

Welsh Government

**A40 Llanddewi Velfrey to Penblewin  
Improvements**

Environmental Statement Chapter 2: The  
Project

A40LVP-RML-EGN-SWI-RP-LE-0010

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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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## 2 The Project

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### 2.1 Chapter introduction

2.1.1 This chapter provides a description of the Scheme together with the process of construction, which forms the basis for the environmental assessment provided in this Environmental Statement (ES).

#### Location of the Scheme

2.1.2 The National Grid References (NGR) for the limits of the proposed new section of trunk road are as follows.

- a) Western tie-in with the A40 (west of Penblewin Roundabout)  
NGR: E 211948, N 216632, (SS 1195 1663);
- b) Eastern tie-in with the A40 (east of Llanddewi Velfrey)  
NGR: E 216232, N 216974, (SS1623 1697).

2.1.3 The location is shown in Volume 2 Figure 1.1.

2.1.4 The likely significant effects of the Scheme have been described throughout the ES taking account of the requirements of the EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU. Several measures have been incorporated into the design of the Scheme to avoid or reduce potential adverse environmental effects. In some cases, these measures may result in enhancement of environmental conditions.

2.1.5 Chapters 2 and 3 of this ES, together with the subsequent topic chapters, provide the data and information required to identify and assess the likely significant effects of the Scheme in accordance with Annex IV of the EIA Directive (see Chapter 5 Legislation and Policy Context for further details). ‘Chainage’ (Ch) refers to a point in metres from the western (Penblewin) end of the new section of the A40. Thus chainage (Ch) 750 is located 750m (metres) east of the Penblewin tie-in, which is slightly to the west of the existing roundabout.

### 2.2 Context

2.2.1 The whole A40 Llanddewi Velfrey to Penblewin Scheme lies within the administrative area of Pembrokeshire County Council (PCC). The

eastern end, at Bethel Chapel is 1.3km away from the boundary with Carmarthenshire County Council (CCC) (refer to Volume 2 Figure 2.1).

- 2.2.2 The A40 is important to the economy of West Wales. It forms part of the Trans-European Transport Network, transporting people and goods to homes, industry and employment and it provides access to ports and serves the Welsh tourism industry.

### **Existing A40: environmental context**

- 2.2.3 The scheme lies between Carmarthen (Carmarthenshire) and Haverfordwest (Pembrokeshire). The Preseli Hills lie 12km to the north and Carmarthen Bay is 10km to the south. Two kilometres to the west are the upper reaches of the Afon Cleddau, while the closest boundary of the Pembrokeshire Coast National Park (PCNP) lies 7km away to the south west. The setting of the existing A40 within the Pembrokeshire administrative area is shown on Volume 2 Figure 2.1. Volume 2 Figure 2.2 shows the statutory designations near the Scheme. Volume 2 Figure 2.3 shows the geographical characteristics and environmental constraints within which the scheme is set. Volume 2 Figures 2.4A and 2.4B show the total permanent land take of the Scheme. A series of photographs which illustrate the existing site are provided in Volume 2 Figures 2.5A and 2.5B. Volume 3 Appendix 2.6 shows the General Arrangement drawings for the Scheme. The Environmental Masterplan, which sets out the proposed landscape and environmental mitigation scheme, is shown in Volume 3 Appendix 2.5 Sheets A to F.
- 2.2.4 The Scheme is set in the rural, lowland agricultural setting of east Pembrokeshire with a mainly dispersed population in individual agricultural holdings and small villages. The land is rolling in character with the Preseli Hills lying some 12km to the north and Carmarthen Bay approximately 10km to the south. The fields are enclosed with hedges and hedge-banks with areas of woodland along watercourses and steeper slopes. There is some arable cultivation on better soils, generally on lower, shallower slopes. Wide views are possible from more elevated locations with the Preseli Hills and the intervening ridges visible to the north. The geographical characteristics and environmental constraints of the scheme are shown in Volume 2 Figure 2.3.
- 2.2.5 The existing A40 follows a route on more elevated ground by following a series of ridges and traversing valley slopes. The existing A40 and

the proposed Scheme are shown on a topographical plan in Volume 2 Figure 2.3. At Llanddewi Velfrey, the route follows the crest of a ridge with relatively steep slopes falling to the north and south. Here the north slopes of the ridge are broken by several narrow steep-sided and wooded valleys containing small northwards flowing watercourses fed by a line of springs along the ridge. These watercourses eventually flow west into the Afon Cleddau SAC or south into the Afon Taf. Further west, approaching Penblewin roundabout, the A40 passes through an area of more gently undulating farmland, close to the floor of the valley.

- 2.2.6 Settlements in the area are dispersed, mainly along the roads, while individual farms and houses are widely spaced and often hidden from each other and from roads by landform and vegetation. Houses coalesce into small groups along the A40. The village of Llanddewi Velfrey was originally a scattering of settlements centred around the medieval church which stands on the south-facing slope of the ridge. When the 18<sup>th</sup> century turnpike and then the current ridge-top road was made in the 19<sup>th</sup> century the centre of settlement migrated northwards to form a linear development, known as Commercial, along both sides of the A40 an important junction with the Llanfallteg Road. This linear settlement expanded north and south along side roads.
- 2.2.7 The modern village of Llanddewi Velfrey, which includes residential areas and recreational/community facilities, lies close to the existing A40. Immediately adjacent to the south side of the A40, in the centre of the study area is a triangle of land, formerly known as Cross Hands, formed between roads and occupied by a large group of properties. The second group, formerly called Commercial Cross, lies on the north side of the A40 less than 200m to the west. The third group, the old village of Llanddewi Velfrey, is gathered loosely around the church and lies approximately 1km to the south of the A40.
- 2.2.8 Because the existing A40 follows the crest of a ridge for much of its route between Pengawse and Robeston Wathen, it passes along the tops of the catchments of numerous small watercourses. The proposed Scheme, from the top of Pengawse Hill to Penblewin would follow the north slope of the ridge around Llanddewi Velfrey and so would cross the upper catchments of several watercourses. These receive water from a series of springs along the slopes of the ridge. The distribution of 'Main Rivers' are shown on Volume 2 Figure 2.3. To the east of Ffynnon, these watercourses flow north to discharge into the Afon Daulan and into the Afon Taf. To the west of Ffynnon, watercourses

flow north to tributaries of the Eastern Cleddau, or south into the Afon Marlais which in turn flows into the Afon Taf. The estuaries of both of these rivers are part of marine Special Areas of Conservation (SAC). Watercourses are considered further in Chapter 7 Road Drainage and the Water Environment.

## Habitats and protected species

- 2.2.9 There are five SAC within 10km of the proposed Scheme and a further two SACs designated for bats within 30km of the site. There is one Special Protection Area within 10km of the site, but no Ramsar Sites are present within this 10km distance. There are no other Locally designated nature conservation sites. The locations of these designated sites are shown in Volume 2 Figure 2.2.
- 2.2.10 The habitats along the route support populations of European Protected Species (EPS), including bats, otter, dormouse and Barn Owl. There are populations of badger and reptiles.

## Heritage Designations

- 2.2.11 There are a number of Listed Buildings (LB), for example the War Memorial (Grade II) beside the A40 in Llanddewi Velfrey and Ffynnon Baptist Chapel (Grade II) beside the A40 in Ffynnon Wood. In the wider setting there are several Scheduled Ancient Monuments (SAM) for example Llanddewi Gaer Promontory Fort which lies on higher ground to the south of the Scheme. There are also a wide range of non-designated archaeological sites that fall within the 600m wide corridor, for example there a number of burnt mounds, of Prehistoric origin along the Llanddewi Velfrey ridge, with some that are likely to be directly affected by the Scheme. Designated cultural heritage sites are shown in Volume 2 Figure 10.1.

## Landscape Designations

- 2.2.12 Within the 5km study area there is one Registered Historic Park and Garden, Blackaldern, to the south of the scheme near Narberth. There are no Historic Landscape Areas. Designated landscapes are shown in Volume 2 Figure 9.4.
- 2.2.13 Pembrokeshire Coast National Park (PCNP), outside the study area, is made up of several different designated zones around the coast and the

location and extent of these is shown in Volume 2 Figure 9.4. An area of the park to the south-west of the Scheme includes the Aberdaugleddau estuaries, which are also designated as a SAC. The other areas of the PCNP are the coastal areas of Amroth and Saundersfoot. Further details of these areas are provided in Chapter 9 Landscape and the Visual Effects.

### **Prevailing weather conditions**

2.2.14 The area receives a typical maritime climate characterised by weather that is often cloudy, wet and windy, but mild. Air quality is good and the Scheme does not pass through or near any Air Quality Management Areas (AQMA).

2.2.15 The Metrological Office data indicates that weather conditions are typical for the region, with an annual rainfall of 1,038mm, with November being the wettest month of the year. Over the year the mean annual temperature is 11°C ranging from a low of 4°C and a high of 19°C. The coldest month on average is February. The prevailing winds are from the west and southwest with wind speeds averaging 12mph over the year. The windiest month is December.

### **Noise Action Plan Priority Areas (NAPPA)**

2.2.16 Llanddewi Velfrey is identified as a Noise Action Plan Priority Area. The NAPPA is considered in Chapter 14 Noise and Vibration.

### **Existing Conditions**

2.2.17 The A40 in West Wales is one of the lowest standard sections of the Trans-European Road Network in the UK. Between St Clears and Haverfordwest, the A40 is mostly single carriageway with few places for overtaking. The road has poor visibility and many accesses opening straight onto the road. A mix of traffic types use the A40, contributing to journey time unreliability and driver frustration, risky manoeuvres and collision incidents. There are occasional convoys of heavy goods vehicles from the ferry ports and slow-moving agricultural vehicles. In these circumstances, when combined with limited overtaking opportunity, this traffic flow can result in periods of platooning. A lack of strategic public transport connectivity in Pembrokeshire generally means there is a dependence on the private car for inter-urban connections.



- 2.2.18 During summer, traffic volumes can increase by over 30%, which further exacerbates the problems described above and leads to slow moving tourist traffic.
- 2.2.19 There is overtaking provision on both the eastbound and westbound directions, but this is inconsistently distributed along the A40 in west Wales. There is a total of 5.5km of overtaking provision in the westbound direction and 3.2km in the eastbound. In the context of the whole A40 corridor in Wales this is 13% of the total length of the trunk road which remains well below the 30% ratio advised for this type of route in the Design Manual for Roads and Bridges (DMRB)<sup>1</sup>. Where overtaking provision does exist, it is not spread along the length of the A40, so there are long lengths in each direction with no overtaking opportunities. This is the case for vehicles travelling east for at least 19km from Robeston Wathen towards St Clears roundabout and for vehicles travelling west for 9.5km from Canaston Bridge to Haverfordwest roundabout.
- 2.2.20 The Scheme includes the substandard section of existing road which passes through the centre of Llanddewi Velfrey, where there is a 40mph speed limit. The problems include numerous side road junctions and field and property accesses from the trunk road. Due to the amount of traffic, pedestrians have difficulty in crossing roads and drivers on the A40 face conflict with Non-Motorised Users, particularly along sections where footways are substandard. Severance of the village of Llanddewi Velfrey by the road and traffic is of particular concern to the local community.
- 2.2.21 Consultation with key stakeholders, including the Local Authority, Welsh Government Departments and the Regional Transport Planner has confirmed these problems:
- a) The road is substandard and where overtaking provision does exist, it is currently not spread along the length of the A40 such that there are long lengths in each direction with no safe overtaking opportunities.
  - b) Limited overtaking opportunities lead to poor journey time reliability and driver frustration.
  - c) Regular convoys of heavy goods vehicles from the ferry ports and slow-moving agricultural vehicles contribute to periods of

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<sup>1</sup> Design Manual for Roads and Bridges, Volume 6 Section 1 Part 1, TD 9/93, Highway Link Design, The National Assembly for Wales, June 1993

platooning and journey time unreliability, which is exacerbated with limited overtaking opportunities.

- d) 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.
- e) The community of Llanddewi Velfrey is severed by the A40, which reduces accessibility, increases risks of non-motorised user collisions and results in traffic noise and has the potential to cause localised air pollution.
- f) 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.
- g) A mix of traffic types using the road, contributing to journey time unreliability and driver frustration, risky manoeuvres and collision incidents.
- h) A lack of strategic public transport connectivity in Pembrokeshire generally means there is a dependence on the private car for inter-urban connections.

## Transport Planning Objectives

2.2.22 A number of transport planning objectives have been 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 2015 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.

## Scheme Environmental Objectives

2.2.23 Working with the Statutory Consultees (Natural Resources Wales, Cadw, Pembrokeshire County Council, South Wales Trunk Road Agency and Welsh Government) the following Scheme Environmental Objectives were agreed:

### **We want to achieve**

#### ***a) Avoid or mitigate impact to provide:***

- i. Minimise net loss of important habitat.
- ii. Maintenance of existing habitat connectivity.
- iii. No adverse impact on biodiversity.
- iv. Protection of watercourses and water quality.
- v. Effective landscape integration.
- vi. Effective visual screening of the new road.
- vii. An overall reduction in visual impact caused by through traffic.
- viii. Safe carriageway crossings.
- ix. Zero waste to landfill.
- x. Minimal carbon footprint.
- xi. Protect farms and other local businesses.
- xii. Avoid or mitigate impact on cultural heritage to provide no permanent adverse impact on historic environment assets.

#### ***b) The benefits of the Scheme***

Maximising delivery of added value:

- i. Overall reduction in traffic noise for residential properties.

- ii. Improved air quality for the residents of Llanddewi Velfrey.
- iii. Habitat creation and improved habitat connectivity integrated effectively with the landscape through good design.
- iv. Improve the impact of road drainage on water quality.
- v. Improve access to and enhance enjoyment of the landscape and of any visible historic assets associated with the road corridor.
- vi. Enabling walking, cycling and healthy lifestyles.
- vii. Support education, learning and community involvement by maximising educational opportunities based on cultural and natural heritage assets.
- viii. Research effective soil and vegetation management as a means of reducing whole life cost of the soft estate.
- ix. Support community life and economic viability through enhanced cohesion and destination creation.

#### **How we want to achieve it**

- a) Compliance with legislation.
- b) Delivery of Welsh Government policy.
- c) Work effectively together throughout the development of the project.
- d) To offer a full and open exchange of information and views during project development to make sure that the right project for Wales is published.
- e) To work together to develop deliverable and effective environmental mitigation.

## **2.3 The proposed Scheme**

2.3.1 With the objective of maximising overtaking opportunities to relieve the kinds of problems identified in Section 2.2, and the environmental objectives, the Scheme will consist of two lanes in one direction, to allow overtaking, and one lane in the opposite direction. Overtaking provision will alternate so that both eastbound and westbound traffic have the opportunity to overtake. These will provide 1.4km extra overtaking opportunities for eastbound traffic and 1km extra of overtaking opportunities for westbound traffic. The Scheme includes a northern bypass of Llanddewi Velfrey from Bethel Chapel to Ffynnon Wood and an improvement to the existing road from Ffynnon Wood to

Penblewin Roundabout. The extent of land take for the Scheme is shown in two drawings in Volume 2 Figure 2.4, while the General Arrangement is shown in Volume 3 Appendix 2.6.

- 2.3.2 Where the proposed Scheme crosses or follows the existing A40, so that the footprint is the same, this is described as ‘online’. Where the Scheme occupies an entirely different area of land this described as ‘offline’.

### Design speed and traffic flows

- 2.3.3 The Design Speed of the proposed Trunk Road is 100kmph and will be subject to national speed. Side Roads will be in keeping with the existing local road network.
- 2.3.4 Following the demise of Carillion in the design phase of the Scheme, traffic figures were reviewed to take account of the 7 months delay. As a result, the decision was taken to amend the original Opening Year and Design Year dates. The changes to traffic were small but Table 2.1 has been updated to summarise the total (all vehicles) for the Existing and Predicted traffic flows on the new trunk road in the **Base Year (2017)**, the amended **Opening Year (2021)** and the amended **Design Year (2036)**.
- 2.3.5 Table 2.2 provides a summary of the Existing and Predicted flows of heavy goods vehicles (HGVs) on the new trunk road in the Base Year (2017), the Opening Year (2021) and the Design Year (2036). Further details of traffic flows are provided in Volume 3 Appendix 2.1 Traffic Forecasting Report.

Table 2.1 Existing and Predicted Traffic Flows: A summary of the total annual average daily traffic flow (all vehicles) for new of the new trunk road in the Base Year, Opening Year and Design Year.

Location	Direction	Base Year 2016	Opening Year 2021		Difference from Do Minimum	Design Year 2036		Difference from Do Minimum
			Do Minimum	Do Something		Do Minimum	Do Something	
A40 west of Penblewin Roundabout	Eastbound	5,340	5,720	5,720	0%	6,500	6,500	0%
	Westbound	5,460	5,850	5,850	0%	6,660	6,660	0%
Proposed A40 between Penblewin Roundabout and Llanddewi Velfrey West Junction	Eastbound	-	-	6,110	-	-	7,110	-
	Westbound	-	-	5,960	-	-	6,950	-
Existing A40 between Penblewin Roundabout and Rest Area	Eastbound	5,820	6,260	490	-92%	7,250	550	-92%
	Westbound	5,700	6,140	530	-91%	7,140	600	-92%
Proposed A40 between Llanddewi Velfrey west junction and Llanddewi Velfrey Roundabout	Eastbound	-	-	5,790	-	-	6,750	-
	Westbound	-	-	5,580	-	-	6,540	-
Existing A40 west of Llanfallteg Road Junction	Eastbound	5,640	6,070	280	-95%	7,060	310	-96%
	Westbound	5,480	5,900	320	-95%	6,890	350	-95%
Existing A40 east of Llanfallteg Road Junction	Eastbound	5,700	6,140	350	-94%	7,160	410	-94%
	Westbound	5,450	5,880	300	-95%	6,890	350	-95%
A40 east of Llanddewi Velfrey (east of Bethel Chapel)	Eastbound	5,600	6,030	6,040	0%	7,040	7,050	0%
	Westbound	5,340	5,760	5,760	0%	6,750	6,750	0%

Table 2.2 Existing and Predicted Heavy Goods Vehicle Flows: A summary of the annual average daily HGV flow for new of the new trunk road in the Base Year, Opening Year and Design Year.

Location	Direction	Base Year 2016	Opening Year 2021		Difference from Do Minimum	Design Year 2036		Difference from Do Minimum
			Do Minimum	Do Something		Do Minimum	Do Something	
A40 west of Penblewin Roundabout	Eastbound	310	310	310	0%	330	330	0%
	Westbound	270	270	270	0%	290	290	0%
Proposed A40 between Penblewin Roundabout and Llanddewi Velfrey West Junction	Eastbound	-	-	300	-	-	320	-
	Westbound	-	-	280	-	-	300	-
Existing A40 between Penblewin Roundabout and Rest Area	Eastbound	300	300	20	-93%	320	20	-94%
	Westbound	290	290	30	-90%	310	30	-90%
Proposed A40 between Llanddewi Velfrey west junction and Llanddewi Velfrey Roundabout	Eastbound	-	-	300	-	-	320	-
	Westbound	-	-	280	-	-	300	-
Existing A40 west of Llanfallteg Road Junction	Eastbound	300	300	10	-97%	320	10	-97%
	Westbound	280	280	10	-96%	300	10	-97%
Existing A40 east of Llanfallteg Road Junction	Eastbound	300	300	10	-97%	330	10	-97%
	Westbound	280	280	10	-96%	300	10	-97%
A40 east of Llanddewi Velfrey (east of Bethel Chapel)	Eastbound	300	310	310	0%	330	330	0%
	Westbound	270	280	280	0%	300	300	0%

## 2.4 General arrangement including cuttings, embankments and false cuttings

- 2.4.1 The Scheme would include a 2.2km long bypass to the village of Llanddewi Velfrey, from Bethel Chapel to Ffynnon Wood, and 2.1km of improvements west of Ffynnon Wood as far as Penblewin Roundabout. A series of photographs to illustrate the existing situation are provided in Volume 2 Figures 2.5A and 2.5B. The General Arrangement of the Scheme is shown in the three drawings in Volume 3 Appendix 2.6. References to chainage (e.g. Ch. 1075) refer to the distance east of the western end of the scheme. The chainages are marked on the General Arrangement plans in 100m divisions.
- 2.4.2 At Penblewin, a new, larger roundabout would be required to accommodate the five legs (Ch. 0.00). To the east of the roundabout, the proposed road would descend on embankment on a roughly parallel alignment with the existing A40 to around Ch. 800. The gap between the old and proposed road would narrow towards Trefangor Farm (Ch. 750) with Trefangor Cottage (Ch. 1,070) being demolished. By Henllan Lodge (Ch. 1,250), the new road would be on the line of the old A40. This alignment would be maintained on the existing road embankment through Ffynnon Wood, although the wider carriageway would require some widening of the embankment. Towards the eastern edge of Ffynnon Wood (Ch. 1,950), the proposed road would begin to draw to the north of the old A40, on a straight alignment, roughly at grade, but extending onto sidelong slope. Between Ch, 1,950 and 2,100, there would be a staggered junction giving access to the settlement of Ffynnon Wood to the north and the old A40 to Llanddewi Velfrey, to the south.
- 2.4.3 Continuing east, the proposed road would pass to the south of Pen-troydin-fâch Farm (Ch. 2,300) in a cutting traversing the north-facing slope. The land becomes increasingly steep to the east, as the proposed road starts to climb the north slope of the Llanddewi Velfrey ridge. From cutting the proposed road would continue onto embankment (Ch. 2,400 to 2,700) and commence a long curve to the south to follow the north slope of the ridge around Llanddewi Velfrey. Then, in cutting, the road would pass under the Llanfallteg Road approximately 200m south of the Pen-troydin-fawr Farm. A proposed bridge at Ch. 2,830 would carry this side road.



2.4.4 The landform to the east of Llanfallteg Road becomes more rolling with the ridge slope divided by small valleys containing wet woodland. Each valley carries a minor watercourse. The proposed road would cross the watercourses on a proposed embankment extending from Ch. 2,950 to 3,360. The embankment would rise up to 17m above the surrounding land. From Ch. 3,360 there would be a deep cutting, nearly 15m deep, which would bring the proposed road back to meet the line of the old A40 at Bethel Chapel (Ch. 3,980). At Ch. 3,800, there would be a four-leg roundabout, with a proposed Private Means of Access provided on the north side of the roundabout to provide access to the chapel and several private properties. On the south side, a road link to the old A40 and Llanddewi Velfrey would be provided. The old and proposed roads tie-in at Ch. 4,300 at the top of Fron Hill.

### Local Side Roads

2.4.5 The existing road network would be modified at a number of locations, where the proposed new section of trunk road would join or cross existing routes. Details are provided in Table 2.3.

Table 2.3 Local side roads

Approximate Chainage	Side road	Proposed works
1,100 to 1,220	Henllan Lodge to Llanddewi Velfrey	Tie-in of the retained existing A40 (to be detrunked) to the existing local road south of the A40.
0,000 to 1,220	Trefangor Burial Ground Access Road	Stopping up and tie-in of the local road leading to Trefangor Burial Ground. New road ties into Penblewin.
1,800 to 2,000	Ffynnon Lane, part of lay-by	Existing access to properties realigned to fit the proposed A40
2,820	Llanfallteg Road	Proposed trunk road passes beneath this road. Llanfallteg Road to pass over the proposed A40 on an overbridge.
3,750	Lane / track to Bethel Chapel off A40	Existing access to A40 to be realigned and tie back into junction onto the proposed A40.

### Henllan Lodge side roads

2.4.6 The proposed improvements would retain the A40 on the existing alignment to the north of Henllan Lodge, but the existing junction that allows traffic onto and off the A40 from the unclassified road to

Llanbedr Velfrey and Tavernspite on the south side would be closed to traffic. The unclassified road would be reconnected with the A40 using via the existing road, which would be detrunked (lose trunk road status) and the Penblewin Roundabout. On the north side of the proposed road, a side road would be provided from Penblewin roundabout to allow access eastwards to Trefangor cemetery. This side road would also provide access for Pen-ca'rmaenau Farm, Bounty Farm and a number of fields. A connection to Public Bridleways, which cross the A40 at Henllan Lodge, would be diverted eastwards to follow the north and south sides of the proposed trunk road, to an underpass located in Ffynnon at Ch. 1,700 (approximately).

### **Junction west of Llanddewi Velfrey**

- 2.4.7 A proposed junction would be provided between the west end of Llanddewi Velfrey and Ffynnon Wood to provide access to the proposed trunk road from the village. The proposed staggered junction would connect to the old road through the village of Llanddewi Velfrey on the south side and with existing access road on the north side that serves the residential properties in Ffynnon Wood, Ffynnon Chapel and several farms to the north.

### **Overbridge for the Llanfallteg Road**

- 2.4.8 A proposed bridge would carry the unclassified Llanfallteg road across the proposed trunk road (Ch. 2,830), which at that point would be in a cutting. The bridge would be sufficiently wide to carry the existing road with hardened verges to be consistent with the existing road width. The bridge would be constructed from concrete with three spans formed with precast concrete beams.

### **Junction east of Llanddewi Velfrey**

- 2.4.9 The Scheme has been designed with the minimum number of proposed junctions to separate local and through traffic. There are various improvements proposed to local road links to ensure that all properties would be able to access the A40 via the proposed junctions. A proposed junction near Bethel Chapel would provide access to the east end of Llanddewi Velfrey and with an unclassified lane serves Bethel Chapel and other properties on the north side. Because the proposed road would be in cutting, the proposed link into Llanddewi Velfrey would

have to climb sharply from the proposed junction to meet the old road to the north east of the former Cross Inn.

## Road drainage and disposal of water

2.4.10 The Scheme surface water drainage system would be designed in accordance with DMRB (HD45) and would use conventional piped drainage to remove water from the carriageway which would discharge into four attenuation ponds located beside the proposed road. These ponds would be designed to store surface water and then slowly discharge it to the existing watercourses. The attenuation ponds and other drainage measures are set out in Chapter 7, Road Drainage and Water Environment. Consideration of Sustainable Urban Drainage (SUDs) is also addressed in Chapter 7. The attenuation pond locations are shown on the Environmental Masterplan drawings (which are included in Volume 3 Appendix 2.5) and listed below:

- a) Ch. 300 north side;
- b) Ch. 1,900 south side;
- c) Ch. 3000 north side;
- d) Ch. 4,100 south side;

## Fencing

2.4.11 Fencing would be provided in the form of post and wire stock-proof mesh where there is a requirement to discourage access by farm stock from adjacent fields and to delineate the Welsh Government landownership. Post and wire stockproof fences are proposed because these have a much-reduced visual impact compared to post and rail stockproof fences, whilst still forming an effective stockproof barrier. Special forms of this fence would be required to discourage animals such as badger and otter from entering the road corridor and so reduce the risk casualties arising from collisions with vehicles. Further fences would be required to discourage access to hazardous locations, such as balancing ponds, the tops of retaining walls and steep slopes. Indicative alignments of proposed fences are shown in the Environmental Masterplan included in Volume 3 Appendix 2.5.

## Signs and communications

2.4.12 The proposed section of trunk road would incorporate signage in relation to junctions, destinations and rest areas. The approximate

locations of signs are indicated on the General Arrangement drawings in Volume 3 Appendix 2.6. A symbol is used to show the location but does not indicate actual sizes of signs. There would be no proposed Intelligent Transport Systems (ITS) on the Scheme (these are signs that display an illuminated message than can be changed from a remote location).

- 2.4.13 Signs will conform with the national standards, regarding materials, colours, dimensions and Welsh Language. These signs will be suitably placed on or at the back of the verge in accordance with standard requirements. There is only a limited possibility to vary the locations of these signs, but care will be taken to place trees, shrubs, hedges and other mitigation measures to avoid compromising visibility splays and sightlines. During detailed design of the scheme the placing of signs and mitigation will be considered carefully to ensure that signs do not cause unnecessary visual impact nor compromise the quality of mitigation.

## Lighting

- 2.4.14 Road lighting is proposed around the two roundabouts at Penblewin and Bethel Chapel. The remainder of the proposed trunk road would not be illuminated.
- 2.4.15 Luminaires would be designed to emit no light above the horizontal level. LED Luminaires are proposed as these can be aimed more precisely, reducing light spill and thus causing less disruption to bats flying in the surrounding countryside

## 2.5 Existing features affected by the Scheme

- 2.5.1 The requirement to provide a safe road with good visibility for drivers sometimes means that features in the setting are adversely affected by the proximity of the new road and associated structures and earthworks. The route has been aligned to minimise the impact of the Scheme on adjacent property.

## Demolitions

- 2.5.2 The proposed Scheme requires the demolition of Trefangor Cottage, which lies on the north side of the existing A40 located at approximately Ch. 1050, to the west of Ffynnon Chapel. A redundant

weighbridge in a layby to the west of Ffynnon Wood will also be demolished.

## Public rights of way

- 2.5.3 Existing footpaths, bridleways and private means of access that would be affected by the Scheme would be suitably diverted. In summary, the public rights of way that would require modification are identified in the following paragraphs.
- 2.5.4 Access would always be maintained during construction. If temporary diversions are to be provided, they would be constructed to an appropriate standard and would be well maintained. The duration of temporary diversions would be kept to a minimum, taking account of the construction programme. Further details are provided in Chapter 15 All Travellers and are shown on Volume 2 Figure 14.1.
- 2.5.5 **Footpath SP19/31/3:** the southern end would be stopped up. The footpath will tie-in to the proposed Trefangor Burial Ground Side Road.
- 2.5.6 **Footpath SP19/37/1:** would have a new connection provided along the Ffynnon private means of access and would link to the proposed underpass which crosses the proposed A40 at approximately Ch. 1,700 and so connect with Footpath SP19/38/1.
- 2.5.7 **Footpath SP19/30/1:** a section would be diverted along the proposed batter of the new A40 to tie-in to the detrunked existing A40 and the diverted bridleway.
- 2.5.8 **Footpath SP19/38/1:** part would be stopped up and diverted along the existing footpath SP19/38/2. A crossing of the proposed A40 would provide a diversion to this footpath, extending along the south side of the proposed road cutting to tie-in to the existing SP19/38/1 footpath.
- 2.5.9 **Footpath SP19/38/2:** the eastern end would be stopped up and would tie-in to the existing Llanfallteg road north of the proposed A40 trunk road.
- 2.5.10 **Footpaths SP19/1/1, SP19/2/2, SP19/3/2:** parts would be stopped up and diverted along the north and south side of the proposed earthworks to a new underpass provided at Ch 3,300 to provide connectivity to these footpaths.

- 2.5.11 **Footpath SP19/4/5:** would be stopped up. No new provision to be provided as there is an adequate alternative route utilising footpath SP19/4/6. The latter would allow users to cross the A40 at the Penblewin roundabout or use the Footpath SP19/5/1.
- 2.5.12 **Footpaths SP19/17/1 and SP19/16/1:** connectivity to these routes would be provided via a proposed footpath that would extend along the south side of the proposed trunk road and would tie-in to the existing footway alongside the existing A40 to be detrunked from the grouped of properties between Croft House and Awelfa to tie-in to SP19/16/1, near Bryncoed.

### Penblewin Rest Area

- 2.5.13 The existing rest area east of Penblewin Roundabout would be maintained via the existing detrunked A40 from the remodelled Penblewin Roundabout. Proposed signs would direct drivers to the rest area from the roundabout. The rest area is located adjacent to the scheme at Ch. 300.

## 2.6 Landscape and Environmental Design Principles (Mitigation and Enhancement)

- 2.6.1 The purpose of the proposed Scheme is to provide a road in accordance with the Scheme objectives set out in Section 2.2 and with the requirements of highways design standards. Achieving a design that satisfies these objectives and standards requires the benefits of the Scheme to be balanced against adverse effects. Known environmental constraints, such as residential properties, designated heritage sites and nature conservation sites, terrain, watercourses and vegetation cover were taken into consideration during route selection. Numerous minor adjustments were made to avoid or minimise impacts during the design period, as more detailed environmental data about the area, and comments and advice from stakeholders in the community and consultees were obtained. The environmental and landscape design is shown in the Environmental masterplan drawings in Volume 3 Appendix 2.5.

### Critical constraints

- 2.6.2 The most critical constraints are:

- a) Minimising adverse effects such as traffic noise, and views on residential properties and areas by placing the Scheme to the north of Llanddewi Velfrey and retaining it on the existing route through Ffynnon Wood;
- b) Minimising adverse effects of construction on watercourses by keeping the route high on the slopes of the ridge, but avoiding residential properties on the ridge top;
- c) Avoidance of the Taf, Daulan and Marlais floodplains to minimise any adverse effects on flood capacity and ensure the road has flood resilience;
- d) Retaining the existing road to provide local access and so improve community cohesion;
- e) Where possible, avoiding adverse effects on woodland and trees;
- f) Providing replacement habitat where areas are likely to be destroyed;
- g) Providing crossings under the road for mammal species such as bats, badgers, otters and dormice;
- h) Taking account of good and bad ground conditions to avoid unstable ground and avoid rock and soil that would need to be taken away from the site, and
- i) Where feasible, avoiding farm severance.

2.6.3 Even after the route was finalised, small adjustments continued to be made within the strip of suitable land. The residual effects of the Scheme were then considered and measures to compensate or mitigate any adverse impacts were developed. Measures to enhance the Scheme, beyond the limits of mitigation were also developed in the interests of future generations. Some environmental design principles were developed to suit the landscape setting and so guide the design of mitigation, compensation and enhancement measures.

### **Environmental design principles**

- a) Minimise the loss of mature vegetation during the development of the alignment;
- b) Provide replacement trees, woodland, scrub and grassland to reflect the patterns of the surrounding landscape using native and locally sourced seed and stock;
- c) Minimising changes to existing watercourses, with new crossings designed to retain the existing capacity and avoid realignment;
- d) Minimising and mitigating any adverse impacts on the quality of views to and from surrounding receptors;

- e) Using opportunities to open-up views from the new road to the wider landscape;
- f) Making minor modifications to the design of the new landform of embankments and cuttings to help incorporate the new road within the natural landform and to reduce the apparent scale of change in the landscape;
- g) Design new hedges, hedge-banks and areas of scrub and new woodland planting to reinstate the locally distinctive landscape patterns of boundaries and vegetation;
- h) To protect cultural heritage features, or to provide mitigation and enhancements of the setting, where opportunities fall within the boundary of the Scheme;
- i) Unless specifically to serve a localised landscape pattern, to use locally indigenous species of trees and shrubs;
- j) Using design of the carriageway, structures, earthworks and landscape to incorporate the connectivity requirements of indigenous native species. Where necessary to provide barriers to movement, or to reinstate safe routes across the proposed road so that natural patterns of movement are not unduly interrupted and casualties from collisions with vehicles are minimised;
- k) Carefully consider the design and integration of proposed structures into a sensitive landscape throughout the design process with careful selection of materials and planting treatments;
- l) Where possible, avoid or minimise lighting, using products that minimise light spillage / bat-friendly lighting
- m) Carefully consider the design and siting of proposed road signs, environmental barriers and street furniture., and
- n) In support of the purposes of the Well-being of Future Generations Act (2015) and the Active Travel (Wales) Act 2013, to use opportunities to incorporate measures that would maintain and enhance the existing network of routes available for non-motorised travellers including routes between and through settlements and interesting circular routes. Take opportunities to create new safe and useful routes within the boundaries of the new Scheme to encourage public use.
- o) In support of the purposes of the Environment (Wales) Act 2016, Section 6 Duty, to use opportunities to incorporate measures that would seek to maintain and enhance biodiversity so far as consistent with the proper exercise of functions and in so doing promote the resilience of ecosystems
- p) To support principles set out in any relevant Ministerial Initiatives, such as Green Corridors



## 2.7 Consultation on Design

2.7.1 The Design Commission for Wales (DCfW) promote the importance of good design for the built environment across all sectors, including infrastructure. The Design Commission reviewed the Scheme in June 2017, and then again in November 2018, and provided written responses which are included in Volume 3 Appendix 2.4.

2.7.2 The main points of the DCfW comments were:

- a) That environmental surveys should inform the design process so that an environmental design strategy should be based on an overarching vision for the Scheme;
- b) The landscape design should be an integral part of the design process that considers views of the road in a positive manner, ensures integration with landform and is appropriate to the setting. A Landscape Design Strategy should prompt early consideration of a range of matters including view, slopes, planting and boundary treatments;
- c) That junction design, materials, planting and lighting should be considered
- d) Bridge design is important with a more efficient bridge structure freeing-up resources for use in mitigation elsewhere on the Scheme.
- e) A positive vision for the detrunking works should be considered to exemplify the New Ways of Working and Goals in the Well-being of Future Generations (Wales) Act, and to ensure that the old road is redesigned to be appropriate to the use as a village access road.
- f) Measures to reduce community severance should be considered.

## 2.8 Existing land use

2.8.1 The Scheme would occupy land mainly in agricultural use. Part of the Scheme would be within boundary of the existing A40, or other public roads. Land uses that would be displaced by the Scheme include farmland and woodland. Details of existing agricultural land use are covered in Chapter 12 Community and Private Assets: Agriculture.

### Land take

2.8.2 One property, Trefangor Cottage, would require demolition to accommodate the proposed Scheme road. A further demolition of a weighbridge to the west of Ffynnon Wood is already within Welsh

Government ownership. Land would be required along the proposed trunk road for junctions, works to local roads, Public Rights of Way, Private Means of Access and Attenuation Ponds. Volume 2 Figure 2.4 indicates the total permanent land take required.

- 2.8.3 The PCC Local Development Plan (LDP) of identifies land allocated for future development in Llanddewi Velfrey. One area, on the northern edge of the settlement, is allocated for residential development. The northern boundary of the allocation would be around 80m from the southern boundary of the Scheme at around Ch. 2,800. The allocation can be seen in Volume 2 Figure 16.1.

## 2.9 Construction

- 2.9.1 The Welsh Government are likely to appoint a contractor to implement the improvements under a Design and Build contract. Bringing detailed design and construction under a single team ensures that the Contractor and Designer understand and address the problems of construction and would be better informed about the potential environmental impacts which could occur.
- 2.9.2 The design has followed an iterative process involving the key stakeholders and the Welsh Government to ensure that the most appropriate solutions have been identified and developed.
- 2.9.3 Carillion (contractor) provided construction advice up until their liquidation in January 2018. Since resumption of the contract by Arup and RML, construction experts within these firms have contributed to the production of the ES. Construction impacts have been based upon the advice of these experts regarding appropriate methods, programme and the environmental mitigation.
- 2.9.4 The bulk earthworks design has been optimised to balance cut and fill which in turn optimises plant movements on site. Apart from topsoil, all excavated material would be reused in the design and none would leave site. Some topsoil will be required within the scheme, but the surplus would be used in making-good of land temporarily taken for construction or made available for other uses such as agricultural improvement. Topsoil handling and storage on site should be in accordance with BS 3882:2015 Specification for topsoil, Annex A Recommendations for stripping, handling and preparing topsoil.

2.9.5 A risk management strategy has been developed to ensure that all key risks are identified and minimised early within the Scheme development process.

2.9.6 The essential temporary working space required outside the permanent land take has been identified and incorporated within the draft Compulsory Purchase Order. This land is included so that the Scheme can be built efficiently and safely, whilst minimising the environmental impacts.

## 2.10 Construction Programme

2.10.1 This section outlines the proposed construction sequence and the key construction activities based on advice of Carillion prior to their liquidation. The programme for design and construction assumes a potential Public Local Inquiry in 2019, with a decision to proceed early in 2020.

### Overall Duration

2.10.2 Detailed design and construction works are considered likely to commence in 2020 and would continue for around 18 months. Maintenance and aftercare of the environmental aspects of the Scheme remain the responsibility of the Contractor for five years after the completion of construction.

### Sequence of Operations

2.10.3 Following the issue of the Notice to Proceed to Construction, there would be a period when the detailed design would be developed. Prior to work starting on site, property precondition surveys and vegetation surveys would be carried out. Early construction activities would include:

- a) Construction of the main site compound.
- b) Construction of main site access points.
- c) Topsoil stripping and stockpiling with archaeological monitoring.
- d) Ongoing programme of seasonal ecological surveys.
- e) Development of site haul roads.
- f) Construction of a temporary road diversion to allow for the construction of Llanfallteg Road overbridge.
- g) Surface water quality monitoring.

- h) Statutory Undertakers service diversions.
- i) Temporary and permanent fencing.
- j) Site clearance of trees, hedges, fencing, walls and small structures.
- k) Drainage operations including pre-earthworks drainage ditches and the installation of culverts on existing watercourses.
- l) Earthworks operations.
- m) Haulage of materials to and from the site on the existing road network.
- n) Treatment of invasive species.
- o) Side road works starting with Trefangor cemetery side road and Henllan Lodge equestrian underpass.
- p) Accommodation works starting with Pen-troydin-fâch Farm access road and underpass
- q) Construction of temporary diversions to existing footpath and bridleways.

2.10.4 The site would be made secure as early as possible by the erection of permanent fencing. Where this is not possible, temporary fencing would be erected. Site clearance work would commence with vegetation clearance.

2.10.5 Bulk earthworks would mainly be carried out in the summer season but would take advantage of any periods of dry weather in the other seasons. Pre-earthworks drainage would follow the earthworks sequence. Mainline pavement construction would continue intermittently through to completion.

2.10.6 Structures would be progressed throughout the construction period. The construction sequence has been determined to ensure that the Scheme would be built with minimum disruption to the local environment, local population and the travelling public. It is likely construction of the following structures would commence early in the construction programme.

- a) **Llanfallteg Road overbridge.** Early temporary diversion of Llanfallteg road so that the bridge can be built online. Self-contained earthworks zones exist to the east and west of the proposed diversion therefore large bulk earthworks will not need to be moved across Llanfallteg Road. On completion allowing site bulk earthworks to be hauled underneath minimising the need for a plant crossing on the public road.

- b) **Ffynnon Wood equestrian and pedestrian underpass**, designed to be constructed in two halves so that half can be built offline without disrupting use of the existing carriageway. Traffic can then be transferred onto the new structure allowing completion of the other half, minimising impact on road users.
- c) **Pen-troydin-fâch farm underpass** built offline from the existing access minimising impact.
- d) **Footpath underpass east of Llanfallteg Road** built offline from the existing paths minimising impact.

## 2.11 Contract Management Plan

- 2.11.1 Civil engineering contractors operate Environmental Management Systems (EMS) which are normally accredited to appropriate British and international standards and form part of a project management plan which would be drawn up to provide a coordinated approach to the management of construction and to clearly define policy, standards, processes, procedures, organisation, roles and responsibility and key performance indicators.
- 2.11.2 Under the overall control of the project management plan would be:
  - a) Health and Safety Management; (see Section 2.12);
  - b) Environmental Management (CEMP) (see Chapter 23 Conclusions and Volume 3 Appendix 2.2);
  - c) Quality management (see Section 2.14);
  - d) Public Relations (See Section 2.15).
- 2.11.3 The Register of Environmental Commitments and Actions (REAC) would be an appendix to the Construction Environmental Management Plan (CEMP). This is included in Volume 3 Appendix 2.3.

## 2.12 Health and Safety Management

- 2.12.1 A civil engineering contractor would normally be appointed as Principal Contractor and Principal Designer for the proposed Scheme by the Welsh Government, in accordance with the Construction (Design and Management) Regulations 2015.
- 2.12.2 In accordance with current Health and Safety legislation, approved codes of practice and our Health and Safety Policy, the civil engineering firm would:

- a) Provide and maintain a place of work that is safe and without risk to the health and welfare of all its employees, subcontractors and the general public.
- b) Provide and maintain plant and systems of work that are safe with minimum risk to health.
- c) Provide appropriate information, instruction, training and supervision to ensure the health and safety at work for all employees.
- d) Allocate sufficient resources to enable the policy to function effectively.
- e) Seek to continually improve health and safety performance.
- f) Consult with and maintain good relations with employees, trade unions representatives, the Health and Safety Executive and other relevant organisations.
- g) Review operational performance using appropriate measures. Review accident investigation reports and audit information.
- h) Make the management of health, safety and welfare an integrated part of the company.

2.12.3 Site specific risk assessments and method statements would be produced prior to any work activates commencing. Noise, manual handling, vibration and environmental assessments would be completed, and appropriate action would be taken to control these issues at site level. Permit to work procedures would be followed for any activities where the residual risk is classified as high.

## 2.13 Construction Environmental Management Plan

2.13.1 A Pre-Construction Environmental Management Plan (Pre-CEMP) is included in Volume 3 Appendix 2.2 in Volume 3. The CEMP is a live document that is developed and updated through the detailed design and construction stages. Development and implementation would be managed throughout by the Environmental Coordinator. The CEMP would ensure that construction activities are planned and managed in accordance with all the environmental requirements identified in the ES.

2.13.2 The key to effective environmental management during the construction phase lies in the comprehensive training of the workforce. This would be controlled by a full-time site-based Environmental Clerk of Works (ECoW).

- 2.13.3 The ECoW (managed by the Environmental Coordinator) would:
- a) Administer the CEMP and assist in the production and review of environmental content of method statements.
  - b) Provide guidance to the site team in dealing with environmental matters.
  - c) Raise awareness of site environmental issues.
  - d) Assist with obtaining and programming any licences from regulatory authorities such as the Natural Resources Wales.
  - e) Monitoring site performance against the CEMP, raising standards and reporting to site management.

## 2.14 Quality Management

- 2.14.1 The onsite construction management team would ensure that proactive quality control is achieved by:
- a) Defining and coordinating an agreed Inspection & Test Plan (I&TP) and regime for each element of work.
  - b) Setting the acceptance criteria for the I&TP to meet all the relevant design, specification and Employer's requirements.
  - c) Adopting an open Non-Conformance Reporting (NCR) process detailing corrective and preventative actions.
  - d) Monitoring timely close out of NCR to prevent jeopardising follow on work which would otherwise be compliant.
  - e) Maintain essential documentation plus sufficient documentation to demonstrate that the product has been installed in a compliant manner.
  - f) A materials testing laboratory, with UKAS Accreditation or similar, would carry out the defined compliance sampling.

## 2.15 Public Relations

- 2.15.1 Construction works on this scale would result in some inconvenience and disruption to residents. It is therefore very important that there are effective channels of communication in place to keep all interested parties informed of activities and to quickly address any complaints or queries.
- 2.15.2 A Public Liaison Officer (PLO) would keep the public and affected landowners informed of progress and advise on forthcoming activities. During the construction phase, they would be based in the site office. The PLO would be the first point of contact for any concerns or queries

and would be contactable through the project e-mail address, telephone number, by post or in person at the site office.

- 2.15.3 The contractor would be responsible for distributing information about the Scheme, including project information letters which would be delivered to specific residents. The contractor would work with all relevant stakeholders to ensure concerns are addressed through a process of providing information, listening, reviewing, taking action and seeking feedback.

### Register of Environmental Actions and Commitments (REAC)

- 2.15.4 The REAC is a schedule of all environmental matters that have been agreed as part of the Scheme. These will include commitments to complete action that could include surveys, monitoring or reporting, or consulting with stakeholders; or commitments to provide mitigation or enhancements as part of the Scheme. A draft of the REAC is included in Volume 3 Appendix 2.3.

## 2.16 Construction Working Hours

- 2.16.1 Working hours would be subject to agreement with the PCC Environmental Health Officer and could vary by location and activity. Typically, there would be no normal working on Sundays or Bank Holidays and the working dates would start and finish at the times set out in Table 2.4.

Table 2.4 Typical site working hours

Period	Day	Start time	Finish time
Summer	Monday to Friday	07:00	19:00
	Saturday	07:00	16:30
Winter	Monday to Friday	07:30	17:30

- 2.16.2 Where construction works could have significant impact on neighbouring properties, the affected parties would be advised of these works prior to their commencement.



## 2.17 Service Diversions

### Utilities

- 2.17.1 Utility diversions are necessary where existing roads would be stopped-up or realigned. The diversions would generally be routed along existing service corridors, roads or footpaths. Where the service could be retained in its present location but would be affected by the proposed Scheme, appropriate protection measures would be agreed with the relevant authority.
- 2.17.2 The Scheme would affect several utilities and all owners and operators of the various utilities have been consulted to establish how their equipment would be affected by the proposed Scheme. The detailed design would take these into account and seek to minimise the impact. The following are known to be affected by construction.
- 2.17.3 **British Telecom:** equipment is located along the length of the existing A40. This will be diverted at several locations along the Scheme. The Penblewin Roundabout forms a junction for this utility and the new roundabout layout has been designed to minimise the impact. The utility will require a diversion at the eastern tie-in of the Scheme around the Llanddewi Velfrey East Junction. For the majority of the length it will remain on the detrunked existing A40.
- 2.17.4 **Western Power Distribution:** equipment along the route includes HV (11KV) and LV overhead cables. Several HV poles and overhead lines will be relocated along the route with a few LV poles and cables being diverted overhead or underground.
- 2.17.5 **EE Telecommunications:** a mast north of the existing A40, east of Llanddewi Velfrey is within the footprint of the proposed A40 and will therefore need relocating.
- 2.17.6 **Dwr Cymru Welsh Water:** several small diameter water mains will require diversion/protection works at approximately six locations. No sewer diversions are planned.
- 2.17.7 Key locations for service diversions include:
- a) Penblewin Roundabout
  - b) Henllan Lodge equestrian underpass.

- c) Ffynnon Wood.
- d) Llanfallteg Road overbridge.
- e) Bethel Chapel roundabout.

2.17.8 Through ongoing liaison appropriate protection measures and/or diversions would be implemented as part of the construction of the Scheme. These measures would comply with the relevant standards and codes of practice agreed nationally with Utilities companies.

## **2.18 Site Clearance and Topsoil Strip**

2.18.1 All site clearance would be carried out under ecological supervision taking into account defined ecological seasonal constraints as identified in ES Chapter 8 Ecology and Nature Conservation.

2.18.2 During and after site clearance, the Archaeologist would carry out any recording of above-ground features. The details of any recording of above-ground features are set out in Chapter 10 Archaeology and Cultural Heritage.

2.18.3 Topsoil would generally be stripped from areas within the construction footprint. This process would be subject to archaeological supervision, which is set out in Chapter 10 Archaeology and Cultural Heritage. Topsoil would be stored in temporary stockpiles and re-used within the works. Topsoil will be stored close to the source wherever there is sufficient space over and above that required for construction movements so that it would be replaced in its original location.

2.18.4 Topsoil, which generally carries considerable fertility, will not be spread on embankments cuttings and verges. Low fertility in the roadside soils will reduce the intensity of long-term maintenance and encouraging greater biodiversity. Surplus topsoil will be removed from site for use in making-good any land taken on a temporary basis for construction and for agricultural improvement in the surrounding area, for example.

## **2.19 Bulk earthworks**

2.19.1 The Scheme has been designed to re-use all excavated bulk earthworks material within the works with none imported or exported from the site.

Excavations from cuttings would be used to construct embankments, noise bunds and visual screens.

- 2.19.2 No contaminated materials were identified in the desk studies and ground investigations. There remains a low potential for localised contamination of excavated materials. This would be reviewed during construction, with a brief for a contamination watching brief added within the CEMP. If contamination was encountered during the construction stage, this material would be taken to a suitably licensed disposal facility or treated in accordance with the appropriate regulations.
- 2.19.3 Earthwork excavation would generally be carried out using hydraulic excavators loading articulated dump trucks that would transport material along internal site haul roads to identified filling locations. Filling operations would involve using bulldozers and vibrating rollers. Where no practicable site alternative is available, road lorries would be used to transport material on the public road. For example, some of the early fill material required east of Penblewin Roundabout might need to use the public road network to pass through Ffynnon Wood. Operations on public roads would be carefully controlled and monitored to minimise disruption to the travelling public.
- 2.19.4 The earthworks sequence would be coordinated with the structures programme to minimise the use of public roads by construction plant. The number of plant crossings and the length of time they would be required would be minimised with, where possible, permanent structure being completed early in the programme.
- 2.19.5 The Scheme requires the movement of approximately 399,000 m<sup>3</sup> of earthworks materials. Table 2.5 below shows the estimated breakdown of this quantity.

Table 2.5 Major earthworks quantities

Excavation	Volume (m <sup>3</sup> )	Deposition	Volume (m <sup>3</sup> )
Topsoil	58,700	Topsoil	58,700
Suitable clays and gravels	329,00	Structural fill	329,000
Unsuitable	11,500	Landscaping, noise and visual screens	11,500
Total excavated	399,200	Total deposited	399,200

- 2.19.6 Approximately 13,000m<sup>3</sup> of imported granular material would be required for drainage construction. Approximately 25,600m<sup>3</sup> of imported subbase would be required for pavement construction. Imported construction materials are set out in Table 2.6.
- 2.19.7 Earthworks activities are vulnerable to wet weather. Clay materials are susceptible to degradation when they get wet. To ensure that they remain suitable for reuse, it would be important to protect them from rainfall, surface and groundwater flows. Control and management of all water sources would be given particular consideration in the method statements for all earthworks activities.
- 2.19.8 In addition to safety and quality problems associated with carrying out earthworks operations in the wet, there are also environmental implications. These can include increased risk of silt entering watercourses, mud spreading onto local roads and subsequent dust as the mud dries. These environmental risks are managed by the CEMP.
- 2.19.9 West Wales presents challenging weather conditions with a high annual rainfall. The earthworks season normally lasts from April to October, but with the opportunity taken to extend the season as weather conditions permit.

## 2.20 Excavation in Rock

- 2.20.1 An assessment of the available geotechnical information indicates that mudstone is present in the proposed cuttings. The assessments of the ease of excavation undertaken indicate that the Bethel Cutting (Ch. 3,480 to 3,850) would require some ripping to excavate the mudstones. Ripping would be carried out by a large bulldozer with a ripper (a claw pulled behind to break up the material below). For detail work such as trimming slopes and drainage channels, hydraulic breakers would be required.

## 2.21 Drainage

- 2.21.1 Pre-earthworks drainage ditches would be installed along the periphery of excavated slopes. These would ensure that any surface runoff entering the site is directed away from the construction operations to suitable discharge points.

- 2.21.2 Construction of the permanent attenuation ponds would be carried out as part of the pre-earthworks process in order to serve as temporary settlement lagoons, to prevent silt entering watercourses.

## 2.22 Structures

- 2.22.1 The Scheme includes: a bridge to carry the Llanfallteg Road over the proposed Scheme at Ch. 2,800, three underpasses at Ch. 1,700, 2,600 and 3,270, and several smaller drainage underpass structures. They vary in size and form to suit the function. The outline structures design has taken buildability issues and ecological constraints into consideration.
- 2.22.2 Construction of the structures would vary in length up to typically eight months for Llanfallteg Road overbridge. Construction of structures would take place all-year-round as they are less weather susceptible than earthworks operations.
- 2.22.3 The proposed structures, including the underpasses and culverts would have an integral ecological function by assisting in maintaining routes used by native species, for example badger, bats, dormouse and otter. The proposed alignments of dedicated wildlife underpasses connect with known routes or corridors, while other underpasses and watercourse culverts would be oversized, or the alignment modified to enhance their secondary function as a wildlife route. The purpose and ecological mitigation provided by these structures is described in Chapter 8 Ecology and Nature Conservation.

## 2.23 Demolition

- 2.23.1 The Scheme would require the demolition of Trefangor Cottage and the weighbridge at Ffynnon Wood. A detailed method statement would be produced for each structure prior to demolition. In addition to identifying all the safety and environmental protection measures required, this would include investigation for the presence of any hazardous materials which may require special procedures for disposal. If protected species are present suitable licences will be obtained before demolition, if required. Most demolition materials would be recycled.

## 2.24 Roadworks

- 2.24.1 Roadworks activities would include pavement construction, carriageway drainage, kerbing, surfacing, safety fencing, signing, lighting, road markings, cycleway and footways. Pavement construction would be undertaken using conventional pavers and smooth wheeled rollers.

## 2.25 Landscaping and Planting

- 2.25.1 Subject to seasonal and construction constraints, grass seeding and planting would be undertaken as early as possible in the construction programme to ensure the maximum establishment, growth and coverage by the time the five-year aftercare period is completed. Where feasible, any planting that could be satisfactorily completed in advance of construction, would be carried out in the first available planting season. Other areas of planting and seeding would be completed when areas of the Scheme are made available.
- 2.25.2 The Contractor would carry out landscape and environmental maintenance in accordance with the Maintenance Environmental Management Plan (MEMP) for five years following completion of the works.
- 2.25.3 The details of the proposed landscape works are set out in Chapter 9 Landscape and Visual Effects and shown on the Environmental Masterplan in Volume 3 Appendix 2.5.

## 2.26 Water Pollution Control Measures

- 2.26.1 Watercourse protection measures would be needed throughout the construction phase and would be defined in the CEMP. Construction phase operations would be carried out in accordance with the Environment Agency's Pollution Prevention Guidelines PPG6. This guidance was withdrawn in 2015 but is still applicable because it represents good practice.
- 2.26.2 A Pollution Control Contingency Plan would be prepared as part of the CEMP, which will set out details of measures to protect watercourses would include the following:

- a) Partial construction of the attenuation ponds would be carried out as an early activity to provide pollution control / silt settlement areas for site runoff during construction.
- b) All fuel, oil and chemicals would be stored in bunded areas.
- c) All plant and equipment would be stored and fuelled away from pollution sensitive areas.
- d) An emergency spill team would be established onsite.
- e) Designated washout bays would be established for concrete delivery lorries.
- f) There would be no pumping into controlled waters without a Discharge Consent from Natural Resources Wales.
- g) Areas of bare soil would be kept to a minimum and silt fences used to control runoff.

## 2.27 Dust and Air Pollution

2.27.1 Standard good practice mitigation measures would be adopted during construction. Pollution Control Contingency Plan will be prepared as part of the CEMP and would include:

- a) Use of water bowsers during dry and/or windy conditions to damp down haul roads, material stockpiles and unsurfaced areas.
- b) Restricting vehicle speeds on unsurfaced routes.
- c) Regular use of road sweepers around access points to working areas.
- d) Daily visual inspections of sensitive locations.

## 2.28 Construction Noise

2.28.1 All construction noise levels would be the subject of a Section 61 consent agreed with the Environmental Health Officer of PCC.

2.28.2 In order to minimise the disruption caused by construction noise, standard good practice mitigation measures would be adopted in accordance with BS 5228-1:2009 and BS 5228-2:2009 Code of Practice for noise and vibration on construction and open sites. They would be defined in the CEMP and would include:

- a) Early erection of noise bunds and permanent screening where practicable.
- b) Use of modern, silenced, well maintained plant.
- c) Limitations on working hours

## 2.29 Temporary works and Facilities

### Construction Workforce

- 2.29.1 During the construction phase, the number of people expected to be working onsite is anticipated to average 50 with an estimated peak of 100. This peak is predicted to occur when the construction works are at the greatest extent with a wide range of trades required to carry out earthmoving, rock excavation, construction of Llanfallteg Road bridge, drainage works, pavement construction, plant maintenance, surveying and office-based support staff. The site compound would be adequately sized to fully accommodate the welfare requirements office space and car parking capacity for this peak workforce.
- 2.29.2 It is anticipated that most of the labour force would be sourced locally. However, some specialist or skilled labour may be from outside the locality. Where possible, local subcontractors would be employed.

### Site Compound

- 2.29.3 The site compound would be located centrally along the length of the Scheme with direct access off the existing A40, avoiding wooded areas. The location would be away from the main centre of the village to minimise disturbance to residents and taking account of environmental constraints to minimise or avoid environmental impacts. The compound would contain the main construction site office, stores, plant maintenance facilities, welfare facilities and car parking. All offices, compounds and storage areas would be secured against theft and vandalism through the provision of fencing, lighting, CCTV, mobile and fixed security personnel as appropriate to the location.
- 2.29.4 Site cabins would also be located adjacent to the various remote structures.
- 2.29.5 Following completion of the works, or a temporary site is no longer require, the contractor would remove all structures and restore ground profiles to match the original. All accesses from the public road will be restored to the original form. Soiling of restored surfaces would be carried out using the original topsoil stripped from the site and stored nearby. Additional topsoil would be available to provide an increased depth over the original, if the landowner approves. Subsoil cultivation,



topsoil spreading, drainage, planting and seeding will be carried out by the contractor.

### Site Access and Site Traffic

- 2.29.6 Main site access points would be established where the proposed road corridor meets existing roads, at:
- a) A487 north of Penblewin Roundabout
  - b) Existing weighbridge layby.
  - c) North-east of Ffynnon Wood.
  - d) Llanfallteg Road overbridge.
  - e) North-west of Bethel Chapel
- 2.29.7 Internal site haul roads would be developed to enable deliveries to access their destination within the site and minimise site traffic interface with the public. All site access points would be clearly signed on the road network.

## 2.30 Haulage of Materials

- 2.30.1 The following paragraphs summarise the categories of material and the approximate volumes. Chapter 16, Materials, provides the assessment of site-won and imported materials and waste.

### Site-won materials

- 2.30.2 The intention is to maintain a balance between the volume of material excavated from cuttings and the volume used to form embankments. Haulage of the site-won material will be substantially contained within the construction site. The intention is to carry all site won material on haul roads formed within the site boundary with minimal use of local roads.
- 2.30.3 Approximately 38,500 m<sup>3</sup> of topsoil will be stripped from the site and as will be reused on areas where topsoil is to be replaced. The majority of grassed areas within the scheme will be seeded onto cultivated subsoil with no topsoil provided. Surplus topsoil, which is a valued resource, will be reused elsewhere for restoration of land taken for temporary use, or for agricultural land improvement. Surplus topsoil will be transported from site for reuse elsewhere.

- 2.30.4 Approximately 313,500m<sup>3</sup> of hard and soft materials would be excavated. All material is expected to be reused in the proposed earthworks, for example in the formation of embankments.

### Demolition materials

- 2.30.5 Potential waste material would arise from the demolition of Trefangor Cottage and the weighbridge. The contractor responsible for demolition of these structures would recover materials for recycling or reuse to minimise the volume taken to landfill. Where feasible materials such as brick and concrete would be processed for use as fill or aggregate within the Scheme.

### Materials brought to site

- 2.30.6 The main materials that would be transported onto site in bulk have been estimated following several preliminary design iterations. Table 2.6 summarises these bulk quantities.

Table 2.6 Bulk quantities to be transported to site

Material	Volume	Numbers of loads
Drainage Stone	13,000m <sup>3</sup>	975
Concrete	2,160m <sup>3</sup>	400
Subbase	25,600m <sup>3</sup>	2,880
Pavement	15,500m <sup>3</sup>	1,740

- 2.30.7 These preliminary quantities result in an estimated 6,000 loads delivering to the site over the 18 months construction period i.e. 12,000 vehicle movements (6,000 full and 6,000 empty). Based on 23 working days in a month, the average truck movements are estimated at 28 per day.
- 2.30.8 Imported materials would be delivered via the closest site access point to the point of work and from there proceed on site haul roads.

## 2.31 Traffic Management

- 2.31.1 The requirements for traffic management have been carefully considered to minimise the disruption to road users during construction. Throughout the construction period all the existing routes would remain open and access would be maintained to all properties along the route.

The locations mentioned in this section can be found on the General Arrangement drawing in 2.6 A, B and C.

- 2.31.2 During normal working, one lane would be maintained in both directions on the A40. During the creation of the tie-ins at each end and the on-line reconstruction through Ffynnon Wood, there would be short-term requirements for single lane working controlled by traffic lights. Where required, they would be manually operated to minimise delay.
- 2.31.3 A speed limit would be imposed on all sections of public road passing through a work site to ensure the safety of the road users and workforce.
- 2.31.4 There would be four main impact areas:
- a) Online improvement of the A40 at Ffynnon Wood.
  - b) Reconfiguration of the Penblewin Roundabout at the western end of the Scheme.
  - c) Tie-in and reconstruction of the A40 near the new Bethel Chapel roundabout at the eastern end of the Scheme.
  - d) Llanfallteg Road crossing the offline improvement of the A40.
- 2.31.5 Llanfallteg Road would be transferred onto a temporary alignment to the west allowing the new overbridge to be built before transferring back onto its existing alignment.

## **2.32 Temporary requirement for land during construction**

- 2.32.1 The draft Orders include some areas of land required for use on a temporary basis for the duration of construction and for a period after. These areas would be required to provide access and working space. This land is included to ensure that the Scheme would be built safely and efficiently, while minimising the environmental impacts.