



Llywodraeth Cymru
Welsh Government

Llywodraeth Cymru / Welsh
Government

A487 New Dyfi Bridge

Environmental Statement –
Volume 1: Chapter 18 Conclusion

900237-ARP-ZZ-ZZ-RP-YE-00021

Final issue | September 2017



Contents

	Page
18 Conclusion	1
18.1 Introduction	1
18.2 Scheme	1
18.3 Alternatives Considered	2
18.4 Policy Context	3
18.5 EIA Approach	3
18.6 Air Quality	4
18.7 Cultural Heritage	5
18.8 Landscape and Visual	6
18.9 Nature Conservation (Ecology)	8
18.10 Geology and Soils	10
18.11 Materials	11
18.12 Noise and Vibration	14
18.13 Effects on Travellers	15
18.14 Community and Private Assets	17
18.15 Road Drainage and the Water Environment	19
18.16 Assessment of Cumulative and Inter-related Effects	22
18.17 Mitigation Measures	24

18 Conclusion

18.1 Introduction

18.1.1 This Environment Statement (ES) has reported on the EIA undertaken for the Scheme and has been carried out in accordance with current legislation and guidance.

18.1.2 It has highlighted impacts associated with the Scheme under a number of environmental topic headings and also describes how adverse impacts will be avoided or mitigated.

18.1.3 The Scheme supports the national, regional and development planning policy that have been outlined in Section 4 and described within the individual specialist topic chapters. On the 16 July 2015, the Welsh Government's National Transport Finance Plan 2015 was published. The plan sets out a timetable of delivery, estimated expenditures and sources of funding for the Welsh Government's key transport projects to support their economic and social priorities. The Plan lists A487 Pont-ar-Dyfi as scheme reference R23 under "New Road Infrastructure – Schemes to be Constructed" with a delivery period of 2015 – 2020.

18.1.4 This chapter summarises the findings of the environmental topics which have been assessed and which are reported in Chapters 6-15 of this ES.

18.2 Scheme

18.2.1 The Scheme would be 1200m in length providing a new A487 trunk road crossing of the Afon Dyfi north of the town of Machynlleth.

18.2.2 The Scheme would commence just north of the existing rail bridge and slopes up on embankments to a new junction with the existing A487.

18.2.3 The new A487 would continue to rise before passing onto a 725m long viaduct and bridge structure.

18.2.4 The viaduct consists of a new section of single carriageway road, with a typical overall width of 14.3m. The typical carriageway width would be 9.3 m (excluding verges), which would consist of two 3.65 m wide lanes, with a 1 m hard strip on either side of the carriageway. In addition, the typical cross section would include 2.5 m grass verges along both sides of the Scheme, increasing in width to accommodate forward visibility requirements as required. The typical carriageway width would be the same on the proposed structures across the floodplain and river, although

with a reduced verge width on the eastern side of the carriageway from 2.5 m to 0.6 m on the viaduct and bridge. The viaduct would accommodate a shared footway/cycleway and associated 1.4m high parapet.

18.2.5 After crossing the floodplain the viaduct would reach its highest point above ground level (9m) at the new Dyfi Bridge, located approximately 480m upstream of the Pont-ar-Ddyfi.

18.2.6 The new stretch of A487 would then tie back in with the current road way at a new junction with the extended A493.

18.2.7 Protective flood bunds would be constructed to reduce flooding to the Eco-park and Cambrian Line Railway Bridge at northern edge of Machynlleth.

18.2.8 A section of traffic calming will be introduced by constructing build-outs on the A493 immediately north of Pont-ar-Ddyfi near Pen-y-Bont Cottages. Give Way lines will create a priority single lane requiring westbound traffic to give priority to opposing eastbound traffic.

18.2.1 The existing A487 south of Pont-ar-Ddyfi would be de-trunked and a no-through route formed by installing a line of bollards on both the north and south side of Pont-ar-Ddyfi. Access to the section of de-trunked A487 south of the river would be provided from the new southern T-junction located opposite to the Dyfi Eco Park.

18.2.2 The Scheme would introduce restrictions to the use of Pont-ar-Ddyfi, by means of Traffic Regulation Order, restricting use to Non-Motorised Users (NMUs) and emergency access for authorised vehicles (subject to weight restriction) during times of flood only.

18.2.3 The Scheme will require the permanent acquisition of 6.45 hectares (ha) of land, including land beneath the proposed viaduct. The Scheme will also require temporary land take of 2.7 ha and 1.1 ha of land take for rights of access.

18.2.4 Chapter 2 of the ES provides a full description of the project.

18.3 Alternatives Considered

18.3.1 Chapter 3 of the ES covers project alternatives in full. Options for the Scheme and other associated transport measures were appraised as part of the Scheme Appraisal using the Welsh Transport Appraisal Guidance.

18.3.2 Options were appraised against agreed transport Planning Objectives, criteria relating to Welsh Impact Areas and other criteria relating to public and stakeholder acceptability, feasibility,

risk and affordability. The Welsh Impact Areas represent the three elements of sustainability which underlines policy in Wales

- The economy
- The environment, and
- Society

18.3.3 Thirty-four different alternatives were considered as part of the study comprising options such as traffic lights, a Machynlleth bypass and a second parallel bridge for one-way traffic on each bridge. As well as this, upgrades of alternative routes and the possibility of a tunnel were all considered.

18.3.4 Following stakeholder consultation, four options were recommended to be taken forward for further appraisal.

18.3.5 Ultimately four alternatives other than the current Scheme were finally appraised:

- A new crossing 200m upstream;
- A new crossing 200-500m downstream;
- Widening and strengthening, flood mitigation and the raising of the A487; and
- Widening and strengthening plus flood mitigation.

18.3.6 The alternatives considered above were rejected due to their negative engineering and environmental impacts.

18.4 Policy Context

18.4.1 The Scheme largely supports those national, regional and development planning policy outlined in Chapter 5 and described within the individual specialist topic chapters. Under new road schemes to be constructed, scheme reference R23 is 'A487 Pont-ar-Dyfi' with a delivery period of 2015 to 2020 within the National Transport Finance Plan for Wales (August 2015).

18.5 EIA Approach

18.5.1 The legislative framework for EIA is set by the EIA Directive (European Directive 2011/92/EU, as amended). As set out in Chapter 1 Section 1.4 of this ES, the requirements of the EIA Directive for highway schemes are transposed by the Highways Act 1980, as amended by The Highways (Assessment of Environmental Effects) Regulations 1999 and The Highways (Environmental Impact Assessment) Regulations 2007 (collectively referred to hereafter as the EIA Regulations).

18.5.2 EIA is the process of identifying and assessing the significant effects likely to arise from a proposed development. The process

requires consideration of the likely changes to the environment, where these arise as a consequence of the proposed development, through comparison with the existing and likely future baseline conditions in the absence of the proposed development.

18.5.3 Scoping is a critical stage early in the EIA process. Scoping is used to identify the issues to be considered in detail during the EIA process for a particular project. Although not a statutory requirement, scoping is an important preliminary procedure, which sets the context for the EIA.

18.5.4 A draft Environmental Scoping Report was issued to Statutory Environmental Bodies and other key stakeholders in September 2015. The purpose of the Environmental Scoping Report was to provide an opportunity to outline surveys to be undertaken, to identify and assess the key environmental impacts and issues of concern, identify the proposed scope of the EIA process and to set out the proposed assessment methodologies for comment. It also identified areas proposed to be scoped out of the assessment. This ensured that all the relevant environmental information would be presented in this ES.

18.5.5 The following sections summarise the findings of the environmental topics which have been assessed and which are reported in Chapters 6-15 of this ES.

18.6 Air Quality

18.6.1 The assessment has examined the potential effects of the Scheme on air quality during construction and the operation phase. A review of current air quality legislation and existing policy has been undertaken.

18.6.2 A baseline assessment concluded that air quality objectives are currently being met and pollutant concentrations are low. There are no AQMAs close to the Scheme. The assessment considered pollutants of Particulate Matter (PM₁₀) and Nitrogen dioxide, as they are primarily associated with road traffic.

18.6.3 During construction, the sensitivity of the area to dust soiling has been assigned as medium, due to the presence of a sensitive receptor within 20m of any dust generating activity. For trackout, which includes consideration of sensitive properties along the road network within 500m of the construction site itself, the sensitivity of the area has been classified as high due to the presence of more than 10 sensitive receptors within 20m of the A487. Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as medium risk for dust soiling for all activities at worst.

- 18.6.4** During construction, the projected background PM₁₀ concentrations in the 1km by 1km grid squares where the Scheme is located are between 9.9µg/m³ and 10.7µg/m³, which falls below the 24µg/m³ threshold. The sensitivity of the area to human health impacts has therefore been assigned as low.
- 18.6.5** During operation for NO₂ the majority of changes are either minor beneficial or negligible, with one moderate beneficial change in 2019 and three moderate beneficial changes in 2034. For PM₁₀ all changes in years are considered negligible. There are no adverse effects predicted for either NO₂ or PM₁₀ concentrations as a result of the Scheme.
- 18.6.6** As no exceedances of air quality objectives were observed across the study area, no mitigation is required for the operational phase. At the construction stage, the dust emitting activities assessed can be greatly reduced or eliminated by applying the site- specific mitigation measures for medium risk sites according to the IAQM guidance.
- 18.6.7** It is concluded that, with mitigation measures appropriate for a medium risk site in place, there is likely to be no significant effect from the dust generating activities on site during construction. Potential impacts during the operation phase of the Scheme have been assessed to be not significant as modelled pollutant concentrations are well below air quality objectives.

18.7 Cultural Heritage

- 18.7.1** Within the study area for the cultural heritage assessment there are two Scheduled Monuments (Pont-ar-Dyfi and Ffridd round barrows) and twenty seven Listed Buildings including the Pen-y-Bont cottages immediately north of the Pont-ar-Ddyfi. The Machynlleth Conservation area is also within the study area.
- 18.7.2** Construction would take place within the setting of the listed Pen-y-Bont cottages immediately to the north of the listed and scheduled Pont-ar-Ddyfi, Pont-ar-Ddyfi itself, and the scheduled Ffridd round barrows. The movement of plant and other construction activities would, from some views, result in a temporary adverse impact that is considered to be minor adverse.
- 18.7.3** The non-designated Pont-ar-Ddyfi milestone, has been identified within the area that could be directly affected by the Scheme. Possible direct impacts upon this asset would be avoided by removal of the milestone under archaeological supervision prior to the commencement of construction and replacement following completion. As a result there would be no change to this asset, and a neutral effect.

- 18.7.4** The non-designated Pont-ar-Ddyfi platform lies within the construction area, and would likely be destroyed by the proposed works. This would be a major adverse impact on a low importance asset, resulting in a slight adverse effect.
- 18.7.5** The Scheme would result in slight adverse effects upon buried archaeological remains during construction. Based upon the slight adverse effects identified upon buried archaeological remains, it is proposed that preservation by record would be appropriate mitigation for these impacts. An archaeological watching brief would be maintained in areas of topsoil stripping.
- 18.7.6** There would be no change to the Machynlleth Conservation area as this has no intervisibility with the Scheme.
- 18.7.7** The Scheme would result in beneficial effects upon the setting of the Pont-ar-Ddyfi and Pen-y-Bont cottages due to the reduction of existing traffic during operation as a result of re-routing and the one-way flow A493 traffic calming measures. The physical structure of Pont-ar-Ddyfi will also be safeguarded by the restriction to permitted vehicles (subject to appropriate weight limit) traffic at times of flooding only.
- 18.7.8** The Scheme would result in a slight adverse effect on the setting of the scheduled, high value, Ffridd round barrows. The proposed T-junction would be visible from the barrows but would not substantially alter their current rural setting and views across the valley.

18.8 Landscape and Visual

- 18.8.1** The Scheme is within a sensitive landscape designated for its rare and distinctive qualities including its natural beauty and recreational value the cultural setting of the Pont-ar-Dyfi historic river crossing and the Millennium Cycle Bridge. Landscape designations include; Snowdonia National Park, Snowdonia National Park International Dark Skies Reserve and the Dyfi Biosphere Reserve.
- 18.8.2** There are numerous highly sensitive visual receptors in the local area, but wider visibility is relatively limited owing to the distinctive topography of the steep sided valley. Sensitive visual receptors include; users of National Cycle Routes 8 and 82, the Wales Coast Path, well-used local footpaths, anglers on the Afon Dyfi, people enjoying the settings of the Scheduled Monument Pont-ar- Ddyfi, passengers on the Cambrian Line Railway, and local residents.
- 18.8.3** During the construction phase, the character of the local landscape would be subject to slight to moderate adverse effects due to the elevated nature of the structure.

- 18.8.4** The character of local landscape of the Dyfi Valley and the area immediately to the north of the Afon Dyfi around the northern junction would receive:
- Significant short-term, temporary and reversible effects arising from the construction phase; and
 - Significant medium-term effects during the first 15 years of the Scheme's operational life, before mitigation establishes.
- 18.8.5** The most significant visual effects as a result of the construction and early operation of the Scheme will be felt by recreational receptors within 100m. These include users of the Wales Coast Path, National Cycle Network routes 8 and 82 and local footpaths. There are also a handful of private dwellings within 100m of the Scheme including a dwelling on the A493 to the north of the Scheme and a single dwelling at the entrance to Dyfi Eco Park. These receptors will receive significant medium-term effects on their visual amenity until mitigation planting becomes established.
- 18.8.6** The Scheme has benefitted from an iterative design and assessment process through which mitigating features have been embedded into the Scheme to avoid or reduce effects at source. Given the character of the landscape and the large scale, yet elegant, simple and 'light-touch' nature of the Scheme, the emphasis of the landscape design has been on integrating the Scheme into the local landscape and to respect and enhance its character and quality. Screening has only been used sparingly at the northern and southern junctions where it fits with the character of existing vegetation. The proposed landscape mitigation measures are shown on the Environment Masterplans at Figure 8.9, Volume 2.
- 18.8.7** Residual landscape and visual effects have been assessed taking account of the mitigating effect of the proposed landscape mitigation once it has had 15 years to establish.
- 18.8.8** A significant residual landscape effect would be on the character of the Afon Dyfi landscape character area within 200m of the scheme. This would be adverse and of a moderate level.
- 18.8.9** Receptors of significant residual adverse visual effects include:
- Large effects on walkers, anglers and cyclists within 100m of the Scheme using the Wales Coast Path, National Cycle Network Routes 8 and 82, the Millennium Footbridge and Public Rights of Way.
 - Moderate effects on walkers and anglers using the public right of way within 250m to the east of the Scheme.
 - Moderate to large effects on residents in property off the A487 to the east of Pen-y-Bont.

18.8.10 All other landscape and visual receptors assessed are predicted to receive lower levels of effect, below the significance threshold of 'moderate'.

18.9 Nature Conservation (Ecology)

18.9.1 The Scheme and study area is located approximately 4.6km north east of a number of designated sites.

18.9.2 The Dyfi Estuary / Aber Dyfi SPA which includes the estuary, adjoining saltmarsh, marshy and improved grassland is a site of importance as a traditional wintering area for Greenland white-fronted goose, representing at least 1% of the wintering population in the UK.

18.9.3 Cors Fochno and Dyfi Ramsar site comprises the Dyfi Estuary, calcareous dune systems and raised mire. The flora and invertebrate fauna are of national importance, and the site also designated for overwintering Greenland white-fronted goose and is a key site in Wales for breeding waders. It also contains nationally important and Red Data Book lower plant species, dune slack and shingle bryophyte assemblages, dune fungal assemblages and a mire bryophyte assemblage.

18.9.4 The Pen Llŷn a'r Sarnau SAC and the Dyfi SSSI, designated for its geological and biological features, has important populations of invertebrate species and has a wide range of breeding and wintering birds; the site is used by a nationally significant population of approximately 5000 over-wintering wigeon (*Anas penelope*), and a flock of approximately 140 Greenland white-fronted geese use the site as the only regular wintering population in Wales.

18.9.5 The nearest SAC designated for bat species is the Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionydd Oakwoods and Bat Sites SAC, which is located approximately 15km from the Scheme.

18.9.6 The study area is located within the Dyfi Biosphere Reserve. Biosphere Reserves have been set up by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) to promote solutions for reconciling the conservation of biodiversity with sustainable use of the area.

18.9.7 An Extended Phase 1 habitat survey was undertaken. The area to the north-east of the Study Area (north of the cycle bridge over the Afon Dyfi) comprises areas of improved and poor semi-improved grassland, grazed by sheep.

18.9.8 The Afon Dyfi intersects the Study Area and is bordered by areas of broad-leaved woodland, scattered scrub, improved and poor-semi-improved grassland and shingle beaches. Japanese

knotweed and Indian balsam are widespread along the course, mainly throughout the woodland area on the northern bank.

- 18.9.9** The area to the south of the Millennium Cycle Bridge and the Afon Dyfi consists of improved and poor semi-improved grassland on the floodplain of the river. This area is subject to heavy grazing and contains areas of marshy grassland and flush within semi-improved and improved fields. Fields within the centre of the Study Area are bordered by fence lines with scattered broad-leaved trees and scattered scrub, and defunct species-rich hedgerows.
- 18.9.10** The fields on the western boundary of the Study Area are bordered by intact species-rich hedgerows, running along both sides of the A487.
- 18.9.11** There are a number of ponds and ditches throughout the Study Area, located at field boundaries within hedgerows and fence-lines with trees. There is a canalised roadside ditch running along the A487 on the western site boundary. The Extended Phase 1 Survey identified areas within the Study Area which have the potential to support a number of legally protected species including:
- Breeding birds;
 - Badger;
 - Otter;
 - Water voles;
 - Bat foraging and roosting;
 - Dormice;
 - Reptiles;
 - Amphibians; and
 - Hedgerow.
- 18.9.12** The construction of the Scheme is predicted to give rise to significant impacts on ecological receptors in the absence of mitigation. These include habitat features of the Pen Llyn a'r Sarnau situated within the Dyfi Estuary, water bodies, bats populations, otters, badgers and a species of 5-spot ladybird.
- 18.9.13** Construction mitigation including pollution prevention, sensitive vegetation clearance, construction methodology and landscape planting are proposed which reduce these impacts to levels that are not significant.
- 18.9.14** In terms of enhancement, wild flower grassland planting will be provided along the existing A487 and on embankment slopes. In addition, there will be provision of interceptors and isolation

devices on the Northern Drainage catchment which will improve habitat quality.

18.9.15 The creation of habitats through the proposed landscape planting will provide further habitat enhancement over and above the areas of that will be lost to the Scheme during construction. The mitigation measures and enhancement measures resulting from the Scheme proposals will ensure ecosystem resilience by maintaining and increasing the extent of grassland, woodland, scrub and hedgerow habitats and connectivity between these habitats. This contributes to the requirements of Section 6 of EWA 2016 and to the UK BAP, Local BAP and TREBAP plans.

18.9.16 The operation of the Scheme is predicted to have potential impacts on water quality, horseshoe bats and badgers which require mitigation. Mitigation measures including petrol interceptors, further planting and a mammal underpass are proposed which reduce these impacts to levels that are not significant.

18.10 Geology and Soils

18.10.1 The baseline review indicated the site to be located in a floodplain of the Afon Dyfi with the underlying geology comprising poorly defined superficial deposits of fluvial alluvium and glacial till over the bedrock of the Borth Mudstone Formation.

18.10.2 The key geological/geomorphological features include:

- Potential presence of former channel alignments in the central part of the scheme.
- Some minor rock exposures present in the northern scheme area along the existing A487.

18.10.3 These are considered to be of low sensitivity.

18.10.4 There are no statutory or non-statutory geological sites within the study area, with the northern end of the scheme located within the Snowdonia National Park. However, the scheme lies within the Dovey GLA and the northern part on the Moal Maesywerngoch GLA. Due to their local importance these are considered to be of low sensitivity.

18.10.5 The Scheme lies within an area identified as a potential source of sand and gravel, however these resources are currently not explored and in accordance with the local policy no new exploration permits will be granted.

18.10.6 No hazards relating to past mineral exploration have been identified. The ground within the study area has a potential for compressible soils and landslide stability hazards have been identified at the northern end of the Scheme.

18.10.7 The assessments indicate that the construction activities associated with the construction of the embankments, viaduct and general earthworks would have a neutral to slight effect on the underlying geology and geomorphology. The earthworks in the northern end of the Scheme would have a slight beneficial significance of impact on the underlying geology due the increased slope stability and creation of rock exposures along the cutting.

18.10.8 Generally, the construction works would have a neutral to slight adverse effect on land contamination issues in relation to the identified human and environmental receptors. Although no mitigation measures would be considered necessary, the risk to the identified receptors could be further limited by the development of an action plan in relation to encountering unexpected contamination. Investigations into the groundwater quality in the northern part of the scheme would be required to inform the design of temporary works primarily associated with dewatering activities.

18.10.9 Generally, the operation of the Scheme would also result in a neutral to slight significance on the underlying geology and geomorphology and land contamination. As with the risks arising from the construction activities, no mitigation measures would be considered necessary during the scheme operation, however the risk to the identified receptors could be further limited by implementation of appropriate controls for the reuse of materials and undertaking foundations works risk assessment.

18.11 Materials

18.11.1 The Scheme has the potential to generate local effects during the construction and operational phase. This is due to:

- The requirement for the import of construction materials (including primary aggregates); and
- The generation of excess materials requiring removal from site to alternative sites or landfill.
- The assessment of the environmental effects associated with the use of material resources and the generation and management of waste resulting from the construction of the Scheme has taken into account the following.
- Types and quantities of materials associated with the construction and operational phases of the Scheme;
- Types and quantities of waste arisings associated with the construction and operational phases of the Scheme including invasive non-native species;

- Movement of materials during construction (both to and from the Scheme);
- The carbon footprint of the scheme, and
- Storage of materials during construction.

18.11.2 There is a net import of construction materials required for the Scheme, which could have an impact on material sources. Materials would be imported from established local suppliers who regularly provide materials to commercial project and therefore the sensitivity of the source is considered to be low. The quantities of the common construction materials required, however, are relatively large in the context of the material suppliers and therefore the magnitude of impact is assessed to be moderate adverse. The significance of effect from construction on the material sources is considered to be slight adverse.

18.11.3 The source of the primary material to be used from-on site is considered to be of low importance as this is within the physical scope of the proposed development and the ground has been assessed. The magnitude of impact on the source of primary materials is considered to be moderate adverse. The significance of impact on the source of raw materials is therefore considered to be slight adverse. The on-site waste management facility will consist of various skips to cater for the different waste streams. It is unlikely that any crushing or screening facilities would be required, as the excavation quantities are likely to be limited. Where possible, materials from haul roads / crane and piling platforms will be re-used within the works or for accommodation works.

18.11.4 The sensitivity of the on-site waste management and construction compound areas is considered to be low. The waste will be removed from the site on a regular basis, so as to ensure that a build-up of waste and contaminants does not occur. The magnitude of impact on the on-site waste management infrastructure is therefore considered to be negligible adverse. The significance of impact is considered to be neutral to slight adverse.

18.11.5 The sensitivity of the off-site waste management infrastructure is considered to be low. The likely quantities of excess materials requiring disposal are relatively small and therefore the magnitude of impact is assessed to be minor adverse. The significance of effect on the waste management facilities is therefore slight adverse.

18.11.6 The impact of the material resources and waste arisings during the operational phase of the Scheme is not known at this stage, but is likely to be minimal. Disposal of waste will be limited and

the Site Waste Management Plan will measure and monitor the quantities and area for disposal.

- 18.11.7** Due to the limited quantity of materials during the operation phase, the magnitude of impact on material sources is considered to be negligible adverse and the significance of impact is considered to be neutral / slight adverse.
- 18.11.8** The residual maintenance materials i.e. waterproofing spray and resurfacing materials will be processed off site for re-use. The materials that are likely to be replaced will not be appropriate for re-use and will therefore be distributed at a local waste and/or recycling compound facility. The facility used would be an established facility and is therefore considered to have low sensitivity. The quantities of materials will be relatively small and therefore the magnitude of impact is assessed to be minor adverse. The significance of effect from operation and maintenance is therefore neutral or slight adverse.
- 18.11.9** It is considered that the generation of waste during the operation and maintenance regime would not have a significant effect on the regional capacity. The sensitivity of the receptor is considered to be low. The magnitude of impact on the regional capacity due to the limited and infrequent amount of materials that will be required during this phase is considered to be negligible adverse. The significance of effect is therefore considered to be neutral.
- 18.11.10** It is anticipated that the transportation of material resources and waste arisings throughout the operation and maintenance regime would not have a significant effect on the local road network and local public road users.
- 18.11.11** The sensitivity of the global climate system is considered to be very high. The magnitude of impact during the operation of the scheme is considered to be negligible due to the minimal amounts of material which will be required and the limited potential for waste arisings. The significance of effect on the global climate system throughout operation and maintenance is therefore considered to be neutral / slight adverse.
- 18.11.12** The likely significance of environmental effects from the use of material sources, and the generation and management of waste, resulting from the construction and operation of the Scheme with mitigation in place is neutral.
- 18.11.13** It is therefore concluded that the use of material resources in the construction of the Scheme would not result in any significant adverse environmental effects.

18.12 Noise and Vibration

- 18.12.1** Residential properties within the study area were identified using Ordnance Survey buildings and address point data. Population data is based on the national average household size.
- 18.12.2** Traffic travelling over the Afon Dyfi from the north of Machynlleth currently passes over the Pont-ar-Ddyfi near residential properties on the north bank of the river. Most of these properties are close to the west side of the Pont-ar-Ddyfi, although there are some residences approximately 130m further east (Y Ffridd Farm).
- 18.12.3** Approximately 500m east of the Pont-ar-Ddyfi, where the Scheme would connect to the existing A487, the Millennium Cycle Bridge crosses the river just south of the existing road as part of National Cycle Route 8. From the Millennium Cycle Bridge, this route continues west along the south river bank to join with the Pont-ar-Ddyfi. Other than the residential uses, the River is used by anglers, and the riverside paths used by walkers and cyclists.
- 18.12.4** Road traffic noise, combined with the noise of the river, affect dwellings and the public paths near to the river.
- 18.12.5** At the southern end of the Scheme is the Dyfi Eco Park which accommodates a range of mainly commercial properties consisting of light industrial and office units. Further south, over the railway, the closest dwellings in Machynlleth are mostly 200m from the Scheme at its closest point (there is a dwelling alongside the station). Noise levels here are affected by local traffic noise and noise from the railway.
- 18.12.6** To the north of the Scheme, the re-routing of A487 trunk road and A493 traffic calming measures reduce the road traffic noise at those properties close to the existing A487 north of the Pont-ar-Ddyfi. Despite the noise reductions, these benefits are assessed as a not significant effect.
- 18.12.7** Further east, where the Scheme re-joins the existing A487 alignment, there are two dwellings, one property to the west of the road (Y Ffridd Farm), and one to the east of the A487 (Glanfechan), the noise of the Scheme would have a minor adverse impact on both dwellings. In the opening year, the dwelling on the west side would be subject to an increase in the 5.0dB+ contour band (major adverse impact) and in the future year increases in the 5.0dB to 9.9dB contour band (moderate adverse impact). On the east side of the road, the dwelling would be subject to an increase in the 1.0dB to 2.9dB contour band (negligible adverse impact) in the opening year, and an increase within the 3.0dB to 4.9dB band in the future year (minor adverse impact).

18.12.8 To the south of the Scheme, the largest noise increases would occur at three dwellings closest to the southern end of the realignment. These are residential dwellings with general locations of:

- On the western boundary of the Dyfi Eco Park;
- South of the railway to the west of the station; and
- Off Ffordd Mynydd Griffiths.

18.12.9 Noise increases would be smaller at more distant properties where there is a greater population density in the town itself. This is assessed as a not significant effect. Dwellings elsewhere in the town would have no noise change in the opening year and increases in the 0.1dB to 2.9dB band in the future year. This is assessed as a not significant effect.

18.12.10 Overall, there are noise decreases where the Scheme is realigned away from housing near the Pont-ar-Ddyfi, and isolated increases at small numbers of properties elsewhere close to the Scheme alignment. During construction, 'Best Practicable Means' mitigation is assumed to control construction noise in the form of low noise emission plant and processes (as specified in BS 5228). Based upon the construction noise assumptions, the assessment has shown that there is unlikely to be significant noise effects around the Scheme during the works.

18.12.11 No significant operational effects were indicated from the assessment based upon the noise change impacts; therefore no additional mitigation is proposed. Also, no properties were found to meet the criteria for the Noise Insulation Regulations. Committed developments on the local road network have been included in the predicted changes in traffic flows. Therefore, the assessment of no operational effects includes cumulative traffic noise effects.

18.13 Effects on Travellers

18.13.1 A number of walking and cycling routes within the vicinity have been identified:

- The Wales Coast Path passes through Machynlleth. The Wales Coast Path is a long-distance footpath which follows, or runs close to, the majority of the coastline of Wales. Within the local area, the route takes a generally north-south direction, crossing the Pont-ar-Ddyfi;
- Glyndŵr's Way is a long distance footpath in mid Wales. It runs for 135 miles (217 km) in an extended loop through Powys between Knighton and Welshpool. The path passes Machynlleth to the southeast;

- Other notable walking routes are promoted by Natural Resources Wales, which are predominately recreational and circular. Whilst there are numerous routes in the area surrounding Machynlleth, none, other than Glyndŵr's Way pass through the town, and none cross the Afon Dyfi at Pont-ar-Ddyfi;
- National Cycle Network Route 8 (NCN 8) - Known as the Lôn Las Cymru, fully open and signed between Cardiff and Holyhead (Anglesey) via Brecon, Builth Wells, Machynlleth, Porthmadog and Bangor. NCN 8 runs along the A487 and crosses the Millenium Cycle Bridge.
- National Cycle Network Route 82 (NCN 82) - Route 82 will run from Bangor to Fishguard when complete. Within the vicinity of the bridge, the route passes over Pont-ar-Ddyfi and west along the A493 and is characterised as an on-carriageway route.

18.13.2 A number of site visits together with user surveys were undertaken to establish the baseline conditions for this range of resources used by Non-Motorised Users.

18.13.3 The Scheme would affect a number of PRowS and cyclepaths along the south bank of the Afon Dyfi and along the A487 at the northern and southern end of the Scheme during construction causing a minor adverse impact. Temporary diversions and crossing places would be provided during the construction phase. These diversion routes will be constructed to the same standard as the existing routes, and will be clearly signed and securely fenced off to prevent access to the construction works.

18.13.4 Once operational, the Scheme would remove traffic along the part of the existing A487 south of Pont-ar-Ddyfi and along the Pont-ar-Ddyfi and its trunk road status would be removed. The Wales Coast Path and NCN Routes 8 & 82 run through this section. The Scheme would accommodate a shared footway/cycleway that pedestrians and cyclists could access. This would have a moderate beneficial effect for pedestrians and cyclists by reducing severance caused by road traffic between residential areas and community facilities and places of employment. This reduction in severance may encourage increased travel by active modes within the area of Machynlleth.

18.13.5 Once operational, a single flow traffic calming measure would be provided along A493 at Pen-y-Bont cottages and will enable a raised footway to be provided along the front of the Pen-y-Bont cottages, and a safer NMU crossing point on the Wales Coast Path and National Cycle Route No.82. The traffic calming measure would have a moderate beneficial effect on the safety of NMUs.

- 18.13.6** The viaduct section of the Scheme will be dominant in the foreground and middle distance of views southeast from the existing A487 south of Pont-ar-Ddyfi. The operational impact on views from the existing A487 south of Pont-ar-Ddyfi is moderate to large adverse along a 200m length of the Existing A487 north of the Dyfi Eco Park.
- 18.13.7** With regard to vehicle travellers, the Scheme would result in a significant raising of the vertical profile of the journey across the valley allowing a much more open viewing opportunity to the surrounding landscape. The form of the new river crossing and any junction features would serve to provide additional visual interest for vehicle travellers, the operational impact on views from the road would be moderate beneficial.
- 18.13.8** The assessment has concluded that the Scheme once operational would result in a reduction in drivers' stress levels due to reduced congestion, enhanced surface quality, reduced frustration and fear of accidents. The Scheme would result in a moderate beneficial effect on driver stress
- 18.13.9** Public transport services and bus stops would continue to function as they do presently and therefore there would be no effects arising from the operation of the Scheme. The Scheme would result in a neutral effect on bus travellers.

18.14 Community and Private Assets

- 18.14.1** The key land use types and private assets within the study area are agricultural land, road infrastructure, commercial and residential.
- 18.14.2** On the north side of the railway and east of the A487 there is a small industrial development known as the Dyfi Eco Park. Between the railway and the Afon Dyfi the land on both sides of the A487 is pastureland. Adjacent to the T- junction on the north side of the existing bridge there is a small hamlet of some 13 dwellings.
- 18.14.3** There are areas of land within the vicinity of the Scheme that are designated for Housing Land Allocation, Employment Allocation, and Community Facilities under the Powys County Council Adopted UDP.
- 18.14.4** Key UDP development designations such as housing land allocation are south of the study area within the town of Machynlleth. There are four sites allocated for housing development within the study area as indicated on Figure 14.1, Volume 2:
- M172 HA1 - Mynydd Griffiths, Phase 2 (0.92Ha.);

- M172 HA2 - Garsiwn (0.15Ha.);
- M172 HA3 - Land to the east of the Vicarage, Newtown Road (0.55Ha.);
- M172 HA4 - OS1546, Aberystwyth Road (1.33Ha.)
- There is one site allocated for employment development within the study area as indicated on Figure 14.1, Volume 2:
- M172 EA1 – Land at Treowain has been allocated as a Special Employment Site (1.35Ha).

- 18.14.5** There are no major planning applications within the study area to consider within this assessment.
- 18.14.6** Agricultural land is provisionally classified as 'Poor' within the Study Area as it is within an area of Grade 4 ALC land.
- 18.14.7** Four farming businesses are within the Scheme's footprint; Y Ffridd Farm, Glanfechan Farm, Marchlyn Farm and a farm business occupying land to the west of the A487.
- 18.14.8** The Scheme would affect a number of private agricultural lands. The greatest impacts would result from the land take at the realigned junctions, flood bund and by the piers for the viaduct. The Scheme would have a moderate-minor adverse effect prior to mitigation on the following farm businesses during both construction and operational stages: Y Ffridd Farm, Glanfechan Farm, Marchlyn Farm and a farm business occupying land to the west of the A487.
- 18.14.9** An agricultural underpass would be constructed at the northern end of the Scheme to allow agricultural practices to continue for the Y Ffridd farm. There will also be agricultural passes throughout the middle section of the Scheme where the piers are situated. The Scheme would have a minor adverse effect on the farm businesses post mitigation during both construction and operational stages.
- 18.14.10** Restricted vehicular access (subject to an appropriate weight restriction) would be provided for landowners south of Pont-ar-Ddyfi, currently Y Fridd, Glanfechan and Marchlyn across Pont-ar-Ddyfi for use in times of flood to enable safe access/ egress. Alternative unrestricted vehicular access would be obtained via the Scheme requiring a minor increase in journey time.
- 18.14.11** The Scheme requires the permanent acquisition of 6.45 hectares (ha) of land, including land beneath the proposed viaduct. The Scheme would also require temporary land take of 2.7 ha and 1.1 ha of land take for rights of access.
- 18.14.12** The Scheme would not impact any land designated as 'open access' land under the CRoW Act, or 'Open Space' within the

Adopted UDP or ‘Community Facilities and Indoor Recreation’ within the Deposit LDP.

18.14.13 No land allocated for housing, employment or retail development under the Powys Adopted UDP or for Housing and Economic Development under the Deposit LDP would be acquired for the Scheme.

18.14.14 As the Scheme does not acquire any land designated for development or Open Space within the Powys UDP, it can be concluded that the Scheme conforms to this plan. There is also no conflict with other policy, legislation or guidance that pertains to private property, land take, land used by the community and development land. Full details of policy, legislation and guidance that has been considered within the ES are provided in Chapter 14.

18.15 Road Drainage and the Water Environment

18.15.1 Surface water features that have been identified within the study area include:

- Afon Dyfi, up to and including the Dyfi Estuary downstream;
- Afon Dulas (North) – a tributary of the Dyfi whose confluence is approximately 500m upstream of the Scheme;
- A drainage ditch that flows parallel with the railway line to the south of the Scheme;
- A drainage ditch that drains the existing highway at the southern end of the Scheme, referred to as the Southern Drainage Ditch;
- Two small watercourses that drain the hillside to the north of the Dyfi, one 150m upstream and one 100m downstream of Pont-ar-Dyfi; and
- A series of drainage ditches and ponded areas on the Dyfi floodplain in/surrounding the Scheme area.

18.15.2 In terms of WFD there are four water bodies with relevance to the Scheme. These are:

- The ‘Dyfi – tidal limit to Afon Twymyn’ river water body, which has an overall status of Moderate with Good ecological status and chemical status failing to achieve good;
- The ‘Dyfi & Leri’ transitional water body, which has an overall status of Moderate with Good ecological status and chemical status failing to achieve good;

- The ‘Dulas North’ river water body, which has an overall status of Moderate with Moderate ecological status and Good chemical status; and
- The ‘Meirionnydd’ groundwater body, which has an overall status of Poor, a quantitative status of Good and a chemical status of Poor.

18.15.3 During the construction phase, following the implementation of mitigation measures and the CEMP, the magnitude of any pollution incident to the Afon Dyfi is likely to be negligible. Therefore, significance of effect is deemed to be neutral.

18.15.4 Additional mitigation measures have been outlined to manage temporary geomorphological risks. These include the following:

- minimising in-channel working, minimising and protecting the extents of excavations and controlling plant trafficking routes;
- excavation for the pier supporting the southern end of the main river span to be kept to a minimum;
- excavation and reinstatement to be carried out to preserve the original structure and extent of the gravel bar;
- plant to be excluded from the area of the gravel bar on the southern bank of Afon Dyfi outside the limits of the excavation;
- excavation for the northern abutment located on the northern river bank of Afon Dyfi and cattle pass to be kept to a minimum;
- Vegetation removal to be kept to a minimum;
- Bare areas exposed during any works to the river banks or by excavation or soil stripping on the floodplain to be protected with temporary measures;
- Plant traffic routes to be kept away from river channel and river banks;
- Works to be carried out under supervision of a geomorphologist.

18.15.5 With these in place, the magnitude of the potential impacts during construction on the geomorphology of the Afon Dyfi is assessed as negligible, with a significance of effect of neutral.

18.15.6 During the construction phase, the magnitude of impacts on the Afon Dulas would be negligible and the significance of effect would be neutral.

18.15.7 During the construction phase, following the implementation of mitigation measures, in the event of a spill or sediment entering

the southern drainage ditch, the magnitude of impact would be negligible and the significance of effect would be neutral.

- 18.15.8** During the construction phase, the magnitude of impacts on the watercourses to the north west of the Scheme would be negligible and the significance of effect would be neutral.
- 18.15.9** During the construction phase, after implementation of mitigation measures and the CEMP (which will include a Surface Water Management Plan), the magnitude of water quality impacts on the Dyfi Floodplain & Railway Drainage Ditches would be negligible and the significance of effect would be neutral. The magnitude of geomorphological impacts, after mitigation, would be moderate adverse, leading to a significance of effect of slight adverse.
- 18.15.10** Groundwater mitigation measures are included in protections to surface water bodies and includes the implementation of a CEMP. As a result, the significance of effects during construction is assessed as neutral.
- 18.15.11** Flood risk mitigation measures during the construction phase would be in accordance with best practice measures and implementation of a CEMP. Therefore, the significance of flood risk effects during construction phase remains unchanged (neutral).
- 18.15.12** During the operational phase, the significance of effects of routine runoff on the water quality of the Afon Dyfi has been assessed as being neutral without mitigation measures in place. Enhancement measures have been included to prevent pollution entering the Afon Dyfi in the event of a tanker spill. With these measures included the magnitude of the potential impact on the Afon Dyfi would be negligible and therefore the significance of effect is assessed as neutral. After the implementation of additional mitigation measures the magnitude of impact on geomorphology during operation would be slight/moderate adverse.
- 18.15.13** During the operational phase, the magnitude of impacts on the Afon Dulas would be negligible and the significance of effect would be neutral.
- 18.15.14** During the operational phase, the significance of effects of routine runoff and accidental spillage on the water quality of the southern drainage ditch has been assessed as neutral. Enhancement measures, in the form of a containment structure and swale, have been included to reduce the effects of a spill. However, based on the criteria in Table 15.4, the significance of effect remains as neutral. Nevertheless, in the unlikely event of a spillage, the enhancement measures would provide

containment, reducing the potential impacts on the water environment.

- 18.15.15** During the operational phase, the magnitude of impacts on the watercourses to the north west of the Scheme would be negligible and the significance of effect would be neutral.
- 18.15.16** During the operational phase, after the removal of temporary construction culverts, the magnitude of water quality impacts on the Dyfi Floodplain & Railway Drainage Ditches would be negligible and the significance of effect would be neutral.
- 18.15.17** During the operational phase, the assessment of effects on groundwater without mitigation measures in place concluded that any impacts would be limited to a 10m radius of the point source at each outfall. No receptors were identified within a 10m radius of Outfalls 2 and 3; therefore, the significance of effects was considered to be slight adverse to neutral, and no mitigation is required.
- 18.15.18** During the operational phase, it is considered that the significance of effect of the Scheme on the Dyfi floodplain is Large/Very Large beneficial. The installation of the flood bund around the Dyfi Eco Park and pumped solution beneath the Cambrian Line Railway Bridge, along with works to increase the flood resilience of properties to the north of Pont-ar-Dyfi would significantly increase the level of flood protection currently provided.

18.16 Assessment of Cumulative and Inter-related Effects

Inter-related effects

- 18.16.1** Inter-related effects are effects from the Scheme on receptors or receptor groups which may be affected simultaneously or concurrently by different environmental effects.
- 18.16.2** The potential for effects from inter-relationships is inherent within the majority of topic assessments and these effects were not repeated within the inter-related effects assessment and were scoped out. The topics where this applies include:
- Cultural heritage;
 - Landscape;
 - Ecology;
 - Geology;
 - Materials;
 - Land use.

- 18.16.3** Receptors that were identified include people living locally to the Scheme and users of PRow and inter-related effects were considered in terms of air, noise and visual effects.
- 18.16.4** There is a low density of dwellings near the existing and new A487 and at the majority of receptors the effect of the Scheme on local air quality and noise is not predicted to be significant.
- 18.16.5** Changes in views from dwellings nearby would result from the introduction of the new section of A487, traffic calming measure and improved highway drainage and would also be a new effect for these receptors. The adverse inter-related effects have been assessed as not being significant to people living near the new A487.
- 18.16.6** Users of Public Rights of Way and other routes near the Scheme during construction may be simultaneously affected by the dust and noise generated during construction activities as well as the visual effects (change in views). Users could also experience a temporary diversion or closure of a route. Such effects would only combine where users of Public Rights of Way are in close proximity to the Scheme's construction activities. The receptors (i.e. the people using the routes) are transient through the landscape along the paths or routes and are unlikely to experience a long term effect. Inter-related effects on people using public Rights of Way during construction are therefore considered to be not significant.
- 18.16.7** During operation, users of Public Rights of Way and other routes may be simultaneously affected by changes in the amount of traffic noise and air quality from the new section of A487 as well as the visual effects (change in views). Users would experience a permanent realignment of a route. Such effects would only combine where users of Public Rights of Way are in close proximity to the Scheme. The receptors are transient through the landscape along the paths or routes and effects are therefore more likely to be felt intermittently. Inter-related effects on people using public Rights of Way during operation are therefore considered to be not significant.

Cumulative effects

- 18.16.8** Cumulative effects are effects of the Scheme together with other developments that are either already built, proposed (but not yet built) or are reasonably foreseeable. Cumulative effects may occur where there is the potential for impacts to overlap by virtue of their geography (spatially) or due to them existing in a common timeframe (temporally).
- 18.16.9** Cumulative developments are considered to be:
- Development under construction;

- Application(s) permitted but which are not yet implemented; and
- Submitted applications not yet determined, and which, if permitted, would affect the proposed development in the scoping request.
- Projects included within development plans which are reasonably foreseeable.

18.16.10 Plans considered within the assessment included:

- Powys Unitary Development Plan (UDP) 2001-2016
- Powys Local Development Plan (LDP) 2011-2026
- Eryri Local Development Plan (2007 - 2022)
- Gwynedd Development Plans;
- Welsh Government National Transport Finance Plan 2105

18.16.11 None of the developments included within the plans were considered to be relevant to this cumulative assessment due to the lack of information available and also due to the distance of the projects from the Scheme. In addition, as none of the proposed developments considered during the desk study exercise have 'a valid planning permission granted by the local planning authority and for which formal EIA is a requirement or for which non-statutory environmental impact assessment has been undertaken' the guidance given within the HA 205/08 suggests that the cumulative impacts of these projects do not need to be assessed.

18.17 Mitigation Measures

18.17.1 A number of measures to mitigate predicted environmental impacts in both the construction and operational phases of the Scheme are outlined in each environmental topic chapter. Where relevant, mitigation measures have been incorporated into the design of the Scheme and are shown on the Environmental Masterplans (refer to Volume 2, Figure 8.9).

18.17.2 It is important that all of the environmental mitigation and enhancement measures which form the basis for the final assessment of effects within each of the environmental topic chapters are taken forward and properly implemented. These mitigation measures are included in the draft Register of Commitments (ROC), which is provided within ES Volume 3, Appendix 17.1 Section 1.5.