmental quality, encouraging active travel circular routes.

Pedestrian and Cyclist Opportunities

4. Promote the use of the detrunked A40 through Llanddewi Velfrey for WCHR users to connect with existing and proposed PRoW, to encourage active travel circular routes.
5. Maintain safe and attractive access for footpath users east of Llanfallteg Road (PRoW - SP19/3/2, SP19/2/2, and SP19/1/1) where these would be severed by the proposed A40 carriageway.
6. Provide a safe, convenient and coherent route for Pedestrians between Llanddewi Velfrey to Bethel Chapel, utilising footpaths SP19/4/5, SP19/4/6 and SP19/4/7.

Equestrian Opportunities

7. Provide connectivity for equestrian users to join existing bridleway (SP19/34/4) severed by the existing A40 and thereby encourage circular active travel routes. Provision for pedestrians, cyclists, and equestrians would take due account of design standards, including Active Travel (Wales) Act Design Guidance, DMRB, and any relevant documents referred to therein.

11.1.3 In the context of the specific opportunities set out above, all facilities directly provided by the Scheme would, within reason, be accessible, attractive for use, coherent, comfortable, convenient, direct, and safe for users to use. All of these parameters should be considered in the overall context of the provision being made, and pre-existent on the surrounding network.

12 Walking, Cycling & Horse-Riding Assessment Team Statement

12.1.1 As Lead Assessor, I confirm that this WCHR Assessment Report has been compiled in accordance with DMRB HD 42/17 and thus contains the appropriate information for the wider design team. The WCHR Assessment was undertaken by the following Assessment and Review Team:

Walking, Cycling & Horse-Riding Lead Assessor

Simon Westwood CEng MICE MSc MEarthSc

Senior Engineer

Arup

Signed:



Date: 21/11/2018

Walking, Cycling & Horse-Riding Assessor

Geraint Jones GMICE MEng

Engineer

Arup

Signed:



Date: 21/11/2018

12.1.2 As design team leader, I confirm that the assessment has been undertaken at the appropriate stage of scheme development and that the wider design team has been involved in the process.

12.1.3 I confirm that in my professional opinion the appointed Lead Assessor has the appropriate experience for the role, making reference to the expected competencies contained in HD 42/17.

Design Team Leader

Tom Edwards CEng MICE MCIHT MEng

Senior Engineer

Arup

Signed:



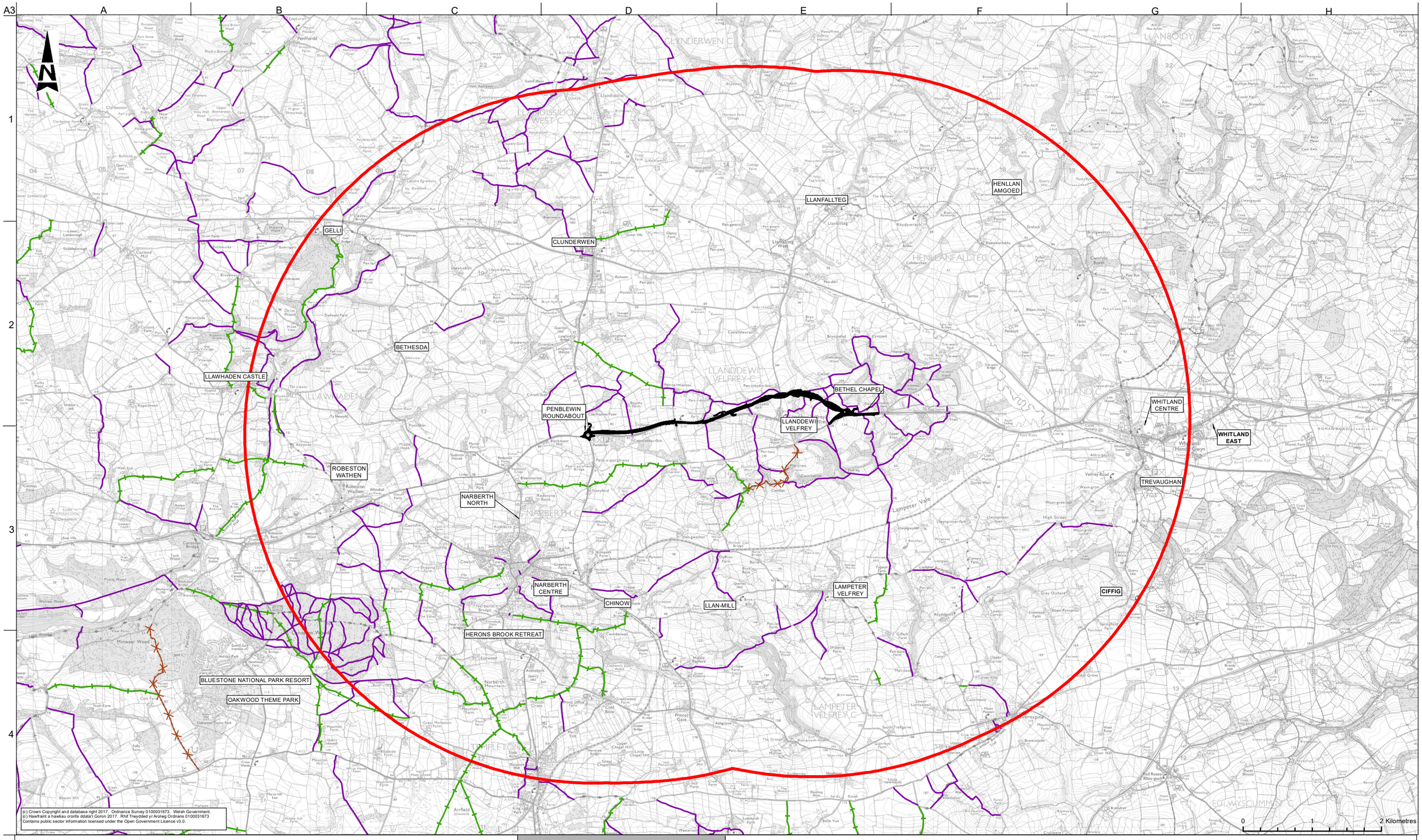
Date: 21/11/2018

Appendix A – WCHR Study Area

A3

A B C D E F G H

1 2 3 4



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LEGEND

- PROPOSED PRELIMINARY HIGHWAY DESIGN
- STUDY AREA BOUNDARY - 5KM FROM SCHEME
- FOOTPATH
- BRIDLEWAY
- RESTRICTED BYWAY
- BYWAY OPEN TO ALL TRAFFIC

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log)

Construction
None
Maintenance / Cleaning
None
Use
None
Decommissioning / Demolition
None

Rev.	Date	Description	By	Chkd	Appd	Auth
P02	18/12/17	FIRST ISSUE	EB	SW	TE	TE

Project Title
A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client
Llywodraeth Cymru
Welsh Government

Delivery Team
ARCADIS · MOTT MACDONALD · ARUP · carillion · RICHARDS

Drawing Title
WALKING, CYCLING AND HORSE RIDING STUDY AREA

Suitability
S4 | SUITABLE FOR STAGE APPROVAL

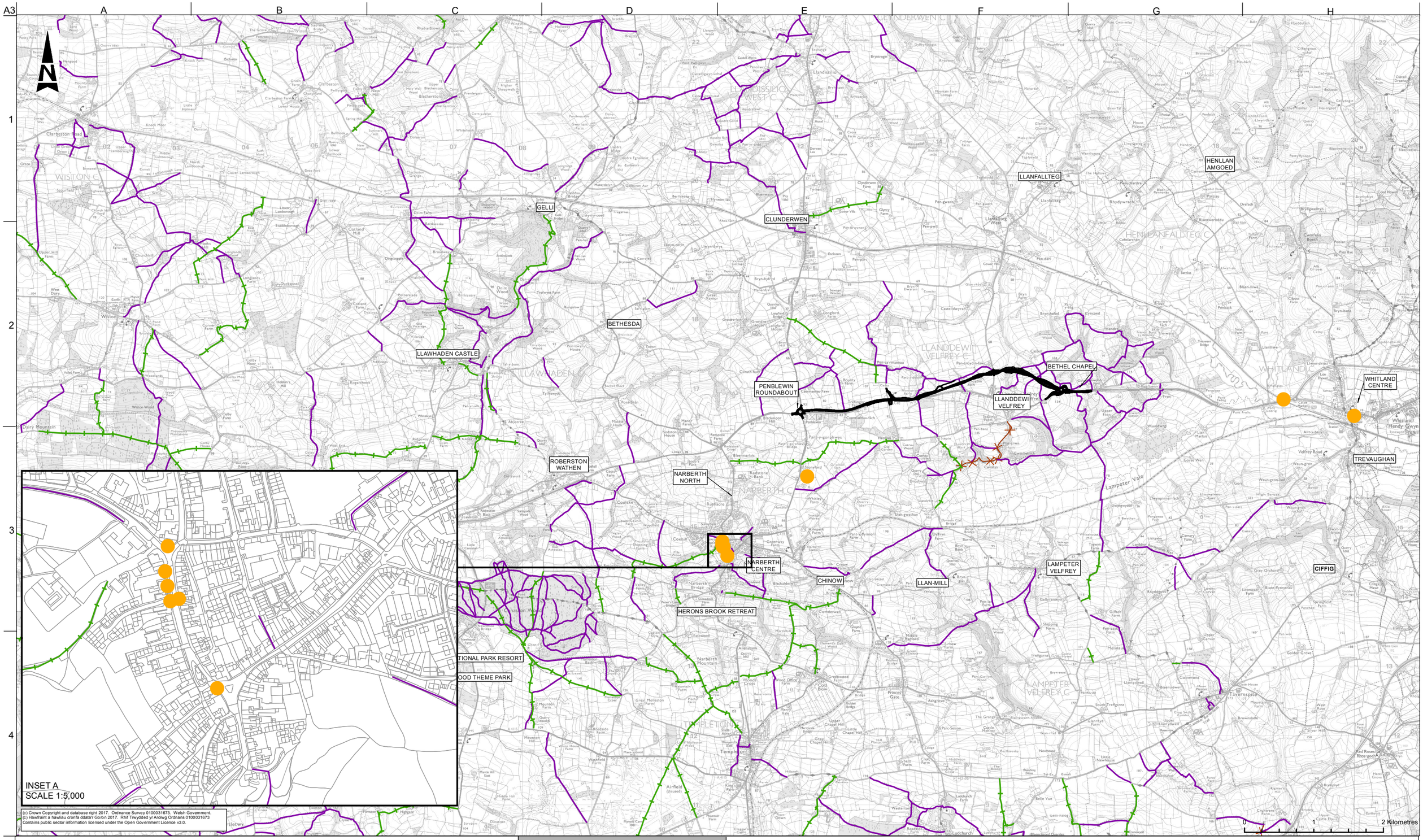
Scale at A3 1:50,000

Rev	By	Chkd	Appd	Auth
P02	EB	SW	TE	TE
	Date 18/12/17	Date 18/12/17	Date 18/12/17	Date 18/12/17

Name

Project	Originator	Volume	Location	Type	Role	Number
A40LVP	ARP	ENM	SWI	DR	C	0004

Appendix B– WCHR Assessment Collision Data



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LEGEND

PROPOSED HIGHWAY

PUBLIC RIGHTS OF WAY

FOOTPATH

BRIDLEWAY

BYWAY OPEN TO ALL TRAFFIC

WALKING, CYCLING OR HORSE RIDING ACCIDENT SITES

NOTES

THIS DRAWING SHOWS THE LOCATION OF WALKING, CYCLING & HORSE-RIDING COLLISIONS ONLY. REFER TO THE INITIAL TRAFFIC AND ACCIDENT DATA FOR DETAILS OF TRAFFIC COLLISIONS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log)

Construction

None

Maintenance / Cleaning

None

Use

None

Decommissioning / Demolition

None

Rev.	Date	Description	By	Chkd	Appd	Auth
P02	19/12/17	FIRST ISSUE	EB	SW	TE	TE

Project Title

A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client

Llywodraeth Cymru
Welsh Government

ARCADIS

MOTT MACDONALD

Delivery Team

ARUP carillion RICHARDS

Drawing Title

WALKING, CYCLING & HORSE-RIDING (WCHR) ASSESSMENT COLLISION DATA

Suitability

S4 | SUITABLE FOR STAGE APPROVAL

Scale at A3 1:50,000

Rev	By	Chkd	Appd	Auth
P02	EB	SW	TE	TE
	Date 19/12/17	Date 19/12/17	Date 19/12/17	Date 19/12/17

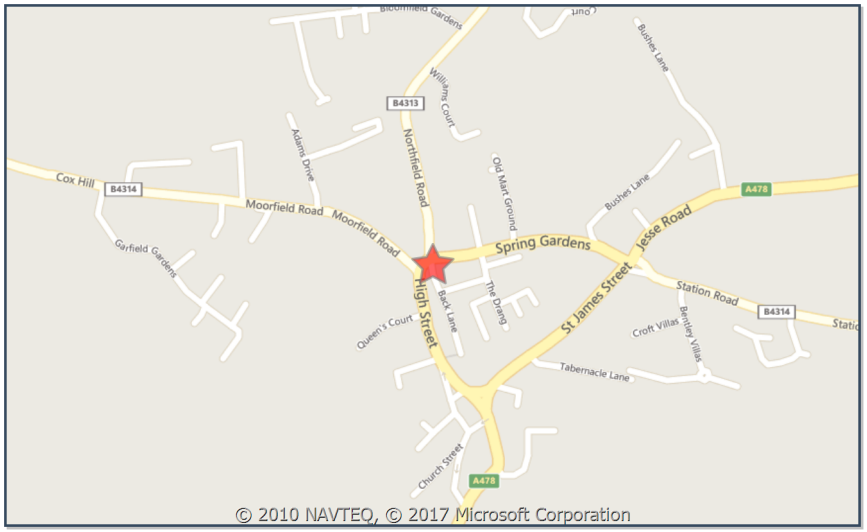
Name

A40LVP - ARP - ENM - SWI - DR - C - 0006

Project | Originator | Volume | Location | Type | Role | Number

crashmap.co.uk

Crash Date:	Wednesday, December 04, 2013	**Time of Crash:**	5:56:00 PM	**Crash Reference:**	**201363CP23913**
Highest Injury Severity:	Slight	**Road Number:**	A478	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire			**OS Grid Reference:**	210910 214800
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Darkness: street lights present and lit				
Carriageway Hazards:	None				
Junction Detail:	Other junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Give way or uncontrolled				



For more information about the data please visit: *www.crashmap.co.uk/home/aboutthedata* and *www.crashmap.co.uk/home/definitions*

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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	7	Male	21 - 25	Vehicle proceeding normally along the carriageway, on a right hand bend	Offside	Other	None	None

Casualties

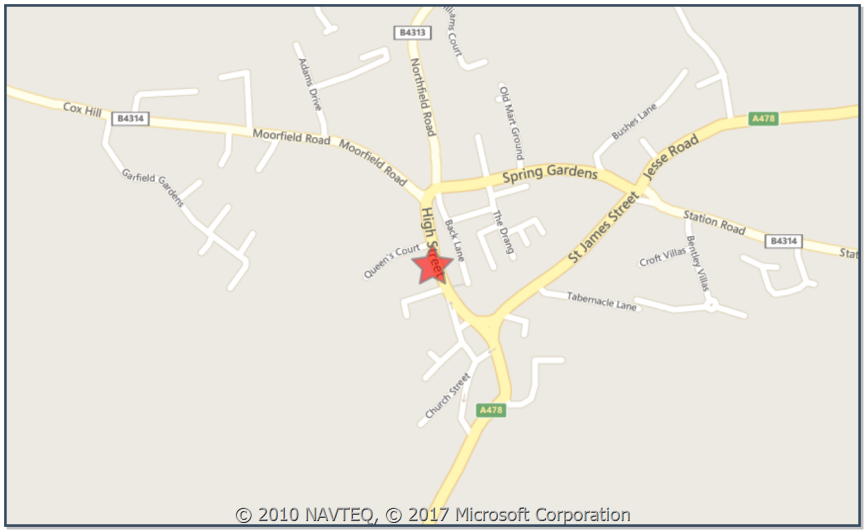
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Pedestrian	Male	66 - 75	In centre of carriageway, not on refuge, central island or central reservation	Crossing from driver's nearside - masked by parked or stationary vehicle

Accident Description: Accident description text currently unavailable for this highway authority / police force

crashmap.co.uk

Crash Date:	Friday, January 15, 2016	**Time of Crash:**	2:30:00 PM	**Crash Reference:**	**201663CP02816**

Highest Injury Severity:	Slight	**Road Number:**	A478	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire County			**OS Grid Reference:**	210890 214690
Weather Description:	Raining without high winds				
Road Surface Description:	Wet or Damp				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Not Applicable				



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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Van or goods vehicle 3.5 tonnes mgw and under	5	Male	46 - 55	Vehicle proceeding normally along the carriageway, not on a bend	Front	Other	None	None

Casualties

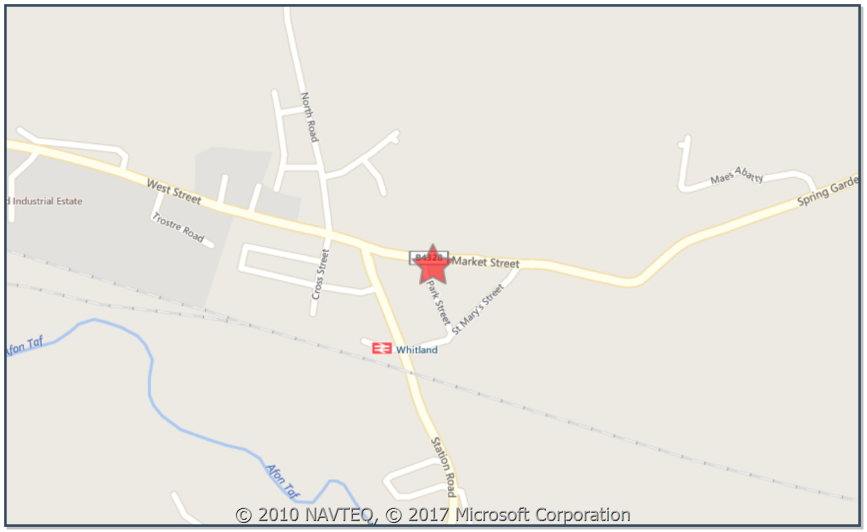
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Pedestrian	Male	66 - 75	Unknown or other	Unknown or other

Accident Description: Not Available

crashmap.co.uk

Crash Date:	Thursday, March 03, 2011	**Time of Crash:**	7:35:00 AM	**Crash Reference:**	**201163AC08111**

Highest Injury Severity:	Slight	**Road Number:**	B4328	**Number of Casualties:**	1
Highway Authority:	Carmarthenshire			**Number of Vehicles:**	1
Local Authority:	Carmarthenshire			**OS Grid Reference:**	220010 216630
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	T or staggered junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Give way or uncontrolled				



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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	-1	Unknown	Unknown	Vehicle is moving off	Did not impact	Other	None	None

Casualties

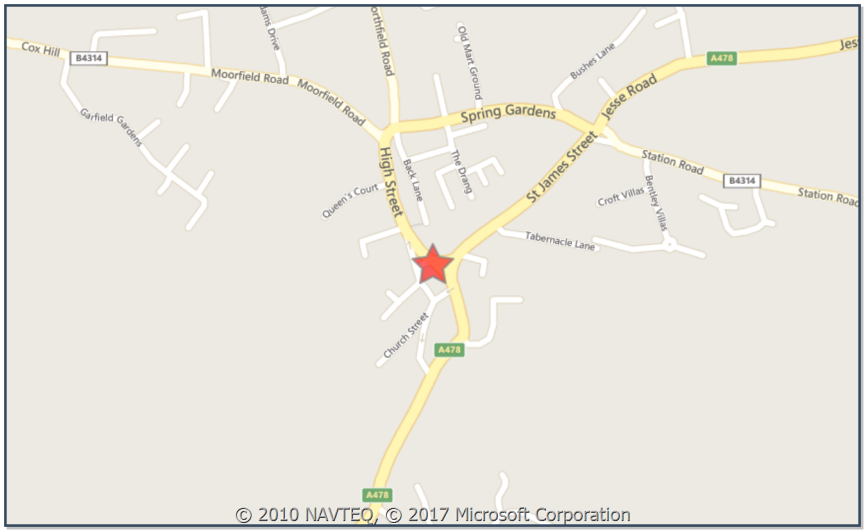
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Pedestrian	Male	26 - 35	Unknown or other	Crossing from driver's offside

Accident Description: Accident description text currently unavailable for this highway authority / police force

crashmap.co.uk

Crash Date:	Saturday, December 24, 2016	**Time of Crash:**	2:44:00 PM	**Crash Reference:**	**201663CP21616**

Highest Injury Severity:	Serious	**Road Number:**	A478	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire County			**OS Grid Reference:**	210950 214600
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Multiple junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Give way or uncontrolled				



For more information about the data please visit: *www.crashmap.co.uk/home/aboutthedata* and *www.crashmap.co.uk/home/definitions*

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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	-1	Female	66 - 75	Vehicle proceeding normally along the carriageway, not on a bend	Offside	Other	None	None

Casualties

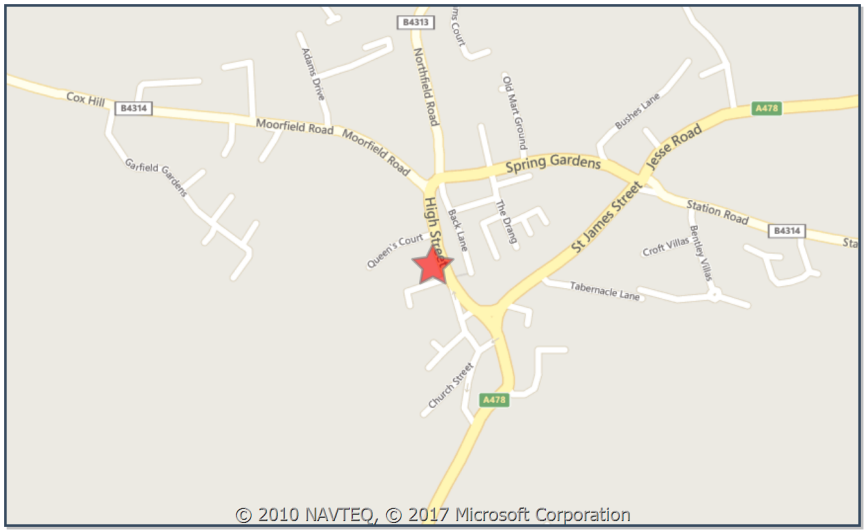
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Serious	Pedestrian	Male	0 - 5	In carriageway, not crossing	Walking along in carriageway - facing traffic

Accident Description: Not Available

crashmap.co.uk

Crash Date:	Monday, May 14, 2012	**Time of Crash:**	9:45:00 AM	**Crash Reference:**	**201263CP10812**

Highest Injury Severity:	Serious	**Road Number:**	A478	**Number of Casualties:**	2
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire			**OS Grid Reference:**	210890 214680
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Not Applicable				



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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Van or goods vehicle 3.5 tonnes mgw and under	7	Male	36 - 45	Vehicle is reversing	Back	Journey as part of work	None	None

Casualties

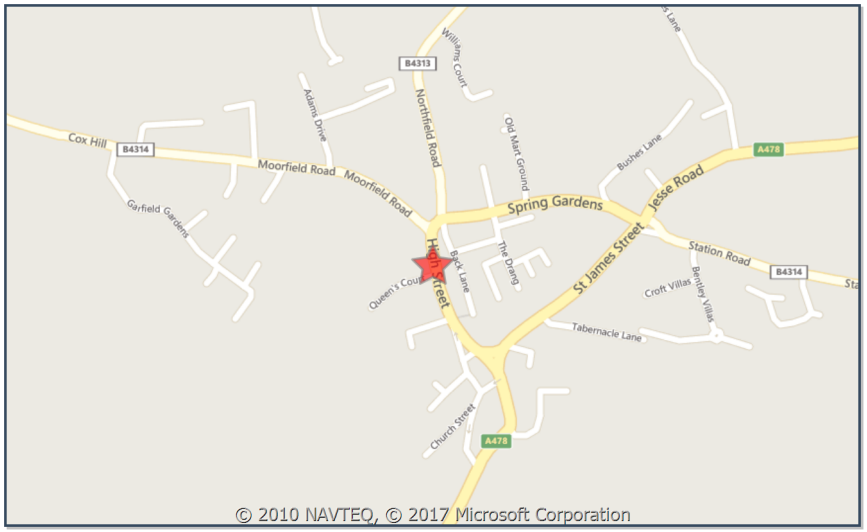
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Serious	Pedestrian	Male	Over 75	In carriageway, crossing elsewhere	Crossing from driver's nearside - masked by parked or stationary vehicle
1	2	Slight	Pedestrian	Female	Over 75	In carriageway, crossing elsewhere	Crossing from driver's nearside - masked by parked or stationary vehicle

Accident Description: Accident description text currently unavailable for this highway authority / police force

crashmap.co.uk

Crash Date:	Monday, February 21, 2011	**Time of Crash:**	11:15:00 AM	**Crash Reference:**	**201163CP05711**

Highest Injury Severity:	Slight	**Road Number:**	A478	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire			**OS Grid Reference:**	210890 214740
Weather Description:	Raining without high winds				
Road Surface Description:	Wet or Damp				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Not Applicable				



For more information about the data please visit: *www.crashmap.co.uk/home/aboutthedata* and *www.crashmap.co.uk/home/definitions*

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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Other vehicle, whether motorised or not	-1	Unknown	Unknown	Vehicle proceeding normally along the carriageway, not on a bend	Front	Other	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Pedestrian	Male	66 - 75	Unknown or other	In carriageway, stationary - not crossing (standing or playing)

Accident Description: Accident description text currently unavailable for this highway authority / police force

crashmap.co.uk

Crash Date:	Monday, October 31, 2016	**Time of Crash:**	5:30:00 PM	**Crash Reference:**	**201663CP23316**

Highest Injury Severity:	Slight	**Road Number:**	A48	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire County			**OS Grid Reference:**	211920 215530
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	60				
Light Conditions:	Darkness: no street lighting				
Carriageway Hazards:	None				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	Single carriageway				
Junction Control:	Not Applicable				



For more information about the data please visit: *www.crashmap.co.uk/home/aboutthedata* and *www.crashmap.co.uk/home/definitions*

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Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	13	Male	66 - 75	Vehicle proceeding normally along the carriageway, not on a bend	Nearside	Other	None	None

Casualties

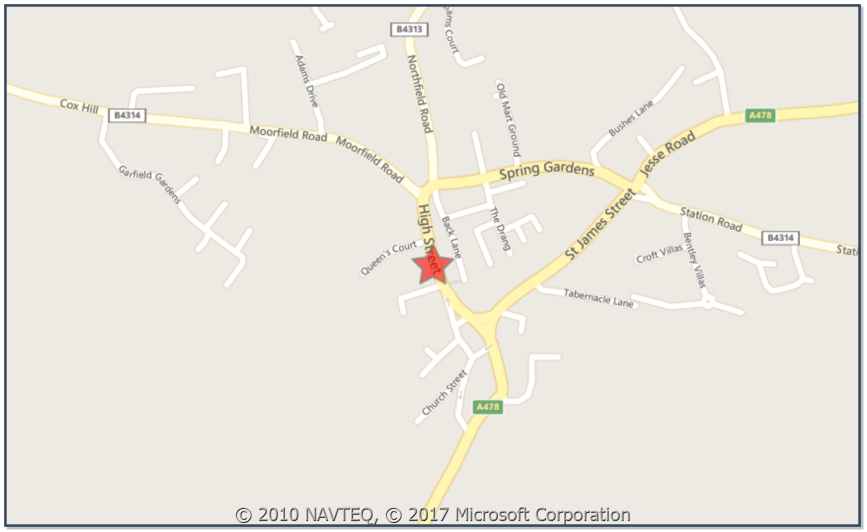
Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Slight	Pedestrian	Female	26 - 35	In carriageway, not crossing	Walking along in carriageway - back to traffic

Accident Description: Not Available

crashmap.co.uk

Crash Date:	Wednesday, October 24, 2012	**Time of Crash:**	6:35:00 PM	**Crash Reference:**	**201263CP23712**

Highest Injury Severity:	Serious	**Road Number:**	A478	**Number of Casualties:**	1
Highway Authority:	Pembrokeshire			**Number of Vehicles:**	1
Local Authority:	Pembrokeshire			**OS Grid Reference:**	210900 214690
Weather Description:	Fine without high winds				
Road Surface Description:	Dry				
Speed Limit:	30				
Light Conditions:	Daylight: regardless of presence of streetlights				
Carriageway Hazards:	Pedestrian in carriageway - not injured				
Junction Detail:	Not at or within 20 metres of junction				
Junction Pedestrian Crossing:	No physical crossing facility within 50 metres				
Road Type:	One way street				
Junction Control:	Not Applicable				



For more information about the data please visit: *www.crashmap.co.uk/home/aboutthedata* and *www.crashmap.co.uk/home/definitions*

powered by INSIGHTwarehouse

Vehicles involved

Vehicle Ref	Vehicle Type	Vehicle Age	Driver Gender	Driver Age Band	Vehicle Maneouvre	First Point of Impact	Journey Purpose	Hit Object - On Carriageway	Hit Object - Off Carriageway
1	Car (excluding private hire)	-1	Unknown	Unknown	Vehicle is reversing	Back	Other	None	None

Casualties

Vehicle Ref	Casualty Ref	Injury Severity	Casualty Class	Gender	Age Band	Pedestrian Location	Pedestrian Movement
1	1	Serious	Pedestrian	Female	16 - 20	In carriageway, crossing elsewhere	Crossing from driver's offside - masked by parked or stationary vehicle

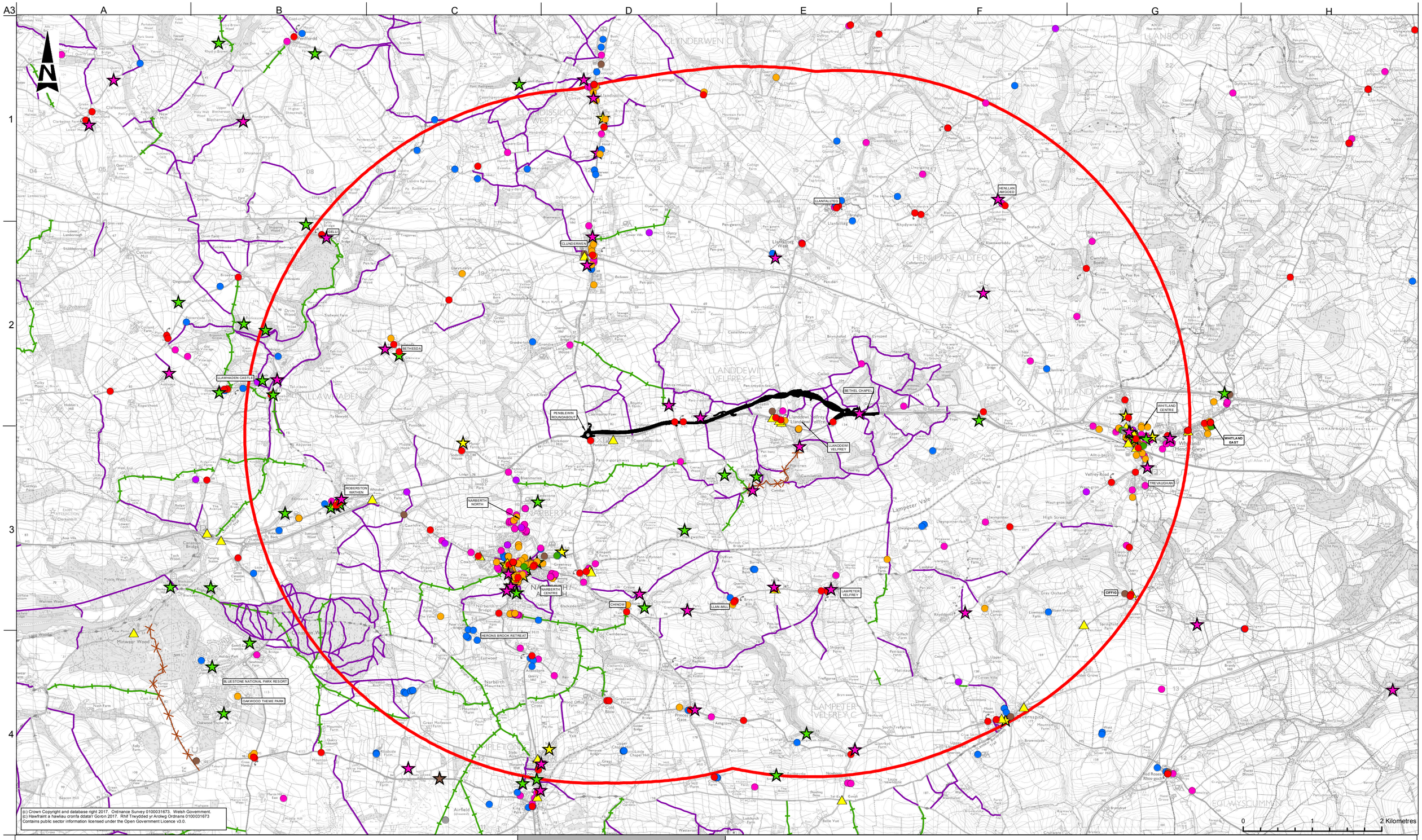
Accident Description: Accident description text currently unavailable for this highway authority / police force

Appendix C – Trip Generators

A3

A B C D E F G H

1 2 3 4



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LEGEND

- PROPOSED PRELIMINARY HIGHWAY DESIGN
- STUDY AREA BOUNDARY - 5KM FROM SCHEME

PUBLIC RIGHTS OF WAY

- FOOTPATH
- BRIDLEWAY
- RESTRICTED BYWAY
- BYWAY OPEN TO ALL TRAFFIC

- PLACES OF WORK
- RECREATION
- HEALTH CARE
- ACCOMDATION
- BUS STOP/ TRANSPORT STATION
- POLICE/ AMBULANCE/ FIRE STATION
- RESTAURANT/ PUBLIC HOUSE
- POST OFFICE/ POST BOX/ TELPHONE BOX
- MILITARY
- TOURIST
- SCHOOLS
- EQUESTRIAN FACILITIES
- PLACES OF WORSHIP

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log)

Construction	
None	
Maintenance / Cleaning	
None	
Use	
None	
Decommissioning / Demolition	
None	

Rev.	Date	Description	By	Chkd	Appd	Auth
P02	19/12/17	FIRST ISSUE	EB	SW	TE	TE

Project Title
A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client
Llywodraeth Cymru
Welsh Government

Delivery Team
ARUP carillion RICHARDS

Drawing Title
TRIP GENERATORS

Suitability
S4 | SUITABLE FOR STAGE APPROVAL

Scale at A3 1:50,000

Rev	By	Chkd	Appd	Auth
P02	EB	SW	TE	TE
	Date 19/12/17	Date 19/12/17	Date 19/12/17	Date 19/12/17

Name A40LVP - ARP - ENM - SWI - DR - C - 0002

Project | Originator | Volume | Location | Type | Role | Number

Appendix D – Survey Locations & Questionnaire



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LEGEND

- PUBLIC RIGHTS OF WAY - FOOTPATH
- PUBLIC RIGHTS OF WAY - BRIDLEWAY
- PUBLIC RIGHTS OF WAY - BOAT
- COUNT SITE LOCATION
- PROPOSED HIGHWAY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
N/A

Maintenance / Cleaning
N/A

Use
N/A

Decommissioning / Demolition
N/A

Rev	Date	Description	By	Chkd	Appd	Auth
P01	18/04/17	AMENDMENTS	HJ	SW	TE	---
P02	20/12/17	AMENDED FOR HD42/17	GJ	SW	TE	---

Project Title
A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client
Llywodraeth Cymru
Welsh Government

Delivery Team
ARUP · carillion · RICHARDS · ARCADIS · MOTT MACDONALD

Drawing Title
WALKING, CYCLING & HORSE RIDING SURVEY SITES

Suitability
S4 | SUITABLE FOR STAGE APPROVAL

Scale at A1 1:10000

Rev	By	Chkd	Appd	Auth
P02	GJ	SW	TE	---
	Date 20/12/17	Date 20/12/17	Date 20/12/17	Date ---

Name
A40LVP - ARP - ENM - SWI - DR - C - 0001
Project | Originator | Volume | Location | Type | Role | Number

File Note

Project	A40 Llanddewi Velfrey to Penblewin Improvements
Subject	NMU Survey Questionnaire
File Reference	A40LVP-ARP-ENM-SWI-FN-C-0003
Prepared by	Jason Prosser
Status	S2 | SUITABLE FOR INFORMATION
Revision | Date	P01 | 26/04/17

1 Survey Questionnaire

1.1 Site Conditions

Q.1 Site

Site location (including GPS location)……..

Time of Interview .....

Date of Interview.....

Interviewer (Surveyor) .....

Q.2 Weather Conditions [enable multiple options to be selected]

Sunny Cloudy Partly Cloudy Rainy Snowy Sleeting
Stormy Hailing Windy Foggy

1.2 Observations of the Surveyor

Q.1 Number in party ……..

Q.2 Direction of travel [show map inset with north arrow]

North bound South bound East bound West bound

Q.3 Mode of transport

Foot Bicycle Horse Mobility Aid Other

1.3 Interviewer Questions

Good Morning/Afternoon Sir/Madam.

Q.1 Would you mind answering some questions about your journey today?

- Proceed
- Refuse

Further Background information if required.

The Welsh Government appointed Carillion, with Arup and RML (the 'Carillion Team') as their technical and environmental advisors, to develop the design of the proposed A40 Llanddewi Velfrey to Penblewin Improvements up to publication of draft Orders (the legal documents required to create a new route, purchase land and mitigate the effects on the environment).

Today we are carrying out surveys on pedestrian, cyclist and equestrian users, collectively known as Non-Motorised Users. Users with disabilities are also included and can be considered when responding to this survey.

All responses and information gathered in this survey is confidential.

The information aims to help provide an understanding of pedestrian, cyclist and equestrian movements within the study area and highlight the ways in which these users may be affected by the proposed scheme. Information on demographics is collected for the purpose of ensuring we have a cross-section of respondents within the community.

Q2. Please provide the full address of where you have just come from, including a postcode if possible. (The previous stop or origin of journey)

- Name of Shop/Business.....
- House Number and Street.....
- District/Town .....
- County.....
- Postcode .....

Q3. What was your reason for being there? Select one below.

- Home
- Holiday Home
- Work
- On Employer's Business
- Education

- Shopping
- Personal Business
- Visiting Friend/Family
- Recreation/Leisure
- On Holiday (Recreation/Leisure)
- Other (specify)

Q.4 Please provide the full address of where you are going, including a postcode if possible. (The previous stop or origin of journey)

- Name of Shop/Business.....
- House Number and Street.....
- District/Town .....
- County.....
- Postcode.....

Q.5 What is your reason for being there? Select one below.

- Home
- Holiday Home
- Work
- On Employer's Business
- Education
- Shopping
- Personal Business
- Visiting Friend/Family
- Recreation/Leisure
- On Holiday (Recreation/Leisure)
- Other (specify)

Q.5a Is this journey part of a two way return trip or a circular walk?

- Yes
- No
- Circular Walk

Q.6 If this is a return trip, what time do you expect to return (Or the time you made outbound trip if this is the return journey)?

- Hour/Minute

Q.7 How frequently do you make this journey?

- ☐ More than five times a week
- ☐ 1 – 4 times a week
- ☐ 2 – 3 times a month
- ☐ Monthly
- ☐ Once every 3 – 6 months
- ☐ Yearly
- ☐ One-off Trip (e.g. holiday)

Q.8 Has your journey consisted of any other mode of transport

Yes/No

(ii) Choose from the following list

Car Bus Foot Bike Horse Taxi Train Other

Other ……

(iii) If by car where did you park?

Address Area Postcode Dropped off

Q.9 On a scale of 1 – 5 how safe do you currently feel travelling as a pedestrian, cyclist or equestrian within the local area?

1 = Very Unsafe 2 = Unsafe 3 = Neither Safe nor Unsafe 4 = Safe 5 = Very Safe

(ii) If 1 or 2, Could you give a reason/example for why you feel this way?

……
……
……

Q.10 NMU Classification Select one below.

- Pedestrians
- Pedestrians walking dogs
- Pedestrians with buggy
- Pedestrian with impairment (type of impairment to be specified)
- Wheelchairs
- Joggers
- Cyclists

- Equestrians
- Other (specify)

Q.11 Any other comments relating to these pedestrian / cyclist / equestrian facilities that you would like to share?

……

1.4 Personal Questions

Would you mind answering a few more personal questions?

Q.12 Age Classification Select one below.

- 0-17
- 18-30
- 30-39
- 40-49
- 50-59
- 60-69
- 70+

Q.13 Please describe your gender identity

Male Female Prefer not to say

Q.14 Ethnicity

A) White

- ☐ English / Welsh / Scottish / Northern Irish / British
- ☐ Irish
- ☐ Gypsy or Irish Traveller
- ☐ Any other white background, write in

……

B) Mixed / Multiple ethnic groups

- ☐ White and Black Caribbean
- ☐ White and Black African
- ☐ White and Asian
- ☐ Any other Mixed/multiple ethnic background, write in

……

C) Asian / Asian British

- ☐ Indian
- ☐ Pakistani
- ☐ Bangladeshi
- ☐ Chinese
- ☐ Any other Asian background, write in

……..

D) Black / African / Caribbean / Black British

- ☐ African
- ☐ Caribbean
- ☐ Any other Black/African/Caribbean background, write in

……

E) Other ethnic group

- ☐ Arab
- ☐ Any other ethnic group, write in

……

F) Prefer not to say

Q.15 Employment Status

Full time Employment Part time Employment Self-Employed Full time Student Part time Student Unemployed Retired Other

Q.16 Do you consider yourself to have any limiting health condition or disability that would affect you as a pedestrian, cyclist or equestrian?

Yes No Prefer not to say

If yes:

Visual Impairment Hearing Impairment Physical Disability

Learning Disability Other

Appendix E

Survey Questionnaire Responses

ID	Interview 1	Interview 2
TIME	06:45:00	11:00:00
WEATHER	Rainy	Rainy
NUMBER OF PEOPLE IN GROUP	2	1
DIRECTION OF TRAVEL	Southbound	Northbound
MODE OF TRANSPORT	Foot	Foot
PROCEED/REFUSED	Proceed	Proceed
ADD1		
ADD2		
ADD3	19 Glan Preseli	4 Glan Preseli
ADD4	Whitland	Whitland
ADD5		
POSTCODE	SA67 7PG	SA67 7PG
EASTING	214700	214700
NORTHING	216900	216900
ORIGIN REASON	Home	Home
OTHER (SPECIFY)		
ADD1	19 Glan Preseli	19 Glan Preseli
ADD2	Whitland	Whitland
ADD3		

ID	Interview 1	Interview 2
ADD4		
ADD5		
POSTCODE	SA67 7PG	SA67 7PG
EASTING	214700	214700
NORTHING	216900	216900
DESTINATION REASON	Home	Home
TWO WAY RETURN OR ONE WAY RETURN TRIP	Circular Walk	Circular Walk
TIME OF RETURN JOURNEY	10:00:00	11:30:00
TRIP FREQUENCY	More than five times a week	More than five times a week
ANY OTHER MODE OF TRANSPORT	No	No
HOW SAFE TRAVELLERS FEEL	4. Safe	1. Very Unsafe
REASON FOR SAFETY RATING		Main road traffic not sticking to speed limits
WCHR CLASSIFICATION	Pedestrians walking dogs	Pedestrians walking dogs
PERSONAL QUESTIONS PERMITTED	Yes	Yes
AGE	50-59	40-49

ID	Interview 1	Interview 2
GENDER	Male	Female
ETHNICITY	White - English / Welsh / Scottish / Northern Irish / British	White - English / Welsh / Scottish / Northern Irish / British
EMPLOYMENT STATUS	Retired	Full time Employment
LIMITED HEALTH CONDITION	No	Prefer not to say

Appendix F – List of Invitees to Public Information Exhibition

			Contact Details	Comments (method of notification)
	Organisation	**Named Individuals**	**Invite Sent**	
Local Community & Community & Town Councils	Landowners	N/A	Yes	Letter Drop 16th and 20th March
	Local Residents	N/A	Yes	Letter Drop 16th and 20th March
	Llanddewi Velfrey Community Council	Lynda Hill	Yes	Letter Drop 16th and 20th March
	Henllanfallteg Community Council	Ella Beattie	Yes	Sent Email 7th April 17 - email bounced back. Copy of letter sent in post 8th April 2017
	Whitland Town Council	Mrs Suzanne Davies	Yes	Sent Email 7th April 17
	Narbeth Town Council	Caroline Coaker	Yes	Sent Email 7th April 17
County Council Officers	SWTRA	Chris Davies	Yes	Sent Email 7th April 17
	Network Management	Darryn Hill	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Ceri Rees	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Ray Greenwood	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Darren Thomas	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Martin White	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Rob Evans	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Dr Steven Jones	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Mike Simmons	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Stephen Benger	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Matt Cloud	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Ben Blake	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Trevor Theobald	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Richard Staden	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Lara Lawrie	Yes	Sent Email 7th April 17
	Pembrokeshire County Council	Alan Hunt	Yes	Sent Email 7th April 17
MP's/AM's	National and Welsh Government (NAW)	Stephen Crabb MP	Yes	Emyr Davies has invited
	National and Welsh Government (NAW)	Simon Hart MP	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Paul Davies Constituency AM	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Angela Burns Constituency AM	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Simon Thomas Regional AM	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Neil Hamilton Regional AM	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Joyce Watson Regional AM	Yes	Emyr Davies has invited
	Welsh Government (NAW)	Eluned Morgan Regional AM	Yes	Emyr Davies has invited
Community Councillors	Llanddewi Velfrey Community Council	Wyn Griffiths	Yes	Via Community Letter Drop
	Llanddewi Velfrey Community Council	Jamie Lewis	Yes	Via Community Letter Drop - Impacted Landowner
Environmental	Pembrokeshire Wildlife Trust	Nathan Walton (Manager)	Yes	Via communication through website and subsequent phone call
	SUSTRANS	Gwyn Smith	Yes	Emailed

	Freight Transport Association	Ian Gallagher	Yes	Spoke to on phone and invited via email 7th April 17. All future correspondence to go to him.
	Freight Transport Association	Vincent Brickley	Indirectly	Will be notified by Ian Gallagher
	Road Haulage Association	Rachel Binns	Yes	Via email 7th April 2017
	PACTO - Pembrokeshire Association of Community Transport Organisations	Debbie Johnson	Yes	Via email 7th April 2017
	Pembrokeshire County Council	Hubert Mathias	Yes	Via email 7th April 2017
	Pembrokeshire County Council	Owen Roberts	Yes	Bloomfield Bus may serve Llanddewi Velfrey? Invited via email sent 7th April 2017
	Taf Valley Coaches Ltd		Yes	Operate 4 services to/from Llanddewi Velfrey Service 322 Haverford West to Carmarthen - Invited via email 7th April 2017
	Jones Login		yes	Via email 7th April 2017
	Richards Bros		yes	Via email 7th April 2017
	First Cymru		yes	Via email 7th April 2017
	Mid & West Wales Fire Service		yes	Via email 7th April 2017
	Mid & West Wales Fire Service		yes	Via email 7th April 2017
	Emergency Services - Ambulance		Yes	Via Letter posted 8th April 2017
	Dyfed-Powys Police		Yes	Via Letter posted 8th April 2017
	Dyfed Police		Yes	Via Letter posted 8th April 2017
	Welsh Government (Transport)	David Hern	Yes	Via email 7th April 2017
	Welsh Government representing Haven Enterprise Zone	Lawrence Humphries	YEs	Via email 7th April 2017
	Bluestone Resort	William McNamara OBE	Yes	Via Letter posted 8th April 2017 - addressed to 'Resort Manager'
	Oakwood Theme Park - Aspro Parks		Yes	Via Letter posted 8th April 2017
	Fishguard Ferry Terminal		Yes	Via Letter posted 8th April 2017
	Irish Ferries		Yes	Via Letter posted 8th April 2017
	Milford Haven Port Authority	Alec Don	Yes	Via email 7th April 2017
	Stena Line Ferries		Yes	Via Letter posted 8th April 2017
NMU's	British Horse Society	Zandra Thomas	Yes	Email sent 14th March 2017 in response to query.
	Pembrokeshire Ramblers Association	John Reeves	Yes	Via email 7th April 2017

Appendix G – Public Information Exhibition Comment Form

A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Comment form for the Public Information Exhibition to be held on Tuesday 25th April 2017 from 10am to 8pm.

Llanddewi Velfrey Village Hall, SA67 7PA

About the exhibition: *Please tick the following boxes for* **Yes** *or* **No**

1.	Did you receive enough notice about the exhibition?	
2.	Did you find the exhibition useful?	
3.	Did the information displayed answer any queries you had?	
4.	Did the venue suit you?	
5.	Were the opening times sufficiently long?	
6.	Were staff able to answer your questions?	
7.	Do you have any other comments about the exhibition?	

.....

.....

.....

About the A40 improvement scheme:

8. Do you have any comments about the A40 improvement scheme – in particular the areas highlighted on Board 6 as options under consideration?

.....

.....

.....

.....

.....

9. Do you have any comments on Board 10 and the proposals to extend the scheme to Redstone Cross Junction?

.....

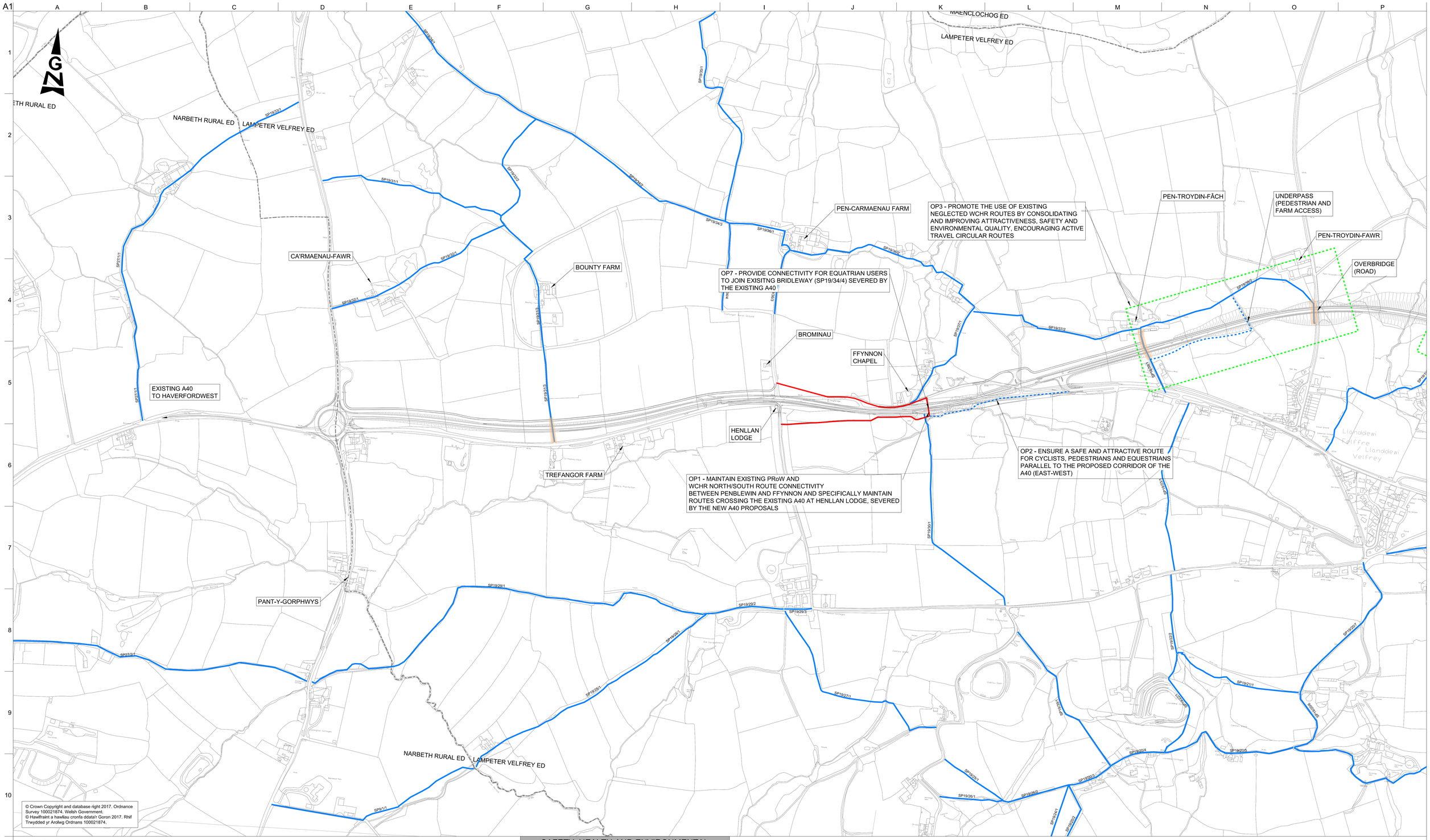
.....

.....

.....

The Welsh Assembly Government thanks you for your co-operation in completing this comment form. Please fold and deposit the completed form in the box provided.

Appendix H – Walking, Cycling and Horse Riding Strategy Drawings



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LEGEND

- PUBLIC RIGHTS OF WAY - NO CHANGE
- NEW PUBLIC BRIDLEWAY
- NEW PUBLIC FOOTPATH
- PUBLIC RIGHT OF WAY (PRoW) PERMANENTLY DIVERTED
- PUBLIC RIGHT OF WAY (PRoW) PERMANENTLY STOPPED UP
- COMMUNITY COUNCIL BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
N/A

Maintenance / Cleaning
N/A

Use
N/A

Decommissioning / Demolition
N/A

Rev	Date	Description	By	Chkd	Appd	Auth
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P01	03/10/18	ISSUE FOLLOWING COMMENTS	AJ	JP	GD	GD
P02	23/11/18	FOR UPDATED REPORT REVISION	HJ	GJ	TE	GD
P03	29/11/18	UPDATED FOLLOWING WG COMMENTS	EB	JP	TE	GD

Project Title
A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client
Llywodraeth Cymru
Welsh Government

ARCADIS
MOTT MACDONALD

Delivery Team
ARUP
RICHARDS Moorcroft Lyons LTD
PLANNING | LANDSCAPE | ENVIRONMENT

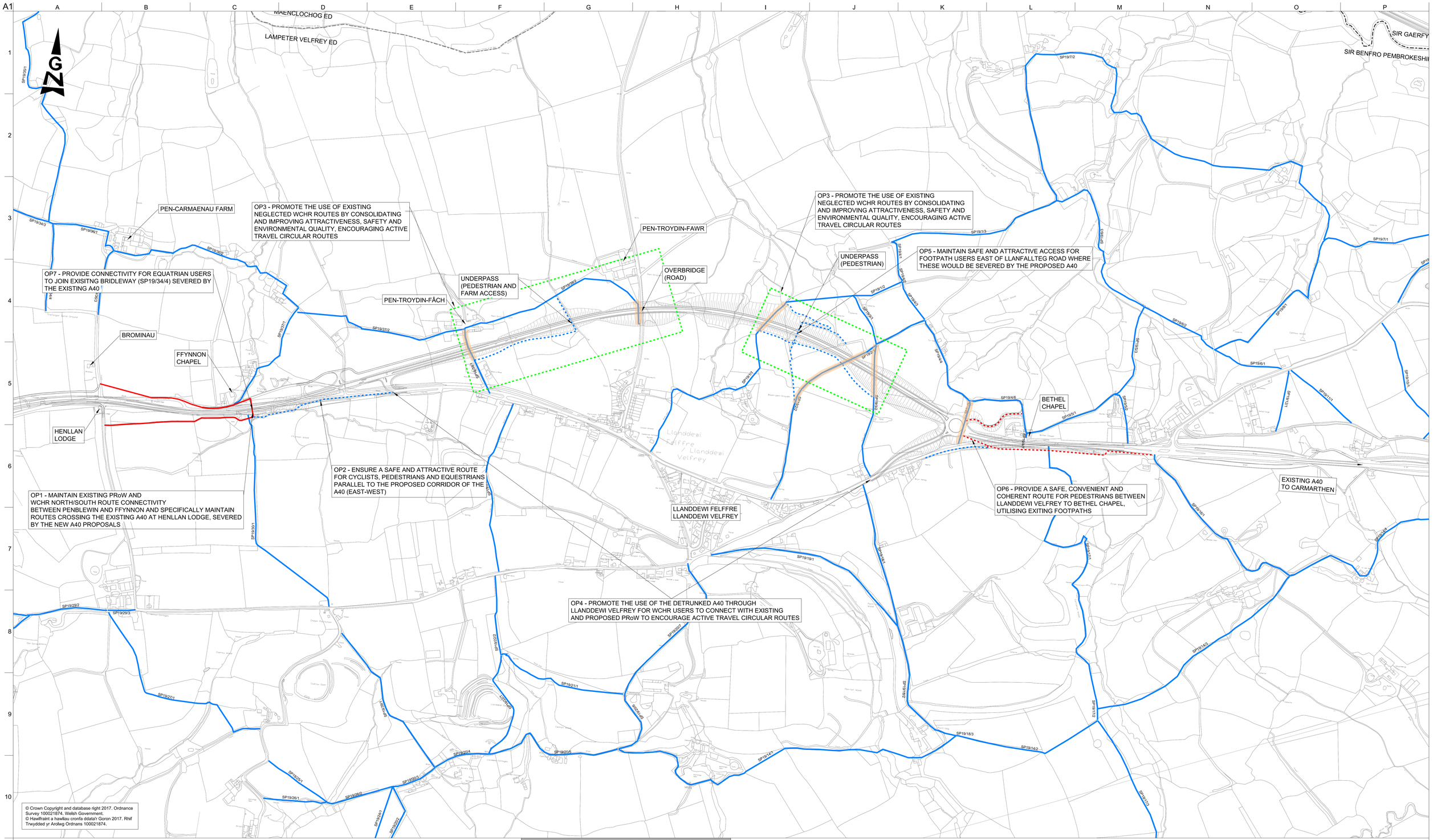
Drawing Title
WALKING, CYCLING AND HORSE RIDING STRATEGY
SHEET 1 OF 2

Suitability
S4 SUITABLE FOR STAGE APPROVAL

Scale at A1 1:5000

Rev	By	Chkd	Appd	Auth
P03	EB	JP	TE	GD
	Date 23/11/18	Date 23/11/18	Date 23/11/18	Date 29/11/18

Name
A40LVP - ARP - GEN - SWI - DR - D - 0001
Project | Originator | Volume | Location | Type | Role | Number



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LEGEND

- PUBLIC RIGHTS OF WAY - NO CHANGE
- NEW PUBLIC BRIDLEWAY
- NEW PUBLIC FOOTPATH
- PUBLIC RIGHT OF WAY (PRoW) PERMANENTLY DIVERTED
- PUBLIC RIGHT OF WAY (PRoW) PERMANENTLY STOPPED UP
- COMMUNITY COUNCIL BOUNDARY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction
N/A

Maintenance / Cleaning
N/A

Use
N/A

Decommissioning / Demolition
N/A

Rev	Date	Description	By	Chkd	Appd	Auth
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P01	03/10/18	ISSUE FOLLOWING COMMENTS	AJ	JP	GD	GD
P02	23/11/18	FOR UPDATED REPORT REVISION	HJ	GJ	TE	GD
P03	29/11/18	UPDATED FOLLOWING WG COMMENTS	EB	JP	TE	GD

Project Title
A40 LLANDDEWI VELFREY TO PENBLEWIN IMPROVEMENTS

Client
Llywodraeth Cymru
Welsh Government

Delivery Team
ARUP
ARCADIS
MOTT MACDONALD
RICHARDS

Drawing Title
WALKING, CYCLING AND HORSE RIDING STRATEGY
SHEET 2 OF 2

Suitability
S4 | SUITABLE FOR STAGE APPROVAL

Scale at A1 1:5000

Rev	By	Chkd	Appd	Auth
P03	EB	JP	TE	GD
	Date 23/11/18	Date 23/11/18	Date 23/11/18	Date 29/11/18

Name
A40LVP - ARP - GEN - SWI - DR - D - 0002
Project | Originator | Volume | Location | Type | Role | Number

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Appendix 17.1 Population and Health Baseline

A40LVP-ARP-EGN-SWI-RP-LE-0015

P01 | S4

19/11/18

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1.2 Economic activity 7

2 Health 14

2.2 Transport and travel 19
2.3 Health behaviour and lifestyle 21

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1 Population

1.1 Local demography

1.1.1 Local demography encompasses a range of parameters that help to define the composition of a given population. These include the size of the population, age profile, gender split, ethnicity and inward/outward migration. This provides a basis for understanding local circumstance and can provide an insight as to how this may change over time and the subsequent link with health outcomes. For example, the health requirements of an ageing population are different to those of a younger demographic.

Population density

1.1.2 The scheme is located in a rural area with low population density, with fewer than 190 people per square kilometre. The nearest settlement is the small town of Narberth, with other centres of population located at Haverfordwest, Milford Haven, Pembroke Dock, Pembroke, and Tenby.

Population structure

1.1.3 Population estimates for the UK for mid-2016 (the latest estimate available at the time of writing) can be used to illustrate the age profile and gender split of the area surrounding the proposed scheme[1]. This information is only available at local authority level, and so data is presented for Pembrokeshire rather than the local study area. The gender split in Wales is fairly even with 49% of the population male and 51% female. The gender distribution in Pembrokeshire is also 49% male and 51% female.

1.1.4 Figure 1 "Age structure, Pembrokeshire compared to Wales", provides a detailed age profile of Pembrokeshire in comparison with Wales. This shows that Pembrokeshire has an older population than the Welsh average, with higher proportions of residents in groups aged 50 and over, and smaller proportions of residents in younger age groups. The older age profile of Pembrokeshire is an important consideration for the health and equalities assessments. Age is one of the nine protected

[1] ONS (2017), Population Estimates for UK, England and Wales, Scotland and Northern Ireland: Mid-2016.

characteristics defined in the Equality Act 2010, and increased age can be related to an increasing requirement for healthcare services and changes to well-being and mobility.

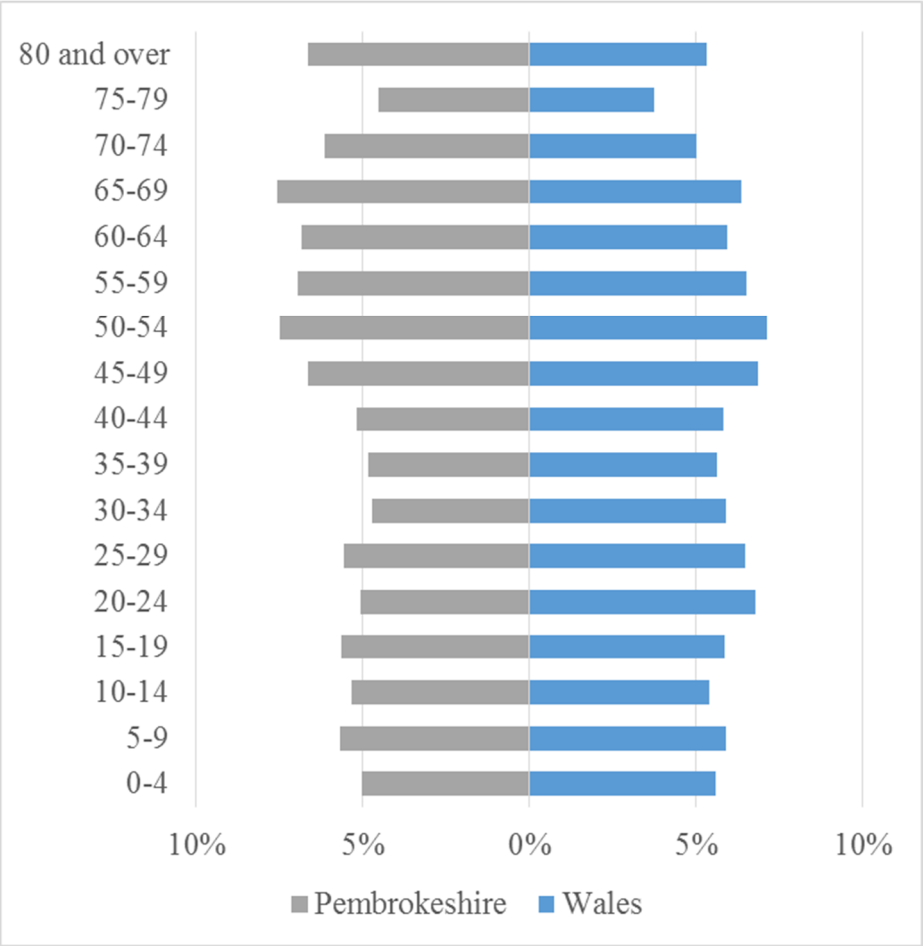

Figure 1 Age structure, Pembrokeshire compared to Wales (Source: ONS (2017), Population Estimates for UK, England and Wales, Scotland and Northern Ireland: Mid-2016)

Welsh language skills

1.1.5 More than half of residents of the study can either understand spoken Welsh, or can speak, read or write Welsh. This is higher than both the average for Pembrokeshire (45.0%) and for Wales (44.1%). Figure 2 "Welsh language skills" shows these percentages.

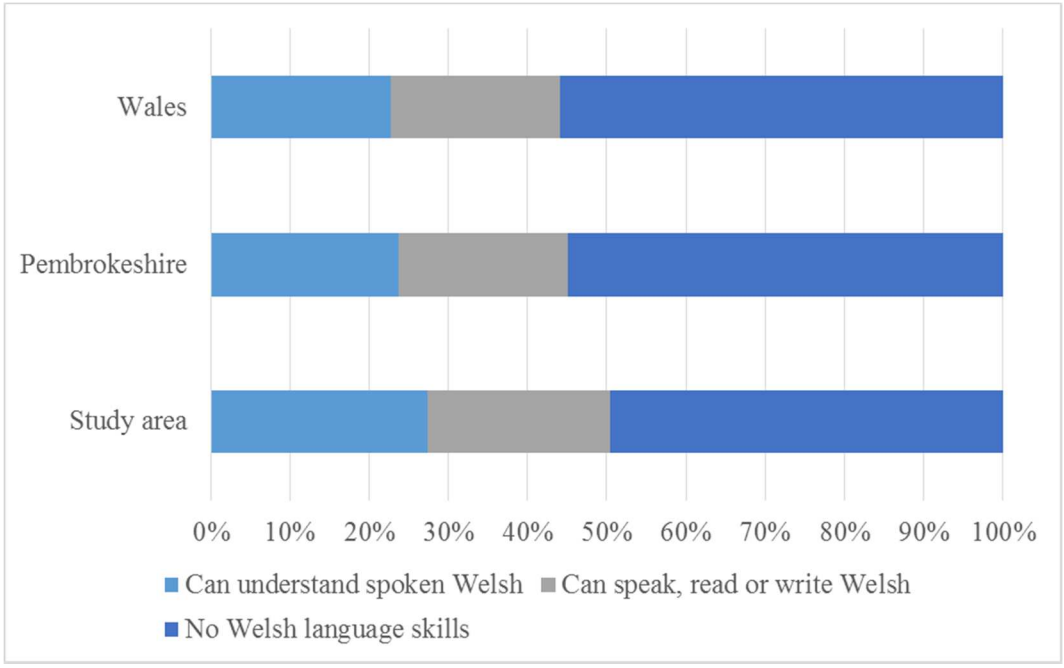

Figure 2 Welsh language skills (Source: ONS, Census 2011)

Migration and population change

1.1.6 ONS migration statistics published as part of the Mid-Year Population Estimates show that in the year ending June 2016, Wales overall recorded a net inflow of internal migrants from other regions in the UK of 3,379, and a net inflow of international migrants of 9,676. Overall (accounting for births and deaths as well as migration flows), the population of Wales increased by 14,064, or 0.5% between 2015 and 2016.

1.1.7 Over the same period, Pembrokeshire recorded a net inflow of 730 internal migrants, and a net inflow of 99 international migrants. Overall, the population of the county increased by 390, or 0.4%. This is a slightly lower rate of population increase than that recorded across Wales as a whole.

Ethnicity

1.1.8 Data from the 2011 census indicates that ethnic diversity is lower in Pembrokeshire and in the local study area than the average for Wales[2]. As shown in Figure 3 "Ethnicity by broad ethnic group", over 98% of the population in these groups is from White ethnic groups, with smaller proportions of residents from mixed, Asian, and Black ethnic

[2] ONS (2012), Census 2011.

backgrounds. Across Wales, just under 96% of residents are from White ethnic groups, with 2.3% from Asian ethnic groups, 1% from mixed or multiple ethnic groups, and less than 1% from Black or other ethnic groups.

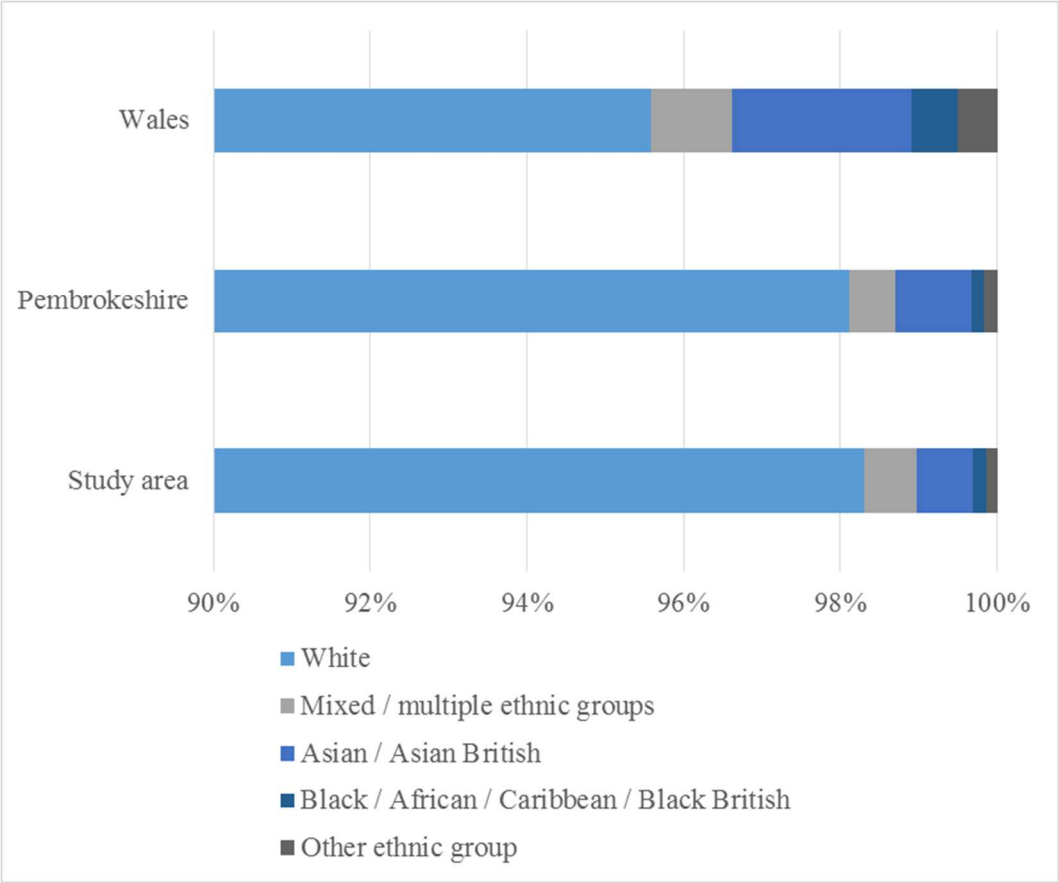

Figure 3 Ethnicity by broad ethnic group (Source: Census 2011)

Religion

1.1.9 The 2011 census indicates that the study area and Pembrokeshire both record a higher than average proportion of residents who give their religion as Christian, and smaller than average proportions from most other religious groups – as shown in Figure 4 "Religion." In the study area, 63.4% of people consider themselves Christian, compared with 63.0% in Pembrokeshire and 57.6% for Wales as a whole.

1.1.10 Across Wales, the largest religious minority group is Muslim, with Muslims accounting for 1.5% of the total population. In both the study area and Pembrokeshire, 0.3% of residents give their faith as Muslim. Other religious minority groups each account for less than 1% of the population of the study area and Pembrokeshire.

1.1.11 The proportion of residents who say they have no religion is lower in the study area and in Pembrokeshire than the Welsh average. However, there are slightly higher than average proportions belonging to other religions (0.7% in the study area and 0.5% in Pembrokeshire, compared with 0.4% across Wales), and the proportion of residents who chose not to state their religion is also slightly above average in both areas.

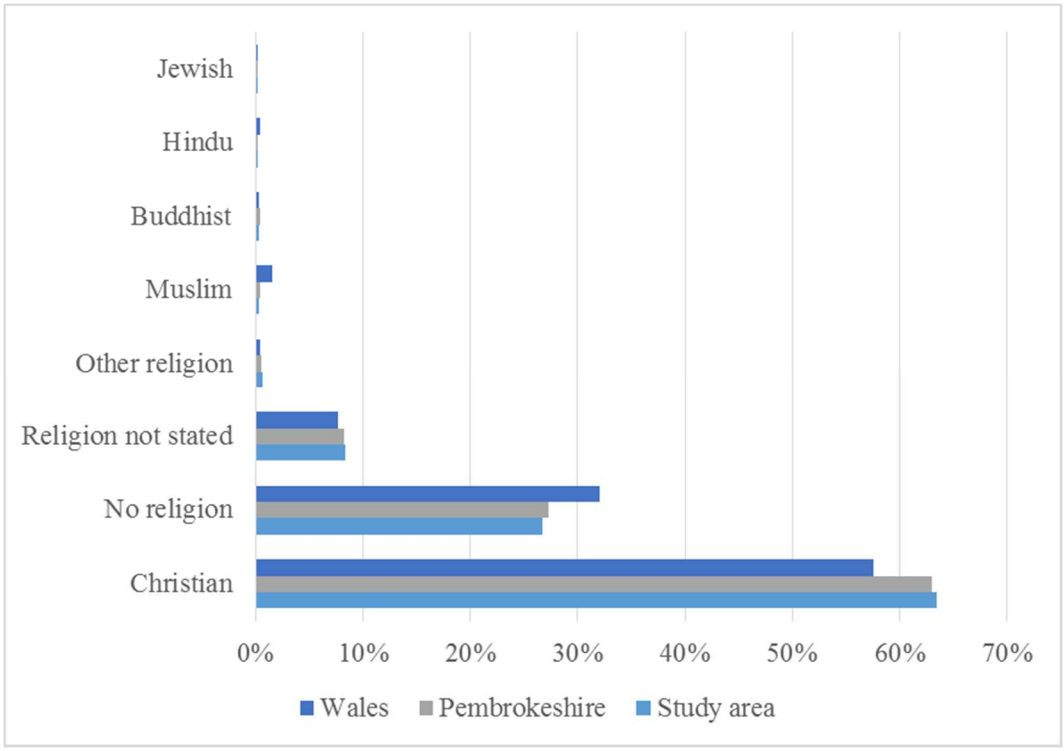

Figure 4 Religion (Source: ONS, Census 2011)

Education

1.1.12 Figure 5 "Educational attainment" illustrates 2011 census data for highest qualification levels attained by working-age residents of the study area and of Pembrokeshire, in comparison with Wales.

1.1.13 This indicates that the study area has a relatively highly-skilled population, with a higher than average proportion of residents with Level 4 qualifications (equivalent to a bachelor's degree) or above (29.3% compared with 24.5% for Wales). There is also a smaller than average proportion of residents with no formal qualifications (22.9% compared with 25.9% for Wales).

1.1.14 The figures for Pembrokeshire are broadly in line with the Welsh averages.

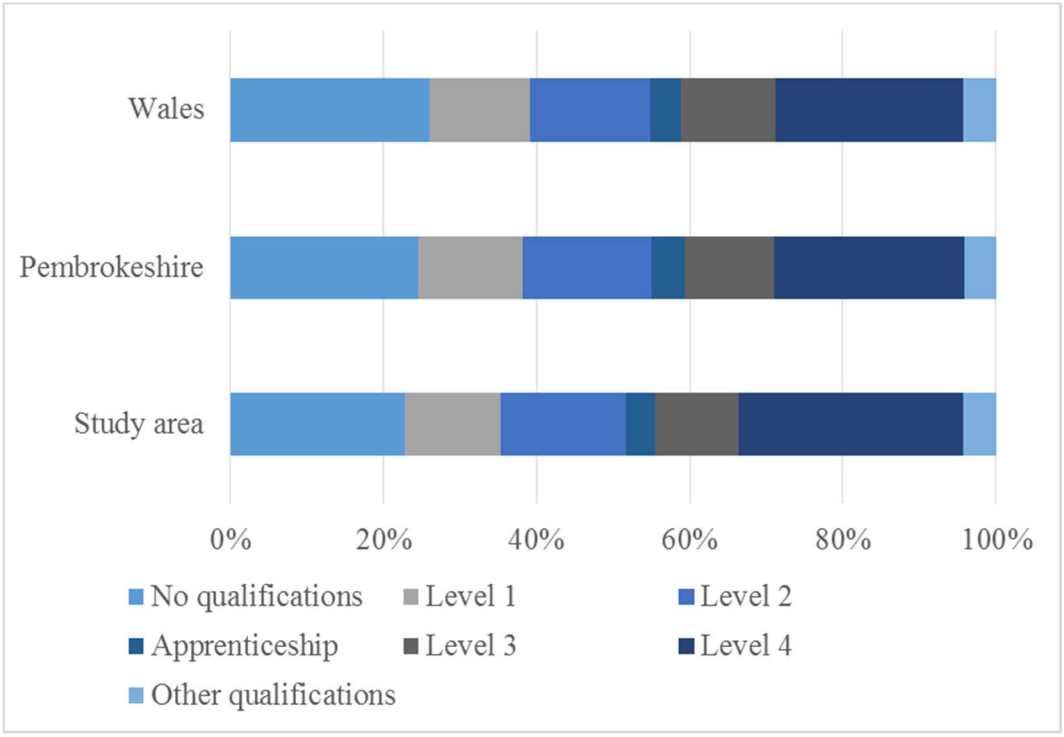

Figure 5 Educational attainment (Source: ONS, Census 2011)

Disability

1.1.15 Figure 6 "Limiting long-term illness or disability" uses census 2011 data and illustrates the proportion of the population that experiences a long-term illness or disability that limits their day-to-day activities either a little or a lot. The proportion of residents of the study area who report a limiting long-term illness or disability is 23.1%, including 11.5% whose illness or disability limits them a lot. This is slightly higher than the Welsh average of 22.7%, and 10.8% whose illness or disability limits them a lot.

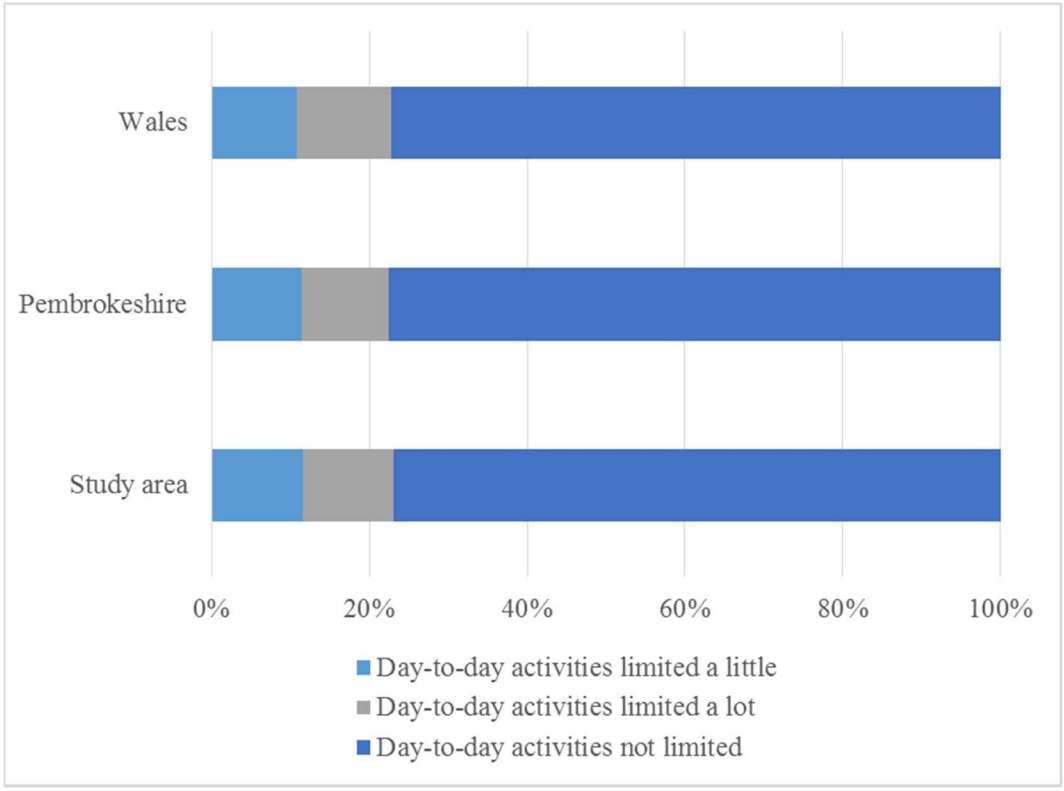

Figure 6 Limiting long-term illness or disability (Source: ONS, Census 2011)

1.2 Economic activity

Industry of employment

1.2.1 The Annual Population Survey (APS) provides up-to-date information on employment and labour market activity[3]. This information is not available for individual wards, and so data is presented for Pembrokeshire rather than for the local study area. "Employment by sector" uses data from the 2017 APS, and compares employment by sector in Pembrokeshire with the average for Wales.

1.2.2 The largest sectors by employment in Pembrokeshire are public administration, education and health; and distribution, hotels and restaurants. This is in line with the pattern for Wales, although the proportion working in distribution, hotels and restaurants is higher than the Welsh average, reflecting the importance of the tourism industry to the local economy.

1.2.3 Pembrokeshire records considerably smaller proportions of residents employed in manufacturing, and in banking, finance and insurance than

[3] ONS (2017), Annual Population Survey, June 2017- June 2017.

the Welsh average. Employment in agriculture and fishing, and in the construction sector is above average. Agriculture and fishing accounts for 7.3% of all employment in the county, and construction for 10.4%.

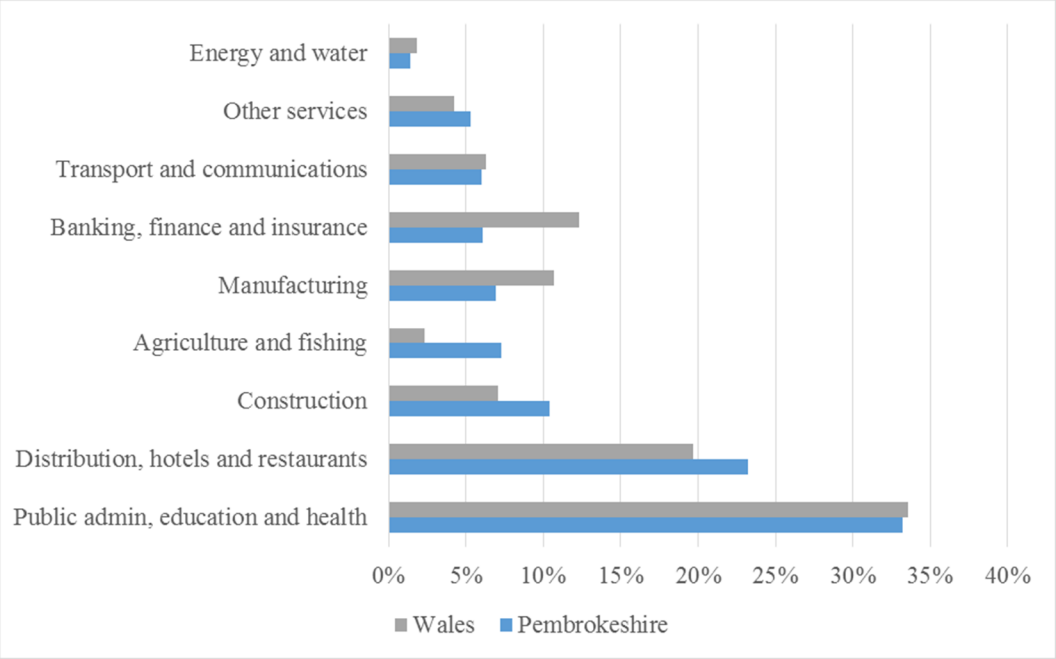

Figure 7 Employment by sector (Source: ONS, Annual Population Survey 2017)

Employment and unemployment

1.1.1 Figure 8 "Economic activity" uses data from the 2011 census to compare employment, unemployment and economic inactivity in the study area and in Pembrokeshire with the average for Wales. This shows that the proportion of residents who are employed either part-time or full-time, is slightly lower in the study area and in Pembrokeshire than across Wales. There is, however, a higher than average proportion of residents who are self-employed, at 16.7% in the study area and 13.5% in Pembrokeshire compared with 8.6% in Wales.

1.1.2 The proportion of residents who are retired is above average in the study area and Pembrokeshire, and the proportion who are students is below average. This reflects the age profile of the area. The proportion who are long-term sick or disabled is slightly lower than average, at 4.5% in the study area and 5.3% in Pembrokeshire, compared with 6.3% across Wales.

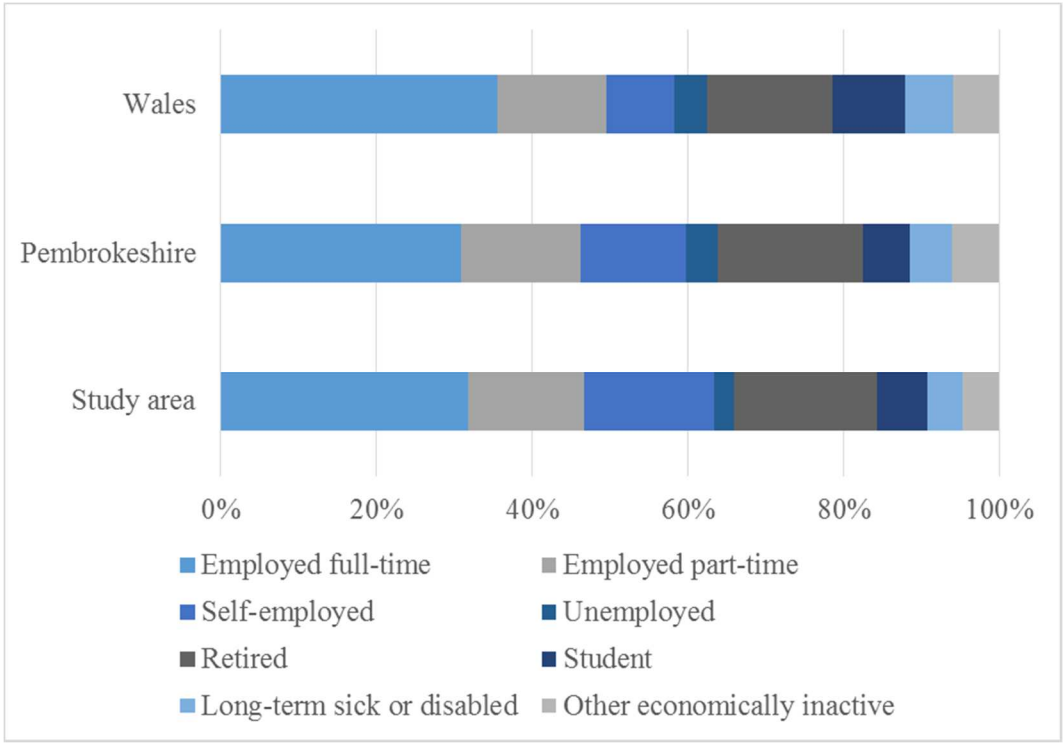

Figure 8 Economic activity (Source: ONS, Census 2011)

1.2.4 According to the census data, unemployment is 2.6% in the study area, compared with 4.0% in Pembrokeshire and 4.3% across Wales. However, APS data can be used to give a more up-to-date understanding of the unemployment rate at local authority level.

1.2.5 Figure 9 "Percentage of working-age adults unemployed, 2007-2017" uses APS data to illustrate the change in unemployment rate in Pembrokeshire and in Wales over the decade to 2017. Over this period, unemployment in Pembrokeshire has followed a similar pattern to the national average, but has remained consistently lower than average. The latest data shows that the unemployment rate in 2017 is 3.6% in Pembrokeshire, compared with 4.9% across Wales.

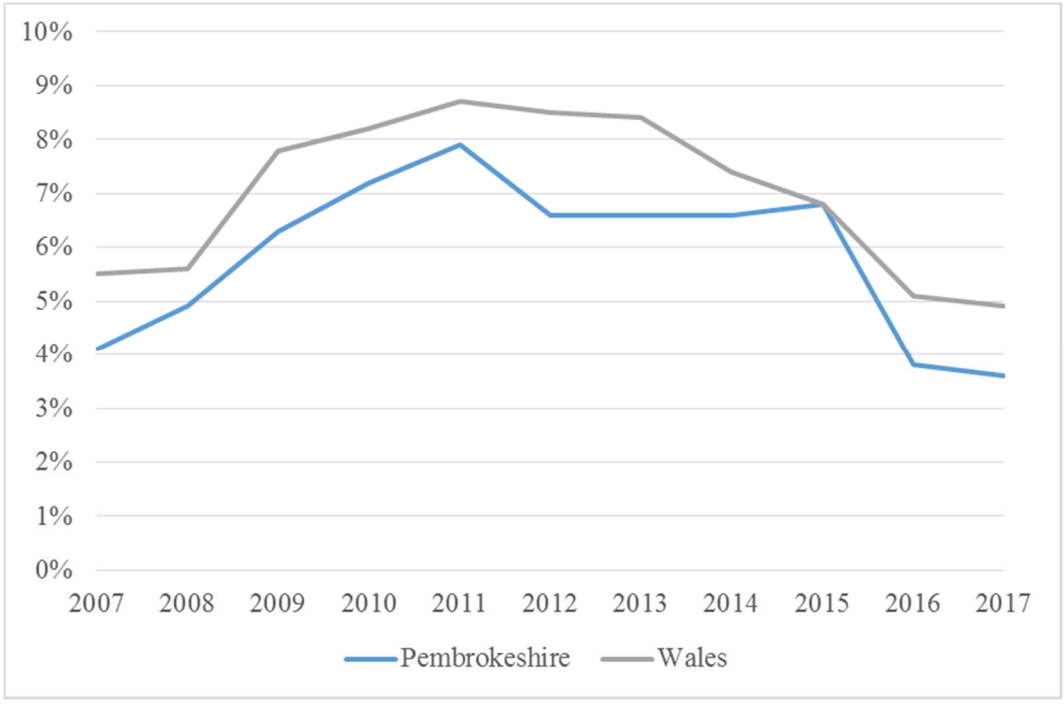

Figure 9 Percentage of working-age adults unemployed, 2007-2017 (Source: ONS, Annual Population Survey 2017)

1.2.6 Claimant count data, which records the proportion of the workforce who are in receipt of out-of-work benefits, can also be used as a measure of unemployment and is available at ward level[4]. Figure 10 "Claimant count by sex" illustrates this data by sex for each of the wards in the local study area, in comparison with Pembrokeshire and Wales.

1.2.7 This shows that the claimant count is higher for men than for women across all areas. It also indicates that the proportion of people who are out of work and claiming benefits in the Lampeter Velfrey and Narberth Rural wards is considerably below the average for Pembrokeshire and for Wales. In Narberth ward, which includes the town of Narberth, it is slightly higher than average, particularly among males.

[4] ONS (2017), Claimant Count, September 2017.

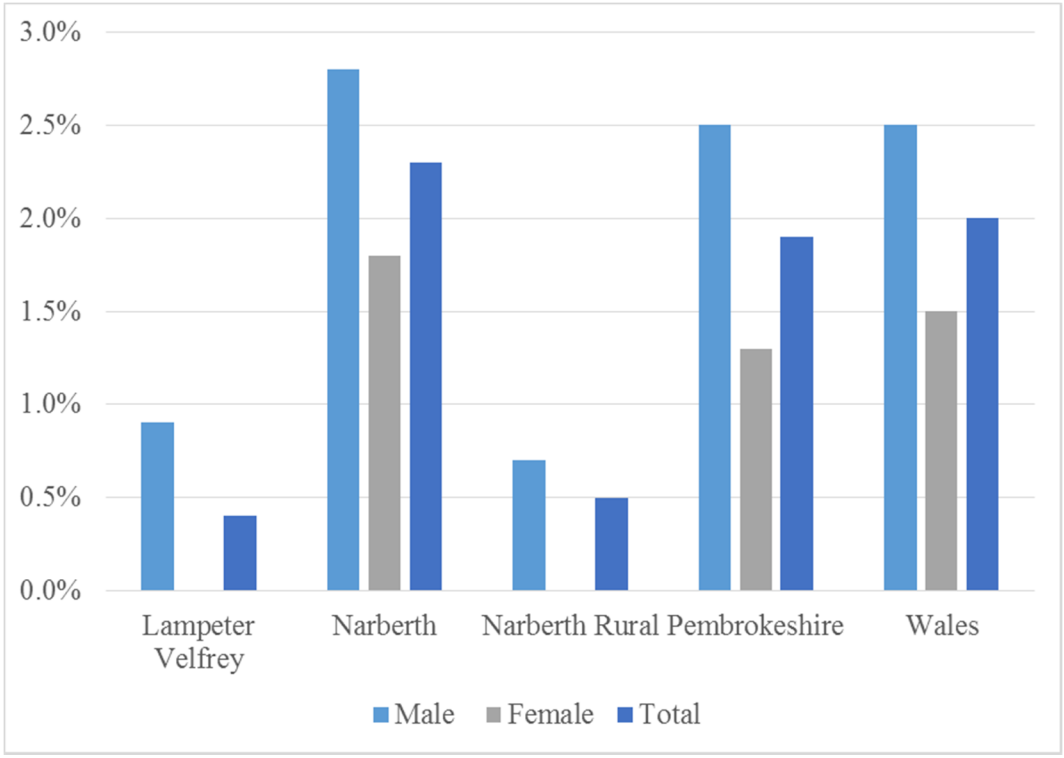

Figure 10 Claimant count by sex (Source: ONS, September 2017)

Deprivation

1.2.8 The Welsh Government's Welsh Index of Multiple Deprivation (WIMD) measures deprivation across eight 'domains'. These are: income; employment; health; education; access to services; community safety; physical environment; and housing. The WIMD ranks the 1,909 Lower Super Output Areas (LSOAs) in Wales against each of these domains[5].

1.2.9 Deprivation within each domain is established using national statistics, such as rates of violence and burglary (crime); people claiming income support (income) or Jobseekers' Allowance (JSA) (employment); homelessness, access to owner-occupation, and distance to services such as GP surgery, school or shops (barriers to housing and services); air quality and road traffic accidents (outdoor living environment); and many other indicators.

1.2.10 Collectively, these indicators of the relative deprivation of a community (expressed through factors relating to individuals, such as rate of disability and employment, and through factors of the living environment, including crime and access to services) strongly influence

[5] Statistics Wales (2014), Welsh Index of Multiple Deprivation.

health and well-being. Certain protected characteristic groups can also be more likely to experience deprivation. Scores for deprivation therefore offer a useful way to show a summary profile of the community, and characterise the urban fabric of the areas in which this Scheme is located, in a way that focuses on the residents' needs and barriers to good health and well-being, and the potential for equality effects.

1.2.11 Figure 11 illustrates multiple deprivation for the Carmarthenshire LSOA for the Scheme area. Deprivation values are split equally into five quintiles, with the first quintile representing the 20% most deprived LSOAs in Wales, and the fifth quintile representing the 20% least deprived LSOAs in Wales.

1.2.12 Pembrokeshire is generally an area of relatively low multiple deprivation. Deprivation is concentrated in Pembroke, Pembroke Dock, Milford Haven, and Haverfordwest, where there are several LSOAs that fall into the 20% most deprived in Wales. The Monkton area to the west of Pembroke town centre, and the Llanion 1 area on the eastern side of Pembroke Dock, both rank within the 100 most deprived LSOAs in Wales.

1.2.13 Figure 12 illustrates data for health deprivation specifically. The health domain uses data for the following indicators: limiting long-term illness; all-cause death rate; cancer incidence; and low weight single births.

1.2.14 Pembrokeshire is again an area of generally low deprivation, with health deprivation concentrated in Pembroke, Pembroke Dock and in Haverfordwest. The Monkton area of Pembroke in particular ranks as the 59th most deprived of the 1,909 LSOAs in Wales.

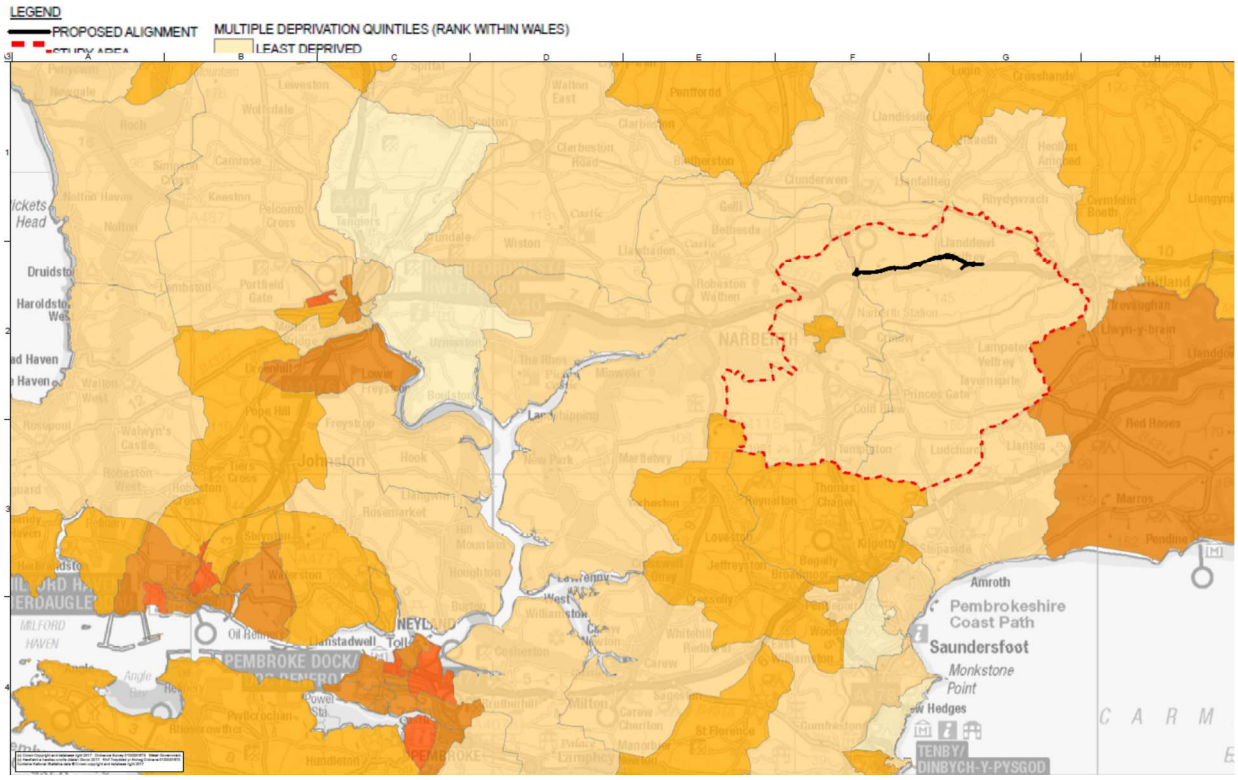

Figure 11 Multiple index of Deprivation, Quintiles within Wales

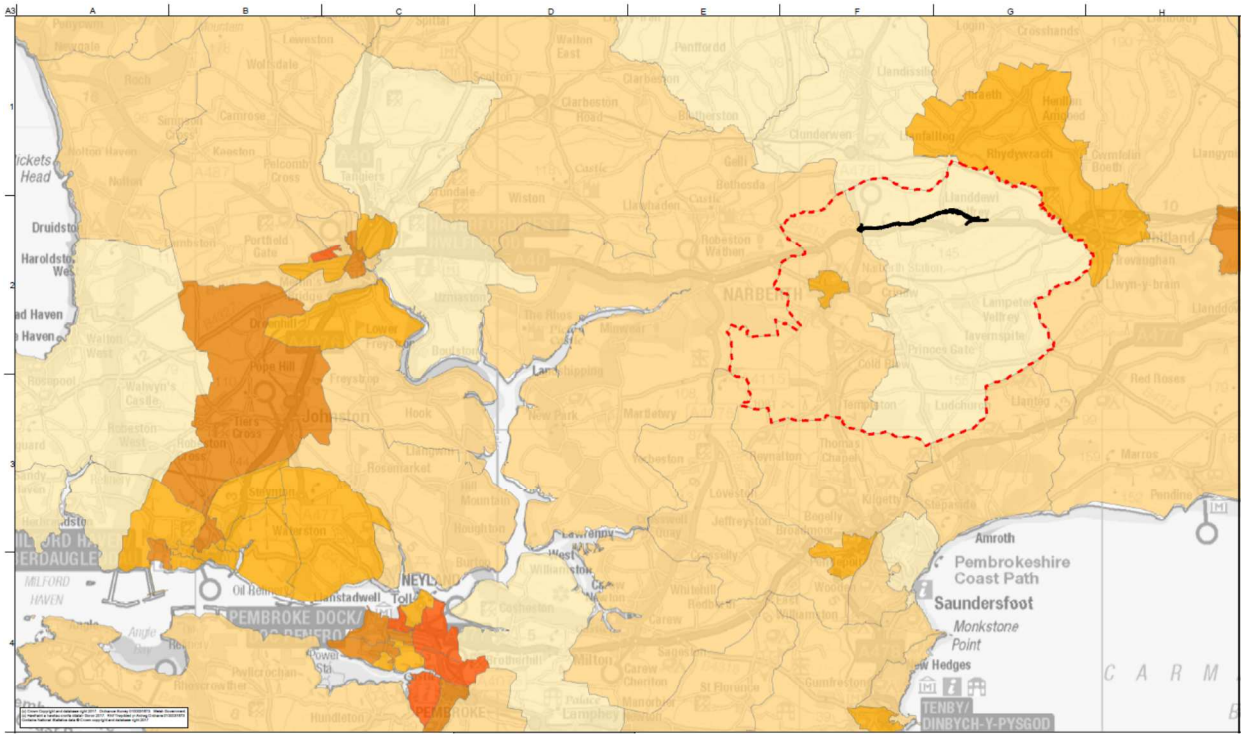

Figure 12 Health Deprivation, Quintiles within Wales

2 Health

Life expectancy and mortality

2.1.1 Over the period from 2008-2014, the life expectancy at birth for both males and females in Wales has steadily increased. This pattern is also reflected in Pembrokeshire, where life expectancy for males has increased from 78.2 to 79.7, and for females from 82.3 to 83.2. Life expectancy for both males and females is higher in Pembrokeshire than the average across Wales as shown in Table 1.

Table 1 Life expectancy at birth (Source: NHS Wales Informatics Service, Health Maps Wales)

		2008-2010	2009-2011	2010-2012	2011-2013	2012-2014
Wales	Males	77.7	78.1	78.3	78.4	78.6
	Females	81.9	82.3	82.3	82.4	82.5
Pembrokeshire	Males	78.2	78.8	79.4	79.3	79.7
	Females	82.3	82.7	82.5	82.8	83.2

2.1.2 The all-cause mortality rate is lower in Pembrokeshire than across Wales. The mortality rate in Pembrokeshire is 941.2 deaths per 100,000 population, compared with 1,045.7 deaths per 100,000 population for Wales. The mortality rate has decreased over the period 2010-2016 in both Pembrokeshire and Wales as shown in Table 2.

Table 2 All-cause mortality rate per 100,000 population (Source: NHS Wales Informatics Service, Health Maps Wales)

	2010	2011	2012	2013	2014	2015	2016
Wales	1,080.0	1,034.8	1,050.8	1,059.8	1,016.9	1,064.4	1,045.7
Pembrokeshire	1,018.8	965.0	978.4	978.9	912.1	1,024.0	941.2

Cancer

2.1.3 In 2015, the incidence of cancer in Wales was 609.3 cases per 100,000 population. In Pembrokeshire, the incidence was higher at 635.9 cases per 100,000 population. This is higher than the figure recorded in 2010, whereas the 2015 rate in Wales was lower than the figure recorded in 2010. However, rates have fluctuated considerably in both Pembrokeshire and Wales over the period from 2010-2015.

2.1.4 The mortality rate from cancer in 2015 was lower in Pembrokeshire than in Wales, at 256.9 deaths per 100,000 population compared with 278.4 deaths per 100,000 population. Again, rates fluctuated between 2010 and 2015, with Pembrokeshire in particular recording an increase in mortality rates between 2011 and 2013. In both Pembrokeshire and Wales, however, there has been an overall decline over the 2010-2015 period as shown in Table 3.

Table 3 Cancer incidence and mortality rates per 100,000 population (Source: NHS Wales Informatics Service, Health Maps Wales)

		2010	2011	2012	2013	2014	2015
Incidence	Wales	624.4	622.8	612.7	645.5	640.1	609.3
	Pembrokeshire	587.3	596.7	696.0	667.5	621.5	635.9
Mortality rate	Wales	290.0	291.4	289.0	286.2	289.1	278.4
	Pembrokeshire	265.1	283.2	283.2	293.2	255.2	256.9

Respiratory disease

2.1.5 In 2015/16, the rate of hospital admissions for respiratory diseases was considerably lower in Pembrokeshire than across Wales. In both areas, the rate of admissions has fluctuated but has been on a broadly upward curve over the period from 2010/11-2015/16. Throughout this period the rate of admissions has remained lower in Pembrokeshire than in Wales as a whole.

2.1.6 Over the same period, the mortality rate from respiratory diseases has also remained consistently lower in Pembrokeshire than in Wales. In 2015, there were 139 deaths per 100,000 population in Pembrokeshire, compared with 171.3 per 100,000 population in Wales. Mortality rates have fluctuated considerably in both Wales and Pembrokeshire over the period 2010-2015, with no clear pattern emerging in either area as shown in Table 4.

Table 4 Hospital admissions and mortality rate per 100,000 population: all respiratory diseases (Source: NHS Wales Informatics Service, Health Maps Wales)

	2010 /2011	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**
Hospital admissions						
Wales	1,507.9	1,432.4	1,518.2	1,485.4	1,598.1	1,707.3
Pembrokeshire	1,397.1	1,164.2	1,333.6	1,315.1	1,418.7	1,499.7
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Mortality rate						
Wales	152.6	148.5	150.2	160.9	144.0	171.3
Pembrokeshire	105.2	103.3	116.7	125.3	92.9	139

Cardiovascular disease

2.1.7 Links have been established between cardiovascular disease and poor health behaviour, lifestyle choice and relative socio-economic deprivation. Comparison of the mortality rates and hospital admissions rates for all cardiovascular disease, shown in Table 5 reveals that Pembrokeshire has a higher rate of hospital admissions for cardiovascular disease than Wales as a whole, but a lower rate of mortality. Across both Pembrokeshire and Wales, admissions and mortality rates have fallen over the period since 2010.

Table 5 Hospital admissions and mortality rate per 100,000 population: all cardiovascular diseases (Source: NHS Wales Informatics Service, Health Maps Wales)

	2010 /2011	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**
Hospital admissions						
Wales	2,014.9	1,933.4	1,876.9	1,897.1	1,839.9	1,817.8
Pembrokeshire	2,160.1	1,948.1	1,874.8	1,760.0	1,871.2	1,860.4
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Mortality rate						
Wales	335.0	309.0	308.5	305.8	284.7	289.2
Pembrokeshire	369.8	332.0	316.1	295.7	281.1	287.9

2.1.8 Data for specific cardiovascular diseases shows that Pembrokeshire has a considerably higher rate of emergency hospital admissions for acute myocardial infarction (heart attack) than Wales, but a lower rate of mortality. In 2015, there were 33.7 deaths per 100,000 population in Pembrokeshire, compared with 47.4 per 100,000 population in Wales

as a whole.

2.1.9 Admissions rates tend to be closer to the average for Wales for coronary heart disease and for stroke, although there are some marked fluctuations over the period 2010-2015/16. The mortality rate from coronary heart disease has tended to be higher than the Welsh average over this period, and in 2015 there were 133.1 deaths per 100,000 population in Pembrokeshire compared with 130.6 in Wales. The mortality rate from stroke has tended to be lower, particularly since 2011, and in 2015 was 59.0 compared with 69.9 for Wales. This is shown in Table 6.

Table 6 Hospital admissions and mortality rate per 100,000 population: acute myocardial infarction, coronary heart disease and stroke (Source: NHS Wales Informatics Service, Health Maps Wales)

Acute myocardial infarction	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**
Emergency admissions						
Wales	145.0	135.0	146.5	151.1	135.8	146.8
Pembrokeshire	187.2	204.3	225.4	169.3	180.8	216.6
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Mortality rate						
Wales	55.6	53.1	47.1	47.7	44.0	47.4
Pembrokeshire	40.0	56.7	47.7	29.2	29.9	33.7
Coronary heart disease	**2010 /2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**
Hospital admissions						
Wales	605.1	569.8	544.0	525.1	490.5	489.0
Pembrokeshire	624.5	605.9	543.2	419.3	430.0	525.6
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Mortality rate						
Wales	159.8	146.9	142.7	142.2	126.4	130.6
Pembrokeshire	167.2	182.2	155.5	135.9	136.5	133.1
Stroke	**2010 /2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**
Hospital admissions						
Wales	223.1	199.7	197.0	207.8	201.2	197.5
Pembrokeshire	231.6	196.6	233.1	211.5	201.5	203.5
	2010	**2011**	**2012**	**2013**	**2014**	**2015**
Mortality rate						
Wales	88.7	77.8	78.3	76.7	75.1	69.9
Pembrokeshire	98.4	68.6	78.5	72.6	64.6	59.0

Access to health services

2.1.10 The Hywel Dda University Health Board provides health care for Carmarthenshire, Ceredigion and Pembrokeshire. As of September 2016, there were 390,590 registered patients within the Hywel Dda University Health Board area. There was a total of 243 General Practitioners (excluding locums, GP registrars and GP retainers), with

an average list size of 1,607 patients[6].

2.1.11 There are four general hospitals within the Hywel Dda University area, located at Aberystwyth, Llanelli, Carmarthen and Haverfordwest. There are also a number of community hospitals, including in Haverfordwest, Tenby and Pembroke Dock, as well as minor injuries units, health centres, and mental health services[7].

2.1.12 The Scheme does not directly impact upon health care services. It does, however, have potential implications for access, accessibility and response time to facilities.

2.2 Transport and travel

2.2.1 Figure 13 "Method of travel to work" uses data from the 2011 census and indicates that car, taxi or motorbike is by some distance the most common mode of transport used by residents of the study area to travel to work. This is in line with the pattern for Pembrokeshire and for Wales. The proportion who travel to work by public transport modes is lower than average in both the study area and in Pembrokeshire, reflecting the rural nature of the area. There is a higher than average proportion of people who work from home (12.1% in the study area and 9.7% in Pembrokeshire, compared with 5.4% for Wales).

[6] Statistics Wales (2017), Statistical First Release: GPs in Wales, 2006-2016.
[7] Hywel Dda University Health Board: http://www.wales.nhs.uk/sitesplus/862/page/42912

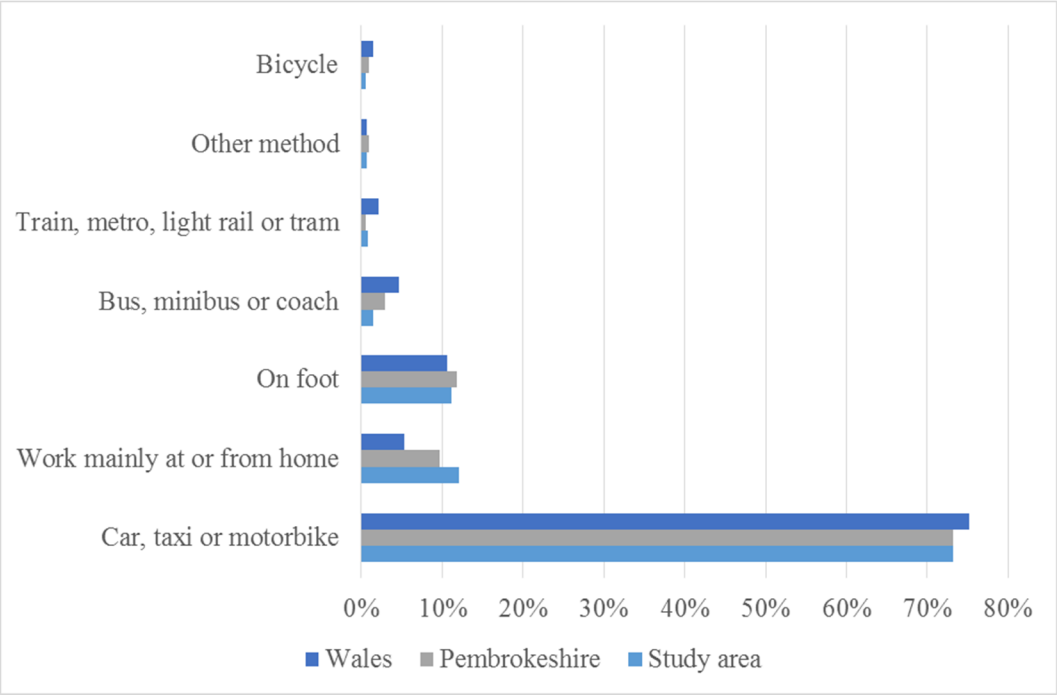

Figure 13 Method of travel to work (Source: ONS, Census 2011

2.2.2 Figure 14 "Car and van availability" also uses census data and shows that car and van availability is higher in the study area and in Pembrokeshire than across Wales. The proportion of households who do not have access to a car or van is 13.3% in the study area, compared with 17.9% in Pembrokeshire and 22.9% in Wales. Again it is likely that this reflects the rural nature of the area, and the relative lack of availability of public transport in comparison to more urban areas.

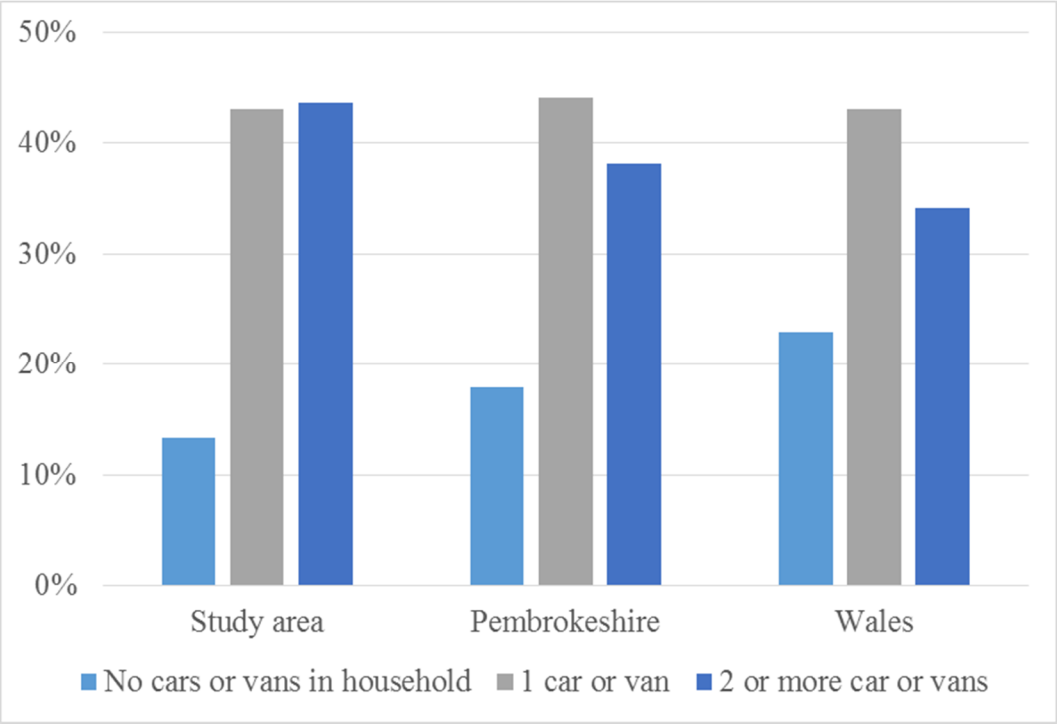

Figure 14 Car and van availability (Source: ONS, Census 2011)

2.3 Health behaviour and lifestyle

2.3.1 Poor health behaviour can have a wide ranging influence on overall health and well-being. Elements such as diet and the level of physical activity a person undertakes, and also the degree of risk-taking behaviour, alcohol consumption and smoking, are directly correlated with a range of adverse health outcomes.

Alcohol

2.3.2 Alcohol consumption is key health concern and a major cause of death and illness in Wales, accounting for around 4.9% of all deaths in the country[8].

2.3.3 Data for 2016/17 shows that, in the Hywel Dda University Health Board area, 22% of adults report alcohol consumption above 14 units per week. The figure for Pembrokeshire is also 22%, above the Welsh average of 20%. Of local authorities across Wales, only Monmouthshire (28%), Vale of Glamorgan (27%) and Carmarthenshire (23%) recorded higher rates[9].

[8] Public Health Wales Observatory (2014), Alcohol and health in Wales 2014: Wales profile.
[9] Statistics for Wales (2017), National Survey for Wales – Population health: health-related lifestyle (adults), 2016-2017.

2.3.4 Data for 2015/16 shows that the rate of alcohol-attributable hospital admissions in Hywel Dda is above the Welsh average, at 1,820.8 per 100,000 population compared with 1,748.8 per 100,000 for Wales. The figure for Pembrokeshire is also above average, at 2,014.4 per 100,000. This is the fourth highest of any local authority in Wales, behind Blaenau Gwent (2,147.5), Merthyr Tydfil (2,087.1), and Caerphilly (2,016.7)[10].

2.3.5 Alcohol-attributable mortality rates show that, in 2013-15, Hywel Dda had 47.6 alcohol-attributable deaths per 100,000 population, compared with a Welsh average of 51.2 per 100,000. Pembrokeshire had a rate of 47.2 deaths per 100,000 population, below the national average and among the lowest in Wales. Only Powys (40.9), Monmouthshire (43.5), Newport (45.8), Carmarthenshire (46.4), and Gwynedd (46.9) and recorded lower rates[11]. It is notable that the lowest figures – with the exception of Newport – were recorded in areas that are predominantly rural.

2.3.6 Public Health Wales states that mortality and hospital admissions associated with alcohol are strongly related to deprivation levels, where rates in the most deprived areas in Wales are significantly higher than those of the least deprived areas. Furthermore, there has been no improvement in the disparity in mortality rates between the most and least deprived areas over time[12].

Smoking

2.3.7 In 2013-15, smoking caused approximately 26,500 hospital admissions in Wales, presenting a significant burden on Welsh health services[13]. Smoking therefore represents a key health concern and challenge across Wales, as well in Pembrokeshire and the wider Hywel Dda area.

2.3.8 The National Survey for Wales found that, in 2016/17, 19% of adults in Wales aged 16 and over identified themselves as a current smoker. The figure was slightly higher for Hywel Dda (20%) and Pembrokeshire (21%). Of local authorities across Wales, only Blaenau Gwent (22%) recorded a higher rate of smokers[14].

[10] NHS Wales Informatics Service, Health Maps Wales.
[11] Ibid.
[12] Public Health Wales Observatory (2014), Alcohol and health in Wales 2014: Wales profile.
[13] Public Health Wales Observatory (2017), Smoking-attributable mortality and hospital admissions.
[14] Statistics for Wales (2017), National Survey for Wales – Population health: health-related lifestyle (adults), 2016-2017.

2.3.9 In terms of smoking-attributable hospital admissions, the rate in Hywel Dda was, in 2013-15, below the Welsh average at 1,297 per 100,000 population compared with 1,478. In Pembrokeshire, it was 1,309, above the figure for Hwyel Dda but still below average. Smoking-attributable mortality rates were also below average in both Hywel Dda and Pembrokeshire, at 257 and 250 per 100,000 population respectively compared with 290 for Wales[15].

2.3.10 There is an association between higher rates of smoking and factors such as age, socio-economic group, deprivation, housing and education. Smoking rates tend to be greatest in the most deprived areas of Wales and caused around one third of the inequality in mortality between the least and most deprived areas[16]. Rates of deaths from smoking are falling in part due to increasing restrictions on smoking; however, socio-economic inequalities are increasing due to faster reductions in the least deprived areas, compared to the most deprived.

Obesity and physical activity

2.3.11 Being overweight (with a body mass index of 25–30) or obese (with a body mass index greater than 30) increases the risk of a range of adverse health outcomes including cardiovascular disease, diabetes, and hypertension.

2.3.12 The National Survey for Wales collects data regarding levels of physical activity and obesity throughout Wales. Data for 2016/17 indicates that, in Wales overall, 59% of adults aged 16 and over are classed as overweight, with 23% classed as obese. 54% of people reported that they met the recommended exercise guidelines (a minimum of 150 active minutes per week), with 32% reporting that they were active for less than 30 minutes per week. Only 24% reported that they ate the recommended five portions of fruit and vegetables per day[17].

2.3.13 In Hywel Dda, the proportion of adults who are overweight and obese is in line with the Welsh average. In Pembrokeshire, however, it is above average, with 63% of adults classed as overweight, including 23% who are classed as obese. A higher than average proportion of adults in both Pembrokeshire (63%) and Hwyel Dda (62%) meet the

[15] Public Health Wales Observatory (2017), Smoking-attributable mortality and hospital admissions.
[16] Public Health Wales Observatory (2012), Tobacco and health in Wales, June 2012.
[17] Statistics for Wales (2017), National Survey for Wales – Population health: health-related lifestyle (adults), 2016-2017.

recommended level of physical activity, and the proportion of adults who are active for less than 30 minutes per week is below average in both areas. In Pembrokeshire, 31% of adults reported that they ate the recommended five portions of fruit and vegetables per day, above the national average[18].

Crime and antisocial behaviour

2.3.14 Crime and the perception of high crime rates can have an influence on mental health and well-being.

2.3.15 Pembrokeshire is covered by the Dyfed Powys police force area. Statistics from Her Majesty's Inspector of Constabulary and Fire and Rescue Services (HMICFRS) crime and policing comparator show that, in 2014, there were 36 crimes per 1,000 people in Dyfed Powys, considerably lower than the average for England and Wales (62 crimes per 1,000 population)[19].

2.3.16 Crime rates in 2014 were lower in Dyfed Powys than the national average for all categories of crime, with the exception of drugs offences and antisocial behaviour. The rate of drug offences was 6 crimes per 1,000 population compared with 3 per 1,000 population for Wales, and there were 50 incidences of antisocial behaviour per 1,000 population compared with 48 for Wales.

Community and health profile summary

2.3.17 The Scheme is located in a rural area with low population density, and lower than average rates of ethnic and religious diversity. Pembrokeshire has an older population than the Welsh average, with higher proportions of residents in groups aged 50 and over, and smaller proportions of residents in younger age groups. This is reflected in a higher than average proportion of residents who are retired.

2.3.18 Unemployment is low, and the workforce is relatively highly skilled, particularly in the local study area where the proportion of working-age residents with a degree-level qualification is above the national average. The largest sector for employment is public administration, education and health, and the agriculture and tourism sectors provide a higher proportion of employment than the Welsh average. Deprivation in the

[18] Statistics for Wales (2017), National Survey for Wales – Population health: health-related lifestyle (adults), 2016-2017.
[19] HMICFRS (2015), Crime and Policing Comparator data, December 2011/12/13/14.

local study area is low. Across Pembrokeshire, there are pockets of higher deprivation in urban areas including Pembroke, Pembroke Dock, Milford Haven and Haverfordwest.

2.3.19 Health deprivation is also low across the study area, with some pockets of higher deprivation. Life expectancy is above the average for Wales, and mortality rates – including from cancer, respiratory and cardiovascular diseases – are lower than average. There are higher than average levels of alcohol consumption and smoking, but lower than average mortality rates attributable to alcohol and tobacco. The proportion of adults who are overweight or obese is slightly higher than average, although a higher than average proportion of adults meet the recommended level of physical activity. Crime is generally low, with the exception of antisocial behaviour and drugs offences where there are higher rates than the figures for England and Wales.

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Appendices to Chapter 18 Climate Change

A40LVP-ARP-EGN-SWI-RP-LE-0014

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This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Appendix 18.1 Greenhouse gas (GHG) emissions assessment

This section outlines the emissions factors used in the GHG emissions assessment. The reference sources for these factors are:

a) 'Inventory of Carbon and Energy (ICE) Version 2.0' developed in 2008 and updated in 2011 by the University of Bath: Sustainable Energy Research Team;

b) 'Greenhouse gas reporting: conversion factors 2017', published in August 2017 by the UK Department of Business, Energy and Industrial Strategy (BEIS);

c) 'Environmental Product Declarations (EPDs)' – specifically for methacrylate resin products[1], and

d) 'Energy and Emissions Projections', published in 2015 by the former Department of Energy and Climate Change (DECC) [2].

Table 1 Emissions factors used in carbon assessment

Item type	Emissions factor	Unit	Reference
Materials			
Aluminium: general	9.16000	*kgCO_2-e/kg*	ICE
Bitumen	0.49000	*kgCO_2-e/kg*	ICE
Blockwork: 10MPa	0.07800	*kgCO_2-e/kg*	ICE
Bricks	0.24000	*kgCO_2-e/kg*	ICE
Concrete: 12/15 MPa GEN 2 30% Fly Ash	0.09300	*kgCO_2-e/kg*	ICE
Concrete: 6/8 MPa GEN 0 30% Fly Ash	0.06100	*kgCO_2-e/kg*	ICE
Concrete: 8/10 MPa GEN 1 30% Fly Ash	0.08200	*kgCO_2-e/kg*	ICE
Concrete: C20/25 typical	0.10700	*kgCO_2-e/kg*	ICE
Concrete: C25/30 typical	0.11300	*kgCO_2-e/kg*	ICE
Concrete: C32/40 typical	0.13200	*kgCO_2-e/kg*	ICE
Concrete: C40/50 typical	0.15100	*kgCO_2-e/kg*	ICE
Iron	2.03000	*kgCO_2-e/kg*	ICE
Methacrylate resin products (waterproofing)	1.92000	*kgCO_2-e/kg*	EPD - refer above
Mortar (1:1:6 Cement:Lime:Sand mix)	0.14000	*kgCO_2-e/kg*	ICE

[1] Bauder, EPD for MMA resin products, https://www.bauder.co.uk/assets/e/n/environmental-product-declaration-mma-resin-products-liquitec.pdf [Accessed November 2017]
[2] DECC, Energy and Emissions Projections, 2015, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/501265/Web_Figures_2015.xls [Accessed November 2017].

Item type	Emissions factor	Unit	Reference
Mortar (1:3 Cement:Sand)	0.22100	*kgCO_2-e/kg*	ICE
Plastic: General	3.33100	*kgCO_2-e/kg*	ICE
Polyethylene: General	2.54000	*kgCO_2-e/kg*	ICE
Polyethylene: Low Density (LDPE)	2.08000	*kgCO_2-e/kg*	ICE
Polypropylene: Oriented Film	3.43000	*kgCO_2-e/kg*	ICE
Precast Concrete	0.16800	*kgCO_2-e/kg*	ICE
PVC Pipe	3.23000	*kgCO_2-e/kg*	ICE
Quarried aggregate	0.00520	*kgCO_2-e/kg*	ICE
Road & Pavement Asphalt	0.07100	*kgCO_2-e/kg*	ICE
Steel: galvanised sheet	1.54000	*kgCO_2-e/kg*	ICE
Steel: general (59% recycled)	1.46000	*kgCO_2-e/kg*	ICE
Steel: section	1.53000	*kgCO_2-e/kg*	ICE
Steel: sheet	1.38000	*kgCO_2-e/kg*	ICE
Steel: stainless	6.15000	*kgCO_2-e/kg*	ICE
Steel: wire	3.02000	*kgCO_2-e/kg*	ICE
Stone: general	0.07900	*kgCO_2-e/kg*	ICE
Thermoplastic (assume similar to ABS)	3.76000	*kgCO_2-e/kg*	ICE
Timber: general	0.72000	*kgCO_2-e/kg*	ICE
Vitrified clay pipe DN 100 & DN 150	0.46000	*kgCO_2-e/kg*	ICE
Fuels			
Gas oil	2.95351	*kgCO_2-e/L*	BEIS
Diesel (100% mineral diesel)	2.67193	*kgCO_2-e/L*	BEIS
Petrol (100% mineral petrol)	2.30075	*kgCO_2-e/L*	BEIS
Electricity			
Electricity generated (UK)	0.243 (in 2020) to 0.018 (from 2050)	*kgCO_2-e/kWh*	DECC
Transport			
Rigid Truck: Average	0.00020	*kgCO_2-e/kg.km*	BEIS
Shipping: Container ship	0.00002	*kgCO_2-e/kg.km*	BEIS
Average Car (fuel unknown)	0.18242	*kgCO_2-e/km*	BEIS

Appendix 18.2 Climate change resilience (CCR) Assessment

The resilience of the development in relation to climate change has been assessed through consideration of the likelihood and consequences of each potential risk.

For each risk, the likelihood and consequence were determined in accordance with Table 2 and

Table 3 respectively. The risk rating for each combination of likelihood and consequence is defined in Table 4.

Table 2 Likelihood scale

Level	Descriptor	Description
A	**Very likely**	Event is expected to occur many times during the lifetime of the development (50-year design life)
B	**Likely**	Event is expected to occur several times during the lifetime of the development
C	**As likely as not**	Event is expected to occur at least once during the lifetime of the development
D	**Unlikely**	Based on the current design, engineering and maintenance standards, the event is not expected to occur more than once during the lifetime of the development
E	**Very unlikely**	Event only occurs in exceptional circumstances and would not be expected to occur in the lifetime of the development

Table 3 Consequence scale

Level	Descriptor	Consequence	Environmental	Social	Financial
1	**Insignificant**	No change	No adverse effect on natural environment	No adverse human health effects or complaints.	Insignificant financial loss.
2	**Minor**	Localised service disruption. No permanent damage. Some minor restoration work required. Lifespan reduced by 10-20%.	Minimal effects on the natural environment.	Short-term disruption to occupants (staff, residents or businesses). Slight adverse human health effects or general amenity issues. Negative reports in local media.	Additional operational costs. Minor financial loss.
3	**Moderate**	Widespread damage and loss of service. Damage recoverable by maintenance and minor repair. Partial loss of local infrastructure. Lifespan reduced by 20-50%.	Some damage to the environment, including local ecosystems. Some remedial action may be required.	Frequent disruptions to occupants. Adverse human health effects. Negative reports in regional media.	Moderate financial loss.
4	**Major**	Extensive damage requiring extensive repair. Lifespan reduced by >50%.	Significant effect on the environmental and local ecosystems. Remedial action likely to be required.	Permanent physical injuries and fatalities may occur from an individual event. Negative reports in national media. Public debate about performance.	Major financial loss.
5	**Catastrophic**	Permanent damage and/or loss of service Retreat and translocation of development.	Very significant loss to the environment. May include localised loss of species, habitats or ecosystems. Extensive remedial action essential to prevent further degradation. Restoration likely to be requirement.	Severe adverse human health effects – leading to multiple events of total disability or fatalities. Emergency response. Negative reports in international media.	Significantly high financial loss.

Table 4 Risk matrix

	Consequence	**1**	**2**	**3**	**4**	**5**
Likelihood		**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
A	**Very likely**	Low	Low	High	Extreme	Extreme
B	**Likely**	Low	Low	Medium	Extreme	Extreme
C	**As likely as not**	Low	Low	Medium	Extreme	Extreme
D	**Unlikely**	Very low	Very low	Medium	High	High
E	**Very unlikely**	Very low	Very low	Low	High	High

Table 5 CCR assessment results

Risk ID	Climate hazard	Description of impact	Existing or embedded mitigation measure	Timeframe: 2020s			Timeframe: 2070s		
				Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating
1	High temperatures	Extreme heat events lead to damage to road surface, deformation of asphalt	Road construction to current standards, monitored as per standard maintenance procedures.	Very unlikely	Minor	Very low	Likely	Minor	Low
2	Low temperatures	Extreme low temperatures lead to damage to road surface, deformation of asphalt- through freeze-thaw	Road construction to current standards, monitored as per standard maintenance procedures.	Unlikely	Minor	Very low	Likely	Minor	Low
3	High precipitation	Extreme rainfall events lead to localised flooding of roads and transport infrastructure, causing disruption to services and traffic	Masterplan design is based on detailed flood risk assessment which incorporates projected climate change.	Very unlikely	Moderate	Low	As likely as not	Moderate	Medium
4	High precipitation	Extreme rainfall events causing damage to road surface (increased	Road construction to current standards, monitored and	Likely	Minor	Low	Likely	Minor	Low

		stripping rate, likelihood of potholing from moisture entering cracks in surface)	maintained as per standard procedures. Resurfacing to occur within 10 - 20 years.						
5	High precipitation	Increase in frequency of heavy rainfall may cause disruption to drainage systems which could lead to their failure and flooding.	Critical assets have been designed with an embedded climate change allowance to account for changes in rainfall.	Unlikely	Minor	Very low	Unlikely	Minor	Very low
6	Low precipitation	Drier conditions and drier soils may lead to damage to drainage systems	Critical assets have been designed with an embedded climate change allowance to account for changes in rainfall.	Unlikely	Minor	Very low	Unlikely	Minor	Very low
7	High precipitation	This visual screening of the new road using shrubs and trees may be impacted by warmer wetter weather, increasing pests and diseases.	The planting design will take account of this, and the management and monitoring of newly planted trees will help to identify any trees that are infected.	Likely	Minor	Low	Likely	Minor	Low

8	Storms and gales	Potential for blown debris during operation and construction causing disruption.	CEMP will be carried out during construction period to mitigate impacts and road management will be undertaken during operation.	As likely as not	Minor	Low	As likely as not	Minor	Low
9	All	Cascading failures due to interdependent infrastructure networks (e.g. power failure causing disruption to streetlighting)		As likely as not	Minor	Low	Likely	Minor	Low

Appendix 18.3 In-combination climate change impact (ICCI) assessment

The in-combination climate impact assessment was undertaken by assessing each identified risk in line with the scales defined for the CCR assessment.

Each environmental topic was then assigned a rating based on the following significance criteria:

a) many potential in-combination climate change impacts with high consequences;

b) some potential in-combination climate change impacts with high consequences;

c) some potential in-combination climate change impacts with low consequences; and

d) no potential in-combination climate change impacts.

Table 6 ICCI assessment results

Environmental topic	Resources / receptors impacted by proposed scheme	Effects of proposed scheme on receptors / resources	Existing mitigation measures	Climate hazard	Potential in-combination climate change impacts on resources / receptors	Likelihood	Justification	Consequence	Justification	Risk rating
Health	Residents of Llanddewi Velfrey	Neighbourhood quality, life, mental health and wellbeing of residents will be improved by reduced traffic through the centre of the village i.e. less air quality, visual and noise impacts.	Development provides beneficial impact	High temperatures and lower precipitation	Hotter weather may cause both residents opening windows more and increased concentrations of air pollutants such and ozone and NOx - this increased impact may be averted by the scheme.	Likely	Hotter weather will likely cause changes to air pollutants in the future	Minor	There is likely to be less vehicles producing these air pollutants on this road in the future.	Low
Transport	Road users	Driver Delay	Junction improvement schemes as presented in the Transport Assessment	High precipitation	Extreme rainfall events lead to localised flooding of roads and transport infrastructure, causing disruption to services and traffic	As likely as not	Extensive flood mitigation has been incorporated into design	Moderate		Medium
Noise	Residential properties	During operation-noise of road.	Development provides beneficial impact	high temperatures and humidity	Increased numbers of residents with windows open.	Likely	It is likely that temperatures will increase leading to increasing numbers of residents opening windows.	Insignificant	It is likely that properties further away from the current route, but within 600m of the proposed route may experience an insignificant increase in noise, but there would be significant permanent direct beneficial effect for most of the residents of Llanddewi Velfrey	Low
Air quality	a. Residential b. Ecological	Increased traffic flows could result in increased NO_2	Measures to reduce polluting vehicle use and encourage alternative travel modes	High temperatures	Hot and sunny conditions lead to higher concentrations of ozone and NO2	Likely	While summers are expected to be hotter, the expected temperature increase is unlikely to be sufficient to	Insignificant	Changes to dispersion of pollutants has not been modelled, effects on local air quality from the operation of this road has be	Low

Environmental topic	Resources / receptors impacted by proposed scheme	Effects of proposed scheme on receptors / resources	Existing mitigation measures	Climate hazard	Potential in-combination climate change impacts on resources / receptors	Likelihood	Justification	Consequence	Justification	Risk rating
							cause significant increases in ozone concentrations		determined as no significant effects to air quality.	
Air quality	a. Residential b. Ecological	Increased traffic flows could result in increased NO_3		Extreme winds	Windier conditions lead to increased dispersion of pollutants	Unlikely	No conclusive projections relating to wind patterns available, however, it is unlikely that there will be major changes to the spread of pollutants	Insignificant	Changes to dispersion of pollutants has not been modelled, effects on local air quality from the operation of this road has be determined as no significant effects to air quality.	Very low
Ecology	Legally protected species (including dormice and bats)	The potential project may impact these legally protected species.	Survey and mitigation measures will be conducted for these species	High precipitation, extreme winds	Increased frequency and intensity of storm events lead to destruction of trees and habitats.	As likely as not	Increased levels of damage due to storms are expected to occur	Minor	Potential impacts to habitat are not expected to be significant for species including amphibians, bats, reptiles, and breeding birds. There is moderate chance of impacting dormice, otter and badgers meaning mitigation will be in place.	Low
Ecology	Invasive species		There will be a plan to deal with any invasive plants and pest during construction and operation.	High temperatures	Increased temperature change the suitability of habitat conditions, potential for increase in spread of non-native species, pests and diseases if native species/plants can't survive.	Likely	Projected temperature increases and precipitation changes are expected to be within the tolerance of local habitats	Minor	Potential impacts to habitat are not expected impact the viable locations of vulnerable species	Low
Community	Residents of Llanddewi Velfrey	Isolation of residential properties from other properties and	Development provides beneficial impact	High precipitation	Potential increase in fluvial flooding caused by runoff may	Likely	Likely increase in precipitation.	Minor	There will be a plan in place to mitigate flooding that will consider climate	Low

Environmental topic	Resources / receptors impacted by proposed scheme	Effects of proposed scheme on receptors / resources	Existing mitigation measures	Climate hazard	Potential in-combination climate change impacts on resources / receptors	Likelihood	Justification	Consequence	Justification	Risk rating
		infrastructure-caused by current road through village			exacerbate isolation of village.				change. During operation the proposed scheme is not expect to cause any increase in flood risk.	
Archaeology and Cultural Heritage	Listed buildings	Potential disruption of historic landscape setting	Planting will be implemented to screen the impact the potential project	High temperatures and increased rainfall	This may lead to an increase in growing season that will lead to an increased rate of growth of vegetation. The landscape may therefore be positively or negatively effected.	Likely	It is likely that temperatures and rainfall will increase.	Minor	The increased growth rate may impact the setting/view of listed buildings. Management plan will be need to maintain vegetation.	Low
Ground conditions	No impacts identified for operational phase following mitigation									
LVIA	No in-combination climate impacts identified									

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Environmental Statement
Appendix 21.1: Development Matrix: Allocated Sites and Planning Applications

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MATRIX 1 - IDENTIFICATION OF 'OTHER DEVELOPMENT ' FOR CEA A40 FOR PLANNING

OTHER DEVELOPMENT' DETAILS						STAGE 1	STAGE 2				
ID	**APPLICATION REFERENCE**	**BRIEF DESCRIPTION of location**	**Approximate Distance and direction from Scheme**	**STATUS**	**TIER LEVEL (1-3 HIGHEST 1,LOWEST 3.)**	**WITHIN SPECIIFC /ALL ZONES OF INFLUENCE**	**PROGRESS TO STAGE 2?**	Overlap in temporal scope	Is there potential to effect the same receptors as the Scheme	**Other factors**	**Progress to Stage 3**
1	Local Development Plan site allocation for residential use (12 no. units)	North of the Village Hall,Llanddewi Velfrey	Directly south	Currently, without the benefit of planning permission. Housing allocation HSG/057/LDP/01 for the village of Llanddewi Felfrey for 12 units. The Local Planning Authority has confirmed that the LDP Plan review commenced on 5th May 2017 and a public consultation on the Delivery Agreement and Review Report is scheduled for 9th November 2017– 5th January 2018. The Delivery Agreement sets out a timetable for preparation of the Replacement Plan and contains a proposed Community Involvement Scheme. The review is therefore in the very early stages eview and LDP2 preparation and Candidate Site process or consequent site assessments yet to be undertaken.	Level 3	Within all project Zones	Yes	Development could be issued and construction commencing	yes - limited to traffic and pollution prevention.	The potentail for the LDP review to extend/withdraw the site, especially given the lack of availability of the existing sewerage treatment works in the locality	yes. 1
2	Local Development Plan site allocation for residential use - allocation HSG/088/LDP/00077 for Narberth village - Land adjacent to Rushacre Farm .		2km south	Planning Reference code 09/0419/PA granted in March 2014 for full planning permission for 54 dwelllings, defined as a major application . Grid reference 210946 215372	Level 1	Landscape	yes	as above	yes - limited to traffic and pollution prevention	construction traffic and assocaited env'l cumulative impacts	yes.2
3	Local Development Plan site allocation for residential use -allocation HSG/088/LDP/00078 for Narberth village - West of Bloomfield Garden		2km south	Currently, without the benefit of planning permission.	Level 3	Landscape	Yes	As above, overlap in temporal scope	yes - limited to traffic and pollution prevention	construction traffic and assocaited env'l cumulative impacts	No
4	Local Development Plan site allocation for employment use -EMP/088/LDP/01		2km south	The planning applications on this site are as follows: 12/0721/PA – extension to existing enterprise park – conditionally approved 01/05/13 16/0273/PA – variation of conditions 3 (to extend the timeframe for the submission of reserved matters) and 6 (to allow the northern plots to be developed) – relating to 12/0721/PA – conditionally approved 23/08/16 16/0733/PA – reserved matters (access) relating to 16/0273/PA – conditionally approved 20/12/16 16/0745/PA – B8 delivery office with associated access, car parking, operational yard and landscaping – conditionally approved 13/01/17 17/0262/NM – non-material amendment to 16/0745/PA – unconditionally approved 11/07/17 17/0517/PA – discharge of conditions 6 and 7 of 16/0745/PA – cancelled 29/08/17 The LPA confirms that work has commenced on access into the LDP employment allocation, but there is no other development at present.	Level 1	Landscape	Yes	As above.	yes -landscape and traffic and pollution prevention	construction traffic and assocaited env'l cumulative impacts	yes. 3
5	Planning application 15/0060/PA	Dingle Caravan Park, Jesse Road, Narberth, Pembrokeshire, SA67 7DP. The delegated report accompanying the decision describes the site as part of an existing caravan site within the settlement of Narberth, with exixsting residentail properties to the south and east, with access served off the existing highway		15/0060/PA Decision Date: 17-Feb-2016 Decision: Conditionally Approved Application Type: Major (Res Mttrs) Full Description: Residential Development (33 units) with play area - application 08/0098/PA Decision Date: 17-Feb-2016 . Proposal incldues children's play space.	Level 1	Landscape	Yes	Overlap in temporal scope	change of sensitivity in receptors a possibility	construction traffic and assocaited env'l cumulative impacts	Yes.4
6	Planning application 10/0238/PA	Land at Redstone Road, Narberth		Full planning permssionFebrauary 2011 for 50 dwellings and associated works. Aerial imagery 2018 indicates site completed.	Level 1	NA	No - works completed				
7	Planning application 13/0889/PA and 17/0170/NM	Land north west of Greenhill, Station Road, Narberth GR 211972 214 572		Outline residential planning permission originally granted in 2015 (MAJOR) under code 13/0889/PA, with variations approved to some of the planning conditions in May 2017 under reference 16/1269/PA . Further amendments approved In June 2017 under planning reference 17/0170/NM, Reserved matters refused in July 2017 under code 17/0129/PA. Planning application for reserved matters code 17/0680/PA approved May 2017 , with further amendments and approvals	Level 1	Landscape	No	Marginal	No	Commencement date and construction traffic will be controlled	No
8	Planning applications - various - for residential	Land off Jesse Road and Station Road, Narberth GR 211972 214572		Outline residentail planning permision approved in 2014 (12/0316/PA), with a negative EIA Screening Opinion. Revisions to condiitons approved in 2016, code number 15/1044/PA.Planning condition number 2 requires reserved matters details to be submitted by the 1 September 2017. Reserved matters approved on the 11 September 2017 for 104 dwellings (code 16/1242/PA), together with other works, including access. Discharge of conditions (code 17/0612/DC) Construction Traffic Management Plan (CTMP)) of Planning Permission 12/0316/PA. part approved/refused 1 November 2017. Planing	Level 1	Landscape	yes	Overlap in temporal scope - signifcant change in number of receptors in this locality.	Yes construction traffic and assocaited env'l cumulative impacts	Commencement date and construction traffic and assocaited env'l cumulative impacts	Yes
9	Planning application 16/0028/PA- for residential	Sunnybank Residential Home, Northfield Road, Narberth SA67 7EP GR210894 215043		Granted 20 July 2016 for redevelopment of site for 25 houses, with a number of conditions discharged in 2016 and 2017	Level 1	Landscape	No - 2017 imagery indicates 6 dwellings completed on site.				No

MATRIX 1 - IDENTIFICATION OF 'OTHER DEVELOPMENT ' FOR CEA A40 FOR PLANNING

OTHER DEVELOPMENT' DETAILS					STAGE 1		STAGE 2				
10	Minerals Planning application 11/0480/MN	Rushacre Farm, Redstone Road, Narberth, SA67 7ES	0.33 km to the south	Quarrying of mineral for use in multiple industry Conditionally Approved 19/07/2012 .10 year period on planning application details. Comments submitted by the County lanscape Officer describes the proposal : *This application is for a small extension to an existing quarry, cutting deeper into a gently rising hill. The existing quarry is located in a valleyside situation where there is no over-look from any nearby properties, and it should not be visible form the road (Redstone Road). The visual impact is therefore not significant. The shape of the excavation is not in sympathy with the surrounding landform and so cuts across the 'grain' of the landscape. However, this is a small development and I do not consider its landscape impact to be significant. If there is over-burden generated from the scheme I suggest that it is utilised as backfill to the current excavated area or formed into a bund to the perimeter that could be planted to integrate or screen the quarry rather than being pushed to the side and around existing tree trunks, as appears to have been in the past.* *A tree survey and proposals report has been submitted, and although there will be some loss of trees (a sporadic line of young to mature ash mainly) they are not considered to be significant.* Comments submitted by the County Highways and also the Pubic Protection Officers provide further site specific issues with the minerals permission: and the EA mention the si The quarry area is located within agricultural land that adjoins an area of mixed residential and commercial uses. The nearest residential property is approximately 340 meters distant to the development site. **Groundwater** Our only comment is on the potential for below water table workings. If the site works below the water table we can offer further advice and guidance. **Pollution prevention** Site operators should ensure that there is no possibility of contaminated water entering and polluting surface or underground waters. Pollution prevention guidance is available on our website at http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx. Narberth Brook is failing under the Water Framework Directive and is known to be impacted by silts, which can smother fish eggs and the food of fish. Silts can come from denuded soils which are stored without being seeded or from surfaces over which vehicles track. Rain mixes with the particles which are carried to watercourses. We recommend that overburden storage areas are maintained so that silt-contaminated runoff is minimised. Tracks and bare areas should be drained so that flows can naturally attenuate in adjoining grassy areas, such as fields. If the quarry installs settlement ponds, an environmental permit under the Environmental Permitting (England and Wales) Regulations 2010 may be required to control any discharges to watercourses/ground. We note within the submission that no oil, fuels etc are to be stored on site. Spill kits and spillage procedures should be in place in case of leakages/accidents with the plant on site. Further guidance is available in our pollution prevention guidance as indicated above. PEMBROKESHIRE COUNTY COUNCIL TOWN AND COUNTRY PLANNING ACT 1990	Level 1	Landscape	No	Scale and impact of limited reference	N		N
11	Minerals planning application 14/0128/MN	Pen-lan farm, Bethesda,, Clunderwen, Pembrokeshire, SA62 6XA	4km to the norh	Permission for continued use granted in 2011 and extension to extraction area in 2014. The accompanying Scoping Opinion issued by the MPA states : *The site itself is located within a rural area, with a very sparse population; there are very few noise sensitive properties in the vicinity of the area and the topography and vegetation of the surrounding area effectively screen the quarry meaning it is not readily visible. Operations at the site are often sporadic, depending on local demand, and very low key, the current planning permission for the site limits the output to 8,000 tonnes per annum, there is no proposal to increase this output. Therefore, any effects from noise, dust or traffic related impacts are not considered to be adverse in any way and any impacts from the site are limited in nature.* *The site is in close proximity to the Cleddau Rivers Special Area of Conservation and various protected species inhabit the ancient woodlands in close proximity to the site. However, it is not considered that the additional area of quarrying outlined in the application would have any adverse impacts upon the above listed sites or species, the low key nature of the operations on site would not have any adverse impacts upon ecology in the area. The potential ecological impacts were assessed for the current planning permission and there were no major issues identified, it is not felt that a small extension to this site would cause enough additional harm to the environment to justify the need for an Environmental Impact Assessment.*	Level 1 - although no details available on the web.	Landscape	No	Existing developmen, but on periphery of the 5 km buffer zone. Some distance away from the Scheme.	Based on the available information, no.		No
12	Planning application 12/0624/PA	Hill Farm. Ludchurch, Narberth Grid reference 213344 212172		Erection of wind turbine 72 m to blade to tip, etc allowed on appeal July 2014. Scoping Opinion issued by the Welsh Government - Cadw and the NRW were consulted - Historic locality and pollution prevention measures.	Level 1	Landscape	No -latest 2017 imagery confirms development completed				No
13	Planning application 16/0530/DC and 09/0208/PA for residential	Site south of Victoria Close, Narberth	2km south	Erection of an apartment building for 8 units	Level 1	Landscape	No - limited small scale relative to other developlments and the main project.	This is realtively a small scale developlment. Some distance away ftom the main scheme.			No
14	Planning applications 12/0971/PA & 972/PA AND 974/PA	Noble Court Holiday Park, Redstone Road, Narberth SA67 7ES	1.3 km south west	Various leisure developments including 53 static caravans and new hotel. Variation to conditons attached to 974 approved in 2016.	Level 1	Landscape	Yes	Overlap in temporal scope and permant change in receports at the site.	Yes	Occupation of additional static caravans - change in receptors and background noise . Cosntruction traffic issues with potential impliactions if developed at same time.	Yes
15	Planning application 14/0724/PA for mixed development	Former Narberth CP School,Moorfield Road, Narberth, Pembrokeshire, SA67 7AG	2km south west	Demolition of former school buildings and erection of convenience food-store, and other developments incluidng apartments granted in 2014. Variation to planning condiitons approved in 201 6 under code no.15/1058/PA.	Level 1	Landscape	Yes	Overlap in temporal scope	Yes	change of sensitivity in receptors and additional traffic activity in town centre point.	Yes
16	Planning application 13/0700/PA for residential	Land adjacent to Templeton CP School, Templeton, Narberth, Pembrokeshire SA67 8RS	4KM south west	Residential Development (24 dwellings) approved in 2014, with a 5 year time period. Latest aerial imagery confims development completed.	Level 1	Landsape	No	No overal issues, distance sufficently away from the main activities of the Scheme	No		No
17	Planning application 14/0581/PA	Great Chapel Hill, Templeton, Narberth, Pembrokeshire, SA67 8SQ	4.5km south west	Agricultural building for housing cattle (Major) granted in 2014, Latest aerila imagery confirms developlemnt completed.	Level 1	Landsape	No	No overal issues, distance sufficently away from the main activities of the Scheme	No		No

CARMARTHENSHIRE LPA BOUNDARY - ONLY A LILMITED PART OF THE COUNTY LIES WITHIN THE 5 KM PROJECT BUFFER ZONE

MATRIX 1 - IDENTIFICATION OF 'OTHER DEVELOPMENT ' FOR CEA A40 FOR PLANNING

OTHER DEVELOPMENT' DETAILS						STAGE 1	STAGE 2			
18	Local Developlemnt Plan site allocation T2/6/H1 for residential - Lon Hywel - allocated for 32 residential units (30% affordable housing viability level indicated)	Directly adjoins southerly lane/boundary of the A40, just under 0.5km north west from the main A40 junction with Whitland and to the east is the residential estate, ' Lon Hywel'.	Approximately 0.5 km to the north west of the A40 Whitand junction.	Reference C/184/02 in the Joint Land Availability Study 2017. 10 units indicated as potential commencement in 2020 and completed by 2022. Outline planning permission previoulsy granted in 2007 (W/16385) for residential, with a Section 106 obligation. Information attached with the outline permision includes the advice of Transport Wales: see extract. Vehicular access to the site via the C3204 rroad. A number of -pre- commencement conditions attached. A further application to extend the time period for submission of reserved details was approved in 2014, under reference w/30421. http://planning.carmarthenshire.gov.uk/AnitePublicDocs/53298373.pdf This allowed a period of 6 years for the submission of reserved matters from the decision date i.e. to 22/08/2020. Background details to the site indicates as below extract, with coal consultation constraints 5 Transport Wales advises of the following: (a) Details of the barrier between the site and the A40 trunk road cutting shall be submitted to the trunk road agent for agreement prior to the commencement of any part of the development hereby permitted. (b) No part of the development should interfere with the A40 bridge structure. (c) Depending on the site access road layout and levels, a length of close boarded fencing may be required to prevent traffic on the trunk road from being dazzled by lights from vehicles on the site access road. (d) There should be no connection to, or interference with, the trunk road drainage system, including boundary drainage, without prior written approval from Transport Wales. Code / Sub code Development Limits / Within Development Limits Coalfield Consultation Area / OffCoal LDP Designation / Housing Allocation (part of application site)	Level 3.	Landscape	YES	Despite only marginally within the Landscape ZTV site lies directly next to the A40 and within walking distance of the Whitalnd A40 roundabout . Cumulation with other proposals in the localiy and the more westerly developments at either end of the project , with sites at Narberth.	YES - limited to traffic and construction	Carmarthenshire LPA recently confirmed that the second AMR 16/17 assessed the LDP's performance and concluded a Review Report should be completed on the LDP.	Yes
19	Planning application code W35693 approved for the change of use into120-150 self storage container facility on the 16/02/2018. See : http://online.carmarthenshire.gov.uk/eaccessv2/pa-applicationsummary.aspx?applicationnumber=W/35693	Directly adjacent to the Whitland A40 roundabout - land adjactent to Whitland Waste Transfer/Recycling site, West Street. Whitland	Directly adjacent to the Whitland A40 roundabout	Site partly within the LDP boundary. See response from the Network Rail amd WG Trunk Road regarding *drainage at their site and there are no impacts with runoff . Also the WG soft estate should not be interfered with. Regards Richard Richard Jones Peiriannydd Ffyrdd / Route Engineer Is-adran Rheoli'r Rhwydwaith - Network Management Division Trafnidiaeth / Transport Llywodraeth Cymru / Welsh Government Parc Cathays / Cathays Park Caerdydd / Cardiff Ffôn / Tel: 03000 256573* TAN 15 (Development & Flood Risk) / Zone B (partly within) TAN 15 (Development & Flood Risk) / Zone C1 (partly within) Biodiversity / Dense/continuous scrub Coalfield Consultation Area / OffCoal Biodiversity / Phase 1: Bare Ground LDP Designation / Affordable Housing Viability Targets - 30% sub LDP Mineral Safeguarding Area MPP3 / Cat 2 - Sand and Gravel LDP Designation / Development Limits - Partly Inside/Outside - GP2	Level 3 - **CURRENTLY BUT THIS MAY CHANGE.**	Landscape	Yes	Despite only marginally within the Landscape ZTV site lies directly next to the A40 and within walking distance of the Whitland west A40 roundabout Cumulation with other proposals in the localiy and the more westerly developments at either end of the project , with sites at Narberth.	YES - limited to traffic and construction	The proposal, if approved, will imapct on the existing traffic movements and baseline to/from the A40 westerly roundabout at Whitland.	yes
20	Planning application W/36386 granted for planning conditions in relation to 70 dwellings http://online.carmarthenshire.gov.uk/eaccessv2/pa-applicationsummary.aspx?applicationnumber=W/3638. Site allocation in LDP as T26/H/4	LAND ADJACENT TO SPRING GARDENS, WHITLAND, CARMS, SA34 0HP. The site lies on the westerly edge of Whitland, with acccess of/onto the B4326 and then to/from the easterly roundbaout at Whitland	1km to the east of the project buffer zone	The site can commence, following all pre- commencemnet conditions approved. The 2017 JHLS indicaates the site likely to commence in 2018/19.	Level 1	Landscape	yes	Despite outisde bufffer zone - site lies directly next to the A40 and within walking distance of the Whitalnd A40 east roundabout Cumulation with other proposals in the localiy and the more developments at Whitland.	yes- cumulatively with other development projects and consructiontraffic	The proposal could be completed before the construction of the A40 imporovements	yes

MATRIX 1 - IDENTIFICATION OF 'OTHER DEVELOPMENT ' FOR CEA A40 FOR PLANNING

OTHER DEVELOPMENT' DETAILS						STAGE 1	STAGE 2				
21	Planning permission for extension to existing industrial building granted in 2014, http://online.carmarthenshire.gov.uk/eaccessv2/pa-applicationsummary.aspx?applicationnumber=W/30784. Site allocation as T2/6/E2	WHITLAND INDUSTRIAL ESTATE, WH	Just over a kilometre to the east of the buffer zone and 0.5 lm south west of the 140 Whitland west roundabout.	Welsh Government project, with a planning pre- commencemnt condition approved in 2015.	Level 1	Landscape	NO	The site close to the A40 roundabout. The limited scale of the proposal, with an existing indistrail use means limited impact only.			no
22	Planning permission granted in June 2017 for the erection of 28 dwellings	FORMER WHITLAND CREAMERY SITE, MARKET STREET, WHITLAND, SA34 0HN	Within Whitland Town Centre	Part of the re- developlemt of the former Creamery site, identified as an employment site in the current LDP plan as T2/6/MU1. Site information background identified in extract above.	Level 1	In recognising that the site lies outside the 5 km buffer zone, the site lies close to the A40 roundabout and the potentail cumulative imapct with other larger development and projects in the locality should be taken into full consideration.	yes		As above	As above	yes
23	Planning permissionS for major agricultural builindings	Drefach Farm, Hennlan Amgoed	3 km north east	A number of relatively large scale agricultural buildings approved in October 2017	Level 1	Landscape	No	Unlikely - as connstruction of the buildings likely to take place quicly, given agricultural practices.	No	Existing collection of farm builindings on the site	No

Code	Sub code
Public Rights of Way	Footpaths
TAN 15 (Development & Flood Risk)	Zone B (partly within)
TAN 15 (Development & Flood Risk)	Zone C1 (partly within)
Coalfield Consultation Area	OffCoal
Coalfield Consultation Area	OffCoal
Contaminated Land	Food Processing - Major
LDP Designation	Existing Employment Areas - EMP1
LDP Designation	Proposed Employment Areas - SP7, EMP1
LDP Designation	Affordable Housing Viability Targets - 30% sub
LDP Designation	Development Limits - Inside - GP2

W/36004	DREFACH, HENLLAN AMGOED, WHITLAND, SA34 0SP	NEW PARLOUR AND LIVESTOCK HANDLING BUILDING	Full Granted	11/10/2017
W/36002	DREFACH, HENLLAN AMGOED, WHITLAND, SA34 0SP	LIVESTOCK CARE BUILDING	Full Granted	11/10/2017
W/36003	DREFACH, HENLLAN AMGOED, WHITLAND, SA34 0SP	LIVESTOCK BUILDING	Full Granted	11/10/2017

Welsh Government

A40 Llanddewi Velfrey to Penblewin Improvements

Environmental Statement

Appendix 21.2: Development Matrix

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

	MATRX 1 Assessment Matrix	MATRIX 2	
SITE 1D	**DESCRIPTION OF CUMULATIVE EFFECTS**	**SCHEME MITIGATION**	**Residual**
1	The site is greenfield, on the edge of the village settlement, with pp for residential. Likely impacts to include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services links.	Identify measures for existing noise levels and include appropriate noise attenuation measures. Enusre appropraite service and infrastrusture connections not adversely affected	The site should remain with the same noise levels, possibly with an improvement. The site should remain with no additional infrastructure or service burdens, likley to cause additional works and impacts.
2	The site is greenfield, on the edge of the town settlement. Likely imapct will include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services links	The site lies near the centre of Narberth town and allocated for resdidential use. The main impact likely to include a cumulative impact with all 'other developments' as listed and the capacity and accessiblity of sites, including adjacent sites, both during and after construction stage and scheme timetable. Avoidance of additional traffic and pollution during construction stage.	The site should remain with the same noise levels, possibly with an improvement. The site should remain with no additional infrastructure or service burdens, likley to cause additional works and impacts.
4	Predominantly greenfield (with commencement made) for employment use. Likely impacts to include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services links.	The site lies on the periphery of the centre of Narberth town. The main impact likely to include a cumulative impact with all 'other developments' as listed and the capacity and accessiblity of sites both during and after construction stage and scheme timetable. Avoidance of additional traffic and pollution during construction stage. Consider limiting full scale views of the site to enable the new development to assimilate with backdrop of existing Narberth built developlment. Consider the capacity and accessiblity of this site and neigbouring sites both during and after construciton stage and scheme timetable.	Additional landscaping and enhancement to/form the site, with added noise mitigation potential measures, with increased accessibility and demand
5	Existing caravan site on edge of settlement, which will include a change to receptors for permanent occupation. Likely impacts to include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services links.	The main impact likely to include a change in additional viewpoints amd cumulative impact with all 'other developments' as listed and the capacity and accessiblity of sites both during and after construciton stage and scheme timetable. Avoidance of additional traffic and pollution during construction stage. Consideration of views for permanent occupiers.	Additional landscaping and enhancement to/form the site, with added noise mitigation potential measures, with increased accessibility and demand
8	Major developoment for residential on southern edge of town. Baseline details included in the CEMP details Likely impacts to include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services links.	The main impact likely to include a change in additional viewpoints amd cumulative impact with all 'other developments' as listed and the capacity and accessiblity of sites both during and after construciton stage and scheme timetable. Avoidance of additional traffic and pollution during construction stage. Consideration of views for significant number of new permanent occupiers.	Increased landscape enhancement, accessibility and better traffic management to/form the southern edge of the town.
14	Existing leisure site, with limited receptors, close to the westerly A40 Junction point. Major re-developoment proposals,with large scale Hotel.Likely impact will include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services link.	Avoid traffic and construction cumulative effects - consider additiional traffic routes to/from.	Increased accessibility and better traffic management to/form the northern edge of the town.

	MATRX 1 Assessment Matrix	MATRIX 2	
SITE 1D	**DESCRIPTION OF CUMULATIVE EFFECTS**	**SCHEME MITIGATION**	**Residual**
15	Within the town centre, with a potentially significant change in land use and additional town centre retail floorspace/ footfall/visitors. Likely impact will include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services link.	Avoid traffic and construciton cumulative effects - consider additional traffic routes to/from.	Increased accessibility and better traffic management to/form the centre of the town.
18	The site is greenfield, with pp for housing as a new developlment for the edge of Whitland town.. Likely impact will include construction and operational stages, with likely impacts of accessibility, noise, pollution and infrastructure /services link.	Consideration for phasing and Identify measures for existing noise and light pollution levels to/from the A40 and include appropriate attenuation measures. Ensure appropraite service and infrastrusture connections not adversely affected and landscape enhancement. No driect access onto A40 - consider additional accessibilty measures/features for non - car transport links/footpaths wih the A40	The site should remain with the same noise levels, and possibly with an improvement. The site should remain with no additional infrastructure or service burdens, likley to cause additional works and impacts.
19	The site represents the first site to/ from the A40 to/from the west of Whitland, with likely impacts to include construction and operational stages -including drainage and aggregates, with likely permanent impacts of accessibility, noise, pollution, flooding and infrastructure /services links.	Consideration for detailed drainage and flood mitigation, including surface water - potential for a SUDS approach, but local aggregate /soil condiions could prove impractical. Consider timing of development of this site and permanent noise and light pollution levels to/from the site and the A40. Ensure appropriate measures included and infrastrusture connections not adversely affected	Overall, permanent anf integrated drainage management: increase in short journeys/visits to /from the locality, over potentially different tmes of the day/week i.e. change in trip generation and associated driver behavior patterns than the current A40 character.
20	The site represents a significant new greenfield housing development for 70 units and represenst the first new housing site to/ from the A40 to/from the easterly edge of f Whitland, with likely impacts to include construction and operational stages, with likely permanent impacts of accessibility, noise, pollution, flooding and infrastructure /services links.	Consideration for potential noise and light pollution from additional use of the A40 along the northerly boundary of the site.	Increased use of A40 junctions and change in local trip generations.
22	Part of a 'Brownfeld' site within the existing , town centre built up area of Whitland. Likely impacts to include construction and operational stage (avoidance of contaminated land) with likely permanent impacts of accessibility, pollution, flooding and infrastructure /services links.	Consideration for construction stage and routes to/from the site, with potentail for disposal of land /soil/contamination from the site to/along the A40. Consider the remaining larger	Increased use of A40 junctions , change in local trip generations and accessibility to/form town centre and the use of the B4326