A465 Heads of the Valleys
Section 2 Gilwern to Brynmawr

Assessment of Implications on European Sites

Addendum to the Statement to Inform an Appropriate Assessment (SIAA)

and

Statement about Alternative Solutions, Imperative Reasons of Overriding Public Interest and Compensatory Measures (SASICOM)

February 2014

A465 Heads of the Valleys
Section 2 Gilwern to Brynmawr

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Addendum to the Statement to Inform an Appropriate Assessment (SIAA) and Statement about Alternative Solutions, Imperative Reasons of Overriding Public Interest and Compensatory Measures (SASICOM)

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Addendum to the Statement to Inform an Appropriate Assessment (SIAA)

ADDENDUM TO THE STATEMENT TO INFORM AN APPROPRIATE ASSESSMENT PUBLISHED ON 10 October 2013

25 February 2014

In October 2013 a Statement to Inform an Appropriate Assessment (SIAA) was published for the above scheme.

CONCLUSION OF THE PUBLISHED SIAA

The published SIAA contained the following answer and conclusions.

"Can it be ascertained that the proposal will not adversely affect the integrity of the sites beyond reasonable scientific doubt?

7.1.5 Whether the Scheme would have an adverse effect on the integrity of the sites has been determined by assessing whether, following the implementation of the mitigation measures identified in this document, it would affect the achievement of one or more conservation objectives set for the three European Sites considered. As stated above, the Scheme would not affect the achievement of any of the conservation objectives set for the Usk Bat Sites SAC, the Cwm Clydach Woodlands SAC or the River Usk SAC.

7.1.6 There is an extremely small risk of a short term effect on integrity of the Usk Bat Sites SAC due to the inherent uncertainties associated with ecological systems and assessments, in relation to effects on Lesser Horseshoe Bats during the period when replacement planting is maturing. However, on the balance of probability using professional judgement, and taking into consideration the precautionary principle, the risk is considered de minimis and extremely unlikely to occur. Therefore it is considered beyond reasonable scientific doubt that there would be no impact on integrity.

7.1.7 Therefore, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010, it is concluded that there would not be an adverse effect on the integrity of the European Sites considered in this Habitats Regulations Assessment."

DISCUSSIONS SINCE PUBLICATION

Natural Resource Wales (NRW) have questioned whether the conclusion of the original report provides a sufficient level of certainty that an adverse effect on the integrity would be avoided. In particular, on a precautionary basis they view there is reasonable potential for more than a short term drop in the population of Lesser Horseshoe Bats in the Clydach Gorge part of the SAC.

After discussions with NRW as to the reason for their view, Welsh Government has concluded, in line with advice in HD 44/09, that as the relevant Statutory Environmental Body are not in agreement in the level of confidence *in an absence of adverse effects**, on the Usk Bat Sites SAC, then for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis *that it cannot be ascertained that the project will not adversely affect the integrity of the site.** . As such there is a need to proceed to the later stages of Assessment of Implications on European Sites (AIES), namely considering alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and compensatory measures.

REVISED CONCLUSION

Paragraphs 7.1.5 to 7.1.7 of the conclusion of the original SIAA have therefore been amended to read:

"Can it be ascertained that the proposal will not adversely affect the integrity of the sites beyond reasonable scientific doubt?

7.1.5 Whether the Scheme would have an adverse effect on the integrity of the sites has been determined by assessing whether, following the implementation of the mitigation measures identified in this document, it would undermine the achievement of one or more conservation objectives set for the three European Sites considered. As stated above, the Scheme would not affect the achievement of any of the conservation objectives set for the Cwm Clydach Woodlands SAC or the River Usk SAC. The Scheme would also not affect the achievement of any of the conservation objectives set for any features of the Usk Bat Sites SAC, other than potentially for the lesser horseshoe bat feature.

7.1.6 After due consideration of the representations of NRW and further discussion, it remains the view of Welsh Government that there is an extremely small risk of a short term effect on the integrity of the Usk Bat Sites SAC due to the uncertainties associated with ecological systems and assessments, in relation to effects on lesser horseshoe bats during the period when replacement planting is maturing.

7.1.7 For the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 it is concluded that there would not be an adverse effect on the integrity of the Cwm Clydach Woodlands SAC or the River Usk SAC.

7.1.8 *In line with HD 44/09, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that that it cannot be ascertained that the project will not adversely affect the integrity of the site . It is therefore necessary to progress to the next stages of the AIES process – Assessment of Alternative Solutions, with subsequent progression to Imperative Reason of Overriding Public Importance, if it is concluded that there are no feasible alternative solutions, and then to the Assessment of Compensatory Measures if one or more IROPI are identified. The results of these stages are detailed in a separate report.*

Statement about Alternative Solutions, Imperative Reasons of Overriding Public Interest and Compensatory Measures (SASICOM)

1 INTRODUCTION

1.1 Background and Purpose of this Report

1.1.1 This report has been prepared to inform the Welsh Ministers (the 'Competent Authority') of the potential for adverse effects of the proposed upgrade of the existing single three-lane carriageway section of the A465 Heads of the Valleys Road between Gilwern and Brynmawr (referred to as Section 2) to dual carriageway standard (hereafter referred to as 'the Scheme') on the Usk Bat Sites Special Area of Conservation (SAC), the Cwm Clydach Woodland SAC and the River Usk SAC. It provides information on the screening (Stage 1) and appropriate assessment (Stage 2) stages of the Assessment of Implications on European Sites (AIES) process, which have been undertaken previously, and then addresses the following subsequent stages of AIES:

- Assessment of alternative solutions (Stage 3):
- Imperative reasons of overriding public interest (Stage 4): and
- Assessment of compensatory measures (Stage 5).

1.1.2 The Scheme is located between Gilwern in Monmouthshire and Brynmawr in Blaenau Gwent, between the end of a previously improved Section 1 (Abergavenny to Gilwern) at Gilwern to a point north of Brynmawr which will tie into Section 3 (Brynmawr to Tredegar) which commenced construction in 2013. The existing A465 between Gilwern and Brynmawr follows the Clydach Gorge, through which the River Clydach flows eastwards. The Gorge is steep sided and wooded and parts of it are included in the Usk Bat Sites SAC and the Cwm Clydach Woodlands SAC. The River Clydach flows into the River Usk SAC. A description of the existing situation is given in section 1.5.

1.1.3 To enable the Welsh Ministers to make the decision on whether the project can proceed, the AIES process has been undertaken in line with the requirements of the relevant legislation and guidance. The Habitats Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna provides legal protection for habitats and species of European importance. The Directive is transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (hereafter referred to as the 'Habitats Regulations').

1.1.4 Regulation 61 of the Habitats Regulations requires the Competent Authority (in this case, the Welsh Ministers), before deciding to give consent for a plan or project which (a) is likely to have a significant effect on a European site (either alone or in combination with other plans or projects), and (b) is not directly connected with or necessary to the management of that site, to make an 'appropriate assessment 'of the implications for that site in view of its conservation objectives. In the light of the conclusions of the assessment, the Competent Authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site.

1.1.5 However, even if negative impacts on the integrity of the European sites are expected or it cannot be ruled out that there would be no adverse effects on the integrity, under Regulation 62 the Competent Authority may agree to the project if it is satisfied that, there being no alternative solutions, it must be carried out for 'imperative reasons of overriding public interest'. If the project affects priority features then only imperative reasons of over-riding public interest relating to either human health, public safety,

beneficial consequences of primary importance to the environment; or other reasons accepted by the European Commission can be used. If the project is thus consented, Regulation 66 states that 'the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected'.

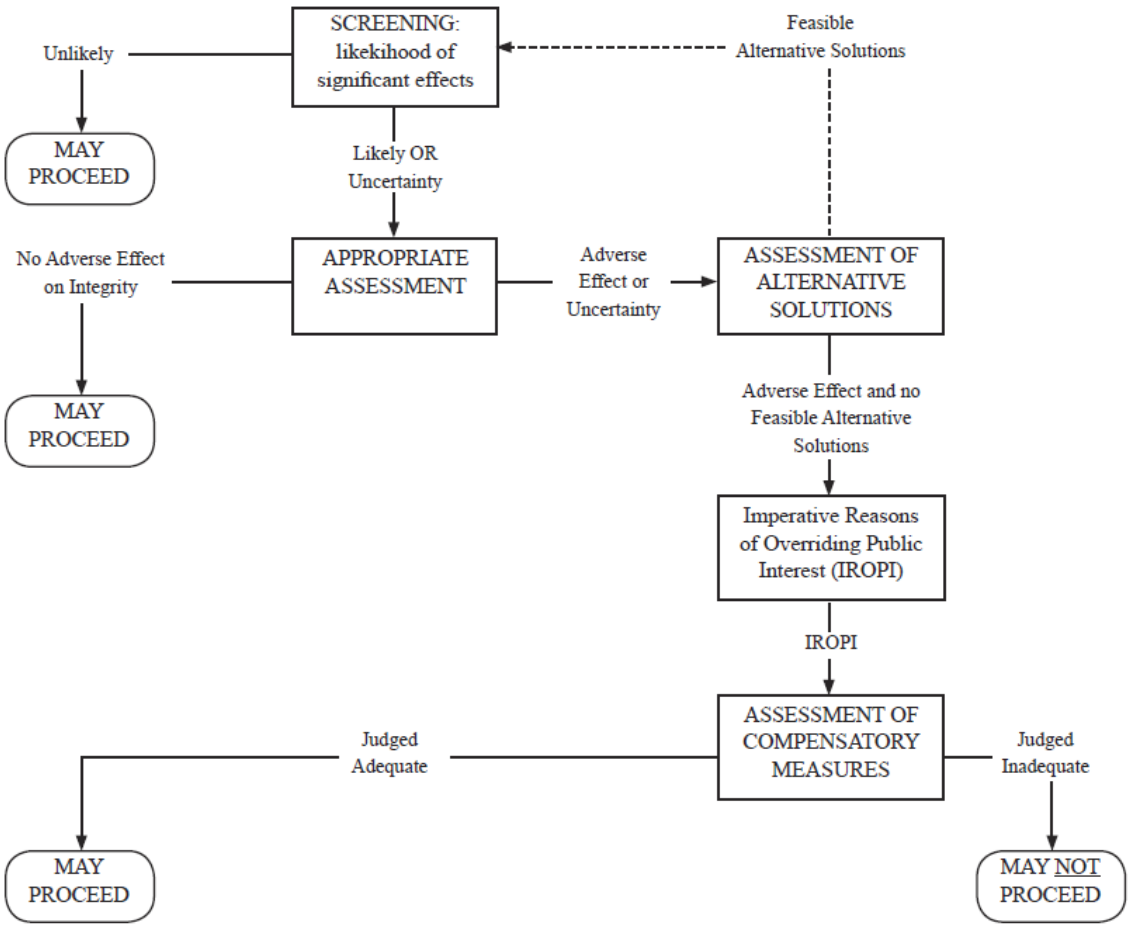
1.1.6 The SIAA concluded that in line with HD 44/09, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that there would be an adverse effect on the Usk Bat Sites SAC. It is therefore necessary to progress to the next stages of the AIES process – Assessment of Alternative Solutions, , in accordance with Regulations 62 and 66.

1.1.7 The purpose of this report is to:

- formally determine whether the proposed Scheme best respects the integrity of the site having considered alternative solutions (taking into consideration the ability of the option to meet the scheme objectives, its feasibility, buildability and cost effectiveness) which has the least impact on the SACs and demonstrate the absence of alternative solutions;
- assess whether or not there are imperative reasons of overriding public interest (IROPI) related to the Scheme; and
- identify the compensatory measures necessary to ensure that the coherence of the Natura 2000 network is protected.

1.2 The AIES process, and results of the AIES to date

1.2.1 The flow diagram below shows an overview of the AIES process as provided within the Design Manual for Roads and Bridges Vol 11, Section 4 HD 44/09: Assessment of Implications (of Highways and/or Roads Projects) on European Sites (including Appropriate Assessment) (HA et al. February 2009)[8] .



Graphic 1.1: Flow Diagram detailing the AIES process

Stage 1 - Screening

1.2.2 A screening exercise was carried out in May 2012, which identified the Scheme could result in likely significant effects on the following European Sites, as reported in the Statement to Inform a Appropriate Assessment (SIAA)[1]:

- Usk Bat Sites SAC
- Cwm Clydach Woodlands SAC
- River Usk SAC

Usk Bat Sites SAC

1.2.3 The screening assessment concluded that the Scheme could result in likely significant effects on the SAC for three interest features, and the potential effects are outlined below:

- **Lesser Horseshoe Bat:** habitat loss – direct land take (roosts); habitat loss – direct land take (foraging habitat); habitat deterioration from aerial emissions during operation; habitat fragmentation by severance of flightlines; disturbance - mortality during construction or operation due to changes in traffic flows / speeds; disturbance - mortality during construction or operation due to disruption of flightlines under

carriageway; disturbance during construction (noise, vibration and lighting); and disturbance during operation (noise, vibration and lighting).

- ***Tilio-Acerion* woodland:** habitat loss – direct land take; habitat loss – indirect deterioration in habitat quality from hydrological changes during construction; and habitat deterioration from aerial emissions during operation.
- **Caves not open to the public:** habitat loss – direct land take; habitat loss – damage to cave systems during construction permanent habitat loss; and effects on Lesser Horseshoe Bat (considered above) and other bat species using the caves, including Greater Horseshoe *Rhinolophus ferrumequinum*, Brandt's *Myotis brandtii*, Whiskered *M. mystacinus*, Natterer's *M. nattereri*, Daubenton's *M. daubentonii* and Brown Long-eared Bats *Plecotus auritus*.

Cwm Clydach Woodlands SAC

1.2.4 The screening assessment concluded that the Scheme could result in likely significant effects for two interest features: Asperulo – Fagetum Beech Forests and Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (Quercion robori petraeae or Ilici- Fagenion) through habitat deterioration – generation of dust during construction and habitat deterioration – aerial emissions during operation.

River Usk SAC

1.2.5 The screening assessment concluded that the Scheme could result in likely significant effects on the SAC for the following interest features, and the potential effects are outlined below:

- **'Water courses of plain to montane levels'**: deterioration in habitat quality from discharge of silt and chemical pollutants to watercourses during construction; and deterioration in habitat quality from discharge of chemicals into watercourses during operation; and
- **Fish species**: deterioration in habitat quality from discharge of silt and chemical pollutants to watercourses during construction; deterioration in habitat quality from discharge of chemicals into watercourses during operation; and
- **Otter**: loss of foraging habitat from land-take (outside the SAC boundary); habitat deterioration from discharge of pollutants to watercourses during construction; habitat deterioration from discharge of pollutants into watercourses during operation; habitat fragmentation; mortality during construction / operation; disturbance during construction (noise and lighting); and disturbance during operation (noise and lighting).

Stage 2 - Appropriate Assessment

1.2.6 The findings of the Appropriate Assessment were reported in the Statement to Inform an Appropriate Assessment (SIAA)[1]. This provided information on the relevant qualifying interests of the three SACs (Usk Bat Sites SAC, Cwm Clydach Woodlands SAC and River Usk SAC), and examined the likely nature and scale of the Scheme's impacts on these sites.

1.2.7 Mitigation was proposed for features of the SAC identified in the SIAA where potential adverse effects from the Scheme were identified. The SIAA concluded that the proposed mitigation was sufficient to prevent adverse effects on integrity with respect to all

qualifying interests of the Cwm Clydach Woodlands SAC and River Usk SAC, and on all qualifying interests of the Usk Bat Sites SAC with the exception of Lesser Horseshoe Bat.

1.2.8 Conservation objectives for the Usk Bat Sites SAC consists of the 'vision for the feature' and performance indicators. The visions for Lesser Horseshoe Bat are as follows:

- The site will support a sustainable population of Lesser Horseshoe bats in the River Usk area;
- The population will be viable in the long term, acknowledging the population fluctuations of the species;
- Buildings, structures and habitats on the site will be in optimal condition to support the populations;
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range;
- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat;
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines - there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management; and
- All factors affecting the achievement of the above conditions are under control.

1.2.9 In the absence of any mitigation, the scheme has the potential to affect the Lesser Horseshoe Bat qualifying feature of the Usk Bat Sites SAC in the following ways:

During construction

- Loss of roosts
- Loss of foraging habitat
- Mortality
- Damage or obstruction of access to roost sites
- Disturbance caused by noise and vibration
- Disturbance caused by lighting (temporary)
- Habitat fragmentation and severance
- Habitat deterioration caused by generation of dust
- Habitat deterioration caused by discharge of pollutants to watercourses

During operation

- Habitat deterioration caused by discharge of pollutants to watercourses
- Mortality

- Disturbance caused by changes in lighting levels
- Disturbance caused by noise and vibration

1.2.10 Proposed mitigation for effects on Lesser Horseshoe Bat included:

- Provision of replacement roosts, including maternity, hibernation, day and night roosts
- Provision of replacement woodland habitat at an overall ratio of 1.3:1
- Sensitive roost destruction and timing of works to avoid mortality or significant disturbance
- Maintaining a lit road during construction and operation to discourage bats from crossing over the road
- Retaining all potential under-road crossings and designing improved extensions/changes so that bats can still fly through them
- Employing pollution prevention and control measures
- Use of low-noise road surfacing

1.2.11 Despite the measures proposed for mitigating potential effects, the Welsh Government believes that there is an extremely small risk of a short term effect on the integrity of the Usk Bat Sites SAC due to the uncertainties associated with ecological systems and assessments, in relation to effects on lesser horseshoe bats during the period when replacement planting is maturing. After due consideration of the representations of NRW and further discussion, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that there would be an adverse effect on the Usk Bat Sites SAC.

1.2.12 As a result of the above, it was necessary to progress to the final three stages of the AIES:

- Assessment of Alternatives (Stage 3);
- Imperative Reasons of Overriding Public Interest (IROPI) (Stage 4); and
- Assessment of Compensatory Measures (Stage 5).

1.2.13 This report deals with Stages 3-5 and comprises the Statement about Alternative Solutions, Imperative Reasons of Overriding Public Interest and Compensatory Measures (SASICOM), in accordance with formal guidance.

1.3 Structure of this Report

1.3.1 This SASICOM presents the methodology and results of the final three stages of the AIES. Chapter 2 covers the Assessment of Alternative Solutions, Chapter 3 covers the consideration of IROPI, Chapter 4 covers the Assessment of Compensatory Measures and Chapter 5 provides a conclusion.

1.4 Guidance and Approach

1.4.1 The report has been prepared using guidance from the Design Manual for Roads and Bridges Vol 11, Section 4: HD 44/09 Assessment of Implications (of Highways and/or

Roads Projects) on European Sites (including Appropriate Assessment), dated February 2009[8]. It is therefore structured in accordance with the requirements of this guidance. In addition, guidelines on ecological impact assessment have been produced by the Institute of Ecology and Environmental Management (IEEM 2006), and this report adopts those elements of the guidance in so far as they are relevant to AIES.

1.4.2 Wherever possible, the assessments included in this report are based on empirical ecological information derived during the Appropriate Assessment process, specifically with regard to the likely effects on the integrity of the SAC. However, where necessary, best expert opinion has also been used in order to carry out more cognisant assessment, and the precautionary principle has been applied to ensure that assessment and decision making errs on the side of caution, without being overly cautious.

1.4.3 With regard to the assessment of alternatives, for example, the assessment for each Option has been carried out using the same data used to inform the SIAA, whilst the consideration of feasibility/buildability and the comparison with Scheme objectives are more qualitative assessments based on best expert opinion and informed by EC guidance[2]. Similarly, the consideration of IROPI is a combination of assessment of raw data and judgement, again informed by the EC guidance[2]. In contrast, the assessment of compensatory measures, and the subsequent consequences for conservation objectives of the qualifying features, has again been carried out using the same data used to inform the SIAA (specifically the assessment of the mitigation proposals), though again the precautionary principle has been applied to the judgements, wherever appropriate.

1.4.4 The authors of this report are Julie Hunt BSC CEng CEnv MICE MCIHT, Robert Harvey BA (Natural Sciences), Ben Matthews MSc CMILT and Richard Green BSc (Hons) CEnv MCIEEM, with contributions from others in the project team. Julie Hunt is a Chartered Civil Engineer with 20 years' experience of design, appraisal and development of highway schemes. Robert Harvey has 16 years' experience in Habitats Regulations Assessment. Ben Matthews Ben has 10 years' experience as a Transport Planner specialising in transport and economic appraisal. Richard Green is a consultant ecologist with over 20 years' experience, including undertaking Ecological Impact Assessments (EcIAs) and Habitats Regulations Assessments, including road projects in Wales. Richard authored IAN 116/08 (Nature Conservation Advice In Relation To Bats) and undertook a review of bat mitigation in relation to highway severance for the Highways Agency in 2011.

1.5 Existing Conditions

1.5.1 The existing single three lane carriageway (WS2+1) was constructed in the 1960s. There are generally two lanes in the westbound (uphill) direction although there is a section with two lanes in the eastbound direction to the west of Gilwern. Traffic flow and speed are restricted by the road width, gradients, at-grade junctions and the limited opportunities for safe overtaking. In many areas the alignment of the existing road results in poor visibility, presenting an increased safety risk. The speed limit is 50mph.

1.5.2 The problems on this section of the A465 include:

i. sub-standard road alignment in places
ii. sub-standard visibility in places
iii. slow moving vehicles on uphill gradients through the Clydach Gorge
iv. lack of overtaking opportunities

v. accident clusters, particularly at or near the existing junctions
vi. a high ratio of serious and fatal accidents
vii. congestion in places at peak times leading to increased journey time and poor journey time reliability
viii. frequent interface between local and strategic traffic at junctions with traffic from side roads having difficulty accessing the trunk road
ix. difficult conditions for effective highway maintenance and management of traffic
x. the existing route cuts through, and restricts connections between, local communities.

1.5.3 On the existing A465 covered by the Section 2 scheme between and including Glanbaiden Roundabout and Brynmawr Roundabout, there were a total of 31 reported personal injury collisions in the five year period July 2007-June 2012, comprising of 2 fatal, 7 serious injury and 22 slight injury collisions as summarised in Table 1.1. The majority of collisions occurred in light, dry conditions. Collision concentrations occur at four locations on the existing road, at Blackrock and in the vicinity of the junctions at Brynmawr, Gilwern and Glanbaiden.

Table 1.1: Collisions by Severity (July 2007 to June 2012)

Year	Number of collisions	Percentage of Total
Fatal	2 6	
Serious	7 23	
Slight	22 71	
Total	31 100	

1.5.4 Considering the full set of collisions, 23% occurred on wet or icy roads, which is lower than the average for Great Britain (45.5%) and for Wales (46.1%) and 10% of collisions occurred after dark, which is lower than the Great Britain (17.6%) and Wales (25.9%) average. This latter statistic might be explained by the existing lighting on the A465 section being considered.

1.5.5 The traffic capacity of the existing roundabout at Brynmawr is exceeded at peak times. Without the Proposed Scheme vehicles on Section 2 of the A465 are predicted to increase by typically 19% by 2017 compared to the 2011 Base Year and by over 50% by 2032 assuming a forecast of central growth. The forecast traffic flow on the A465 between Brynmawr and Gilwern without the published scheme is over 22,000 AADT in 2017 (assumed Opening Year). A summary of the predicted traffic flows are shown in Table 1.2,without the Proposed Scheme (Do Minimum) and with the Proposed Scheme (Do Something). HGVs comprise approximately 7-8% of the predicted 2032 traffic at peak times on Section 2 of the A465 with the Proposed Scheme.

Table 1.2: Forecast Daily Traffic Flows on A465 Section 2

Route Section	2011 Base	DM 2017	DS 2017	DM 2032	DS 2032
A465 East of Brynmawr Junction	19,290	22,760	28,110	29,060	42,860
A465 East of Glanbaiden Junction	20,840	24,830	29,880	32,590	45,990

1.5.6 The recommended maximum traffic flow on a WS2+1 carriageway layout in opening year (based on DMRB TA 46/87 Traffic Flow Ranges for Use in the Assessment of New Rural Roads) is 21,000 AADT. While this standard is primarily used for economic assessment, it indicates that the existing A465 will be at or over capacity in 2017. If nothing is done then traffic congestion and traffic related problems, including collisions, will increase.

1.6 The Scheme Objectives

1.6.1 The Welsh Government's objective for the Scheme is to improve the A465 Heads of the Valleys Road between Gilwern and Brynmawr (Section 2 of the overall dualling programme) from a single 3-lane carriageway to dual 2-lane carriageways in accordance with the made Line Order and its associated Environmental Statement and to deliver the scheme to programme and budget.

1.6.2 The Scheme-specific objectives are:

1. To maintain the current level of service and to carry out improvements.
2. To reduce journey times for private and commercial road users.
3. To facilitate economic regeneration.
4. To enhance road safety and reduce casualties.
5. To do all this with proper care for the environment.
6. To deliver a scheme that is sustainable.
7. To promote non motorised user (NMU) provision, providing opportunities for healthy lifestyle.
8. To deliver a scheme which minimises future maintenance and disruption to the network.
9. To reduce journey time variability and improve resilience on the A465.
10. To use the A465 to manage traffic effectively and improve resilience on the strategic road network in South East Wales.
11. To deliver a scheme that integrates with public transport and the local transport network.
12. To improve access to healthcare, education and leisure facilities.
13. To reduce community severance.

1.6.3 In order to assess the suitability of the alternatives considered in this document as a solution to these objectives, each alternative route or design option has been considered

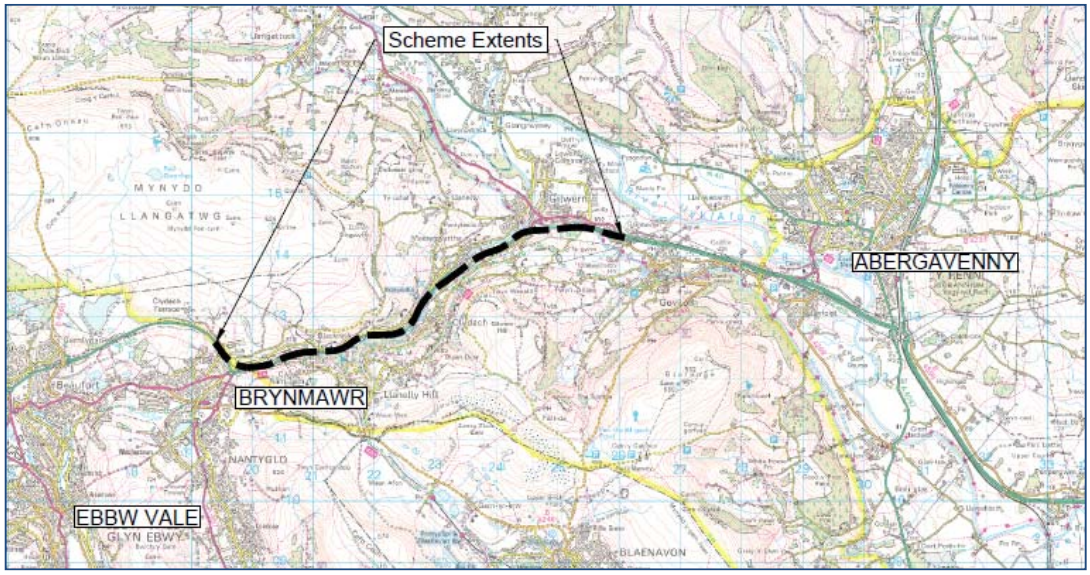
against all of these Scheme Objectives. This process is presented in tabular form in Appendix C, and is described in more detail in Chapter 2.

1.7 Scheme Description

1.7.1 The scheme is part of Welsh Government's overall programme to dual the A465 Heads of the Valleys Road between Abergavenny and Hirwaun. Section 2 is one of six sections. The Line Order for the entire scheme was made in June 1999. Section 4 (Tredegar to Dowlais Top) and Section 1 (Abergavenny to Gilwern) were complete in 2004 and 2008 respectively. Section 3 commenced construction in January 2013 and is expected to be complete by the end of 2014. The National Transport Plan (2010) states that Sections 5 (Dowlais Top to A470) and 6 (A470 to Hirwaun) will be completed by 2020. The location of all six sections are shown in Figure 7.2.

1.7.2 As part of the Early Contractor Involvement (ECI) Contract to design and construct the published scheme, work has taken place over the last two years on the development of the scheme design to minimise the footprint and impact on the environment, in particular within the Clydach Gorge, and to review the type and provision of junctions and structures. The process also involved consultation with key stakeholders and consultees on the improvement options.

1.7.3 The proposed Scheme would extend for 8.1km from west of the Intermediate Road bridge at Brynmawr to immediately east of the Glanbaiden Junction near Gilwern. The Scheme location is shown in Graphic 1.2 below. Approximately 5.8km would be on-line (i.e. built over part of the existing road) and 2.3km off-line (i.e. built away from the existing road). The Scheme would be lit throughout. Traffic signs would be designed in accordance with current highways standards and regulations, taking into account the requirements of the Local Authorities, the Welsh Tourist Board, Welsh Government and other parties.



Graphic 1.2 – Scheme Location

1.7.4 The layout of the Proposed Scheme is shown on Figure 1 in Appendix A. The new road would be a dual carriageway with four junctions. At each junction, drivers on the A465 would pass through the junctions uninterrupted.

1.7.5 The Proposed Scheme will reduce journey times and improve journey time reliability, due to the introduction of grade-separated junctions and the increased capacity of the dual carriageway compared to the existing conditions.

1.7.6 The hardstrips and verges are narrower than standard width and the alignment includes tighter bends than standard for the design speed. This combination requires that the whole length of the Scheme would be subject to a mandatory 50mph speed limit.

1.7.7 Forty-two existing structures fall within the length of the published scheme comprising 3 bridges, 20 walls, 3 footbridges, 5 subways, 10 culverts (greater than 900mm diameter) and 1 concrete channel carrying the River Clydach.

1.7.8 Intermediate Road Bridge would be demolished, but the Clydach Viaduct and Saleyard River Bridge would both be retained after strengthening/modification work. Seven existing retaining walls would be demolished or buried within the new works with thirteen retained with some minor modification or strengthening works. One footbridge, at Brynmawr Roundabout, would be retained with that at the Lion Hotel being demolished and the footbridge at Clydach being replaced by a new structure. The two subways at Brynmawr Roundabout would be retained and the subways at Pont Harri Isaac, Blackrock and Pant Glas would be closed to pedestrians but extended and converted into bat crossings. All ten culverts would be retained with extension or refurbishment works as required including the implementation of measures to encourage bats to continue to use them. The existing river channel would also be retained.

1.7.9 Additionally thirteen other culverts would be affected by the proposed scheme. These are either small diameter pipes (less than 0.9m) or carry watercourses below side roads and are not maintained by Welsh Government. All thirteen would be retained with extension and refurbishment work as required, including the implementation of measures to encourage bats to continue to use them.

1.7.10 The boundaries of the SACs in the vicinity of the Scheme are shown in Figure 1 in Appendix A. The Scheme design is shown on Figures 2 and 3 (a-f).

1.7.11 The western edge of the Usk Bat Sites SAC meets the Scheme at the point where Cwm Nantmelyn tributary flows into the River Clydach at ch. 30200 (Figure 3 (a)). The southern boundary of the Usk Bat Sites SAC runs adjacent to the north boundary of the existing A465 carriageway until ch.30410.

1.7.12 The SAC boundary follows the River Clydach as it flows back under the A465 at ch 30410, and from this point eastwards until ch. 32310 (Figure 3 (c)), the eastern edge of the Usk Bat Sites SAC, the existing A465 and the Scheme are entirely within the Usk Bat Sites SAC boundary.

1.7.13 For descriptive purposes the Scheme is divided into four parts:

- Brynmawr (ch. 29200 to 30500) - Figure 3 (a).
- Clydach Gorge (ch. 30500 to 33050) - Figure 3 (a-c).
- Sale Yard (ch. 33050 to 34800) - Figure 3 (c-d).
- Gilwern (ch. 34800 to 37000) – Glanbaiden - Figure 3 (d-f).

Brynmawr

1.7.14 The proposed scheme at Brynmawr involves an all movements grade separated junction, the construction of 1.3km of dual carriageway offline and new side roads to link the junction with the local road network (see Figure 3(a)).

1.7.15 The scheme commences towards the eastern end of the Clydach Dingle at ch. 29000, and cuts through part of the site of the former Anacomp Factory to the south of Brynmawr Foundation School. From ch. 29450 to ch. 30000 the proposed road would be constructed offline in new cutting, thus avoiding the existing Brynmawr roundabout.

1.7.16 To reduce the amount of rock removal required on the north side of the road the dual carriageways would be built split level with the eastbound (north side) carriageway being constructed at a higher level than the westbound (south side) carriageway. This arrangement would continue until ch. 31580 at the eastern end of the Clydach Gorge.

1.7.17 On the north side of the new A465 a new eastbound off-slip would be constructed across the southern part of the former Anacomp Factory site to a new 4-arm roundabout (Main Road Roundabout) opposite ch. 30000.

1.7.18 All construction from ch. 29000 to 30200, including the new roundabout and connection to local roads is outside the Usk Bat Sites SAC boundary.

1.7.19 From ch. 30200 to the Pont Harri subway at ch. 30500, the new carriageway is tight to the southern boundary of the Usk Bat Sites SAC. The Pont Harri subway would become redundant as a subway but would be extended and maintained as a bat crossing and as a watercourse, accepting flows from the north hillside that currently drain beneath the subway. East of ch. 30500 the Scheme is entirely within the Usk Bat Sites SAC. Cwm Clydach Woodlands SAC abuts the southern edge of the Usk Bat Sites SAC from ch. 30550.

Clydach Gorge

1.7.20 The proposed scheme through the Clydach Gorge involves alternating asymmetrical widening to the north, then south, then north of the existing road (see Figure 3 (a-b)). This is within the Usk Bat Sites SAC.

1.7.21 The first part of the alignment through the Clydach Gorge as far as ch. 31600 has the eastbound carriageway being constructed immediately to the north of the existing carriageway and away from the Clydach Viaduct (i.e. asymmetrical widening to the north). There is a Lesser Horseshoe Bat maternity roost located under the Clydach Viaduct at ch. 30800.

1.7.22 The dual carriageways would be built split level along the length of the gorge with the eastbound (north side) carriageway being constructed at a higher level than the westbound (south side) carriageway. Retaining walls would be required between the eastbound and westbound carriageways. The majority of the eastbound carriageway will have cut slopes to the north with localised walls to protect infrastructure in the Sewage Works and Water Works. Between ch. 31200 and 31600, the local road above the A465 (Main Road) will require diverting and a 200m length of retaining wall.

1.7.23 Between ch. 31600 and 32000 the proposed alignment involves asymmetrical widening to the south. This will require the building out of embankments on the south side of the

road. These will be steepened and reinforced to reduce land-take within the Usk Bat Sites SAC.

1.7.24 The Blackrock subway (ch. 31630) would be replaced by a new footbridge but the redundant subway would be extended and maintained as a bat crossing.

1.7.25 Between ch. 32000 and 32700 the proposed alignment involves asymmetrical widening to the north. This will require cut slopes to the north side of the road between ch. 32000 and 32500. The Scheme passes beyond the eastern boundary of the Usk Bat Sites SAC just past ch. 32300, and hence no further construction occurs within the SAC beyond this point.

1.7.26 Between the village of North Clydach and Saleyard (ch 32700 to 33400), the new scheme requires widening to both the north and south of the existing A465 (i.e. symmetrical widening).

1.7.27 Throughout the Clydach Gorge the River Clydach is located to the south of A465. Seven north to south flowing tributaries of the River Clydach cross under this part of the road (Nant yr Hafod, Nant Gwyn, five unnamed) in culverts, all of which would be extended.

Sale Yard

1.7.28 The proposed scheme from opposite the Clydach Iron Works to Gilwern involves off-line construction to the south of the existing A465 (see Figure 3 (c-d)). The eastbound off-slip and onslip utilise the existing A465 carriageway.

1.7.29 Between ch. 33400 and 34000 the new scheme would include a new road bridge over the River Clydach (ch. 33700) as well a new underbridge (Clydach Link Underbridge at ch. 33875). The location of the mainline carriageway, the Saleyard River crossing structure, provision of a retaining wall and the position of the junction allows the River Clydach to flow along its existing path.

1.7.30 The Pant Glas Subway (ch. 33400) would become redundant as a subway but would be extended and maintained as a bat crossing. A new footbridge is to be constructed at ch. 33430.

Gilwern

1.7.31 From ch. 34800 to 35150 the proposed scheme opposite Gilwern involves a short length of asymmetric widening to the south followed by a short length of asymmetric widening to the north.

1.7.32 The scheme is then constructed off-line to the south of the existing A465 between ch. 35250 and 35900 before joining the line of the existing road to the Glanbaiden Junction (see Figure 3 (d-f)).

1.7.33 The slip roads and the circulatory carriageway of the current Glanbaiden junction together with some earthworks for the main A465 carriageway were completed as part of Section 1 (Abergavenny to Gilwern) of the A465 Heads of the Valleys road. As part of Section 2 the required earthworks would be completed and the dualled main carriageway would be completed over the roundabout from approximately ch. 35900 to approximately 37000. The Gilwern Canal Bridge (ch. 36130) which takes the A465 over the Monmouth to Brecon canal was rebuilt as part of Section 1 and would not require any further structural works.

1.7.34 On the north side of the road, to the east of Glanbaiden junction, the slip road tie-in between existing and proposed requires the slip road to be raised by up to 1m. In order to minimise impacts on Hopyard Underpass culvert, which is a Lesser Horseshoe Bat crossing, a low retaining wall above the top of the culvert will be used so that the majority of the vegetation planted as part of Section 1 can be retained.

2 ASSESSMENT OF ALTERNATIVE SOLUTIONS

The SIAA concluded that In line with HD 44/09, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that there would be an adverse effect on the Usk Bat Sites SAC. It is therefore necessary to progress to the next stages of the AIES process – Assessment of Alternative Solutions. The objective of this process is to identify whether there are alternative solutions.

2.1 Assessment Methodology

2.1.1 A number of different types of options were considered, as required in the EC guidance (and set out in the DMRB advice note on AIES, HD44/09). These have been addressed under the following headings:

- Do Nothing
- Alternative Means of Meeting Objectives
- Alternative Routes
- Alternative Size and Scale
- Alternative Methods of Construction
- Alternative Operational Methods
- Alternative Decommissioning Methods
- Alternative Timescales

2.1.2 A list of the options considered is provided in Table 2.1 below. The drawings illustrating some of the alternative solutions listed below are included in Appendix A. An assessment of the alternative solutions against the scheme objectives is included in Appendix C. The outcome of the process is presented below and summarised in the 'Assessment of Alternative Solutions Matrix', included in Appendix B.

Alternative Category	Alternative
Do Nothing	DN1 - Do Nothing.
Alternative Means of Meeting Objectives	AM1 - Rail (east-west) AM2 - Rail (north-south) AM3 - Tram/guided busway AM4 – Bus
Alternative Routes	AR1 - Over Llangatwg AR2 - Along former Abergavenny to Merthyr Tydfil railway line AR3 – Orange Route from 1990s route selection process AR4 – Through Blaenavon: A465 Llanfoist-B4246-B4248 Blaenavon-A467 Brynmawr-A465 AR6 – Strategic Re-routing to M4/A472
Alternative Size and Scale	AS1 - Lower design speed/speed limit and omit central reserve AS2 - Increase design speed/speed limit AS3 - 2+1 lanes AS4 - At grade junctions AS11 - Tunnel AS12 - Double deck carriageway AS14 - Split cantilever AS15 - Employer's conceptual design AS25 - Do minimum AS26 - Reduced carriageway cross section AS27 - Do minimum with speed limit enforcement
Alternative Methods of Construction	AC1 - Walls instead of batter AC7 - Viaduct in lieu of embankments/walls
Alternative Timescales	AT1 - Road closure

Table 2.1 – Summary list of alternatives considered.

2.1.3 The assessment of alternative options presented in this chapter is based on a sufficient level of detail of information to enable a reasoned, objective and transparent decision to be made on whether or not an alternative solution exists. It therefore includes, for each alternative option, a brief description, an assessment of whether it meets the Scheme objectives and an appraisal of how feasible, buildable and cost effective it would be relative to the proposed scheme. These criteria are used to assess if feasible alternatives to the proposed scheme exist. For an alternative solution to be taken forward it would also need to perform better than the Proposed Scheme with regard to its impact on the conservation objectives and integrity of European sites and on the coherence of the Natura 2000 Network. For this reason an assessment has been made on the balance between the relative impacts on European sites' conservation objectives and relative achievement of the scheme objectives (in line with EC guidance on Article 6(4)).

2.1.4 An appropriate level of assessment, based on the level of design work carried out, has been made on the basis of the same baseline ecological information used to inform the Environmental Statement, the Screening Report and the SIAA. The potential effects on the SAC considered within this assessment process are the same as those listed under Screening in section 1.2 of this report.

2.1.6 The first question that needs to be asked when considering the possible impacts of a scheme (or alternative) on a SAC is whether or not it is directly connected with, or necessary for, the nature conservation management of the SAC. This is to enable conservation work that could at least temporarily have an adverse effect on one or more of the qualifying features (e.g. woodland management) to take place without contravening the Habitats Regulations. None of the alternative options listed below are directly connected with, or necessary for, the nature conservation management of the SACs.

2.2 Alternative Solutions

Do Nothing DN1

Description

2.2.1 The existing route passes through the Usk Bat Site SAC for length of approximately 2.1km. If no improvement was carried out then a 'Do Nothing' option would be necessary in order to maintain the existing road in its current condition. In order to do this, routine maintenance operations would be required. Typical activities would include, but are not limited to:

- winter maintenance, such as de-icing/gritting;
- line painting;
- resurfacing;
- pavement reconstruction;
- repairs to damage;
- dealing with traffic accidents;
- structural inspection works and maintenance work to structures, bridges, culverts and retaining walls;
- repair/strengthening works to a number of principle structures;
- maintenance of the highway drainage network; and
- management and maintenance of roadside grass areas and vegetation trimming.

Assessment of implications for European Sites

2.2.2 In the short to medium term, as the footprint of the highway would remain unchanged if the 'do nothing' option were adopted, there would not be any further land take from the SAC or changes in the existing environmental conditions surrounding the SAC. However environmental conditions may worsen due to traffic growth and the structures in the current road would need to be rebuilt or strengthened relatively soon, which would have some of the same effects as the Proposed Scheme. Therefore this option would not have a direct adverse effect on the integrity of the European Sites, but would only have slightly less effects on the SAC in the medium to long term.

Comparison with Scheme Objectives

2.2.3 It is considered that the 'do nothing' option would essentially meet the objective to have 'proper care for the environment', as the effects on the SAC and surrounding environment are considered to be minimal. However, the 'do nothing' option does not meet the other Scheme objectives sufficiently (see Appendix C - Assessment of Alternatives against Scheme Objectives). With a lack of a central reserve there would be no improvement in accident figures, journey times or reliability if this option was chosen. In the future these will all worsen due to traffic growth.

2.2.4 Due to the increasing maintenance requirement the 'do nothing' option is not considered to be a sustainable long term solution for this section of the trunk road network and therefore the objective of 'to deliver a scheme that is sustainable' is not considered to be met by this option.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.2.5 Maintaining the existing situation is considered to be feasible and cost effective in the short term. However, due to the sub-standard nature of the existing road, and the increasing safety standards required when undertaking maintenance operations, future maintenance costs are likely to increase and carrying out routine maintenance will become less feasible, and in order to carry out future maintenance operations in a safe manner an improvement to the standard of the trunk road would be required in future years.

Comparison with the Preferred Option

2.2.6 The 'do nothing' option would avoid direct impact on the Cwm Clydach Woodlands and Usk Bat Sites SACs in the short term, but would only have slightly less effect than the Proposed Scheme in the medium to long term. This option does not meet the network and safety scheme objectives. Therefore this is not an alternative solution.

2.3 Alternative Means of Meeting Objectives

Consideration was given to a wide range of non-road based alternative means, including extending the Monmouthshire to Brecon Canal up the Clydach valley as part of a canal/river/sea option. However, due to the viability of building and operating such an option in this location, this was not taken further.

Consideration was also given to improving the existing cycle network between Gilwern and Brynmawr. However, the majority of users of this section of the trunk road are unlikely to transfer to the improvement due to the length of journey which they are undertaking on the network and the challenging topography for cyclists. Further the A465 would not be improved as part of the scheme. This would limit the ability of the option to meet safety, connectivity, journey time, economic regeneration, and integration objectives. For these reasons this option was not taken further.

i) Option AM1 – Rail (east-west)

Description

2.3.1 This option considers the construction of a new 30km rail line east-west to link the existing north-south rail lines across the heads of the South Wales Valleys. The line would link existing stations at Merthyr Tydfil, Rhymney, Ebbw Vale Parkway and Abergavenny and would have the potential to provide a new station at Brynmawr. The line would partially follow the former rail line. Refer to Figure 4 in Appendix A. There are limited options for the route of a rail line linking Abergavenny and Methyr Tydfil, with a key constraint being the challenging topography through the Clydach Gorge. The

gorge itself would constrain the geometry of a rail route and routes to the south and north would require considerable structures and tunnelling.

Assessment of implications for European Sites

2.3.2 The footprint of this option within the Usk Bat Sites SAC would be 6.3 ha, which is 2.4 ha less than proposed scheme. The footprint within the Cwm Clydach Woodlands SAC would be 2.4 ha, which is 2.4 ha more than proposed scheme. Re-opening and widening the tunnel on this route would cause significant ecological disturbance, including to bats roosting within the tunnel that form part of Usk Bat Sites SAC population. This option would therefore have an adverse effect on both Cwm Clydach Woodlands SAC and Usk Bat Sites SAC, which would be greater overall than the impact of the proposed scheme.

Comparison with Scheme Objectives

2.3.3 An east-west service could connect the main settlements along the Heads of the Valleys and provide a level of service to these local travellers. Connection to the rail main-line at Abergavenny would provide an ongoing service to the north and south, and thence to the east. There would be no convenient existing westbound connection to tie into (other than linking to Merthyr Tydfil, then south to Cardiff before connecting onwards to the west). Therefore achievement of the objective to improve level of service would be limited and this option would not offer any improvement in provision for road users, including HGVs, making use of the wider highway network and unable to switch transport modes.

2.3.4 This option would reduce local trips on the existing road and have significant non-motorised user benefits but would not reduce the volume of through traffic including HGVs and other commercial road users. Combined with lack of improvement to the existing route this option would not reduce journey times. Whilst some employment and training benefits would arise from local connections across the heads of the valleys and connection to the eastern train network, limitations on the connectivity of the option due to limited options for new stations and connecting existing populations would mean the benefits would not be sufficient to meet the scheme's economic regeneration objective as well as the proposed scheme.

2.3.5 This option would not include improvement to the road network. Some transfer of local road users would reduce traffic volumes but this would not significantly improve road safety and therefore would not meet the safety objective.

2.3.6 Construction works for a new offline 30km rail line would have significant environmental and sustainability issues.

2.3.7 This option has no benefit to minimise future maintenance and disruption of the highway network. Whilst this option would offer improvement of the wider transport resilience along the heads of the valleys corridor it would not improve journey times along the A465 or improve the resilience of the highway network.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.3.8 A 30km offline rail line would require significant land take from agricultural and residential areas, with little or no convenient route for a new rail line.

2.3.9 This option could be constructed but would require significant structures, tunnelling and earthworks to navigate undulating topography along the route.

2.3.10 At a cost of £23m-28m per km this option would have a cost in the order of £690-840m which is significantly more than the proposed scheme.

Comparison with the Proposed Scheme

2.3.11 This option would incur greater impact on the SACs. This option would achieve only a few of the scheme objectives sufficiently, and would incur significant cost, feasibility and buildability issues. It would also offer little or no improvement in journey times or safety enhancement on the highway. Therefore this is not an alternative solution.

ii) Option AM2 – Rail (north-south)

Description

2.3.12 This option considers improvement of existing north-south rail lines as an alternative to the proposed scheme. This would potentially include an extension of the Ebbw Vale line towards Brynmwar and new stations on other existing north-south valleys lines at Rhymney, Refer to Figure 4 in Appendix A.

Assessment of implications for European Sites

2.3.13 The route of this option could be developed to remove the direct footprint within Usk Bat Sites SAC and Cwm Clydach Woodlands SAC. Therefore this option would not have an adverse effect on the integrity of the European Sites.

Comparison with Scheme Objectives

2.3.14 Whilst it would achieve scheme objectives to benefit non-motorised users and reduce journey times for north-south rail travellers, this option would not offer any benefit to east-west rail travellers. It would also not offer any improvement in provision for road users, including HGVs, making use of the wider highway network and unable to switch transport modes. Therefore this option would not meet the objective to reduce journey times.

2.3.15 This option would provide some employment and training benefits arising from improvement of the north-south train network. However it would not offer regeneration benefits along the east-west Heads of the Valleys corridor as it does not provide any additional east-west connectivity.

2.3.16 This option would have relatively low impact on designated sites. An adverse effect on the integrity of Usk Bat Sites SAC and Cwm Clydach Woodlands SAC would be avoided compared to the proposed scheme. This option could be constructed in a sustainable manner. However this option would not meet economic and social aspects of sustainability as well as the proposed scheme.

2.3.17 This option would offer no improvement of the A465 or wider strategic road network in South Wales, therefore not achieving the objectives to improve the route, minimise future maintenance and disruption, and improve safety on the network.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.3.18 The scope of this option has not been determined in detail therefore costs cannot be estimated. It is considered that this option would not be cost effective unless combined with new rail links east-west.

2.3.19 Many lines within the Newport - Abertillery - Brynmawr valley (A467) were removed in the 1960's with just limited industrial usage after this. The corridor has since been occupied by the A467 improvement over much of its length. Lines exist to Aberbeeg

which then feed the Ebbw Vale link. Infrastructure from this point through to Brynmawr would have to occupy almost an entirely new footprint requiring a combination of substantial residential and industrial clearance and use of structures and tunnelling to limit this. This is generally representative of the situation within the south - north running valleys and means that this option is not feasible.

Comparison with the Proposed Scheme

2.3.20 This option would not include direct impact on the SAC but would only be constructed if combined with an east west rail link which would affect the SAC. This option does not achieve the scheme's route improvement objectives, would offer no benefit in safety or journey time on the trunk road, and is unfeasible. It is therefore not an alternative solution.

iii) Option AM3 – Tram/Guided Busway

Description

2.3.21 Construction of a new light tram line or guided busway east-west connecting the Heads of the Valleys, offline of the existing A465 trunk road. Offline route to the south of the existing road has been assumed due to restrictions along the line of the A465 trunk road. A one way tramway/guided bus route with passing areas would be used due to the frequency of the service. An east-west service could connect the main settlements along the Heads of the Valleys (including Gilwern, Clydach, Brynmawr) and provide a level of service to these local travellers.

Assessment of implications for European Sites

2.3.22 The footprint of this option within the Usk Bat Sites SAC would be 6.3 ha, which is 2.4 ha less than proposed scheme. The footprint within the Cwm Clydach Woodlands SAC would be 2.4 ha, which is 2.4 ha more than proposed scheme. Re-opening the tunnel on this route would cause significant ecological disturbance, including to bats roosting within the tunnel that form part of Usk Bat Sites SAC population. This option would therefore have an adverse effect on both Cwm Clydach Woodlands SAC and Usk Bat Sites SAC, which would be greater overall on the integrity of the Natura 2000 network than the impact of the proposed scheme.

Comparison with Scheme Objectives

2.3.23 This option would not offer any improvement in provision for road users, HGVs etc making use of the wider highway network and unable to switch transport modes.

2.3.24 This option may reduce local trips on the existing road but would not reduce the volume of through traffic including HGVs and other commercial road users. Combined with lack of improvement to the existing route it can be assessed that this option would not meet the objective of reducing journey times.

2.3.25 This option would provide some employment and training benefits arising from local connections across the Heads of the Valleys and connection to the eastern train network. However limitations on the connectivity to the existing network and integration with existing transport systems of the option would mean the benefits of integration, access and severance would be lesser than the proposed scheme.

2.3.26 This option would not improve the route and therefore would not meet the objective to enhance road safety, though increase in NMU provision would be high along the route of the tram/guided bus improvements.

2.3.27 This option's offline alignment would create significant indirect impacts on the SACs. A significant construction programme would be required to install the tram/guided busway over a 11km offline length between Gilwern and Brynmawr, with the associated high amount of importation and deposition of materials.

2.3.28 Whilst this option would offer improvement of the wider transport resilience along the Heads of the Valleys corridor it would not improve the A465 and therefore not reduce journey times or improve the resilience of the highway network.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.3.29 An 11km offline development would require significant land take from agricultural and residential areas. This option would face similar topographical and disturbance challenges as the rail options but the smaller footprint would be slightly easier to accommodate.

2.3.30 The minimum length required would be 11km, costing in the order of £110-161m. Cost effectiveness of the works would be dependent on level of usage of the new system.

Comparison with the Proposed Scheme

2.3.31 This option has an overall equal combined footprint on SACs (Usk Bat Sites and Cwm Clydach Woodlands SACs) to the proposed scheme but would have a greater adverse impact on bat habitats due to intrusive works to re-open the currently unused rail tunnel and adverse effects on the Cwm Clydach Woodlands SAC. This option would achieve fewer scheme objectives at similar cost than the proposed scheme, with feasibility and buildability issues. Therefore this is not an alternative solution.

iv) Option AM4 – Bus

Description

2.3.32 Improvement of bus provision along the existing A465 route from Abergavenny to Merthyr Tydfil.

Assessment of implications for European Sites

2.3.33 The route of this option could be developed with no additional footprint within Usk Bat Sites SAC and Cwm Clydach Woodlands SAC. An adverse effect on European Sites would therefore be avoided.

Comparison with Scheme Objectives

2.3.34 This option would not offer any improvement of the route and therefore no change in provision for road users, including HGVs, making use of the wider highway network and unable to switch transport modes. This option would reduce travel times for public transport users but not offer any significant benefit to wider through road users. As such it would also fail to meet access and severance objectives as well as the proposed scheme.

2.3.35 This option would provide some employment and training benefits arising from improvement of public transport facilities, but little or no benefit from commercial regeneration. This option would have to include provision to include NMU provision, for instance improved car parking facilities at bus stops to integrate the option into the network.

2.3.36 This option would have no impact on designated sites. This option may require construction of car parking facilities along the route but this could be done in a

sustainable manner. However this option would not meet economic and social aspects of sustainability as well as the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.3.37 The cost of this option would be dependent on the size and scale of works to improve parking facilities and to operate buses. However facility improvement works would be feasible to construct.

Comparison with the Proposed Scheme

2.3.38 This option would not directly impact the SAC. An improved bus service along the A465 would achieve some localised improvements in NMU provision, but this option would not improve the safety of the route or achieve the wider route improvement and resilience objectives. Therefore this is not an alternative solution.

2.4 Alternative Routes

i) Option AR1 – Over Llangatwg

Description

2.4.1 Improvement of an alternative existing route, north from the A465 at Brynmawr onto the B4560, then travelling across Llangatwg, through Llangattock, and south on the A4077 back to the A465 near Gilwern; a route of approximately 22km to dual carriageway standard. Refer to Figure 5.1 in Appendix A. The existing A465 route would remain in operation but would only be signed for local users.

Assessment of Implications for European Sites

2.4.2 This option would be constructed without a direct impact on the USK Bat Sites SAC, by extending the road on the side not bounded by Usk Bat Sites SAC. However, the improvement of this route would increase traffic volume around the perimeter of the Usk Bat Sites SAC and River Usk SAC compared to the existing situation, leading to increased risk of bat fatalities crossing the road. There would also be a potential air quality effect on the Usk Bat Sites SAC and River Usk SAC due to the proximity. Owing to the longer length of road adjacent to the Usk Bats Sites SAC and the presence of active blanket bog and Tilio-acerion woodland (both priority habitats), this would have a more significant impact on air pollution than from the proposed scheme.

Comparison with Scheme Objectives

2.4.3 This option would be carried out to dual carriageway standard. Therefore the level of service would be improved. However, the length of this option is approximately double the length of the proposed scheme. Therefore journey times would be higher than the proposed scheme and higher than the existing route. This would limit achievement of the objective to facilitate economic regeneration.

2.4.4 This option would offer an improvement in road safety for the alternative route, but not for the remaining unimproved A465 route; the length of this alternative versus the existing A465 is significantly longer and hence this route would fail to attract a significant transfer of users. The remaining users would still use the existing A465, and hence this option would not meet the objective of enhancing safety as well as the proposed scheme. Localised safety improvements could be made, plus the existing road would carry less traffic.

2.4.5 It is considered that this option would avoid adverse effect on the integrity of the River Usk SAC and Cwm Clydach Woodlands SAC but would have a greater risk of adversely

affecting the Usk Bat Sites SAC. In terms of sustainability the greater length of route to be upgraded would require more construction materials. A reasonable cut/fill balance could be achieved, but the level of earthworks required would be very high.

2.4.6 NMU provision, integration and access would not be improved along the existing route and hence this option would not meet these objectives as well as the proposed scheme. This option would reduce potential disruption to the network and journey time variability but the longer length would require higher maintenance.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.4.7 This option would require demolition or blighting of numerous houses and significant works in the village of Llangattock. Improvement of the B4560 and A4077 would involve significant realignment and many departures from standard, for reduced visibility, sharper bends, and steeper gradient than appropriate for a high speed road which would lead to reduction in safety and potential for reduction in the speed limit to mitigate this.

2.4.8 Towards the northern end of the B4560 where it joins the Llangattock Road, cuttings and embankments would be substantial and require significant land take. The existing Llangattock link road and return 'leg' A4077 to Gilwern would again require major interventions and be unfeasible given the residential areas alongside.

2.4.9 At a cost of £20-25m per kilometre, the cost of this option would be approximately £440-£550m. Therefore the cost would be significantly higher than the proposed scheme with fewer benefits, leading to very low cost effectiveness.

Comparison with the Proposed Scheme

2.4.10 This option would not have direct impact on the SAC but would include indirect effects including worse air pollution effects than the proposed scheme. This option would not be feasible to construct and fails to either reduce journey times and road safety on the A465, or meet connectivity objectives sufficiently. It is therefore not an alternative solution.

ii) Option AR2 – Along former Abergavenny to Merthyr railway line

Description

2.4.11 A new 11km dual carriageway highway routed along the former rail line (refer to Figure 5.1 in Appendix A).

Assessment of Implications for European Sites

2.4.12 The footprint of this option within the Usk Bat Sites SAC would be 6.3 ha, which is 2.4 ha less than proposed scheme. The footprint within the Cwm Clydach Woodlands SAC would be 2.4 ha, which is 2.4 ha more than proposed scheme. Re-opening and widening the tunnel on this route would cause significant ecological disturbance, including to bats roosting within the tunnel that form part of Usk Bat Sites SAC population. This option therefore would have an adverse effect on both Cwm Clydach Woodlands SAC and Usk Bat Sites SAC, which would be greater overall on the integrity of the Natura 2000 network than the impact of the proposed scheme.

Comparison with Scheme Objectives

2.4.13 This option would have reduced footprint in the Usk Bat Sites SAC but increased footprint within the Cym Clydach Woodlands SAC. The loss of bat roosting sites in the closed tunnel could mean an overall greater impact on the Usk Bat Sites SAC than the

proposed scheme which would mean the environmental objective not be achieved as well as the proposed scheme.

2.4.14 This option would require significantly greater works and materials than the proposed online widening scheme and would therefore be less able to achieve the sustainability objective.

2.4.15 NMU provision, integration and access would not be improved along the existing route and hence this option would not meet these objectives as well as the proposed scheme. This option would reduce potential disruption to the network and journey time variability but the longer length would require higher maintenance.

2.4.16 This option would achieve the road safety improvement objective, assuming cross section and alignment are in accordance with standards but this would only apply to the new route and improvements would not be made to the existing A465.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.4.17 This option is feasible and buildable but has more constraints and barriers than the proposed scheme due to establishing the route across the challenging topography.

2.4.18 At a cost of £30-35m per kilometre, the cost of this option would be approximately £300-385m, which is significantly higher than the proposed scheme. Levels of benefit would not be as great as the proposed scheme and therefore the cost effectiveness would be lower.

Comparison with the Proposed Scheme

2.4.19 This option has an overall equal SAC footprint to the proposed scheme but would have a greater adverse impact on bat habitats due to intrusive works to re-open the currently unused rail tunnel. The option would require more complex construction works and more construction materials, with associated sustainability impact. The feasibility of the option would be lower with higher costs and lesser benefits as few scheme objectives would be met. For these reasons this is not an alternative solution.

iii) Option AR3 –Orange Route from the 1990s route selection process

Description

2.4.20 This option is a route which was considered during route selection in the 1990s (known as the 'Orange Route'). Refer to the Figure 5.1 included in Appendix A. It would comprise a dual carriageway offline and north of the existing A465. Local eastbound traffic would utilise the existing A465 (1 lane) between Brynmawr and Gilwern. Westbound local traffic would utilise the existing A465 (2 lanes) between Gilwern and Brynmawr.

Assessment of implications for European Sites

2.4.21 Footprint within the Usk Bat Sites SAC would be 15.0 ha, which is 6.2 ha more than the proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. This option would have an adverse effect on Usk Bat Sites SAC and the impact would be greater than that of the proposed scheme.

Comparison with Scheme Objectives

2.4.22 This option would require significant works and materials due to the offline carriageway configuration. It would also have an adverse effect on the integrity of the

Usk Bat Sites SAC due to increased footprint of scheme and habitat severance as the route would divide areas of the Usk Bat Sites SAC.

2.4.23 This option would also require increased maintenance due to the running of two separate carriageways.

2.4.24 NMU provision, integration and access would not be significantly improved along the existing route and hence this option would not meet these objectives as well as the proposed scheme. This option would reduce potential disruption to the network and journey time variability. This option would achieve the road safety improvement objective, assuming cross section and alignment are in accordance with standards but this would only apply to the new route and improvements would not be made to the existing A465.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.4.25 This option could be constructed but would involve substantial permanent and temporary land take together with access at additional offline locations to the north within the National Park. The risk of impact on the Karst system would need to be seriously considered (close proximity to Graig y Ffynnon) and change in the hydro geological condition which supports the Karst system to the south in the Clydach Gorge and to the north into Mynydd Llangatwg. Some improvement would still be required on the existing A465 to convert it to the new westbound carriageway to bring it up to standard for a 3 lane highway from Sale Yard to Brynmawr. Increased elevation in comparison to the proposed scheme would lead to increased risk of construction difficulties during winter months. Substantial ecological, environmental and heritage constraints, including in the SAC, National Park and the Karst system, would be attached to this proposal and would impact severely on the methods to be adopted in construction.

2.4.26 The volume of cut material would be greater than the proposed scheme, requiring a greater number of HGV movements to transport this material away, placing a greater burden on the existing side road network.

2.4.27 At a length of approximately 8.4km and cost of £10-15m per kilometre, the cost of the new build section would be similar to the proposed scheme. The improvement of the existing route would cost between £3-5m per kilometre, making the overall cost for comparison £110-£160m, and incur additional maintenance liability due to maintenance of a greater length of highway and associated features.

Comparison with the Proposed Scheme

2.4.28 This option has a significantly higher SAC footprint than the proposed scheme and would create a new corridor directly through the Usk Bat Sites SAC. It would be more challenging to construct and maintain than the proposed scheme. For these reasons it is not an alternative solution.

iv) Option AR4 – Through Blaenavon: A465 Llanfoist – B4246 – B4248 Blaenavon – A467 Brynmawr – A465

Description

2.4.29 Improvement of existing routes to dual carriageway, exiting the A465 at a new junction at between Llanfoist and Govilon, taking the B4246 then B4248, some new alignment

bypassing Blaenavon before joining the A467 to connect back to the A465 near Brynmawr, a route of approximately 14km. Refer to Figure 5.1 in Appendix A.

Assessment of Implications for European Sites

2.4.30 The route of this alternative could be developed to lessen or remove the direct footprint within Usk Bat Sites SAC and Cwm Clydach Woodlands SAC. The effect on European Sites may therefore be less, but there is still a risk of effects on lesser horseshoe bats through potential impacts on foraging routes and caves near Siambra Ddu (a component SSSI of the SAC).

Comparison with Scheme Objectives

2.4.31 This option would be completed to dual carriageway standard but this alternative route is offline and approximately 4km longer than the proposed scheme. Therefore level of service, network resilience and journey improvement objectives would be partially achieved but not as well as by the proposed scheme. Safety improvement would be made along this route but not along the existing A465 and hence this objective would not be met as well as the proposed scheme.

2.4.32 Whilst this option would offer some improvement of the network, lack of reduction of journey times would limit facilitation of economic regeneration.

2.4.33 The length of this option and its offline route would require significant earthworks, construction materials and disturbance to greenfield areas with ecological and landscape impacts. It would therefore fail to achieve the sustainability objective. Failing to improve the connections to the communities along the A465 would limit the achievement of the community severance objective.

2.4.34 NMU provision and integration would not be improved on the existing A465 and therefore whilst objectives relating to these could be achieved on the new route overall these objectives would not be met as well as by the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.4.35 The topography of this proposed route poses severe difficulties for construction, in many areas requiring damage to historic landscape features alongside the route of the A4248. The route would pass across heathland and previous coal workings where subsidence issues are common. Stabilisation works would be required at previous workings between Garn yr Erw and Cwm Darrenfelen ahead of a steep descent towards Llanfoist. The Cwm Darenfelen to Llanfoist leg is not suitable for increased traffic flow or upgrading due to significant change in elevation over a short distance resulting in steep gradient and tight curvature which is not appropriate for a high speed road. The existing highway falls a total of approximately 400m over 4000m making the terrain an extremely difficult environment for road building to dual carriageway standard.

2.4.36 The minimum length of this option would be 14km from Llanfoist to Brynmawr via Blaenavon. The cost of this option is estimated to be in the order of £20m to £25m per kilometre with an overall cost of approximately £280m -350m. Therefore the cost would be significantly higher than the proposed scheme with fewer benefits.

Comparison with the Proposed Scheme

2.4.37 This option removes direct SAC footprint but there remains a risk of effects on lesser horseshoe bats. This option has sustainability issues such as significant new alignment through greenfield areas. It is also less able to meet the scheme objectives sufficiently,

would incur higher costs and be less feasible to construct. It is therefore not an alternative solution.

v) Option AR6 –Strategic Rerouting, using either the existing M4 east-west or A472.

Description

2.4.38 Strategic re-routing to encourage use of:

- the existing M4 as an east-west route rather than the A465. Therefore traffic leaving the A465 and using the A470 to the M4, then rejoining the A465 via the A449 (or A4042). Refer to the Figure 5.2 in Appendix A. This option would require a level of improvement of the alternative route.
- the 'Cross-valley link'. This would essentially be to encourage traffic from the A465 onto the A470 (or other north-south A465 link), then taking the A472 and A449 before connecting to the A40. Refer to the Strategic Re-routing plan Figure 5.2.

2.4.39 The A465 would not be improved as part of this option.

Assessment of implications for European Sites

2.4.40 The route of these options would be developed to remove the direct footprint within Usk Bat Sites SAC and Cwm Clydach Woodlands SAC. An adverse effect on these European Sites would therefore be avoided. However there is a risk that improvements required to attract traffic away from A465 would have adverse impact on European Sites proximal to the A470 (Cardiff Beech Woods SAC) and M4 (River Usk SAC near Newport, and Cefn Cribwr Grasslands SAC and Kenfig SAC near Bridgend).

Comparison with Scheme Objectives

2.4.41 Re-routing of traffic and associated business and regeneration opportunities away from the A465, combined with not improving it, would negatively affect economic regeneration of the Heads of the Valleys corridor and fail to meet the economic regeneration objective.

2.4.42 Not improving the A465 would fail to meet objectives relating to reducing maintenance liability and improving NMU provision along the route.

2.4.43 Although transfer of traffic flow would reduce journey times and increase safety on the A465, this would not be sufficient to meet the relevant objectives due to the lack of improvement to the A465 route and restrictions of the alignment and number of lanes.

2.4.44 This option would have relatively low impact on designated sites and that it could be constructed in a sustainable manner. However this option would not meet economic and social aspects of sustainability as well as the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.4.45 The detail of works associated with this option are not fully scoped but they would generally be buildable.

2.4.46 In terms of feasibility, improvements could be made to the alternative route but such improvements would not be sufficient to encourage sufficient transfer of users from the A465 route to remove the requirement to improvement of the A465 route corridor due to the length of the option. If a significant volume of traffic was diverted from the A465 there would be capacity issues on the A470 M4 and A472.

Comparison with the Preferred Option

2.4.47 This option would avoid footprint within the Usk Bat Sites SAC but could impact on other SAC on the M4 and A470 corridors. This option would fail to achieve many of the scheme objectives for the east-west corridor. Compared to the proposed scheme, this option would provide little improvement in road safety, journey times, disruption or NMU facilities in the scheme area. Lack of improvement of the A465, would severely limit economic regeneration in comparison to the proposed scheme. Therefore this option is not an alternative solution.

2.5 Alternative Size and Scale

Consideration was given to a wide range of options with alternative size and scale, including closure of Black Rock Road which runs adjacent and parallel to the north of the A465. This road is located within the Usk Bats Site SAC and as a result of the scheme would need to be realigned slightly north of its current route. Closure either side of Blackrock would avoid the need for this realignment (12m north at its furthest deflection), but would require construction of replacement turning areas to the east and west of Blackrock within the SAC. For this reason the extent of land take within the SAC would not be significantly altered for this option and the option was not investigated further.

i) Option AS1 – Decrease design speed/speed limit and omit the central reserve.

Description

2.5.1 A similar route and standard to the proposed scheme but with a lower Design Speed of 70kph (40mph speed limit), lowering the radius of curves and size of verges, and omitting the central reserve and partially the vehicle restraint. Speed limit enforcement measures would be required.

Assessment of implications for European Sites

2.5.2 The footprint of the option within the Usk Bat Sites SAC would be 8.5 ha, which is 0.2 ha less than proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. A reduction in vehicle speed would reduce oxides of nitrogen emissions per vehicle kilometre so there would also be a reduction in air quality impacts on the SACs. The adverse impact of this option on European Sites would therefore be slightly less than that of the proposed scheme.

Comparison with Scheme Objectives

2.5.3 Lack of separation of the opposing running lanes and lack of central vehicle restraint would fail to meet the safety objective of the scheme due to the greater likelihood and severity of collisions.

2.5.4 Additional lane capacity would increase the level of service and achieve resilience improvement, although these objectives would not be improved as well as the proposed scheme due to lower speed of the route and greater likelihood of collisions, due to lack of central reservation, causing disruption.

2.5.5 As a result of the lower speed limit, journey time reduction would be low (only achieved at peak times while off-peak journey times would increase due to the lower speed limit than the existing 50mph limit) and fail to meet this objective. The economic regeneration and connectivity objectives, would be limited by the low journey time reduction and hence these objectives would not be met as well as the proposed scheme.

Whilst this option would have lesser environmental impacts it would not meet economic and social aspects of sustainability as well as the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.6 This option could feasibly and reasonably be constructed.

2.5.7 This option would lower the cost of the scheme by approximately £20-30m. However, the cost effectiveness of the scheme would be negatively affected by the lower economic benefit and the potential for increase in accident rates due the omission of the central reserve.

Comparison with the Proposed Scheme

2.5.8 The option would achieve a slight reduction in SAC footprint relative to the proposed scheme

2.5.9 In comparison with the proposed scheme, omission of the central reserve and vehicle restraint would greatly increase the likelihood and severity of road traffic accidents, particularly head on collisions. This would fail to achieve a key safety objective of the scheme. It would not achieve journey time savings and economic regeneration as well as the proposed scheme, which in turn lowers the cost effectiveness.

2.5.10 For the above reasons this is not an alternative solution.

ii) Option AS2 – Increase design speed/speed limit

Description

2.5.11 A similar online improvement to the proposed scheme but with a higher Design Speed of 120kph (70mph speed limit). This would require a larger scheme footprint due to increasing the radius of curves and size of verges.

Assessment of Implications for European Sites

2.5.12 Footprint within the Usk Bat Sites SAC would be 10.5 ha, which is 1.8 ha more than proposed scheme. There would be no footprint in Cwm Clydach Woodlands SAC. An increase in vehicle speed would increase oxides of nitrogen emissions per vehicle kilometre so there would also be a potential increase in air quality impacts on priority features of the SACs. The adverse impact of this option on European Sites would therefore be slightly greater than that of the proposed scheme.

Comparison with Scheme Objectives

2.5.13 This option would achieve most scheme objectives similarly to the proposed scheme. Journey time reductions would be slightly higher and therefore facilitation of economic regeneration would be slightly higher. However the higher speed would mean that road safety and causalities would not be improved as well as the proposed scheme.

2.5.14 There would be less opportunity for connections at some of the junctions, Gilwern in particular, due to the increased speed which would limit the achievement of the community severance and access objectives. The increased design speed would mean bus stops would not be provided on the A465 mainline and the greater footprint would have a greater impact on the public rights of way network, limiting the achievement of the NMU provision objective.

2.5.15 In terms of sustainability this option would require slightly more materials and construction works than the propose scheme and would have a greater footprint within, and impact on, the Usk Bat Sites SAC.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.16 Whilst this option could feasibly and reasonably be constructed, given the straighter alignment and larger footprint required compa**re**d to the Proposed Scheme, and the resulting increase in the size and extent of new structures, it would be more difficult to construct and would require larger working areas. This option would add approximately £30-40m to the scheme cost. However, additional journey time savings would maintain the cost effectiveness.

Comparison with the Proposed Scheme

2.5.17 This option would have greater impact on the SAC. This option would deliver greater journey time reductions and therefore increased economic benefit than the proposed scheme; however sustainability, environmental and cost impacts would be greater. Therefore this is not an alternative solution.

iii) Option AS3 – 2+1 lanes

Description

2.5.18 Improvement of the route to Wide Single 2+1 (WS2+1) lane carriageway configuration in either direction with no central reserve along, or close to, the existing alignment through the Clydach Gorge from Brynmawr to Saleyard. The remainder of the route from Saleyard to Gilwern would be improved to dual carriageway. Refer to Figures 6.1 and 6.3 in Appendix A. The design standard for WS2+1 roads, TD 70/08, requires WS2+1 roads to be separated from dual carriageway roads by a minimum length of 2km of single carriageway or by at-grade roundabouts. In either case this would have a considerable effect on the design and operation of the remainder of Section 2 and the interface with Section 3.

Assessment of implications for European Sites

2.5.19 The footprint within the Usk Bat Sites SAC would be 6.5 ha, which is 2.2 ha less than proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. The adverse impact of this option on European Sites would therefore be less than that of the proposed scheme.

Comparison with Scheme Objectives

2.5.20 For this option the level of service of the route would not be significantly improved over part of the existing route which already has a similar arrangement to this. The W2+1 part of the route would not increase the capacity of the existing road. It would be near capacity in the opening year 2017 and by 2032 there would be significant queuing. It would therefore fail to meet the level of service objective as well as the proposed scheme.

2.5.21 The journey time reduction objective would not be achieved as well as the proposed scheme due to the lack of additional lanes on part of the route. Whilst the alignment would be improved on part of the route, the other part would only be slightly improved, the improvement in the resilience of the network would be limited due to disruption when incidents caused vehicles to obstruct the single lane. Also, an emergency downhill lay-by would be required to reduce disruption but this would increase scheme footprint locally.

2.5.22 A lack of central reservation or vehicle restraint on part of the route would fail to meet the objective to improve road safety as well as the proposed scheme.

2.5.23 The introduction of a minimum length of 2km of single carriageway or at-grade roundabouts at either end of the WS2+1 part of the road would further significantly reduce the traffic benefits of the scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.24 This option could feasibly and reasonably be constructed.

2.5.25 This option would reduce the scheme cost by approximately £40m. However, the cost effectiveness would be lower due to lesser benefits in terms of journey time reduction and safety.

Comparison with the Proposed Scheme

2.5.26 This option would achieve a reduction in scheme footprint within the Usk Bat Sites SAC.

2.5.27 This option would fail to meet the key strategic scheme objectives for reducing journey times, route improvement and increasing resilience of the network as well as the proposed scheme. The lack of central reserve and vehicle restraint would make this option significantly less safe than the proposed scheme.

2.5.28 Therefore this is not an alternative solution.

v) Option AS4 – At Grade junctions

Description

2.5.29 This option considers at-grade junctions as opposed to the proposed grade separated junctions at Brynmawr and Gilwern. Refer to Figure 6.2 in Appendix A.

Assessment of implications for European Sites

2.5.30 The footprint on the Usk Bat Sites SAC would be 8.7 ha, the same as the proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. The adverse impact of this option on European Site**s** would therefore be the same as that of the proposed scheme.

Comparison with Scheme Objectives

2.5.31 Use of at grade junctions would limit the scheme's ability to achieve journey time reductions and to improve the level of service on the route. This would have a subsequent limiting effect on the scheme's ability to facilitate economic regeneration. NMU provision would not be met as well as the proposed scheme as NMU facilities included in many of the grade separated junctions would not be provided.

2.5.32 Non continuous traffic flow on at-grade junctions would also limit the scheme's ability to meet objectives to improve the resilience of the network and more effectively use the route to manage traffic. Whilst this option would have reduced footprint and material requirement it would not meet the economic and social aspects of sustainability as well as the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.33 This option could feasibly and reasonably be constructed.

2.5.34 The cost of this option would reduce the scheme cost by approximately £40m than the proposed scheme but would offer lower cost effectiveness due to the limitations on the level of service improvements.

Comparison with the Proposed Scheme

2.5.35 Changing grade separated junctions to at-grade would not reduce SAC footprint as junctions are outside of the SAC.

2.5.36 This option would also have a detrimental effect on the scheme's ability to achieve journey time, connectivity and economic regeneration and resilience objectives. Therefore it is not an alternative solution.

v) Option AS11 – Tunnel

Description

2.5.37 This option considers construction of a new twin bored tunnel with forced ventilation at the entrance and exits; the entrance and exit would be configured outside of the SAC extents. This would require a tunnel approximately 2.9km long. Refer to Figure 6.1 in Appendix A.

Assessment of implications for European Sites

2.5.38 The route of this option could be developed to remove the direct footprint within the Usk Bat Sites SAC and Cwm Clydach Woodlands SAC. However the subterranean route could affect caves, which are themselves a qualifying feature of Usk Bat Sites SAC and also inhabited by Lesser Horseshoe Bats, themselves a qualifying feature. Loss of, or serious damage to, caves would be hard to mitigate or compensate and would constitute an adverse effect on Usk Bat Sites SAC of greater magnitude than the proposed scheme. There would be a concentration of air pollutants at the tunnel entrance but the effect of this has not been assessed as the entrance and exits would be situate outside the SAC.

Comparison with Scheme Objectives

2.5.39 Journey time reduction and route improvement objectives would be achieved similarly to the proposed scheme. Road safety improvement would be as per the proposed scheme, but there would be inherent risks associated with tunnel construction and operation and the maintenance liability of the route would be significantly increased. There would be no improvement to safety and NMU provision on the existing A465 route. This option would have less opportunity to integrate with the existing transport network which would limit the ability to reduce community severance as well as the proposed scheme.

2.5.40 This option would require significant additional works and materials, so would be highly unsustainable and fail to meet this objective.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.41 This option would be feasible and buildable.

2.5.42 This option would incur approximately an additional £85m of scheme cost.

Comparison with the Proposed Scheme

2.5.43 Whilst this option would avoid direct SAC surface footprint if it encountered caves it would incur a direct and significant negative impact on the SAC. This impact on European Sites would be worse than that of the proposed scheme.

2.5.44 In addition, this option would be more expensive, less sustainable and incur greater maintenance liability.

2.5.45 For the above reasons this is not an alternative solution.

vi) Option AS12 – Double deck carriageway

Description

2.5.46 This option considers a 'Double Deck' carriageway i.e. a structure approximately 2.9km long and 14m wide to facilitate one carriageway running directly on top of the other through the Clydach Gorge. This structure would align within the existing A465 boundary, unless strengthening works to existing structures required a wider footprint. The split level carriageway would be lit The remainder of the route would be dual carriageway in both directions. Refer to Figures 6.1 and 6.3 in Appendix A.

Assessment of Implications for European Sites

2.5.47 The footprint of this option could be developed with no direct surface level footprint within the Usk Bat Sites SAC or Cwm Clydach Woodlands SAC outside of the existing highway footprint. However, strengthening works on existing structures would be more significant due to more significant structures required by this option. Underground features would be required, which would have an adverse impact on the Usk Bat Sites SAC if caves were impacted.

Comparison with Scheme Objectives

2.5.48 Journey time reduction and route improvement objectives would be achieved by this option. Provision of NMU facilities would be complicated by this option and subways would have to be provided instead of footbridges which would mean this objective was not achieved as well as the proposed scheme.

2.5.49 The Road safety improvement would be increased assuming alignment standards are improved, although there would be inherent risks associated with the construction, operation and maintenance of this significant structure.

2.5.50 The maintenance liability of the route would be significantly increased, potentially failing to meet this scheme objective.

2.5.51 This option would require significant additional works and materials so may be considered unsustainable and failing to meet this objective. Similarly, the negative landscape and visual impact of the considerable structure would limit the achievement of the sustainability objective.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.52 The required road closures for this option are unfeasible in terms of the impact on the existing highway network during construction. The construction sequence would be extremely involved and would necessitate long term night time closure of the A465 with single lane running for prolonged periods whilst the wall sections are constructed.

2.5.53 The method of construction would require conversion of all overhead features to underground, e.g footbridges would have to be subways, all overhead services would have to be diverted or raised above the eastbound carriageway involving extremely costly and disruptive HV overhead line diversions.

2.5.54 Strengthening of some underground features would be required since in the temporary case loading conditions would be worsened due to wall loading until the westbound running surface was complete to its full width. Therefore there would be a need for temporary restraint to sections of the structure prior to its completion, e.g. walls, and this would include anchoring which would impact on the limestone cave areas if encountered.

2.5.55 Maintenance would be extremely difficult and would necessitate full closure of the route for extended periods.

2.5.56 This option would add approximately £60-80m to the scheme cost, significantly lowering its cost effectiveness.

Comparison with the Proposed Scheme

2.5.57 This option would remove the scheme footprint within the Usk Bat Sites SAC. However dependant on the amount of strengthening works required to existing structures and underground features and if the cave system was affected, this option would result in a higher impact on the Usk Bat Sites SAC than the proposed scheme.

2.5.58 As opposed to the proposed scheme, this option would require lengthy road closure which would have a significant negative impact on the road network in terms of disruption and safety.

2.5.59 Compared to the proposed scheme, significant additional works and materials would be required to build this structure, with associated sustainability issues. Additionally, the landscape and visual impact of the structure may be considered negative in comparison to the proposed scheme.

2.5.60 Construction and operation costs would be significantly higher than the proposed scheme.

2.5.61 For the above reasons this is not an alternative solution.

vii) Option AS14 – Split level and cantilevered

Description

2.5.62 This option considers carriageways at different levels through the Clydach Gorge and built on cantilever over the gorge (See Figures 6.1 and 6.3 in Appendix A). The cantilever structure would be up to 2.9km long and 8m wide. The remainder of the route would be dual carriageway in both directions.

Assessment of Implications for European Sites

2.5.63 The footprint within the Usk Bat Sites SAC would be 8.5 ha, which is 0.2 ha less than the proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. The adverse impact of this option on European Sites would therefore be slightly less than that of the proposed scheme. Additional foundation works to support the cantilever would risk impacting on the cave network and having a greater impact on the integrity of the SAC than the proposed scheme.

Comparison with Scheme Objectives

2.5.64 The footprint within the Usk Bat Sites SAC would be 8.5 ha, which is 0.2 ha less than the proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. The adverse impact of this option on European Sites would therefore be slightly less than that of the proposed scheme. Additional foundation works to support the cantilever would risk impacting on the cave network and having a greater impact on the integrity of the SAC than the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.65 Foundation construction would be difficult in the limestone area from Ch 31400 - 31900 and this construction method would not be successful in the area of Ogof Capel and

Gellenyn around Ch 31600 - 31700 where caves are close to the existing carriageway level and construction depth would be minimal.

2.5.66 Permanent land take would be reduced on the down slope to the south but temporary land take would be similar if not the same as the proposed scheme.

2.5.67 During construction, serious disruption would be caused by the occupation of the existing A465. Numerous closures of the route would be required to install the concrete sections for the vertical elements and deck of the structure for this option. Single lane running under 2 way traffic lights would also be required for extended periods.

2.5.68 This option would add approximately £35m to the scheme cost. It would require an increased maintenance regime with associated cost.

Comparison with the Proposed Scheme

2.5.69 This option would result in a slightly lower SAC footprint than the proposed scheme but risks impacting the cave network and the integrity of the SAC if the caves are impacted upon.

2.5.70 This option would have serious buildability issues as well as sustainability and maintenance and be less cost effective than the proposed scheme. It is therefore not an alternative solution.

viii) Option AS15 – Employer's conceptual scheme

Description

2.5.71 The employer's conceptual design was a D2AP online improvement with slightly different alignment to the proposed scheme, different junction arrangements at Brynmawr and Saleyard and no grade separated junction at Gilwern. (See Figure 6.3 in Appendix A).

Assessment of implications for European Sites

2.5.72 The footprint within Usk Bat Sites SAC would be 9.4 ha, which is 0.7 ha more than that of the proposed scheme. There would be no footprint in Cwm Clydach Woodlands SAC. The adverse impact of this option on European Sites would therefore be slightly greater than that of the proposed scheme.

Comparison with Scheme Objectives

2.5.73 This option would achieve all scheme objectives apart from the objective to have 'proper care for the environment'. This is due to the fact that it would have greater impact on the Usk Bat Sites SAC than the proposed scheme, with greater adverse effect. This option also would have a greater negative impact on the geological SSSI at Brynmawr due to construction works in closer proximity than the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.74 Feasibility, buildability and cost effectiveness would be as per the proposed scheme .

Comparison with the Proposed Scheme

2.5.75 This option would have greater impact on the integrity of the SAC than the proposed scheme.

2.5.76 This option achieves strategic network improvement objectives similarly to the proposed scheme, with similar cost, feasibility and buildability, but does not meet the environmental objective.

2.5.77 Therefore this is not an alternative solution with lesser impact on the SAC.

ix) Option AS25 – Do minimum

Description

2.5.78 This option includes minor improvements to road lighting, road pavement, and road markings and minor improvements to junctions to remove conflicting turning manoeuvres. It would also require the work listed in the Do Nothing Option in order to maintain the existing road in its current condition. In order to do this, routine maintenance operations would be required. Typical activities would include, but are not limited to:

- winter maintenance, such as de-icing/gritting;
- line painting;
- resurfacing;
- pavement reconstruction;
- repairs to damage;
- dealing with traffic accidents;
- structural inspection works and maintenance work to structures, bridges, culverts and retaining walls;
- repair/strengthening works to a number of principle structures;
- maintenance of the highway drainage network; and
- management and maintenance of roadside grass areas and vegetation trimming.

Assessment of implications for European Sites

2.5.79 In the short to medium term, as the footprint of the highway would remain unchanged if the 'do minimum' option were adopted, there would not be any further land take from the SAC or changes in the existing environmental conditions surrounding the SAC. However environmental conditions may worsen due to traffic growth and the structures in the current road would need to be rebuilt or strengthened relatively soon, which would have some of the same effects as the Proposed Scheme. Therefore this option would not have a direct adverse effect on the integrity of the European Sites, but would only have slightly less effects on the SAC in the medium to long term.

Comparison with Scheme Objectives

2.5.80 It is considered that the 'do minimum' option would essentially meet the objective to have 'proper care for the environment', as the effects on the SAC and surrounding environment are considered to be minimal. However, this option does not meet the other Scheme objectives sufficiently. The lack of a central reserve means that safety objectives would not be met sufficiently.

2.5.81 Due to the increasing maintenance requirement the 'do minimum' option is not considered to be a sustainable long term solution for this section of the trunk road network and therefore the objective of 'to deliver a scheme that is sustainable' is not considered to be met by this option.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.82 Maintaining the existing situation with some minor improvement is considered to be feasible and cost effective in the short term. However, due to the sub-standard nature of the existing road, and the increasing safety standards required when undertaking maintenance operations, future maintenance costs are likely to increase and carrying out routine maintenance will become less feasible, and in order to carry out future maintenance operations in a safe manner an improvement to the standard of the trunk road would be required in future years.

Comparison with the Preferred Option

2.5.83 The 'do minimum' option would avoid direct impact on the Cwm Clydach Woodlands and Usk Bat Sites SACs in the short term, but would only have slightly less effect than the Proposed Scheme in the medium to long term. This option does not meet the network and safety scheme objectives sufficiently. Therefore this is not an alternative solution.

x) Option AS26 – Reduced carriageway cross section

Description

2.5.84 This option considers additional reductions to carriageway, verges and central reservation widths and therefore reduce footprint within the SAC. Refer to Figure 6.3 in Appendix A.

Assessment of implications for European Sites

2.5.85 The footprint of this option within the Usk Bat Sites SAC would be 8.4 ha, 0.3 ha less than proposed scheme. This is based on a calculation including 0.4m reduced from carriageways, 0.3m from each verge and 0.7m from the central reservation.

2.5.86 The adverse impact of this option on European Sites would therefore be slightly less than that of the proposed scheme.

Comparison with Scheme Objectives

2.5.87 This option would have serious safety implications. Visibility and run off areas would be reduced, increasing likelihood and severity of accidents. It would therefore fail to meet the safety objective as well as the proposed scheme. This option would hence not meet the social aspect of sustainability and reduction of maintenance liability as well as the proposed scheme.

2.5.88 Level of service and journey times improvement objectives would be achieved, but not as well as the proposed scheme due to the more constrained alignment. This option would also reduce the ability of the scheme to meet the resilience objective due to increased likelihood of incidents.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.89 Buildability would be similar to the proposed scheme; however this option would not be feasible from a design perspective. The alignment would be significantly below minimum design requirements and the safety implications would be hard to mitigate and would reduce the cost effectiveness of this option.

2.5.90 Further reducing the cross section would reduce the scheme cost by approximately £6m.

Comparison with the Proposed Scheme

2.5.91 This option would result in a slight reduction in SAC footprint compared to the proposed scheme.

2.5.92 The cross section of the proposed scheme has already been reduced to below standard to reduce footprint within the Usk Bat Sites SAC and includes four Departures from Standard. Additional Departures would reduce the safety of this option.

2.5.93 This option would also not achieve objectives sufficiently in terms of network resilience, level of service and journey time improvement.

2.5.94 For the above reasons this is not an alternative solution.

xi) Option AS27 – Do Minimum with Speed Limit Enforcement

Description

2.5.95 This option includes minor improvements to road lighting, road pavement, and road markings and minor improvements to junctions to remove conflicting turning manoeuvres and introducing permanent speed limit measures using either average speed check cameras or a similar enforcement method. The enforcement infrastructure would be located outside the SAC.

2.5.96 It would also require the work listed in the Do Nothing Option in order to maintain the existing road in its current condition. In order to do this, routine maintenance operations would be required. Typical activities would include, but are not limited to:

- winter maintenance, such as de-icing/gritting;
- line painting;
- resurfacing;
- pavement reconstruction;
- repairs to damage;
- dealing with traffic accidents;
- structural inspection works and maintenance work to structures, bridges, culverts and retaining walls;
- repair/strengthening works to a number of principle structures;
- maintenance of the highway drainage network; and
- management and maintenance of roadside grass areas and vegetation trimming.

Assessment of implications for European Sites

2.5.97 In the short to medium term, as the footprint of the highway would remain unchanged if the 'do minimum' option were adopted, there would not be any further land take from the SAC or changes in the existing environmental conditions surrounding the SAC. However environmental conditions may worsen due to traffic growth and the structures in the current road would need to be rebuilt or strengthened relatively soon, which would have some of the same effects as the Proposed Scheme. Therefore this option would not have a direct adverse effect on the integrity of the European Sites, but would only have slightly less effects on the SAC in the medium to long term.

Comparison with Scheme Objectives

2.5.98 It is considered that the 'do minimum' option would essentially meet the objective to have 'proper care for the environment', as the effects on the SAC and surrounding environment are considered to be minimal. However, this option does not meet the

other Scheme objectives sufficiently. Which this option would enhance safety on the one part by enforcing the speed limit the lack of a central reserve means that safety objectives would not be met sufficiently.

2.5.99 Due to the increasing maintenance requirement the 'do minimum' option is not considered to be a sustainable long term solution for this section of the trunk road network and therefore the objective of 'to deliver a scheme that is sustainable' is not considered to be met by this option.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.5.100 Maintaining the existing situation with some minor improvement is considered to be feasible and cost effective in the short term. However, due to the sub-standard nature of the existing road, and the increasing safety standards required when undertaking maintenance operations, future maintenance costs are likely to increase and carrying out routine maintenance will become less feasible, and in order to carry out future maintenance operations in a safe manner an improvement to the standard of the trunk road would be required in future years.

Comparison with the Preferred Option

2.5.101 This option would avoid direct impact on the Cwm Clydach Woodlands and Usk Bat Sites SACs in the short term, but would only have slightly less effect than the Proposed Scheme in the medium to long term. This option does not meet the scheme objectives sufficiently. Therefore this is not an alternative solution.

2.6 Alternative Methods of Construction

Consideration was given to a wide range of alternative methods of construction including:

- Insitu versus Precast Concrete,
- Steel within structures,
- Concrete Carriageway,
- Use of steel vehicle restraint throughout the route,
- Using pneumatic plant to remove hard rock,
- Reducing the size and scale of temporary compound areas.

However none of these options would affect the land take within the SAC so such options were not investigated further in this document.

i) Option AC1 – Walls or steep slopes instead of batters.

Description

2.6.1 Walls or steep slopes instead of batters where relevant within the SAC. e.g. north of the scheme for the length of the sewage and water works. Refer to Figure 6.1 in Appendix A.

Assessment of implications for European Sites

2.6.2 The footprint within the Usk Bat Sites SAC would be 8.3 ha, which is 0.4 ha less than the proposed scheme. There would be no footprint in Cwm Clydach Woodlands SAC. Whilst this option would have slightly less footprint within the SAC, the area which would not be removed is included in the proposed scheme for planting with higher quality habitat species which would benefit lesser horseshoe bats. In the long term therefore, this option would have the same effect on the SAC as the Proposed Scheme.

Comparison with Scheme Objectives

2.6.3 This option would not achieve the scheme objectives because it would not meet the objective of having due regard to the environment (e.g. landscape and cultural heritage value of the National Park).

2.6.4 Imported materials including concrete and steel would be required to construct the additional retaining walls so may be considered to be less sustainable than the proposed scheme. This option would also have a slightly greater maintenance liability than the proposed scheme.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.6.5 Retaining walls along this length would be challenging to construct due to significant height required. Whilst they could feasibly and reasonably be constructed, this would incur additional cost of approximately £26m compared with the proposed scheme.

Comparison with the Proposed Scheme

2.6.6 This option would not have lesser negative impact on the integrity of the SAC than the proposed scheme.

2.6.7 This option would not achieve the scheme objectives sufficiently. For this reason this is not an alternative solution.

ii) Option AC7 – Viaduct in lieu of embankment/walls

Description

2.6.8 This option considers construction of the highway on an elevated viaduct through the Usk Bat Site SAC from chainage 29400 to 31600 to reduce the footprint of SAC land permanently lost to the scheme. Refer to Figure 6.1 in Appendix A.

Assessment of implications for European Sites

2.6.9 The footprint within the Usk Bat Sites SAC would be 8.0 ha, which is 0.7 ha less than the proposed scheme. There would be no footprint in the Cwm Clydach Woodlands SAC. However, the greatly increased construction requirements would have an increased risk of an effect on the cave system, through piling. The adverse impact of this option on European Sites would therefore be greater than that of the proposed scheme.

Comparison with Scheme Objectives

2.6.10 This option would achieve journey time and route improvement objectives similarly to the proposed scheme.

2.6.11 The viaduct would require significant additional maintenance, which would result in road closure and disruption, reducing the scheme's ability to meet these objectives.

2.6.12 This option would result in adverse landscape and visual impact, and require significant additional construction materials, therefore compromising the scheme's meeting of the sustainability objective.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.6.13 The required road closure for this alternative is likely to be unfeasible in terms of the significant safety and disruption impacts on the existing road network during a closure

of approximately 6 - 9 months. Increased journey time for emergency vehicles would also highly likely render this alternative unfeasible.

2.6.14 In terms of buildability, this alternative can be built but require significant construction works including in-situ concrete works or prefabricated sections craned into place., which may require additional temporary footprint within the SAC.

2.6.15 The cost of this alternative would add approximately £105m to the scheme cost. This would significantly reduce cost effectiveness.

Comparison with the Proposed Scheme

2.6.16 This option would slightly reduce SAC footprint relative to the proposed scheme but would have a greater adverse effect on the caves within the SAC.

2.6.17 There would be sustainability issues regarding the volume of materials required to construct the viaduct.

2.6.18 The closure of the road during construction would have a highly significant negative impact on the road network with disruption and potentially safety issues on diverted routes.

2.6.19 The additional cost relative to the proposed scheme would mean that the costs of this option would outweigh the benefits.

2.6.20 For the above reasons this is not an alternative solution.

2.7 Alternative Operational Methods

2.7.1 Consideration was given to whether removing maintenance access routes for the Proposed scheme would reduce landtake within the SAC. However within the SAC the maintenance access for the Proposed Scheme is directly from the highway and there is no land that is required purely for maintenance access and so there is no opportunity to reduce landtake from within the SAC by modifying maintenance access routes.

2.8 Alternative Decommissioning Methods

2.8.1 The A465 is part of the Trans-European Network, the primary Welsh trunk road network and is one of the main strategic east-west routes linking south Wales and the Midlands in England. It is therefore an essential route both locally and strategically, and cannot be decommissioned in the foreseeable future. Furthermore, decommissioning the A465 would not meet the Scheme's objectives or the objectives set out for the A465 within the Welsh Government's National Transport Plan 2010.

2.9 Alternative Timescales

i) Option AT1 – Road Closure During Construction

Description

2.9.1 This option considers closure of the existing A465 during construction of the dualling through the SAC. Otherwise, the scope of the scheme remains as per the proposed scheme. It is estimated that the closure would last for 3-6 months.

Assessment of Implications for European Sites

2.9.2 This option would not reduce the land take and clearance works required in the SAC. The footprint on Usk Bat Sites SAC would be 8.7 ha, the same as the proposed scheme. There would be no footprint in Cwm Clydach Woodlands SAC.

Comparison with Scheme Objectives

2.9.3 This option would achieve scheme journey time and route improvement objectives similarly to the proposed scheme.

2.9.4 This option would lead to reduced road safety on the network during construction due to the lack of suitable alternative routes, failing to meet the safety objective.

2.9.5 In the short term, this option would lead to serious and prolonged disruption of the wider network, failing to meet the network improvement objective.

Consideration of Feasibility, Buildability and Cost Effectiveness

2.9.6 The impact of road closure on the existing network would be highly significant, making this option unfeasible. Lack of convenient and appropriate diversion routes would lead to serious congestion with the associated safety, health, social and economic impact.

2.9.7 This option would improve buildability and reduce the programme.

2.9.8 This alternative would reduce construction costs but would have negative economic impact on road users during the closure due to lack of connectivity.

Comparison with the Proposed Scheme

2.9.9 This option would have similar impacts on the SAC footprint as the proposed scheme. This option would incur serious disruption to the wider road network for a substantial period of time. This disruption would have associated social, environmental and financial impacts as available diversionary routes may not be feasible to carry the diverted traffic, therefore failing to meet the majority of the scheme objectives sufficiently. For these reasons the option is not an alternative solution.

2.10 Consultation on Alternatives Solutions

2.10.1 Consultation on some of the alternatives has been carried out during design development, as described in Chapter 4 of the published Environmental Statement. Consultation on the alternatives described in this report will be carried out through the wider consultation, with NRW, Blaenau Gwent County Borough Council, Monmouthshire County Council, Brecon Beacons National Park Authority and interested parties/members of the public on publication of this document.

2.11 Conclusions

2.11.1 Throughout the course of the development of the Scheme, a number of different route options, alignments, and design and construction alternatives have been considered, all driven by the requirement to minimise the impacts on the SACs. This process of continual refinement of the design resulted in the proposed scheme, which is the option being promoted in the Draft Orders and assessed through the Environmental Impact Assessment as described in the Environmental Statement.

2.11.2 In order to carry out the Assessment of Alternative Solutions required under the Habitats Regulations, various alternative options to the proposed scheme have been assessed with regard to their implications for the SACs, the extent to which they are feasible and their ability to meet the Scheme Objectives. The focus of the alternatives assessment is primarily on impacts relating to the footprint of the project (net loss of land within the SAC), because these are readily quantified and can be directly compared

between options; however consideration has also been given to other effects where they can be identified. The decisions on alternatives have considered integrity and the conservation objectives of the Natura 2000 sites, and their contribution to the overall coherence of the Natura 2000 network.

2.11.3 Whilst a number of the alternatives would result in reduced land take from the SAC, the majority only marginally so, none would meet all the Scheme Objectives sufficiently; and as such cannot be regarded as alternative solutions. Conversely, there were other alternatives that, whilst partially meeting the Scheme Objectives, would lead to greater land take from the SAC.

2.11.4 On the basis of this Assessment of Alternative Solutions, it is therefore concluded that there is no feasible alternative to the proposed scheme that would meet the Scheme Objectives sufficiently and have a lower impact on the SAC. It is concluded that for the purpose of regulation 62 of the Habitats Regulations there is no alternative solution.

3.0 IMPERATIVE REASONS OF OVERRIDING PUBLIC INTEREST (IROPI)

3.1 Consideration of IROPI

3.1.1 Since it has been concluded that no alternative solution exists it is necessary to establish whether or not there are IROPI to justify the Scheme proceeding.

3.1.2 The first step of the IROPI stage is a consideration of the requirements of Annex I and Annex II of the Habitats Directive. If a priority habitat or species, as listed in Annex I and Annex II, would be affected by the Scheme, then for the Scheme to be allowed to proceed, the imperative reasons would need to be "…reasons relating to human health, public safety or beneficial consequences of primary importance to the environment, or other reasons which in the opinion of the European Commission are imperative reasons of overriding public interest."

3.1.3 Whilst the Usk Bat Sites SAC does contain two priority habitats, blanket bogs and Tilio Acerion Woodland, there would be no effects on the integrity with respect to these features. The A465 road improvements would therefore not result in impacts on priority habitats or species, and so the definition of overriding public interest is not so constrained. The imperative reasons may therefore also include public interests of a social or economic nature, as long as the reasons are sufficient to override the harm to the site.

3.1.4 Where it is determined that the reasons put forward are not imperative, and/or not of overriding public interest (relative to the importance of the European Site), the project or plan may not proceed.

3.1.5 The reasons put forward are as follows:

- IROPI 1 – For Reasons of Agreed National Policy
- IROPI 2 - For Reasons of Public Safety
- IROPI 3 - For Reasons of Economic Nature

3.2 IROPI 1 - For Reasons of Agreed National Policy

Background

3.2.1 As stated in the EC guidance document 'Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000)', and further clarified by the 'Guidance document on Article 6(4) of the 'Habitats and Wild Birds Directive': Alternative Solutions, Imperative Reasons of Overriding Public Interest (IROPI) and Compensatory Measures, (December 2012)', it is reasonable to consider that the ''imperative reasons of overriding public interest, including those of a social and economic nature'' refer to situations where plans or projects envisaged prove to be indispensable:

- within the framework of actions or policies aiming to protect fundamental values for citizens' lives (health, safety, environment);
- within the framework of fundamental policies for the State and society; and
- within the framework of carrying out activities of an economic or social nature, fulfilling specific obligations of public service.'

3.2.2 The proposed Scheme to dual the section of the A465 between Gilwern and Brynmawr (Section 2) was established in 1994 in response to a review which had identified deficiencies in relation to safety and capacity on this stretch of the A465. The proposed Scheme is part of Welsh Government's overall programme to dual the A465 Heads of the Valleys Road between Abergavenny and Hirwaun. Section 2 is one of six sections. The Line Order for the entire scheme was made in June 1999. Section 4 (Tredegar to Dowlais Top) and Section 1 (Abergavenny to Gilwern) were complete in 2004 and 2008 respectively. Section 3 commenced construction in January 2013 and is expected to be complete by the end of 2014. The National Transport Plan (2010) states that Sections 5 (Dowlais Top to A470) and 6 (A470 to Hirwaun) will be completed by 2020. The overall A465 dualling programme, which includes the Section 2 Scheme has since been included within, or is aligned to, the following policies, plans and programmes:

Trans European Transport Network (TEN-T)

3.2.3 The A465, along with the M4, A40 and A477, constitutes the Strategic Road Network (SRN) in the South of Wales, and it forms part of the Trans-European Road Network (TERN). The TERN is one of several Trans-European Transport Networks. It is designed to improve the internal road infrastructure of the EU, aiding freedom of movement for goods, persons and services to reinforce economic and social cohesion within the EU. It is therefore an important link between Wales and the rest of Europe. The full route of the A465 extends from Swansea to Hereford, serving the industrialised northern sections of the South East Wales Valleys along the way.

Programme for Government 2011 to 2016

3.2.4 The Welsh Government's Programme for Government 2011 to 2016 outlines the Government's commitment to delivering their manifesto. It's aims include:

- To strengthen the conditions that will enable business to create jobs and sustainable economic growth
- Reducing poverty, especially persistent poverty amongst some of our poorest people and communities, and reducing the likelihood that people will become poor
- Ensure that rural communities remain vibrant and able to offer people an excellent quality of life with access to high quality employment, affordable housing and public services and sustained by reliable and effective infrastructure in terms of broadband, public transport and utilities
- Make our communities safer

3.2.5 The corresponding key actions the Welsh Government is undertaking to deliver the improvements include:

- Improving our infrastructure – deliver the priorities within the National Transport Plan (NTP)
- Improving Welsh skills for employment
- Supporting the economy and business
- Tackling worklessness and raising household income
- Improving the skills of young people and families

- A thriving rural economy
- Improving safety in communities
- Creating sustainable places for people

One Wales: Connection the Nation – The Wales Transport Strategy (WTS) (2008)

3.2.6 The WTS focuses on the role transport can play in delivering the Welsh Government's wider policy objectives. The Strategy sets out a series of high level outcomes and the steps needed for their delivery.

3.2.7 The WTS notes the importance of good, reliable connections between Wales and other parts of the UK and EU for business and tourism. It recognises the importance of the east-west corridors and in particular the TEN-T routes as priority. It also identifies the Heads of the Valleys route as providing an alternative link (to the M4) between west Wales and the Midlands, while at the same time connecting the Valleys (one of Wales's most deprived areas) with international destinations.

3.2.8 The WTS includes 5 strategic priorities. These are set out below, together with the way in which the proposed scheme aims to meet these priorities.

- **Integrating local transport:** The provision of grade-separated interchanges would ease congestion and free the local roads for local transport.
- **Improving access between key settlements and sites:** The proposed scheme would improve the link between west Wales and the Midlands. It would improve journey times and journey time reliability.
- **Enhancing international connectivity:** The Heads of the Valley is recognised as one of the most important corridors for international connectivity with Wales. The proposed scheme forms part of the Trans European Transport Network (TEN-T) and would improve links to West Wales, Ireland, the English trunk road network and Europe.
- **Increasing safety and security:** The provision of a dual carriageway with grade separated junctions would provide more reliable journeys with increased safety (safe overtaking opportunities, reduced risk of cross-over accidents). New pedestrian/cyclist/equestrian facilities would give users safe/secure routes.
- **Reducing greenhouse gas emissions and other environmental impacts:** Extensive mitigation measures would be provided to minimise the environmental impacts of the proposed scheme. Environmental improvements would include pollution control measures to control discharge to water courses, where currently there is no such provision.

Wales Infrastructure Investment Plan for Growth and jobs (WIIP) (2012)

3.2.9 The WIIP sets out the Welsh Government's strategic capital investment priorities. The aim of the WIIP in relation to transport are to secure the most out of the existing road network through well planned maintenance and upgrades to ensure that the road network operates more efficiently.

3.2.10 The WIIP makes reference to the ongoing A465 Dualling of the Heads of the Valley as a particular case study. The case study highlights that the Project has associated

regeneration benefits, which include improved accessibility to jobs as well as key public services such as healthcare, education and leisure facilities, improved connectivity for local communities. These benefits are in addition to direct benefits, including reduced journey times, improved reliability and greater safety.

National Transport Plan (NTP) (2010)

3.2.11 The NTP sets out solutions to transport issues along the main movement corridors in Wales, and demonstrates how the Wales Transport Strategy will be delivered over the five year period 2010-2015.

3.2.12 East-West road links are specifically identified within the NTP, and the aim of these links is "to improve reliability, journey time and safety along the east-west road corridors". In particular, Chapter 4 of the NTP (The East - West Corridor 'Targeted investment in infrastructure') specifically identifies the A465 as a key corridor for allowing east to west travel in South Wales and in turn promoting economic growth. It is stated that:

"The A465 Heads of the Valleys road provides a strategic link for the northern Valleys, supporting regeneration and providing an alternate link between west Wales and the Midlands."

3.2.13 The NTP was prioritised in December 2011 to reflect the objectives of the Welsh Government as set out in the 'Programme for Government 2011-2016'. The prioritisation confirmed the status and outline programme for the A465 dualling with construction of the length between Gilwern and Brynmawr programmed to commence in 2014-2015.

3.2.14 The Scheme will contribute to the following priorities and aims of the NTP:

- 'Strategic Priority' 3 of 5: Improving access between key settlements and sites;
- 'Strategic Priority' 4 of 5: Enhancing international connectivity;
- 'Strategic Priority' 5 of 5: Increasing safety and security;
- 'General Aim' 7 of 10: To operate, improve and maintain the trunk road network to meet our statutory obligations and deliver our strategic objectives;
- 'General Aim' 8 of 10: To continue to improve the safety of the road network, with special emphasis on reducing casualty rates of vulnerable users;
- 'General Aim' 9 of 10: To improve the sustainability of freight movements, including supporting the modal shift of freight from road to rail where environmental, economic and social benefits can be achieved;
- 'East-West Corridor Aim' 2 of 3: To improve reliability, journey times and safety along the east-west road corridor in south Wales; and
- 'East-West Corridor Aim' 3 of 3: To continue to develop the most appropriate, and sustainable, solutions to transport issues in south-east Wales.

Sewta Regional Transport Plan (RTP) (2010

3.2.15 The South East Wales Transport Alliance (Sewta) is the regional transport consortia for south east Wales and includes representatives from 10 local authorities. The Sewta RTP provides a 15 year transport strategy (2010-2025).

3.2.16 The Sewta RTP recognises that South East Wales is Wales' "most important region economically and the key driver of Wales's current and future economic prosperity". The A465 Heads of the Valleys Road is identified in the RTP as one of three Strategic Opportunity Areas offering potential regional benefits.

3.2.17 The proposed Scheme will contribute to the following Transport planning Objective within the RTP:

- TPO2: To make better use of the existing road system.

3.2.18 The Scheme is also in line with the following policies highlighted in the RTP:

- HIP1: Sewta supports the management and maintenance of the regional road network to a uniform high standard;
- HIP4: Sewta supports selective improvements to the national highway system where they are to the overall benefit to RTP objectives;
- HIP5: Sewta supports measures to ensure that the transport system is more resilient and less susceptible to the influences of climate change;
- ECP1: Sewta supports improved links between South East Wales and other parts of Wales and the UK, in particular by rail, coach and sea; and
- FRP1: Sewta supports measures to improve the sustainability, efficiency and effectiveness of the transport of freight, including the transfer to rail and water where practical.

<u>People, Places, Futures - The Wales Spatial Plan (WSP) (2004 and updated in 2008)</u>

3.2.19 The Wales Spatial plan sets the context for planning and policy in Wales that have spatial implications.

3.2.20 The long term vision for the region's development is set out in the WSP and its strategy for the 'South East – Capital Network'. The 'Capital Network' strategy envisages that new development will be focused on 14 key settlements across three sub-regional areas, one of which is the 'Heads of the Valleys Plus' comprising the upper valleys of the Capital region.

3.2.21 The WSP identifies the dualling of the A465 as an opportunity for growth in the least well off areas of the Capital Region. The programme is:

"providing targeted support to regenerate the least well off areas of the Capital Region, including the key settlements of Merthyr Tydfil and Ebbw Vale, linked to the opportunities for growth presented by the dualling of the A465 Heads of the Valleys road."

3.2.22 The Scheme will contribute to one of the WSP priorities for the Capital region, that the area will function as a networked city region, on a scale to realise its international potential, its national role and to reduce inequalities.

The WSP highlights the current Heads of the Valley regeneration programme, which is a 15-year regeneration strategy developed in partnership with five local authorities (Rhondda Cynon Taff, Merthyr Tydfil, Caerphilly, Blaenau Gwent and Torfaen). The purpose of the strategy is to tackle the root causes of economic inactivity and other key issues in the area. The A465 is identified as a 'Primary Route' that provides a direct link

between the Key Settlements for the region: Merthyr Tydfil, Abergavenny, Aberdare and Ebbw Vale.

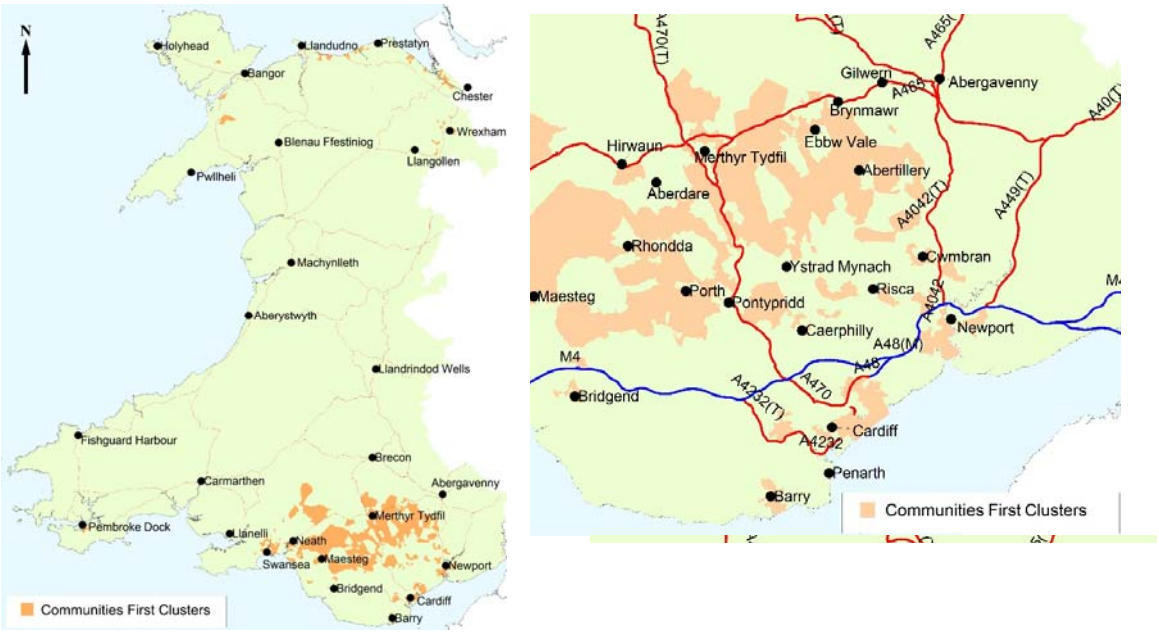
Turning Heads – A Strategy for the Heads of the Valleys (2020)

3.2.23 Turning Heads sets out a strategy for the Heads of the Valleys in the context of the Wales Spatial Plan.

3.2.24 The Strategy identifies amongst the seven major Opportunities for the area – 'the upgrading of the A465 Heads of the Valley Road'. The upgrading of the A465 is identified as a major opportunity to improve the marketability of the region to investors, particularly those that will provide skilled jobs and high value-added services. Delivery of the Scheme will serve to heighten awareness of the region as an emerging business district, reinforcing the positive strides that have been made through on-going major regeneration projects, such as that at Ebbw Vale Steelworks.

Communities First Programme

3.2.25 The Communities First programme is a policy tool that supports the Welsh Government's tackling poverty agenda. The aim of the programme is to support the most disadvantaged people in the most deprived areas of Wales, by narrowing the education/skills, economic and health gaps in comparison to more affluent areas.



Graphic 3.1: Communities First Clusters in Wales and the region of the Proposed Scheme

3.2.26 The presence of Communities First Clusters in the Wales and the region of the proposed Scheme is shown in Graphic 3.1. A review of the Welsh Index of Multiple Deprivation (IMD) (2011) confirms that the adjacent local authority districts of Blaenau Gwent, Merthyr Tydfil and Torfaen all contain lower super output areas (LSOAs) that are ranked in the 10% most deprived in Wales. Analysis of the local authority IMD data confirms the following:

- The most deprived local authority is Merthyr Tydfil, with 25.0% of its LSOAs in the most deprived 10% in Wales, closely followed by Blaenau Gwent with 23.4%;

- Blaenau Gwent has 87.2% of its LSOAs in the most deprived 50% in Wales, whilst Merthyr Tydfil contains 77.8%; and
- In general, the Valleys and urban local authorities tend to be more deprived than those which are largely rural.

3.2.27 The proposed Scheme will contribute to the aspirations of the Communities First Clusters by increasing economic opportunity as a result of the following:

- Improved and safer access to the business premises served by the A465;
- The Valleys will become more attractive to new inward business investment as a result of increased efficiencies offered through improved journey times and reliability;
- Achieving increased business agglomeration on the A465 will enhance productivity; and
- Accessibility throughout the wider region will be improved ensuring that a greater number of employment opportunities become available.

3.2.28 These impacts will assist in unlocking benefits associated with existing investment that has targeted developing the skills base and improving educational attainment.

Summary of IROPI 1: Agreed National Policy

3.2.29 The A465 provides strategic connectivity with the rest of the UK and Europe. Along with the M4, A40 and A477, it constitutes the Strategic Road Network (SRN) in the South of Wales and it forms part of the Trans-European Road Network (TERN), which is designed to improve the movement for goods, persons and services to reinforce economic and social cohesion within the EU.

3.2.30 The Wales Transport Strategy places an emphasis on enhancing international connectivity, citing connections within the UK and internationally as vital for business and tourism, with route reliability is least as important as journey time.

3.2.31 The Wales Spatial Plan also recognises the importance of strategic connectivity to the regeneration programme for the Heads of the Valleys - one of the most deprived areas of Wales. Indeed, it identifies the A465 dualling scheme as integral to providing opportunity for growth in the area.

3.2.32 The NTP also recognises the strategic importance of the route for East-West movements. It specifically identifies the A465 as a key corridor for allowing east to west travel in South Wales and in turn promoting economic growth.

3.2.33 It is reasonable that the Scheme's inclusion in policy and programmes provides an imperative reason of overriding public interest, in that the Scheme has been identified as a key catalyst for strategic connectivity and subsequently economic growth and regeneration.

3.3 IROPI 2 - For Reasons of Public Safety

3.3.1 The DMRB guidance at Para 4.48 includes reasons of human health or public safety.

3.3.2 One of the Scheme Objectives for A465 section 2 is 'To enhance road safety and reduce casualties'.

Collision History

3.3.3 Collision data has been obtained from the Welsh Government for the following study area and time period:

- A465 Section 2 between Glanbaiden Roundabout and Brynmawr Roundabout inclusive; and
- A five year period between 1st July 2007 and 31st June 2012.

3.3.4 The data includes all personal injury accidents recorded by South Wales police. There are also likely to have been further 'damage only' accidents which did not involve personal injury and were not recorded.

3.3.5 A total of 31 personal injury collisions occurred throughout the study length with 22 classed as slight, 7 serious and two as fatal, as summarised in Table 3.1. Whilst these statistics result in an accident rate below the national average for this road type, the remainder of this Chapter describes how the proposed Scheme can reduce the number of collisions between Brynmawr and Gilwern.

	Number of collisions	Percentage of Total
Fatal	**2**	**6**
Serious	**72**	**3**
Slight	**22**	**71**
Total	**31**	**100**

Table 3.1 – Collisions by Severity

Cluster Sites

3.3.6 Further analysis of shows a number of cluster sites at:

- Glanbaiden roundabout junction of the A465, A4077 and B4246;
- Gilwern priority junction of the A465 and A4077;
- Brynmawr roundabout junction of the A465, A467 and A4047;
- Blackrock layby 1.3km east of Brynmawr roundabout

3.3.7 These correspond to the three main junctions on A465 Section 2 as well as the layby at Blackrock. Table 3.2 summarises the collisions by cause at all of the cluster sites listed above.

Table 3.2 – Summary of Cluster Sites

Likely Cause	Glanbaiden Roundabout	Gilwern junction	Brynmawr Roundabout	Blackrock layby
Speed/ distance error	6		3	
Injudicious movement	2 2			
Overtaking	1			
Loss of control	1			
Illegal Manoeuvre			2	

Glanbaiden Roundabout

3.3.8 Glanbaiden Roundabout is a large roundabout built in preparation for its conversion to a grade separated junction when Section 2 is dualled. The road to the east of the junction is currently dual carriageway, having already been upgraded. This roundabout, formed by the A465, the A4077 and the B4246, has a cluster of nine accidents. It has a collision rate of 1.8 per year. The major proportion, 66% of the collisions, occurred as a result of speed distance errors which, although high, are typical at a roundabout. Two accidents were caused by injudicious movements and one by overtaking. All nine were of slight severity.

Gilwern Junction

3.3.9 Gilwern Junction is a priority junction. Right turns into or out of the junction are prohibited. Three accidents occurred at Gilwern Junction, of which two were due to injudicious movements where vehicles have pulled out of the junction and collided with oncoming traffic; the other was due to loss of control. Of the three collisions, one occurred on an icy road surface and was classified as serious, the others were classified as slight.

Brynmawr Roundabout

3.3.10 This is a standard four-arm roundabout at the junction of the A465, the A465 and the A4074 King Street at Brynmawr. Three accidents occurred at Brynmawr Roundabout, all of them rear shunt incidents, two slight accidents on the A4047 King Street and one serious on the A465 from the east.

Blackrock layby

3.3.11 The layby at Blackrock is on the southern side of the A465 and accessible to westbound traffic. Eastbound trawffic is prohibited from turning into the layby. Both of two collisions (one serious and one slight) at this site were caused by the contravention of a traffic regulation order, with eastbound traffic making a prohibited turn into the layby.

Clydach Gorge

3.3.12 Of the 31 collisions on Section 2, 17 occurred at a cluster site. Of the remaining collisions, 7 occurred within a 600m stretch where the road passes through the Clydach Gorge. This may be related to narrowing of the carriageway. One of the two fatal collisions occurred on this stretch of road.

Further Safety Issues

3.3.13 There are further safety issues on the A465 between Brynmawr and Gilwern which are not obvious from analysing the collision history alone. It is, however, the judgement of transport professionals that these issues increase the probability of future collisions and/or the probability of an increase in the severity of collisions.

- The section of A465 mostly has three lanes, which makes access from side roads difficult (e.g Old Trap Road) and in places quite dangerous. On a single carriageway, collisions causing one or more of the vehicles involved to cross the path of oncoming vehicles have a higher incidence of severe injuries and risk of fatalities:

- The long incline through Clydach Gorge is marked as two lanes up and one down – it partly allows overtaking downhill but most of it has double white lines to prevent overtaking. The frustration of being unable to overtake can lead to risky manoeuvres;

- Traffic modelling predicts an increase in traffic flows, resulting in an increase in accident rates without intervention. Increased traffic flows will also lead to congestion and delay and increase driver frustration; and
- Existing at-grade junctions at Brynmawr and Glanbaiden carry high traffic flow which must slow on approach to the roundabout creating a higher probability of shunt type accidents.

Accident Benefits resulting from the Scheme

3.3.14 A cost benefit analysis of accident benefits has been undertaken using COBA11 for a 60 year period from the Scheme opening year of 2017. The COBA model network covers the same area as the existing SATURN traffic model network, this includes a large area of Southeast Wales between the points of Neath to the west, Newport to the east and Brecon to the north. It covers the M4 and A465.

3.3.15 The results are presented in Table 3.3. The accident benefit (reduction in accidents) between the Do Something (the Scheme) and the Do Minimum is 163 accidents saved over 60 years. The corresponding casualty benefit over 60 years is 6 fewer fatal, 23 fewer serious and 217 fewer slight.

Table 3.3. COBA results

	Links	Junctions	Total
Do Minimum			
No. of accidents	19765	6261	26026
Do Something			
No. of accidents	19643	6221	25863
Benefits			
No. of accidents	123	40	163

3.3.16 The reduction in accidents shown can be attributed to the following reasons:

- Grade separation of Glanbaiden junction, which demonstrates significant benefits (see Table 3.4 below)
- Improvement of the A465 to modern dual carriageway, which lowers the predicted accident rate and reduces the likely severity of accidents.

Table 3.4. A465 Section 2 Scheme Area

	No. of accidents		
	DM	DS	Benefits
Links	337.6	422.6	-85
Junctions	335.9	193.3	142.6
Total	673.5	615.9	57.6

3.3.17 The Scheme transfers trips from other routes to the A465 as well as generating new trips. The increase in traffic flow would normally result in an increase in collisions; however this is offset by the safety benefits of the Scheme design.

3.3.18 On the wider network, there are benefits to other routes where traffic has been transferred away, particularly north-south Valley routes. However, there are some disbenefits to other sections of the A465 where additional traffic has been loaded on to the route without improvements to the standard of road.

3.3.19 Analysis of the two key junctions at either end of the Scheme is shown in Table 3.5. Grade separation at Glanbaiden roundabout has removed a significant amount of traffic from the junction resulting in accident benefits. However, despite grade separation at Brynmawr roundabout, there are some disbenefits at the junction as a result of the Scheme. This can be explained by the very low baseline of actual accidents (3 recorded personal injury accidents) at the junction during the 5-year period July 2007 to June 2012. This has resulted in a low accident rate for the do minimum.

Table 3.5. Accident benefits at Brynmawr and Glanbaiden Roundabouts

	No. of accidents		
	DM	DS	Benefits
Brynmawr 1	59.9	88	-28.1
Brynmawr 2	181.8	198.8	-17
Glanbaiden	179	11.5	167.5

1 = Roundabout node only; 2 = Roundabout plus merges, diverges and revised school access

Summary of IROPI 2: Public Safety

3.3.20 Accident modelling shows that, over a 60 year period from the opening year, the Scheme will save 163 accidents and 246 casualties, including six fatal casualties. This is primarily as a result of transferring traffic on to the A465 which will be a modern dual carriageway, which lowers the predicted accident rate. In addition, grade separation of junctions will reduce the likelihood of vehicle conflict, particularly shunt type collisions.

3.3.21 Furthermore, from the analysis of recent accident records, it is clear that there are clusters of collisions on the A465 between Brynmawr and Gilwern where collisions occur due to reasons that would not be possible when the Scheme is constructed.

3.3.22 The Scheme is predicted to reduce collisions and save lives. This provides a clear reason of overriding public interest.

3.4 IROPI 3 - For Reasons of Economic Nature

Introduction

3.4.1 The DMRB guidance at Para 4.48 includes reasons of a social or economic nature.

3.4.2 Reasons of an economic nature include the following sub-sections:

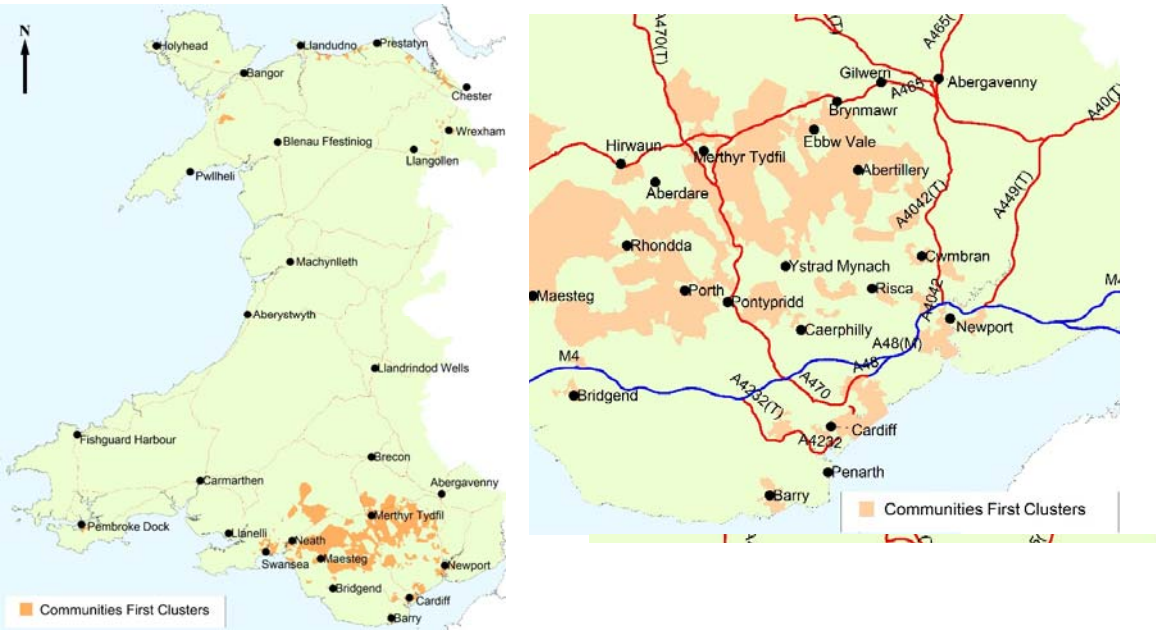
- Local Economic Outputs
- Economic Impacts on Health
- Cost Benefit Analysis
- Wider Impacts

3.4.3 As set out in IROPI 1, the Welsh Government Strategy document 'Turning Heads – A Strategy for the Heads of the Valley' sets out a strategy for the Heads of the Valleys in the context of the Wales Spatial Plan.

3.4.4 The Strategy identifies amongst the seven major Opportunities for the area – 'the upgrading of the A465 Heads of the Valley Road'. The upgrading of the A465 is identified as a major opportunity to improve the marketability of the region to investors, particularly those that will provide skilled jobs and high value-added services. Delivery of the Scheme will serve to heighten awareness of the region as an emerging business district, reinforcing the positive strides that have been made through on-going major regeneration projects, such as that at Ebbw Vale Steelworks.

Communities First Programme

3.4.5 The Communities First programme is a policy tool that supports the Welsh Government's tackling poverty agenda. The aim of the programme is to support the most disadvantaged people in the most deprived areas of Wales, by narrowing the education/skills, economic and health gaps in comparison to more affluent areas.



Graphic 3.2: Communities First Clusters in Wales and the region of the Proposed Scheme

3.4.6 The presence of Communities First Clusters in the Wales and the region of the proposed Scheme is shown in Graphic 3.2. A review of the Welsh Index of Multiple Deprivation (IMD) (2011) confirms that the adjacent local authority districts of Blaenau Gwent, Merthyr Tydfil and Torfaen all contain lower super output areas (LSOAs) that are ranked in the 10% most deprived in Wales. Analysis of the local authority IMD data confirms the following:

- The most deprived local authority is Merthyr Tydfil, with 25.0% of its LSOAs in the most deprived 10% in Wales, closely followed by Blaenau Gwent with 23.4%;
- Blaenau Gwent has 87.2% of its LSOAs in the most deprived 50% in Wales, whilst Merthyr Tydfil contains 77.8%; and

- In general, the Valleys and urban local authorities tend to be more deprived than those which are largely rural.

3.4.7 The proposed Scheme will contribute to the aspirations of the Communities First Clusters by increasing economic opportunity as a result of the following:

- Improved and safer access to the business premises served by the A465;
- The Valleys will become more attractive to new inward business investment as a result of increased efficiencies offered through improved journey times and reliability;
- Achieving increased business agglomeration on the A465 will enhance productivity; and
- Accessibility throughout the wider region will be improved ensuring that a greater number of employment opportunities become available.

3.4.8 These impacts will assist in unlocking benefits associated with existing investment that has targeted developing the skills base and improving educational attainment.

Local Economic Outputs

3.4.9 This Section considers the potential impacts of the Scheme on the local economy. Transport improvements can affect the pattern and scale of economic activity at a local or regional level. This is of particular relevance where a transport improvement impacts on an area for which economic development or regeneration is a policy priority.

Impacts of Business Location and Investment

3.4.10 A number of important current and allocated employment sites to the east and west of Section 2 of the A465 have been identified based on the Blaenau Gwent Local Development Plan and Deposit Monmouthshire Local Development Plan. These are:

- Rassau Industrial Estate – Rassau Industrial Estate lies to the west of the Scheme and access to the site would be improved by the dualling project. Rassau has significant potential for development of larger units. Rassau Industrial Estates contains an area of employment land of 117 hectares of which 95 hectares are currently occupied and the remaining 22 hectares are vacant.;
- Sites at Rhyd Y Blew and Bryn Serth – located immediately to the south of the A465 these sites acts as a gateway to Ebbw Vale. Currently, these sites are unoccupied and cover an area of 39 hectares.
- Crown Business Park – industrial land and property located to the south of the A465 in Tredegar covering an area of 23 hectares of which 5 hectares are vacant.
- Industrial sites in Brynmawr – there are a cluster of industrial sites located in the eastern part of Brynmawr to the south of the Brynmawr roundabout.
- Westgate Business Park, Llanfoist - located to the east of section 2, this development site has a direct link onto the A465. This site is allocated for office and general industrial use.

3.4.11 Additionally, planning consent has been granted for the Circuit of Wales proposal which is adjacent to Rassau Industrial Estate to the west of the Scheme. The Circuit of Wales proposal is for the development which consists of a motorsports complex with

view to providing a catalyst for further related development. The scheme is forecast to create 220 full-time equivalent (FTE) visitor facing jobs at the circuit with an additional 70 FTE jobs non-visitor facing automotive jobs. There is the potential for additional employment in related automotive and tourism developments; the developer, the Heads of the Valleys Development Company, forecast that a total of 1,490 FTEs could be created as a result of the new racing circuit. If the development is realised, the A465 will be a key access route between the Circuit of Wales site and the Midlands of England and will enable access for visitors during hosting major events.

3.4.12 The A465 traffic model has been used to simulate the effect of the Scheme on journey times between a selection of economic centres and employment sites. The model shows peak period journey time savings are evident for journeys using the length of the scheme improving the actual and perceived accessibility to the Heads of the Valleys area and the sites listed above.

3.4.13 The improved access afforded to these sites and the improved connections between this part of South Wales and the Midlands of England would contribute to making this area a more attractive location for investment. This is of particular importance for transport and logistics related functions but also for other industries which rely heavily on transport and accessibility.

Impacts on the Labour Market

3.4.14 The geographical extent of a labour catchment area and therefore the size of the labour force available to a firm is constrained by travel times and transport costs.

3.4.15 This has two effects. Firstly, it improves access to employment opportunities for residents of the Heads of the Valleys area who are less constrained in their choice of where to work. Secondly, it improves a firm's access to labour, enabling businesses to recruit over a wider geographic area. This would reduce labour costs and have a positive impact on the ability of firms to recruit workers with appropriate skills.

3.4.16 Accessibility modelling has been undertaken to illustrate the effect of the Scheme on access to employment or 'employment opportunity'. Employment opportunity is defined here by the number of jobs that residents can get to within a specific time frame.

3.4.17 The results of the accessibility model show that A465 Dualling would also increase access to labour force of the Heads of the Valleys area. With the completion of the scheme, the average number of employment opportunities accessible within 30 minutes for residents of the Heads of the Valleys area will increase from approximately 137,100 jobs to 145,700 jobs (+6.3%).

3.4.18 Whilst the main commuting flows in South Wales and north-south to the major conurbations of Cardiff and Newport, the Scheme would have a minor positive effect on employment opportunity for residents of the Heads of the Valleys area by reducing travel times during peak times.

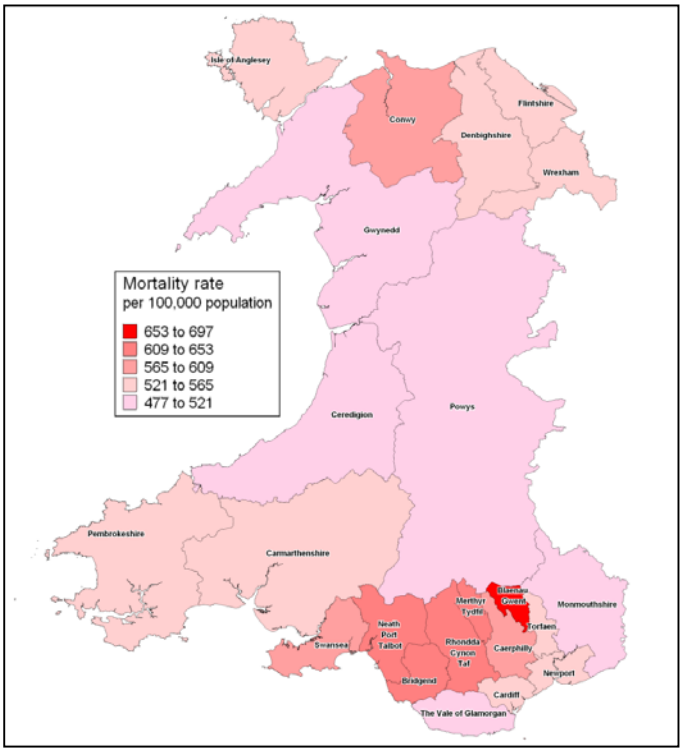
Economic Impacts on Health

3.4.19 Employment and income are potentially the most significant determinants of long-term health, influencing a range of factors including the quality of housing, education, diet, lifestyle, coping skills, access to services and social networks. Consequently, poor economic circumstances can influence health throughout life, where communities subject to socio-economic deprivation are more likely to suffer from morbidity, injury,

mental anxiety, depression and tend to suffer from higher rates of premature death than those less deprived (Ref.3,4,5)

3.4.20 As shown in Graphic 3.3, such a protracted pattern of economic deprivation, morbidity and mortality is well known to communities within the Heads of the Valleys (Ref.1), where the communities of Blaenau Gwent, and Merthyr Tydfil County Borough Councils (CBC) in particular, consistently demonstrate a correlation between the highest rates of morbidity and mortality in Wales, and the highest rates of socio-economic deprivation.

Graphic 3.3 - Age-Standardised Mortality Rates per 100,000 population (2011)



Source: Cymru Information Services. Health Maps Wales (2011) (Ref.7)

3.4.21 The construction and operational of the proposed Scheme constitutes a significant opportunity to support regional regeneration and inward investment, address barriers to education, employment and income opportunities and as a consequence address the key underlying feature defining a cycle of significant deprivation and health inequality.

3.4.22 The construction of the proposed Scheme itself represents a significant capital investment (in excess of £125 million), creating 170 jobs including 50 apprenticeships. A key principle of the construction phase is to optimise the uptake of direct, indirect and induced socio-economic benefits through, training, employment and procurement initiatives including:

- a 50 person apprenticeship programme targeting long term unemployed and economically inactive individuals;

.

- education and training support provided to local people;
- a procurement programme sourcing the majority of the sub-contract and material orders from local companies;
- providing incentives and support for the development of new small to medium enterprises (SMEs) in the area; and
- sponsoring local community groups and organisations.

3.4.23 On the above basis, and when considering socio-economic circumstance and the existing burden of poor health (particularly within Blaenau Gwent and Merthyr Tydfil CBCs), the construction of the proposed Scheme in itself presents a significant opportunity for socio-economic health benefits (mental, physical and social health), that will be optimised through targeted initiatives to further tackle local deprivation and existing inequality within the area.

3.4.24 The proposed Scheme also presents an opportunity to support physical activity and social connectivity improvements at both a local and regional level, while further addressing existing environmental and behavioural barriers limiting levels of physical activity, including:

- improving the quality of green transport networks (influencing the desire to walk/cycle over alternative options);
- improving pedestrian safety and addressing perceptions of poor safety, as detailed in IROPI 2 (enabling people of all ages and levels of mobility to safely utilise routes);
- raising awareness regarding the convenience, economic and social, mental and physical health benefits of active lifestyles.

Cost Benefit Analysis

3.4.25 An economic assessment has been undertaken to analyse the costs and benefits of the proposed Scheme that are likely to accrue over a 60-year period. Benefits are in the form of user benefits, covering journey time savings and vehicle operating costs. The purpose of the economic assessment is to establish the degree to which the proposed scheme offers value for money for the taxpayer. The economic assessment – often referred to as 'cost-benefit analysis' – considers whether the value of the benefits of the proposed scheme justify its cost.

3.4.26 The cost benefit analysis for the A465 Section 2 Improvement has been undertaken using TUBA (Transport User Benefits Analysis, version 1.8) software. The accident assessment has been undertaken using COBA11 software. This in accordance with the methodology and values set out in WebTAG, the standard approach to transport scheme assessment, which is endorsed by Welsh Government through the Welsh Transport Planning and Appraisal Guidance (WelTAG).

3.4.27 A positive Net Present Value (NPV) and a Benefit Cost Ratio (BCR) greater than 1 indicates that the benefits due to the proposed scheme outweigh its costs. The higher the NPV and BCR, the better the value for money of the scheme.

3.4.28 The results, as shown in Table 3.6, indicate that the proposed scheme – when considered in isolation from the remaining A465 dualling programme – has a total PVB of £248m (2010 prices) compared with the total PVC of £170m, indicating a NPV of £78m. This

provides a BCR of 1.46. This indicates that the proposed scheme offers value for money in that the construction costs would be more than offset by the improvements in transport economic efficiency, safety and carbon emissions.

	2010 prices and values
Consumer User Benefits	56,307
Business User Benefits	159,660
Private Sector Provider Impacts	0
Wider Public Finances	25,157
Accident Benefits	18,089
Carbon Benefits	-10,857
Present Value of Benefits (PVB)	248,356
Present Value of Costs (PVC)	170,256
Net Present Value (NPV)	78,110
Benefit Cost Ratio (BCR)	1.46

Table 3.6. A465 Section 2 Improvement – Cost Benefit Analysis Results

3.4.29 The Section 2 Improvement is forecast to produce significant benefits for both consumer and business users. The split of user benefits is 11% to commuters, 15% to other and 74% to business trips, with the latter category including the OGV and HGV trips.

Sensitivity Test-Economic Assessment of the Full A465 Scheme

3.4.30 The proposed Scheme between Gilwern and Brynmawr forms part of a programme of improvements to the A465 trunk road between Abergavenny to Hirwaun. The improvements to Section 4 (Tredegar to Dowlais Top) and Section 1 (Abergavenny to Gilwern) are already complete. Section 3 (Brymawr to Tredegar) is under construction. The remaining sections are Section 5 (Dowlais Top to the A470) and Section 6 (A470 to Hirwaun), both programmed for completion by 2020.

3.4.31 Consequently, a sensitivity test was completed in which the proposed improvements to Sections 5 and 6 of the A465 were added to the appraisal in addition to the Section 2 scheme. It was assumed that section 2 would open in 2017 with sections 5 and 6 opening in 2020. The costs and benefits for this exercise were therefore the total costs and benefits for these three improvements combined.

3.4.32 The results of the TUBA analysis are summarised in Table 3.7, below. This shows that the combined present value of costs of building all three improvements is £410m and the combined benefits accruing from these improvements is £659m. This means that the NPV in building all three sections is £249m, giving a BCR of 1.64, excluding accident benefits. This compares with the Section 2 Dualling in isolation NPV of £78m (2010 Prices) and a Benefit-Cost Ratio of 1.46.

	2010 prices and values
Consumer User Benefits	150,064
Business User Benefits	461,507
Private Sector Provider Impacts	0
Wider Public Finances	46,573
Accident benefits	N/A
Carbon Benefits	653
Present Value of Benefits (PVB)	658,797
Present Value of Costs (PVC)	402,642
Net Present Value (NPV)	256,155
Benefit Cost Ratio (BCR)	1.64

Table 3.7: Sections 2, 5 and 6 Improvements – TUBA Results (excluding accident benefits)

Wider Impacts

3.4.33 The 'Wider Impacts' methodology developed by the Department for Transport is a means of taking account of benefits that are not captured by the appraisal of user benefits. This Chapter incorporates the 'Wider Impacts' assessment as a sensitivity test to adjust the BCR for the Scheme. Wider Impacts comprises two effects, namely agglomeration effects and increased economic output.

3.4.34 Agglomeration effects describe the productivity benefits that accrue to firms from locating close together. Agglomeration effects include better matching of skills to jobs, the exchange of knowledge and technology between firms, and better access to a suitable supply chain.

3.4.35 Reduced journey times between Gilwern and Brynmawr will reduce the costs of travel between key economic centres in South Wales and between South Wales and the Midlands. This enables firms to take advantage of the benefits of better access to their workforce, suppliers or customers. The benefits of increased agglomeration resulting from the Scheme have been estimated through the application of parameters provided by the Department for Transport.

3.4.36 Under normal conditions, the direct benefits of reduced transport costs can result in an increase in economic output by firms which will be of value to consumers. Based on Department for Transport Guidance, these benefits are assumed to be 10% of the direct benefits to business users.

3.4.37 The headline results are:

- Journey time savings are of a magnitude that could be significant for business location decisions
- The majority of areas experience increases in effective density as a result of the time savings and lower transport costs that result from the Scheme. The effects are most significant for the areas in close proximity to the Scheme.

- A number of areas experience a reduction in effective density across some or all sectors. This is because the costs of travel to, from and within some zones increases as a result of the Scheme. This is due to the effect of induced traffic and such incidences occur mainly for zones which are located further away from the Scheme and therefore benefit to a lesser extent from the Scheme.
- Changes in effective density are greater for service sectors for which face-to-face contact and therefore distance plays a more important role than the movement of goods.
- Productivity benefits are concentrated within the Heads of the Valleys area, although benefits accrue over a wide area of South Wales stretching to Swansea in the West.
- For South Wales as a whole, the productivity benefits of the Scheme outweigh any localised dis-benefits.

3.4.38 The results of the assessment of the Wider Impacts associated with the A465 Section 2 Scheme are summarised in Table 3.8. This shows that the Scheme would produce predicted benefits of more than £32m over the 60-year assessment period associated with agglomeration effects and increased output. Wider Impacts represent 13% of total scheme benefits which is broadly equivalent to estimates produced for transport schemes in other parts of the UK.

	Benefits (£000) **(2010 prices, discounted to 2010)**
Agglomeration Effects	16,632
Increased Output	15,966
Total Wider Impacts	**32,598**

Table 3.8 - Wider Impacts Assessment

Composite Economic Assessment (TEE and Wider Impacts)

3.4.39 The Wider Impacts of the Scheme have been used as a sensitivity test to adjust the main economic appraisal. The results of this test are given in Table 3.9. The inclusion of Wider Impacts results in an improved BCR of 1.65.

	Benefits (£000) **(2010 prices, discounted to 2010)**
Consumer User Benefits	56,307
Business User Benefits	159,660
Private Sector Provider Impacts	0
Wider Public Finances	25,157
Accident Benefits	18,089
Carbon Benefits	-10,857
Present Value of Benefits (PVB)	**248,356**
Present Value of Costs (PVC)	**170,256**

	Benefits (£000) (2010 prices, discounted to 2010)
Net Present Value (£000)	**78,100**
Benefit to Cost Ratio	**1.46**
Sensitivity Test	
Agglomeration Effects	16,632
Increased Output	15,966
Total Wider Impacts	32,598
Adjusted PVB	280,954
Adjusted NPV	110,698
Adjusted BCR	**1.65**

Table 3.9 A465 Section 2 Economic Assessment Results

Summary of IROPI 3: Economic Nature

3.4.40 The Scheme is likely to increase the accessibility of an area to a greater number of firms and workers, thereby increasing agglomeration, productivity and GDP. Furthermore, lower production costs (due to reduced transport costs) are likely to result in an increase in output which will be of value to consumers.

3.4.41 The proposed Scheme therefore represents a significant opportunity to support and enhance regional and national economic viability and growth, while supporting and improving access to education, employment and income and addressing the key underlying factor defining the highest levels of morbidity, mortality and health inequality in Wales for the last decade.

3.4.42 The Section 2 Improvement is forecast to produce significant economic benefits for both consumer users and business users. Overall the total present value of benefits (PVB) is £248m (2010 prices) compared with the total present value of costs (PVC) of £170m, indicating a net present value (NPV) of £78m. This provides a Benefit Cost Ratio (BCR) of 1.46.

3.4.43 Adding the wider economic benefits to the initial cost benefit analysis results in an improved BCR of 1.65, where the benefits outweigh the costs by a factor of 1.65. Thus, it can be stated with confidence, that journey time benefits to consumers and businesses as well as agglomeration benefits provide an overriding reason of public interest.

3.5 Consultation on IROPI

3.5.1 Consultation on the IROPI described in this document will be carried out through the wider consultation, with NRW, Blaenau Gwent County Borough Council, Monmouthshire County Council, Brecon Beacons National Park Authority and interested parties/members of the public on publication of this document.

3.6 Conclusions on IROPI

3.6.1 The imperative reasons for the Scheme improvement to proceed have been identified as:

- that the dualling Scheme is included as part of Welsh Government national policy;

- that it is of importance for public safety, in that accident modelling shows that, over a 60 year period from the opening year, the Scheme will save 163 accidents and 246 casualties, including six fatal casualties;
- that it is of economic benefit: the wider economic benefits from the scheme will include increased agglomeration, increased access to the labour market and improvements to human health. The Scheme has a benefit cost ratio of 1.4, increasing to over 1.5 when wider economic benefits are considered.

3.6.2 The above IROPI are proposed as being overriding and in the long term public interest.

4.0 DESCRIPTION AND ASSESSMENT OF COMPENSATORY MEASURES

4.1 Introduction

4.1.1. Since it has been determined that there are no alternative solutions and there are imperative reasons of overriding public interest, the project can proceed to the final stage of the AIES process, the assessment of Compensatory Measures, so that the coherence of the Natura 2000 network is protected. For the Scheme to be approved, it is necessary to demonstrate that, before the scheme would have any adverse effects, the design, implementation, management and monitoring of Compensatory Measures, in consultation with NRW, are appropriately secured and guaranteed. Additionally, it is necessary to inform the European Commission of the outcome of this process once a decision has been made.

4.1.2. This chapter presents the results of the process that has been followed in identifying and assessing Compensatory Measures for the Scheme. The measures are summarised in the Compensatory Measures Matrix (as required under European Commission guidance: Clarification of the concepts: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory measures, Overall Coherence, Opinion of the Commission), which is included in Appendix D. In accordance with EC guidance on Compensatory Measures (EC, 2007/2012), the compensatory measures constitute measures specific to a project or plan, additional to the normal practices of implementation of the "Nature" Directives. They aim to offset the negative impact of a project and to provide compensation corresponding precisely to the negative effects on the species or habitat concerned.

4.2 The Need for Compensatory Measures

4.2.1 Despite the measures proposed for mitigating potential effects, the Welsh Government believes that there ere is an extremely small risk of a short term effect on the integrity of the Usk Bat Sites SAC due to the uncertainties associated with ecological systems and assessments, in relation to effects on lesser horseshoe bats during the period when replacement planting is maturing. After due consideration of the representations of NRW and further discussion, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that there would be an adverse effect on the Usk Bat Sites SAC.

4.2.2 Regulation 66 of the Conservation of Habitats and Species Regulations 2010 require that “the appropriate authority must secure that any necessary Compensatory Measures are taken to ensure that the overall coherence of Natura 2000 is protected”.

4.2.3 The SAC was selected on the importance of the roost sites, based on an assessment of known roosts at that time. The majority of the foraging habitat and a number of the maternity roosts and other roost sites necessary for the SAC lesser horseshoe bat population lie outside the SAC.

4.2.4 A particular role of the SAC is its likely important long-term geographical role in supporting wider Favourable Conservation Status (FCS) of lesser horseshoe bat populations in the Ebbw valley to the west of the SAC.

4.2.5 The aspects of structure and function of the SAC that enable the level of population to be maintained can be categorised as:

- foraging habitat;
- winter roost sites;
- maternity roost sites;
- other roosts;
- linear habitat connections between roosts and foraging habitat; and
- the lesser horseshoe bats that use the site.

4.2.6 The majority of good woodland foraging habitat lies outside the SAC. Areas lost to the proposed scheme within and outside the SAC will be replaced by planting in suitable connected locations but replacement of the lost foraging value may only be fully realised in the medium-term (taking into account the effective increase in foraging value of foraging habitatat that is not removed but will be in close proximity to the proposed new Hafod maternity roost) . In the long term foraging value inside and outside the SACit will be increased.

4.2.7 It is extremely unlikely there would be an adverse effect through loss of hibernation roost sites and therefore there is no reduction in this resource from within the SAC.

4.2.8 There are no known significant maternity roosts within the SAC boundary. Whilst the Clydach Viaduct summer roost has been classified as a maternity roost it appears to play only a very minor role in the productivity of the Gorge population. The two key maternity roosts are Clydach House and Auckland House both of which are outside of the SAC. The mitigation measures include a purpose-built maternity roost within the SAC boundary (Hafod Roost), higher up the Clydach Gorge and close to good woodland foraging habitat where there is likely to be less competition for foraging habitat. The proposed scheme would therefore directly increase the resource value of maternity roosts and indirectly increase the resource value of foraging habitat.

4.2.9 Other roost sites are less important individually to maintaining the SAC population level. With mitigation, the proposed scheme would not lead to an overall reduction in this roost resource within or outside the SAC or spatially over the population's range.

4.2.10 Linear habitat connections between roosting and foraging resources lie within and outside of the SAC boundary. Mitigation measures aim to retain flight-line connectivity throughout the construction period and enhance access to foraging habitat in the medium and long-term. There is an extremely small risk that bats' responses during the period of getting used to the changed landscape and under-road crossing structures, may effectively reduce the value of the resource in the short-term, but in the long-term the proposed scheme would increase the value of the resource.

4.2.11 Any reduction of the number of individual bats within the population of the SAC would very largely result from changes that occur outside the SAC, including short-term minor loss of foraging habitat and short-term reduction in connectivity between roosts and foraging habitat. Both of these changes pose an extremely small risk in the short-term but due to the mitigation provided with the scheme are predicted to result in an increase in the population of lesser horseshoe bats in the medium and long-term.

4.2.12 Within the SAC boundary itself, therefore it is likely that the only aspect of structure and function that has any significant potential to be adversely affected is the level of population using the SAC – for which there is an extremely small risk of a drop in the short term as a result of habitat changes outside the SAC boundary. However, in the medium to long-term, the population is predicted to rise above the current level, removing any adverse effects on the structure and function of the SAC.

4.2.13 During discussions with NRW it was recognised that no additional mitigation measures can be delivered that would entirely remove the risk of a short-term drop in population of the SAC. It is accepted by NRW that the mitigation measures will in time fully mitigate all adverse effects on the integrity of the SAC, and that the population in the SAC in the longer term is predicted to increase, and some other aspects of the SAC structure and function are expected to improve. Therefore the contribution to the coherence of Natura 2000 made by the integrity of this SAC, including its population level, will be protected by the mitigation measures taking effect. No additional measures over and above the measures already identified and aimed at offsetting the impact of the project are required to protect this aspect of coherence. Compensatory Measures therefore need to address a different aspect of the function of the SAC, e.g. its role in supporting the wider lesser horseshoe bat population to support and potentially enhance the ability of the species to remain in favourable conservation status across its range in the longer term.

4.3 The Methodology used to Assess the Measures

4.3.1. In accordance with EC guidance on Compensatory Measures (EC, 2007/2012).

The proposed measures are designed to:

a) address, in comparable proportions, the species negatively affected;

b) provide functions comparable to those which had justified the selection criteria of the original site, particularly regarding the adequate geographical distribution.

c) Be within the same bio-geographical area

4.3.2 The assessment of the Compensatory Measures has used professional judgement, in consultation with NRW, to consider whether these criteria are met.

4.4 The Proposed Compensatory Measures

4.4.1 The objective of the proposed Compensatory Measures is to provide measures in line with 4.3.1 above; and provide additional opportunities for lesser horseshoe bats to roost between the SAC population in the Clydach Gorge and populations known to be present in the Ebbw Valley. These opportunities would potentially support and enhance the ability of the species to remain in favourable conservation status.

4.4.2 It is proposed to provide artificial "stepping stone" roosting opportunities within the embankments of the A465 Heads of the Valleys Section 3 scheme which runs between Brynmawr and Tredegar that is currently under construction.

4.4.3 The roosts would be provided at the following locations (See Figure 7.1):

- Weather station culvert on the north side of the carriageway (chainage 28750). Incorporation of a roost buried in the new road embankment above the extended culvert, placed at a high level to reduce flood risk;

- River Clydach culvert on the north side of the carriageway (chainage 27950). Incorporation of a partially buried roost in the area of the bank south of the river channel and west of the culvert, within the landscaping area;
- In the vicinity of Culvert 273 (chainage 27300). Incorporation of a roost into the north embankment of the east bound Ebbw Vale on slip or in a new bund within the landscaping area between the on slip and the main carriageway, subject to a further consideration of information about the location in relation to the risk to bat flightlines. and
- In the vicinity of Culvert 265 (chainage 2650). Incorporation of a roost into an embankment either north or south of the main carriageway.

4.4.4 These locations were chosen after an analysis of the current connectivity between the SAC and the Ebbw Valley; and a consideration of the landscape after the Section 3 scheme is complete. The chosen locations were also influenced by the results of bat surveys undertaken, including bat activity and radio-tracking surveys. I.e., chosen locations are in known areas of lesser horseshoe bat activity.

4.4.5 The design of the roosts would consist of a concrete pipe of ideally 600mm diameter leading to a chamber of diameter 900mm and height 1,800mm. However, the detailed design of the roosts would be tailored for the individual sites, engineering constraints and an understanding of how bats would use / find the locations. Detailed design would be undertaken in consultation with NRW.

4.4.6 The roosts would be within land owned by the WG and managed in perpetuity as part of the trunk road estate.

4.4.7 The roosts would be incorporated into the embankment works of the Section 3 scheme, which is currently under construction. It is intended that the work would be carried out by October 2014, which is before any risk of effects on the SAC is created by construction of Section 2 from October 2014.

4.5 Assessment of Compensatory Measures

4.5.1 The current habitat connectivity between the Clydach and Ebbw Valleys is considered sub-optimal due to its open moorland nature with limited woodland foraging, roosting and commuting resources. In particular, there are few buildings, trees or structures that might act as night roosts.

4.5.2 Provision of a series of “stepping stone” roosting opportunities at key crossing points of the A465 Section 3 scheme is likely to improve the connectivity of this open area between the wooded valleys of the Rivers Clydach and Ebbw, by providing bats with ability to hold up in inclement weather and rest during crossing the area and provide sufficient facility for the potential for occasional day roosting by small numbers of bats.

4.5.3 Improving connectivity would increase the opportunity for genetic exchange between the SAC population and the Ebbw population and populations further west.

4.5.4 There may also be benefits to the SAC population in the Clydach Valley in the short-term by enhancing accessibility to foraging resources to the west of the maternity roosts within the valley, by reducing the energetic requirements required to fly back and forth between the roost and foraging resources, by providing roosts suitable for day and night

use. It has been demonstrated in Knight and Jones (2009) (Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat *Rhinolophus hipposideros*) that night roosts are an important structural element of the habitat resource mix required by lesser horseshoe bat. Radio tracking studies undertaken for the proposed scheme have demonstrated that some bats from the SAC population in the Clydach Gorge forage in this area.

4.5.5 In the context of the role of the SAC geographically in relation to supporting Favourable Conservation Status outside SAC sites (as part of considering the coherence of the Natura 2000 Network), the SAC is likely to have an important long-term role in supporting the population in the Ebbw Valley. This should be increased once the new Hafod roost, located further up the valley is used.

4.5.6 The design of mitigation for Section 2 and Section 3 schemes means that there should be no decrease in the connectivity between the two valleys for lesser horseshoe bats compared to the present situation. Therefore any Compensatory Measures that potentially improve the connectivity would constitute an enhancement of the role of the SAC in supporting the Ebbw populations and therefore support and potentially enhance the coherence of the Natura 2000 network overall.

4.5.7 Using the tests set out in 4.3.1, the following can be ascertained:

Do the Compensatory Measures address, in comparable proportions, the species negatively affected?

The measures offset what the Welsh Government believes is an extremely small risk of an adverse effect on the lesser horseshoe bat feature of the site at a proportionate scale by providing potential for improvements to the coherence of the Natura 2000 network so that the populations in the SAC and to the west of the SAC are potentially better connected.

Do the measures provide functions comparable to those which had justified the selection criteria of the original site, particularly regarding the adequate geographical distribution?

The population of lesser horseshoe bats in UK is supported by 13 SACs across south west England and Wales. The Usk Bat Sites lies approximately in the centre of the spread of these SACs. There are many smaller populations of the species in between these SACs, including those situated to the west of the SAC itself. The measures provide the opportunity for an improvement to the link between the SAC populations and populations to the west.

Are the measures within the same bio-geographical area?

The stepping stone roosts are within the area between Clydach Valley part of the SAC site and the head of the Ebbw Valley - a distance of 3.8km.

4.5.8 Finally, the proposed Compensatory Measures are additional to the normal practices of implementation of the "Nature" Directives, and do not jeopardize the integrity of any other Natura 2000 site.

4.6 Consultation on Compensatory Measures

4.6.1. The Compensatory Measures have been developed in consultation with NRW. This has included a range of meetings, draft documents and site visits. Further consultation on the compensatory measures described in this document will be carried out through the wider consultation, with NRW, Blaenau Gwent County Borough Council, Monmouthshire County Council, Brecon Beacons National Park Authority and interested parties/members of the public on publication of this document.

4.7 Proposals for Monitoring and Reporting

4.7.1. The objective of the proposed Compensatory Measures is to provide additional opportunities for lesser horseshoe bats to roost between the SAC population in the Clydach Gorge and non-SAC populations known to be present in the Ebbw Valley. In the light of the extremely small size of the adverse effect it is asserted that success is achieved by providing those opportunities i.e. providing the roosts.

4.7.2 However, to monitor whether the opportunities provided are used, bat recorders will be employed annually (for a period of 2 months during the summer to record roosting lesser horseshoe bats) in each roost during the 5 year maintenance period.

4.7.3 The presence of bats using the roosts within the context of monitoring of bats on Section 3, would be used to confirm that the potential enhancement had been realised. Monitoring will cease after any lesser horseshoe bats have been shown to use the roosts.

4.8 Conclusions on Assessment of Compensatory Measures

4.8.1. The assessment has concluded that the proposed Compensatory Measures can be secured and are sufficient to ensure that the coherence of the Natura 2000 network will be protected.

5 CONCLUSIONS OF THE STATEMENT

5.1 Conclusions

5.1.1 This SASICOM report represents the final stages of the Assessment of Implications on European Sites of the A465 Heads of the Valleys Section 2 Gilwern to Brynmawr.

5.1.2 Natural Resource Wales (NRW) have questioned whether the conclusion of the original report provides a sufficient level of certainty that an adverse effect on the integrity would be avoided. In particular, on a precautionary basis they view there is reasonable potential for more than a short term drop in the population of Lesser Horseshoe Bats in the Clydach Gorge part of the SAC.

5.1.3 After due consideration of the representations of NRW and further discussion, it remains the view of Welsh Government that there is an extremely small risk of a short term effect on the integrity of the Usk Bat Sites SAC due to the uncertainties associated with ecological systems and assessments, in relation to effects on lesser horseshoe bats during the period when replacement planting is maturing.

5.1.4 In line with HD 44/09, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the basis that there would be an adverse effect on the Usk Bat Sites SAC. It is therefore necessary to progress to the next stages of the AIES process – Assessment of Alternative Solutions, with subsequent progression to Imperative Reason of Overriding Public Importance, if it is concluded that there are no alternative solutions, and then to the Assessment of Compensatory Measures if one or more IROPI are identified.

5.1.5 Stages 3 to 5 of the AIES process have been undertaken in accordance with Regulations 62 and 66 of the Conservation of Habitats and Species Regulations 2010, which require any Competent Authority that intends to consent a scheme that could have an adverse effect on the integrity of a European Site to demonstrate that there are no alternative solutions, that it must be carried out for 'imperative reasons of overriding public interest', and that it can secure that any necessary compensatory measures will be taken to ensure that the overall coherence of Natura 2000 is protected.

5.1.6 **a) Are there alternative solutions that would have a lesser effect or avoid an adverse effect on the integrity of the site?**

There are no alternative solutions that would achieve the Scheme Objectives whilst also having a lesser effect upon the integrity of the SACs (by having a lesser effect on the conservation objectives).

5.1.7 **b) Is a priority habitat or species adversely affected by the proposal?**

There are no priority habitats or species that would be adversely affected by the proposal.

5.1.8 **c) Are there any Imperative reasons of Overriding Public Interest, including those of a social or economic nature?**

There are three imperative reasons of overriding public interest. The first relates to the inclusion of the Scheme in agreed Welsh Government national policy, the second relates to public safety and the third relates to economic benefits.

5.1.9 **d) Do the compensatory measures ensure that the coherence of the Natura 2000 network is protected?**

The compensatory measures are sufficiently extensive and reliable to ensure that the coherence of the Natura 2000 network is protected. The stepping stone roosts are within the area between Clydach Valley part of the SAC site and the head of the Ebbw Valley - a distance of 3.8km.

Given these conclusions, it is considered that the Welsh Ministers (as the Competent Authority) are able to agree to the project in accordance with Regulations 62 and 66 of the Conservation of Habitats and Species Regulations 2010.

References

1 A465 Heads of the Valleys Section 2 Assessment of Implications (of highways and/or road projects) on European Sites (including Appropriate Assessment (AIES) Statement to Inform an Appropriate Assessment under the Conservation of Habitats and Species Regulations 2010 (October 2013)

2 European Commission (2007/2012), Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC Clarification on the Concepts of: Alternative Solutions, Imperative Reasons of Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission

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8 (HA et al, 2009) HD 44/09 Design Manual for Roads and Bridges Volume 11 Section 4 Part 1 Assessment of Implications (of Highways and/or Roads Projects) on European Sites (including Appropriate Assessment) February 2009.

Appendices

Appendix A - Figures

Appendix B - Assessment of Alternative Solutions Matrix

Appendix C- Assessment of Alternatives against Scheme Objectives

Appendix D - Compensatory Measures Matrix

APPENDIX A – Figures

Figure 1 – Scheme Location and Nearby SACs

Figure 2 – Proposed Scheme

Figure 3a – 3f – Current Scheme Design

Figure 4 – Alternative Means of Meeting Objectives Plan – Rail

Figure 5.1 – Alternative Route Plan Sheet 1 of 2

Figure 5.2 – Alternative Route Plan Sheet 2 of 2

Figure 6.1 – Alternative Size & Scale and Alternative Methods of Construction Plan

Figure 6.2 – Alternative Size & Scale – AS4 At-Grade Junction Plan

Figure 6.3 – Alternative Size & Scale Cross Sections

Figure 7.1 – Proposed Roost Locations as Compensatory Measures for A465 HOV Section 2

Figure 7.2 – Plan showing locations of All Sections of A465 Upgrade with Bat Roosts

River Usk / Afon Wysg SAC

Usk Bat Sites / Safleodd Ystlumod Wysg SAC

Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC

Usk Bat Sites / Safleodd Ystlumod Wysg SAC

Legend

- Scheme Footprint
- SAC

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Scheme Location and Nearby SACs

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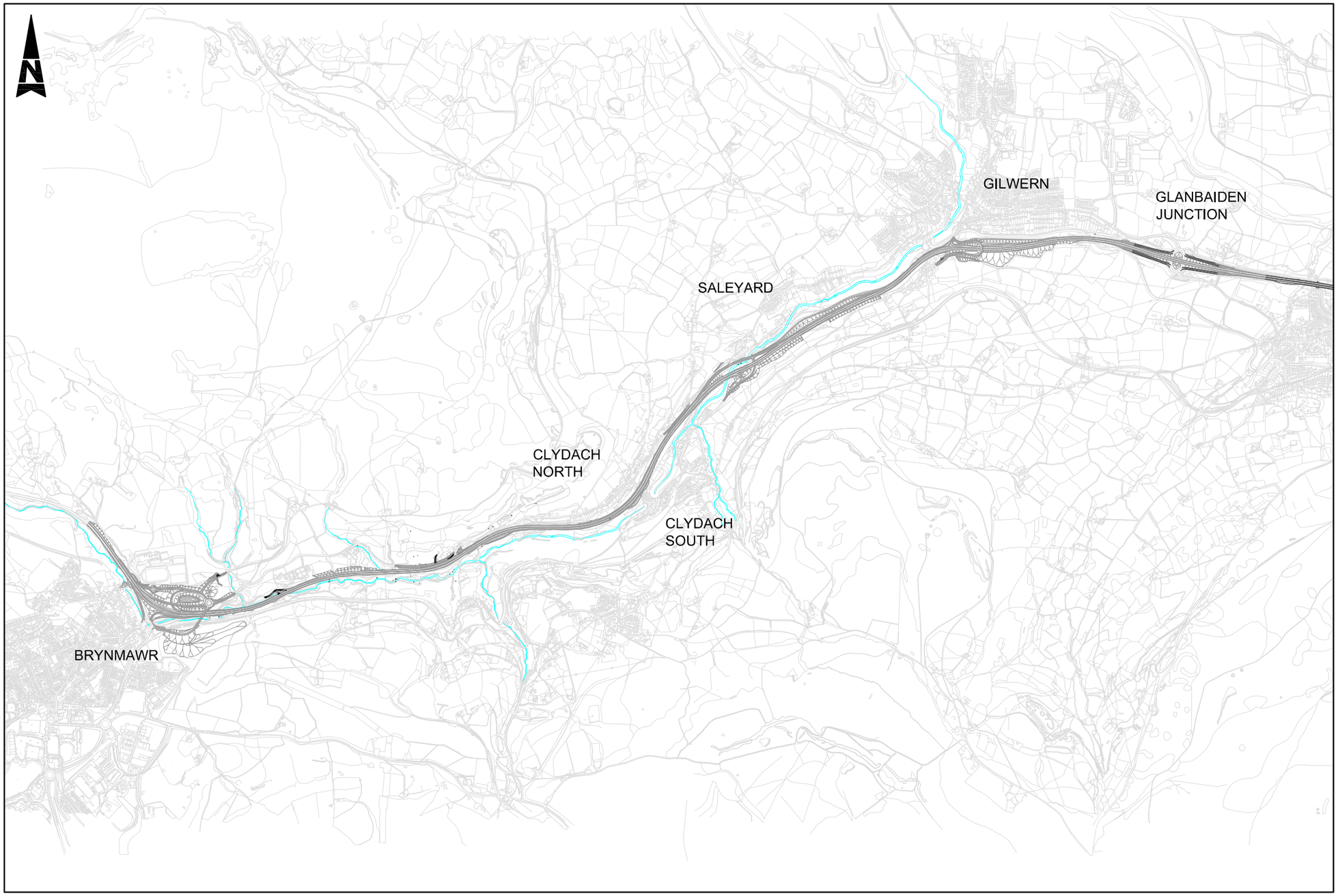

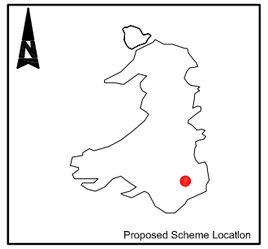

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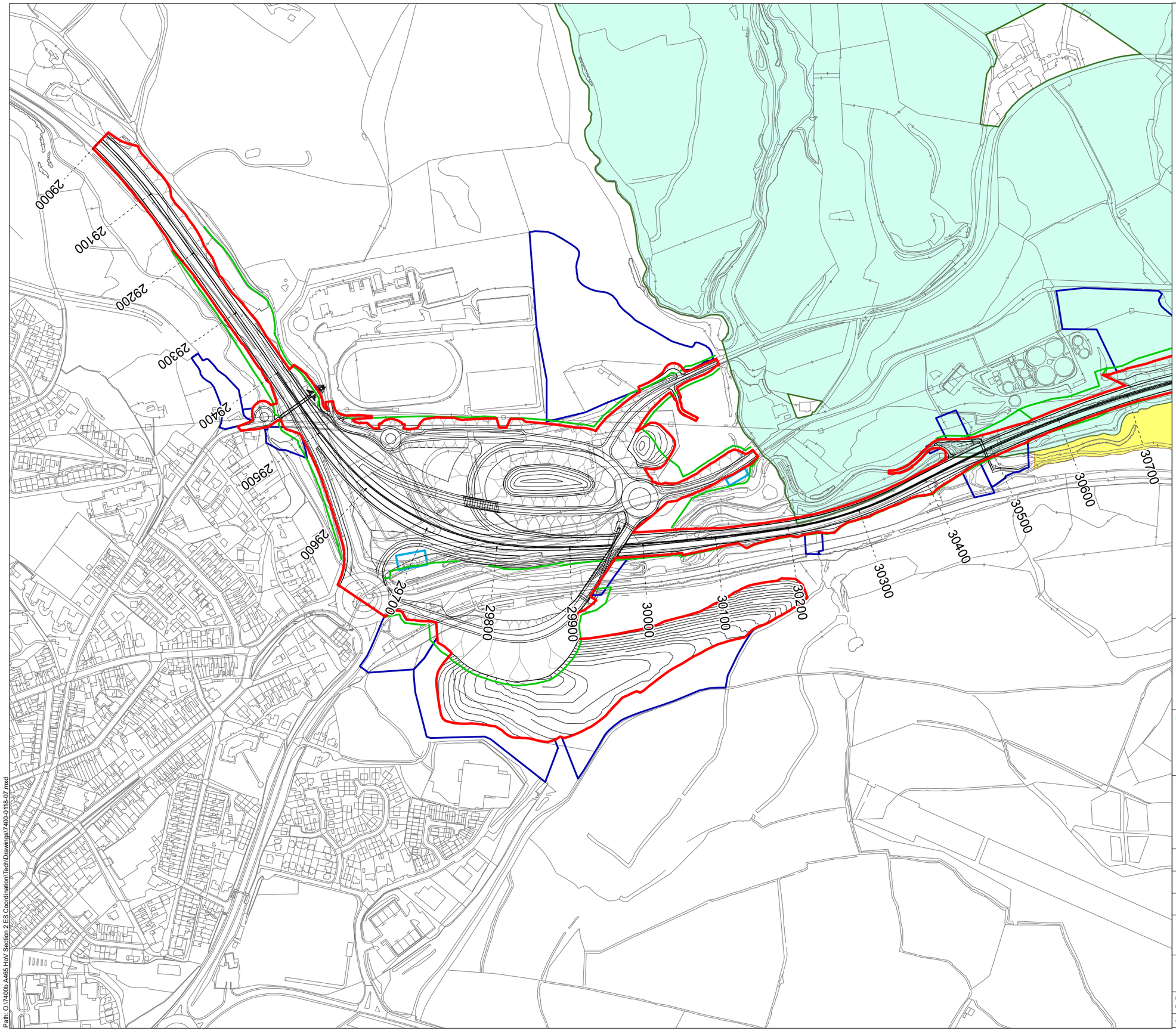

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- Scheme Footprint
- Drainage Feature / Attenuation Pond
- Scheme Fenceline
- Temporary landtake during construction
- Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC
- Usk Bat Sites / Safleodd Ystlumod Wysg SAC
- River Usk / Afon Wysg

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Current Scheme Design
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Sheet 1 of 6

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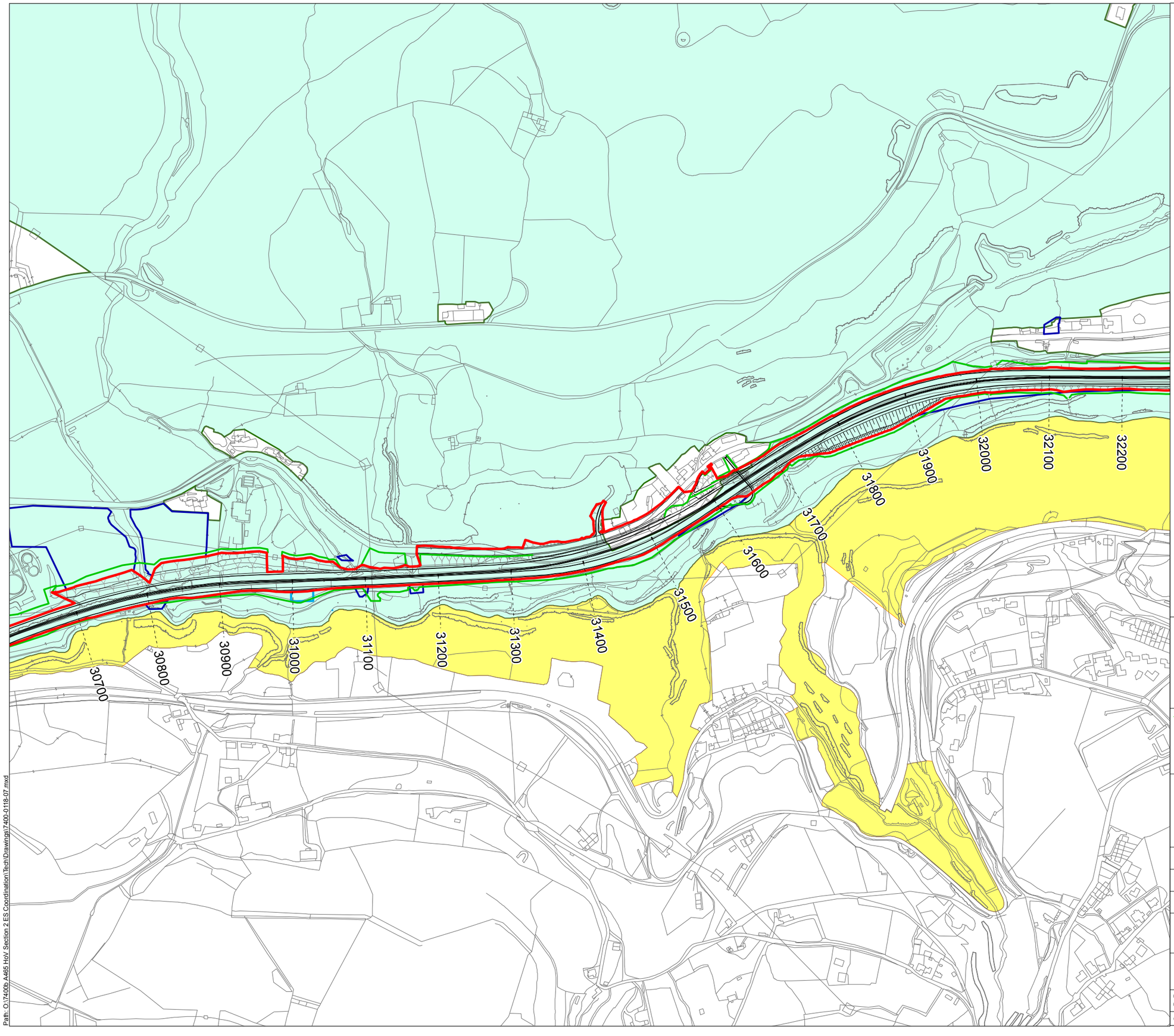

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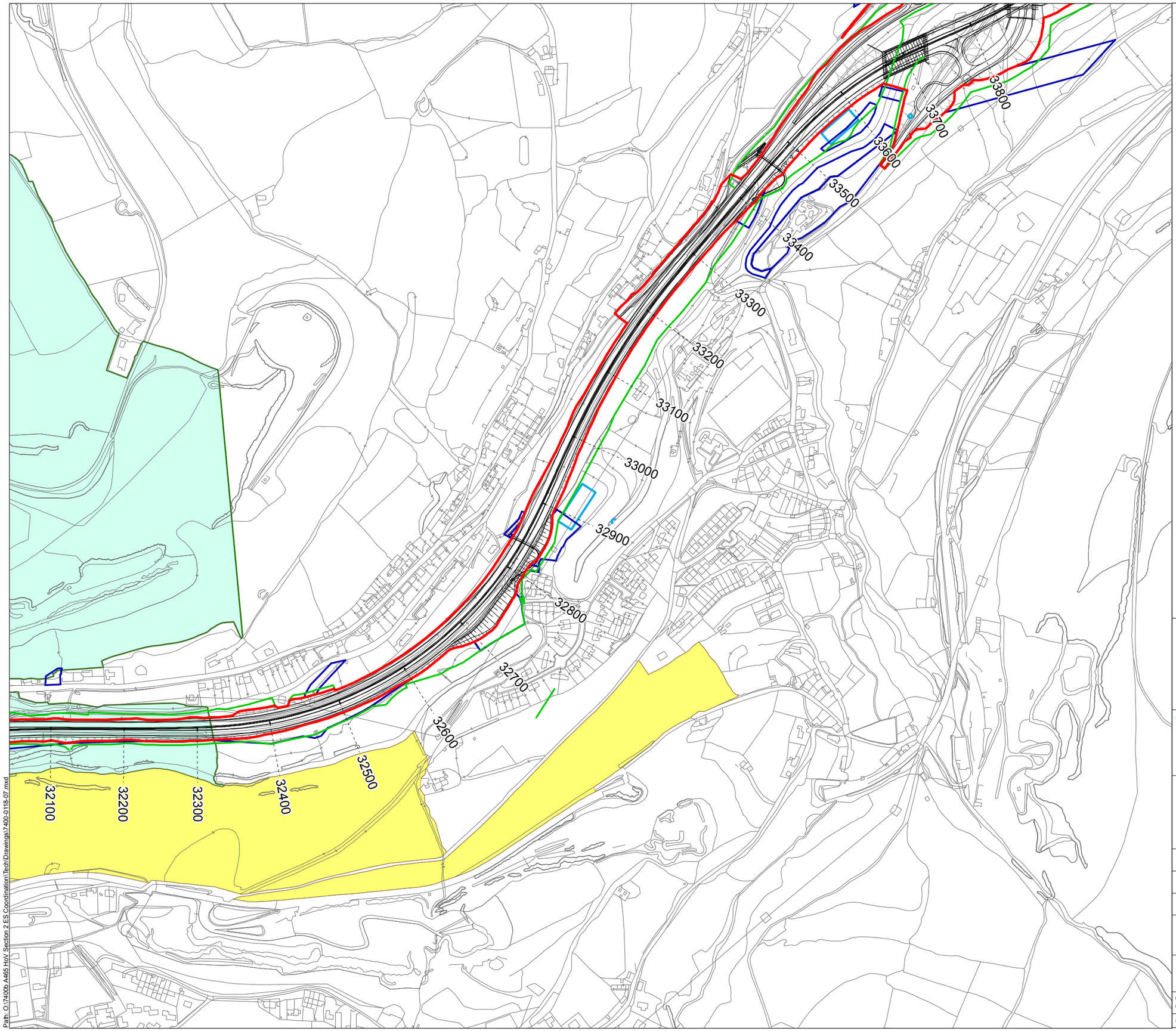

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- Scheme Footprint
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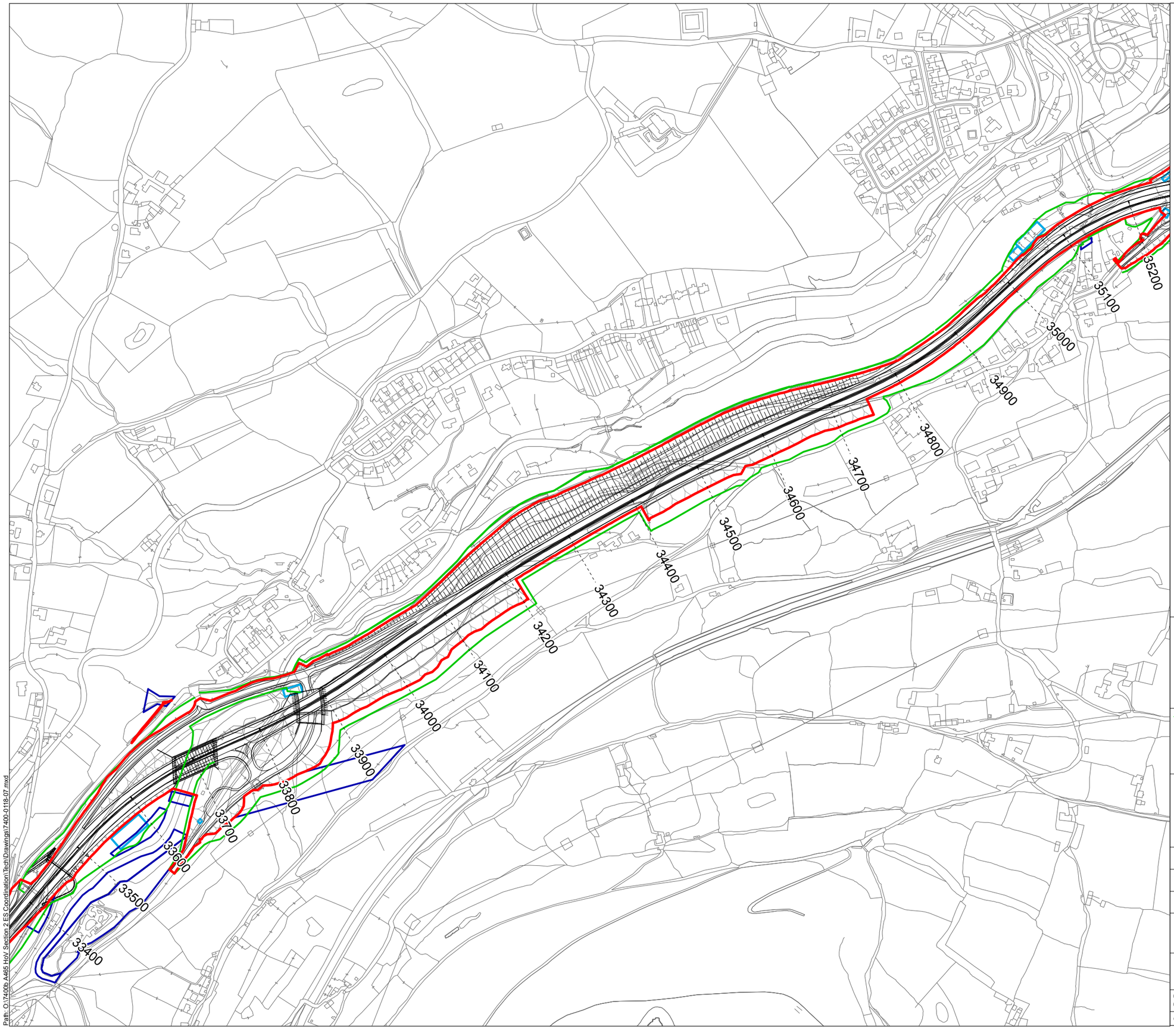

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- Drainage Feature / Attenuation Pond
- Scheme Fenceline
- Temporary landtake during construction
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- Usk Bat Sites / Safleodd Ystlumod Wysg SAC
- River Usk / Afon Wysg

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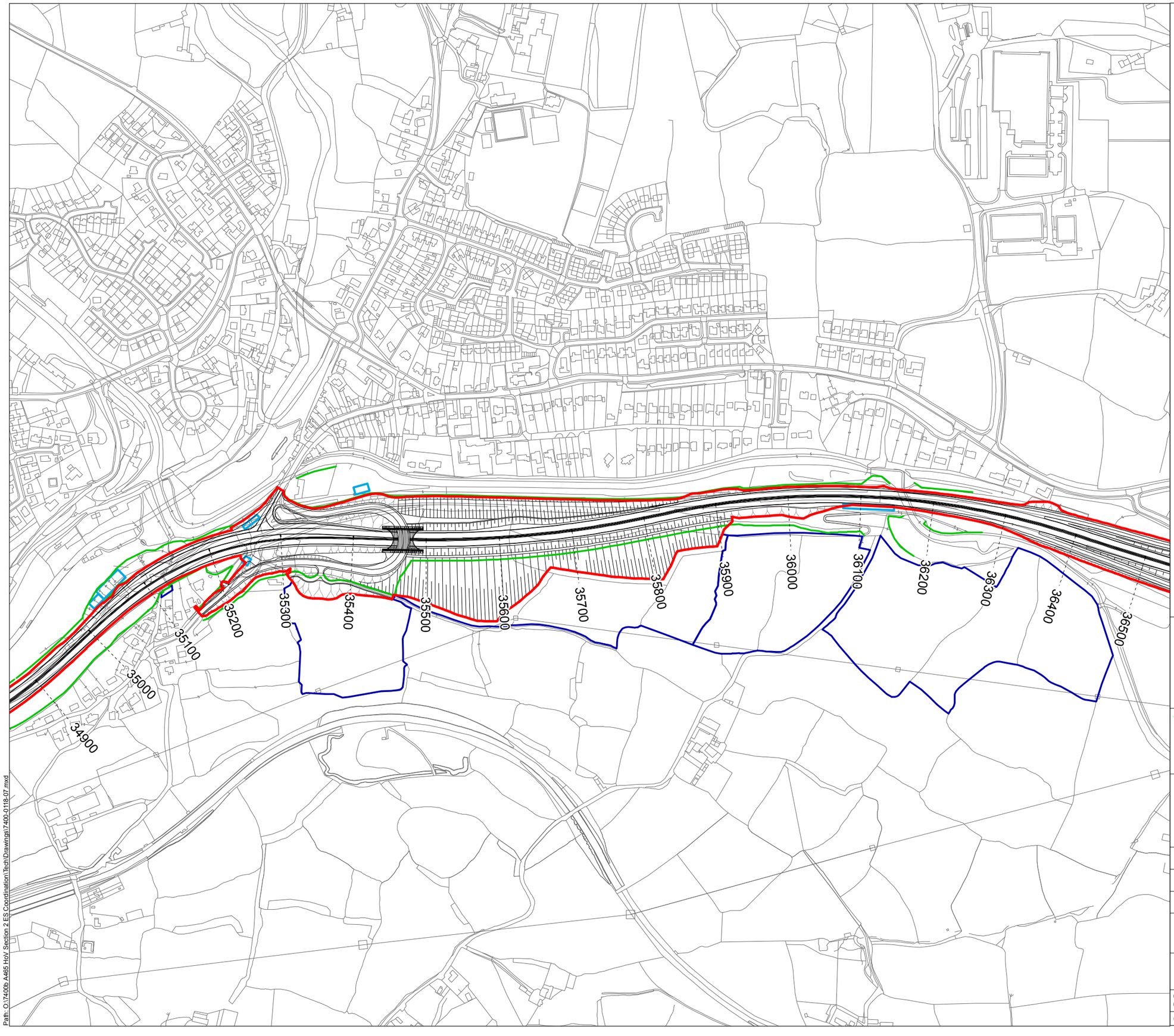

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Section 2: Gilwern - Brynmawr

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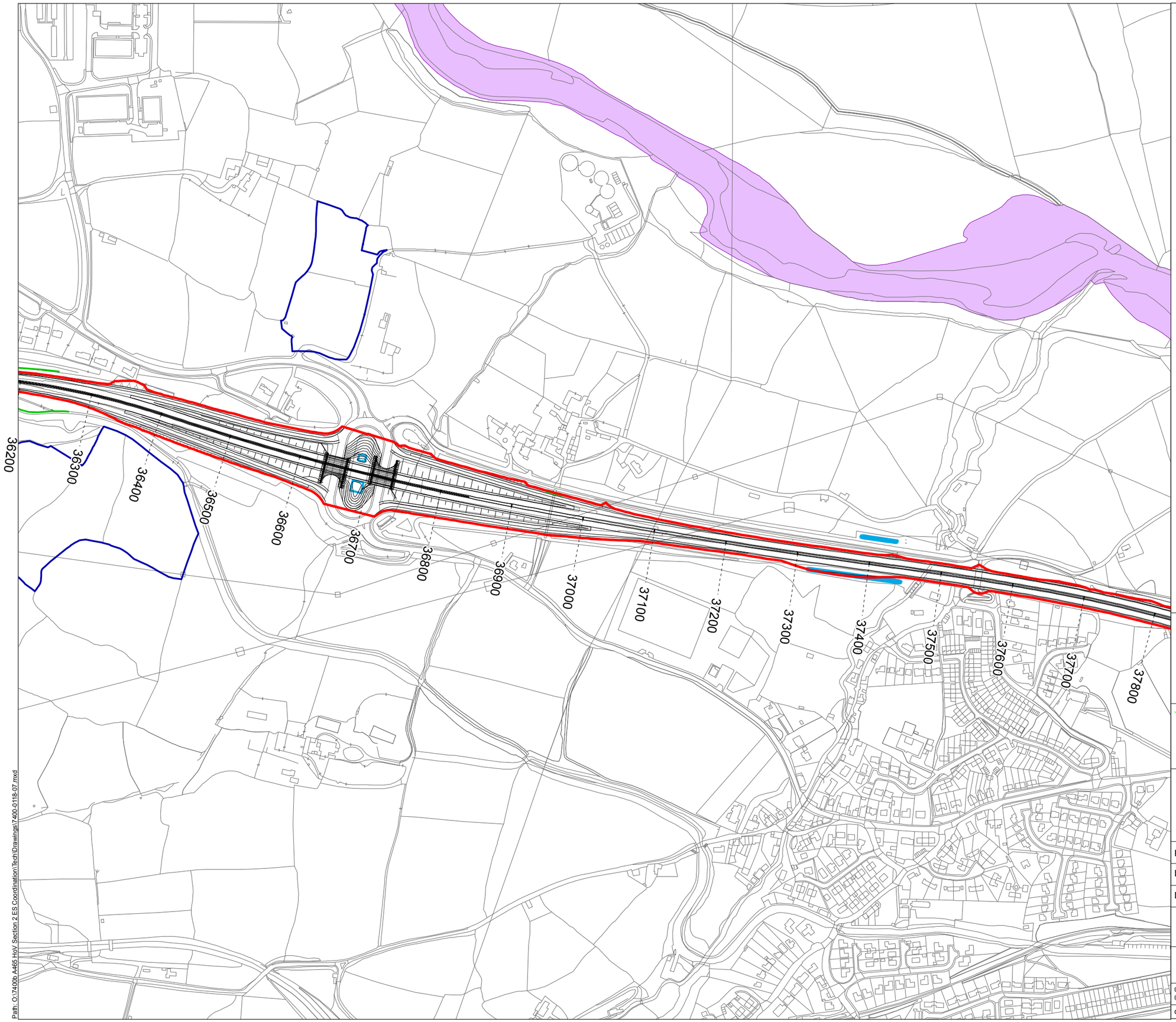

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Current Scheme Design
KS3 rev7
Sheet 6 of 6

Figure: 3f	Revision: -
Date: Aug 2013	Status: FINAL
Drawn: -	Checked: -

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dwg ref: 7400-0118-07

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Rev P1

Figure Number Figure 4

Suitability S0

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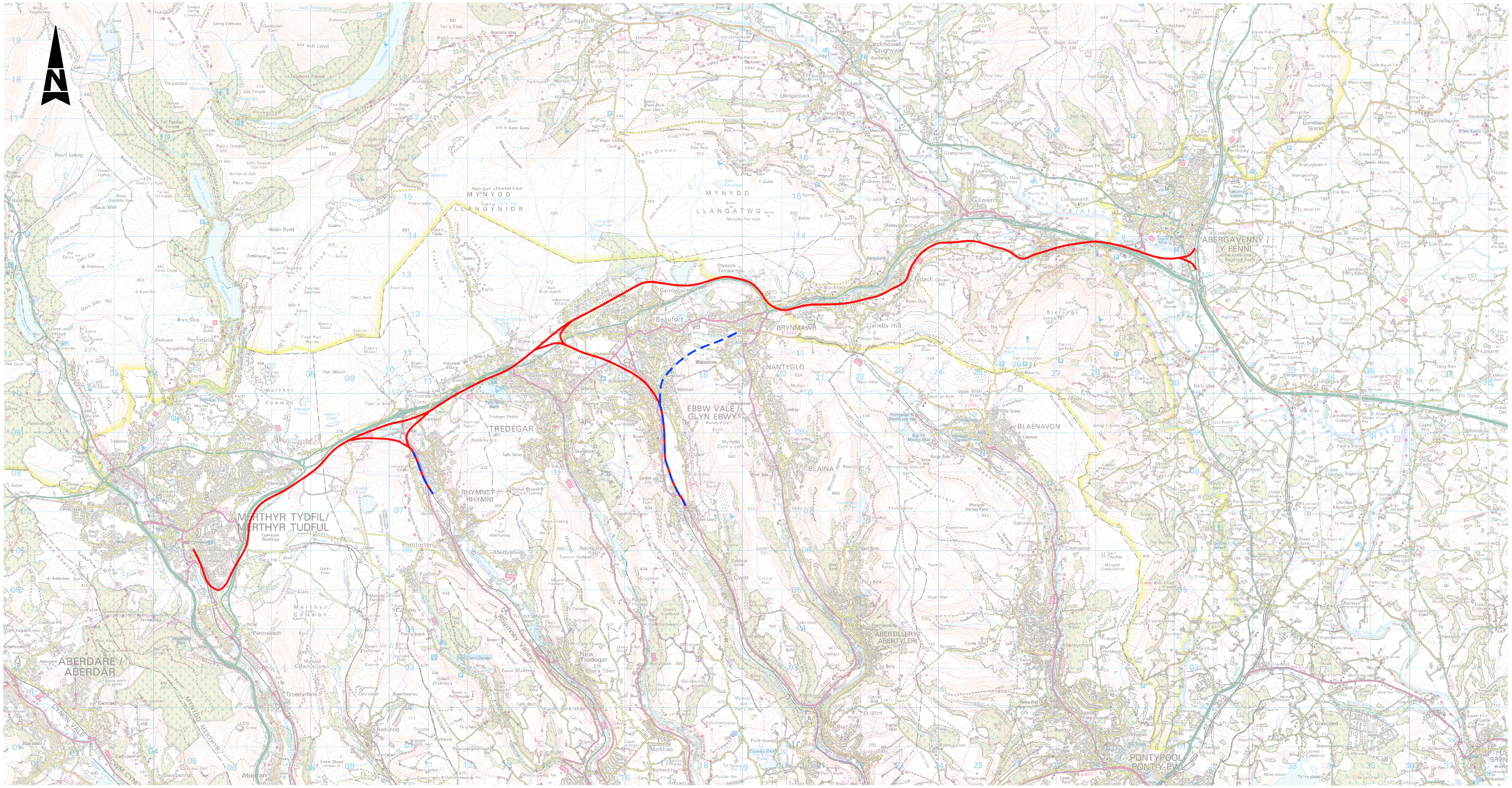

Alternative Method 1 - Rail (East - West)

Alternative Method 2 - Rail (North - South)

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue
FOR INFORMATION

Title
ALTERNATIVE MEANS OF MEETING OBJECTIVES PLAN RAIL

Original Scale	Designed/Drawn	Checked	Authorised
1:50,000	LG	JE	NM
	Date 26/11/13	Date 26/11/13	Date 29/11/13

Status	Figure Number	Rev
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Date: Nov 28, 2013 - 3:43pm Plotted by: EgdellJ

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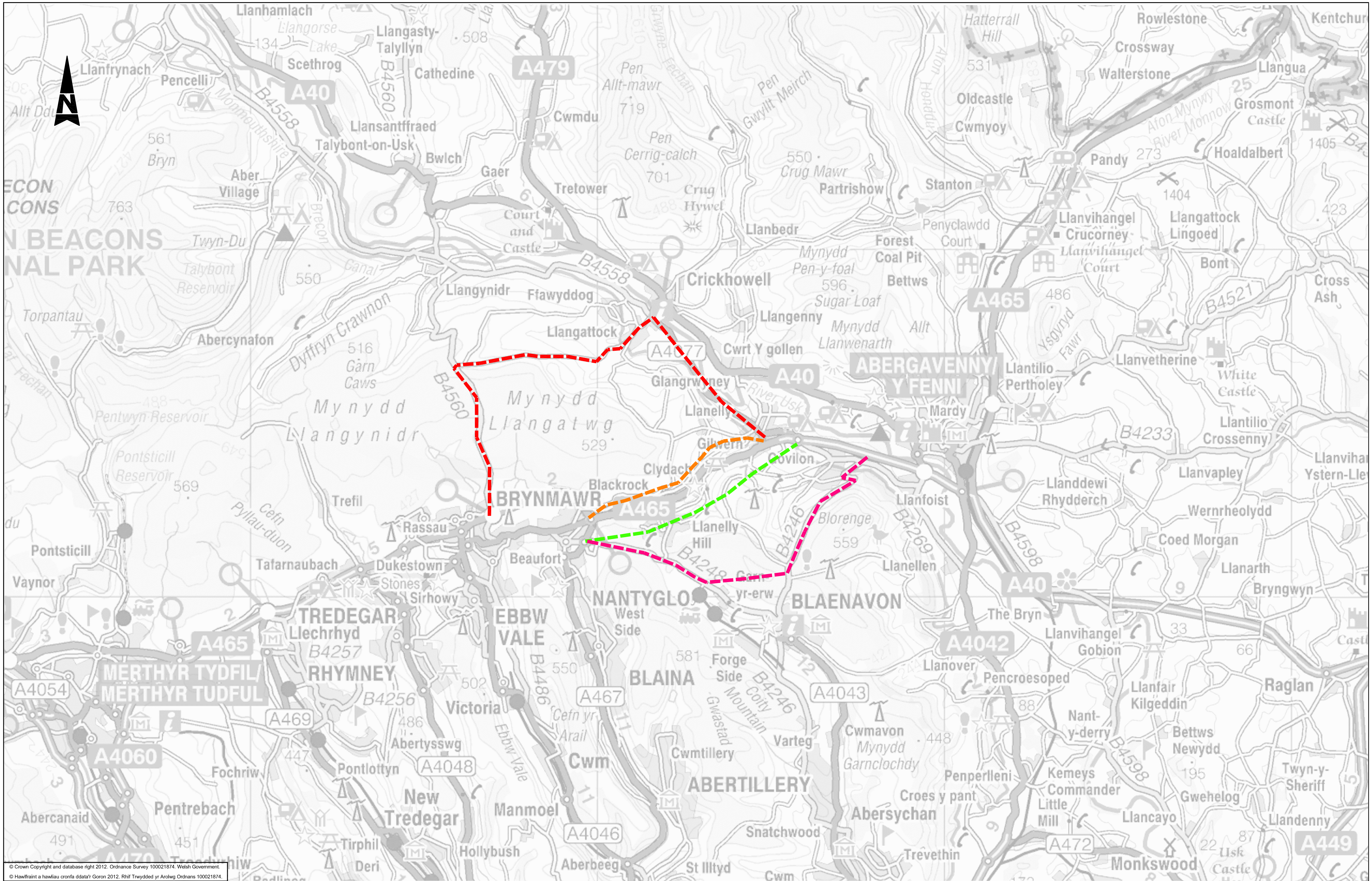

Alternative Route 1- Over Langatwg

Alternative Route 2 - Along former railway line

Alternative Route 3 - Original PI routes

Alternative Route 4 - Through Blaenavon

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue

FOR INFORMATION

Title
ALTERNATIVE ROUTE PLAN
SHEET 1 OF 2

Original Scale	Designed/Drawn	Checked	Authorised
1:50,000	IE Date 26/06/13	MJ Date 26/06/13	NM Date 26/06/13

Status	Figure Number	Rev
S0	Figure 5.1	P1

Rev P1

Figure Number Figure 5.1

Suitability S0

DO NOT SCALE

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A1

File: Figure 4.dwg

Date: Nov 28, 2013 - 4:08pm Plotted by: EgdellJ

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Rev P1

Figure 5.2

Figure Number

Suitability S0

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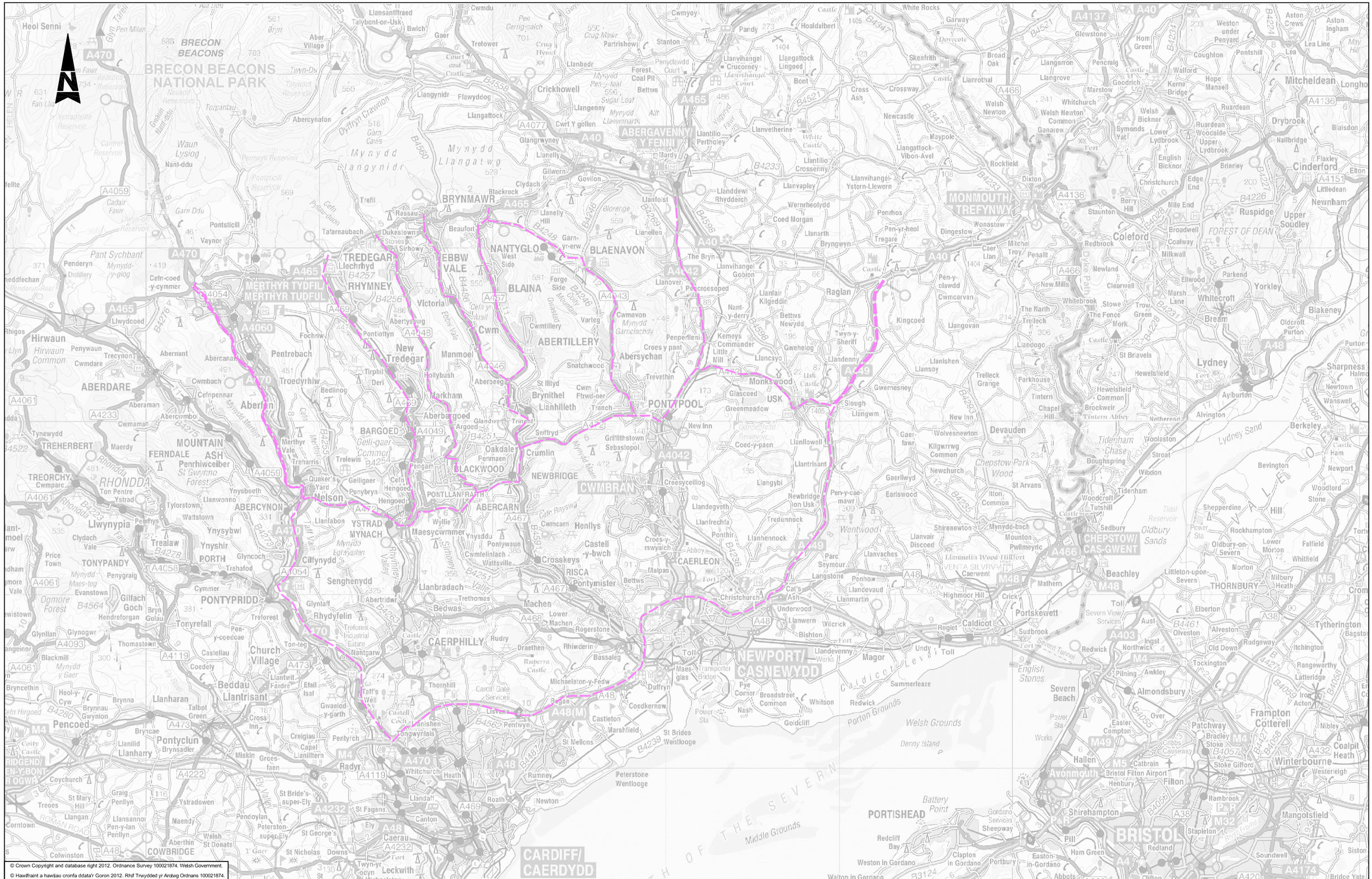

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue

FOR INFORMATION

Title

ALTERNATIVE ROUTE
PLAN
SHEET 2 OF 2

Original Scale	Designed/Drawn	Checked	Authorised
1:100,000	IE	MJ	NM
	Date 26/06/13	Date 26/06/13	Date 26/06/13

Status	Figure Number	Rev
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Rev P1

Figure Number Figure 4.1

Suitability S0

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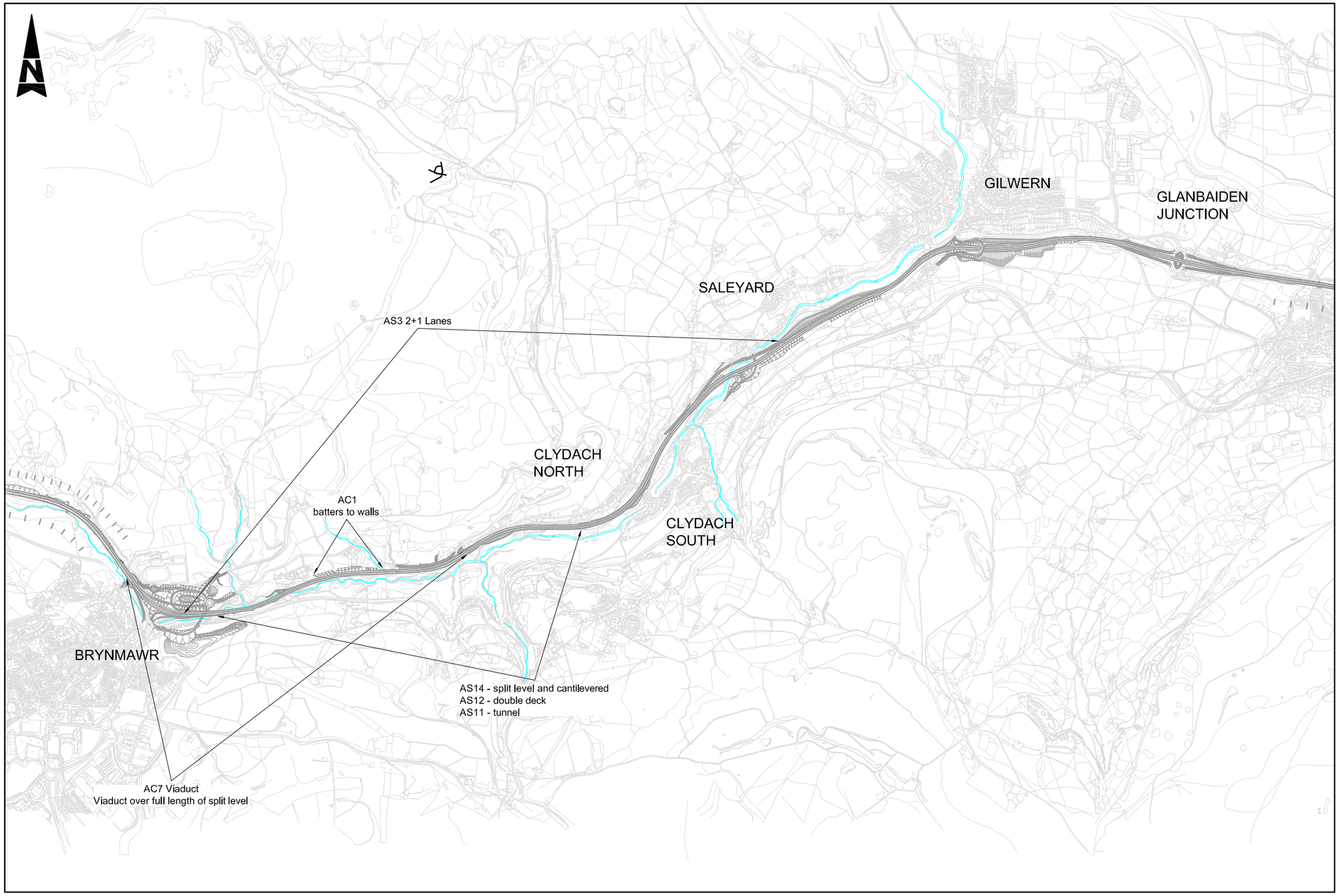

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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Welsh Government

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COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue
FOR INFORMATION

Title
ALTERNATIVE SIZE & SCALE AND ALTERNATIVE METHODS OF CONSTRUCTION PLAN

Original Scale	Designed/Drawn	Checked	Authorised
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Status	Figure Number	Rev
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Rev P1

Figure Number Figure 6.2

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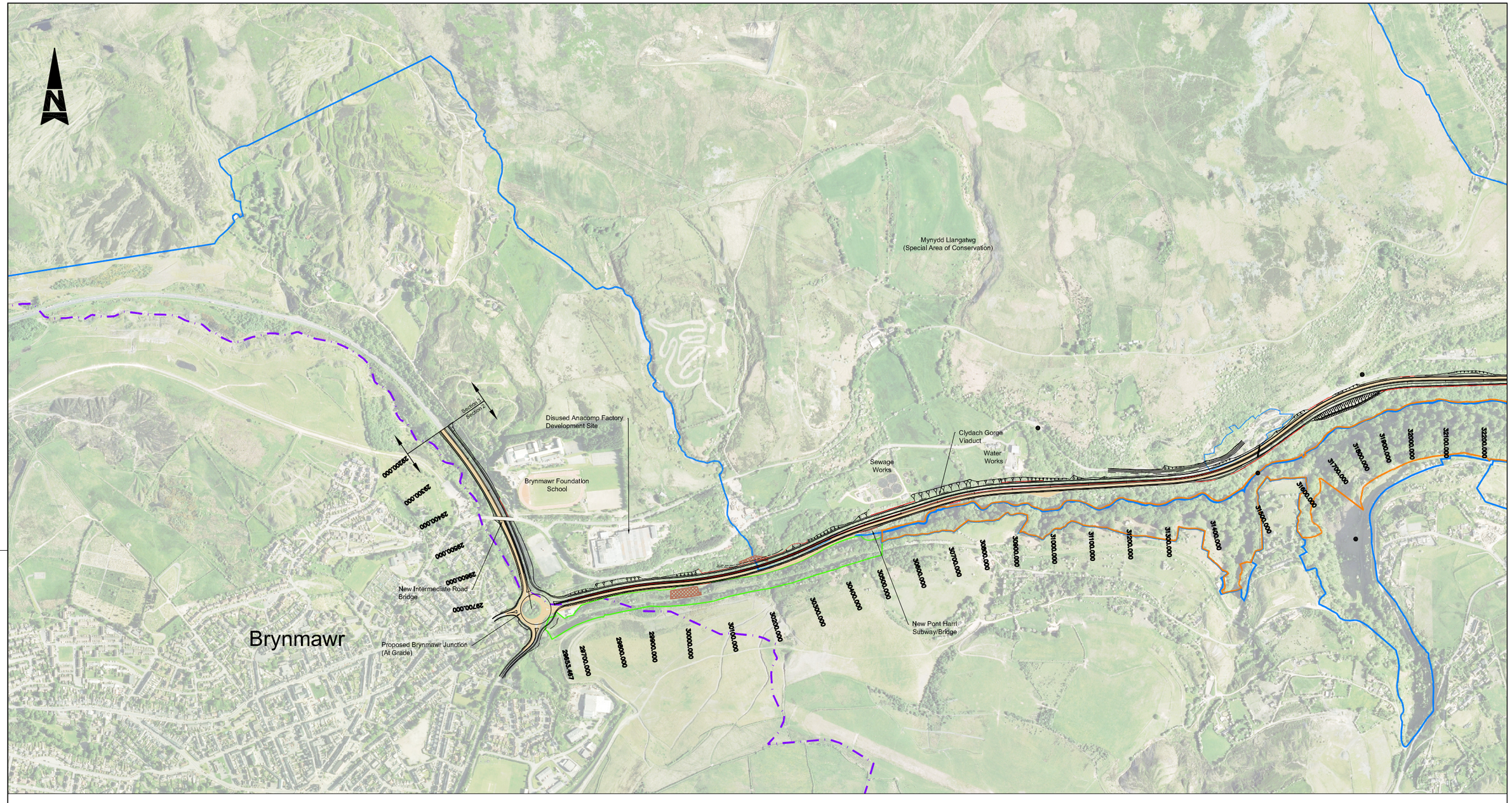

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue

FOR INFORMATION

Title
ALTERNATIVE AS4
AT GRADE JUNCTION
PLAN

Original Scale	Designed/Drawn	Checked	Authorised
1:5000	IE	MJ	NM
	Date 26/06/13	Date 26/06/13	Date 26/06/13

Status	Figure Number	Rev
S0	Figure 6.2	P1

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Rev P1

Figure Number Figure 6.3

Suitability S0

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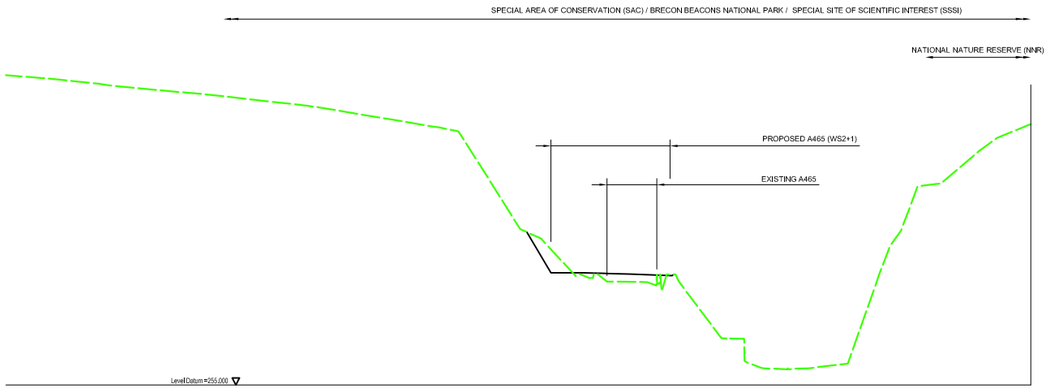
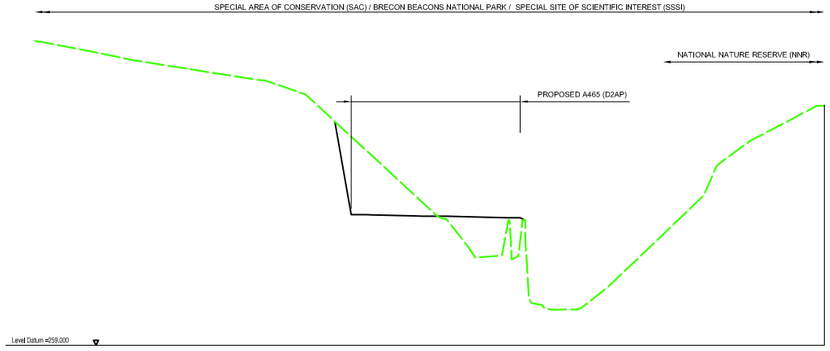
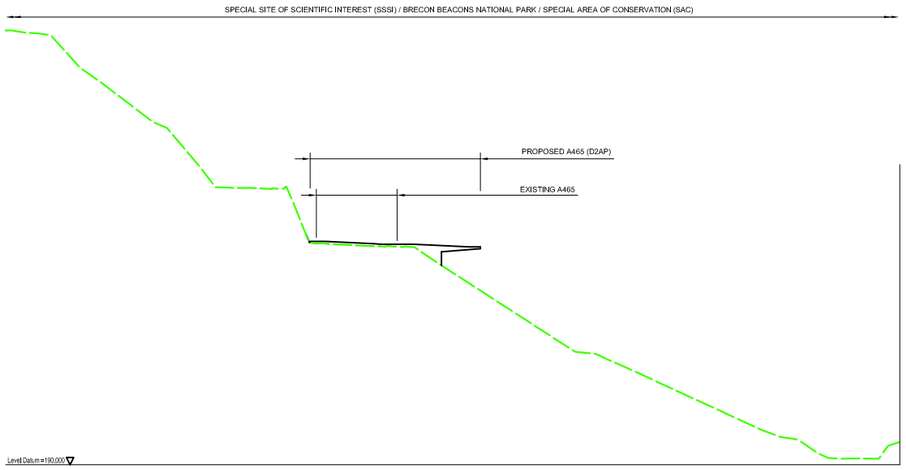


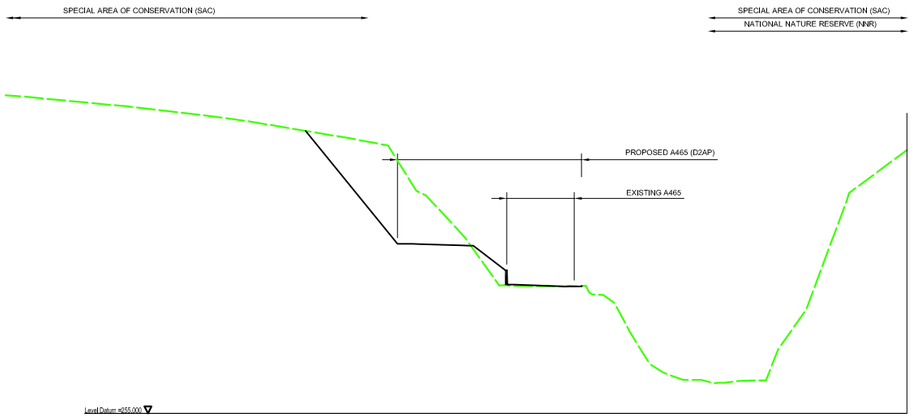
AS3 2 +1 Lane
Chainage 30800



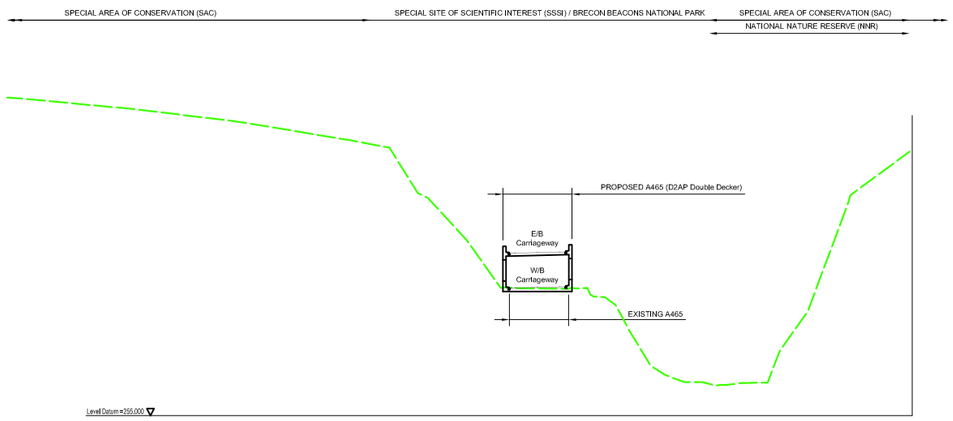
AS 15 Employers Outline Design
Chainage 30800



AS 14 Split Cantilever
Chainage 31800 Scale



AS 26 Reduced Cross Section
Chainage 30800



AS 12 Double Deck Carriageway
Chainage 30800

Alternative Route 1

Rev	Description	By	Date	Chk'd	Auth
P1	S0 - For review and comment.	LG	26.11.13	JE	NM

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COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose of Issue
FOR INFORMATION

Title
ALTERNATIVE SIZE & SCALE CROSS SECTIONS

Original Scale	Designed/Drawn	Checked	Authorised
1:500	IE	MJ	NM
	Date 26/06/13	Date 26/06/13	Date 26/06/13

Status	Figure Number	Rev
S0	Figure 6.3	P1

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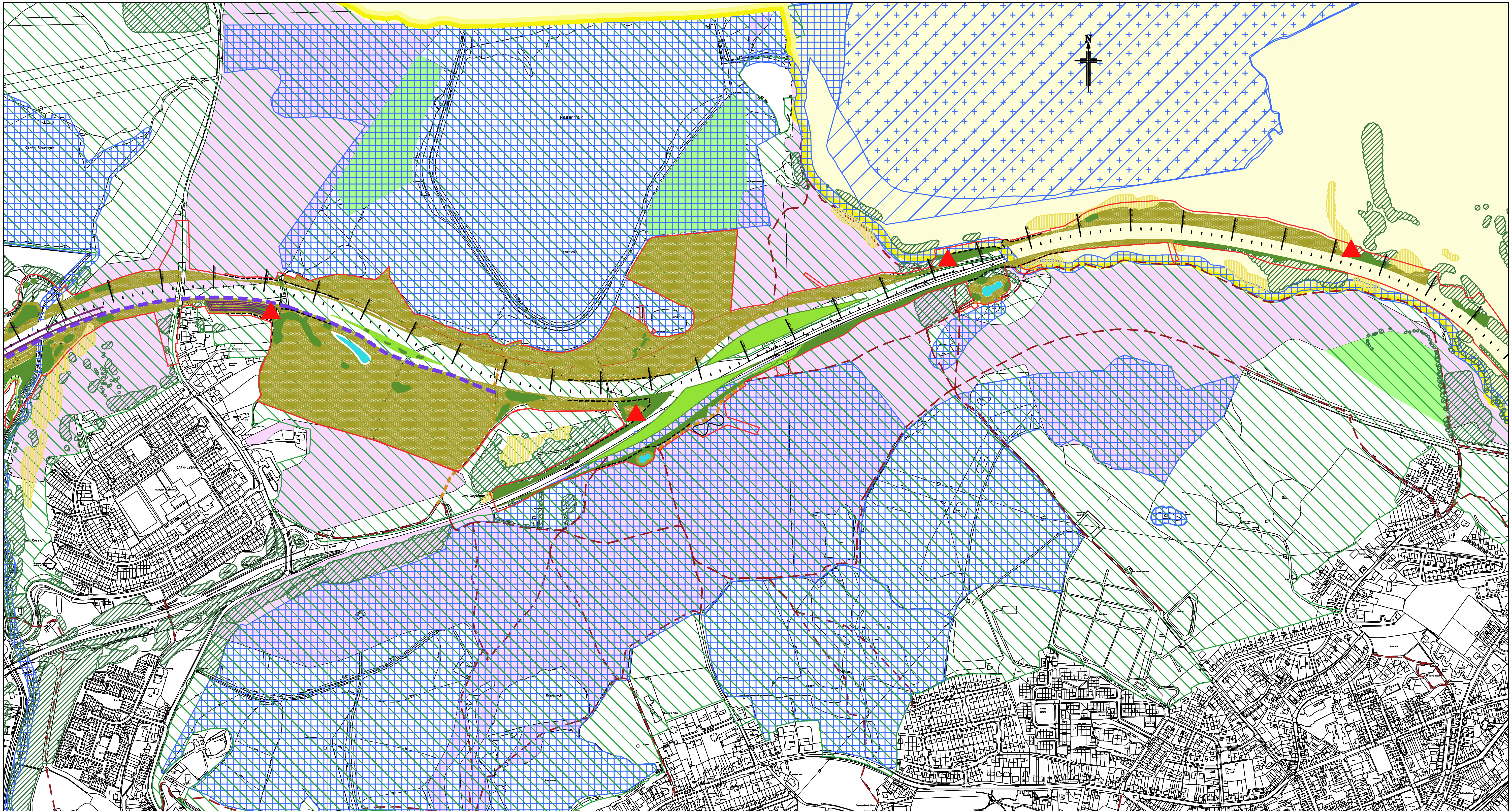


Proposed Vegetation
- Proposed Planting
- Proposed seeding
- Proposed ground cover/ wildflower seeding
- Proposed Hedge

Existing Vegetation/Landscape
- Groundcover
- Existing Vegetation
- Existing Watercourse

Additional mitigation measures
- Noise barrier
- Proposed Ponds
- Replacement Common Land
- New Footpaths
- New cyclepaths
- Otter Proof Fencing
- Noise bund

- Petrol Interceptor
- Surface Water Outfall
- Stream Diversion
- Land Take Boundary
- Proposed Stone Wall Boundary

Designations
- P3.2 - Historic Landscape
- P3.1 - Listed Buildings

- P2.1 - Brecon Beacons National Park
- P2.2 - Special Landscape Areas (SLA) (Blaenau Gwent LDP Deposit Draft)
- P1.1 - Special Area of Conservation (SAC)
- P1.1 - Site of Special Scientific Interest (SSSI)
- P1.2 - Sites of Importance for Nature Conservation (SINC)
- Public Rights of Way
- Common Land
- LHB Roost Compensatory for Section 2

Environmental Functions
- EFA - Visual Screening
- EFB - Landscape Integration
- EFC - Enhancing the Built Environment
- EFD - Nature Conservation and Biodiversity
- EFE - Visual Amenity
- EFF - Heritage
- EFG - Auditory Amenity
- EFH - Water Quality

Landscape Elements
- LE 1.0 Grassland
- LE 1.1 - Amenity Grass Areas
- LE 1.2 - Grassland with Bulbs
- LE 1.3 - Species Rich (or Conservation) Grassland
- LE 1.4 - Rock and Scree
- LE 1.5 - Heath and Moorland
- LE 1.6 - Open Grassland
- LE 2.0 Native Planting
- LE 2.1 - Woodland
- LE 2.2 - Woodland Edge
- LE 2.3 - High Forest
- LE 2.4 - Linear Belts of Shrubs and Trees
- LE 2.5 - Shrubs with Intermittent Trees
- LE 2.6 - Shrubs
- LE 2.7 - Scattered Trees
- LE 2.8 - Scrub
- LE 3.0 Ornamental Planting
- LE 3.1 - Amenity Tree and Shrub Planting
- LE 4.0 Hedges
- LE 4.2 - Native Species Hedges
- LE 4.4 - Native Hedgerows with Trees
- LE 5.0 Individual Trees
- LE 5.1 - Individual Trees
- LE 6.0 Wetland Habitats
- LE 6.1 - Water Bodies and Associated Plants
- LE 6.2 - Banks and Ditches
- LE 6.4 - Marsh and Wet Grassland

Environmental Elements

Auditory Amenity
- E1.1 - Noise Reducing Surface
- E1.2 - Noise Barrier-Built Elements
- E1.3 - Noise Earthworks

Water Quality
- E 2.1 - Water Pollution Control Measures
- E 2.2 - Surface-Water Outfalls
- E 2.3 - Soakaways

For injurous weeds EFD E 4.1 please refer to Volume 3 Appendix E-5

Nature Conservation and Biodiversity
- E3.1 - Protected Species
- E3.2 - Ecological Protection Measures
- E4.1 - Injurious Weeds
- E4.2 Legislated Pests

Client/Team

Llywodraeth Cymru
Welsh Government

ATKINS Halcrow A CH2M HILL COMPANY RPS

COSTAIN

A465 Heads of the Valleys
Section 2: Gilwern - Brynmawr

Purpose Of Issue

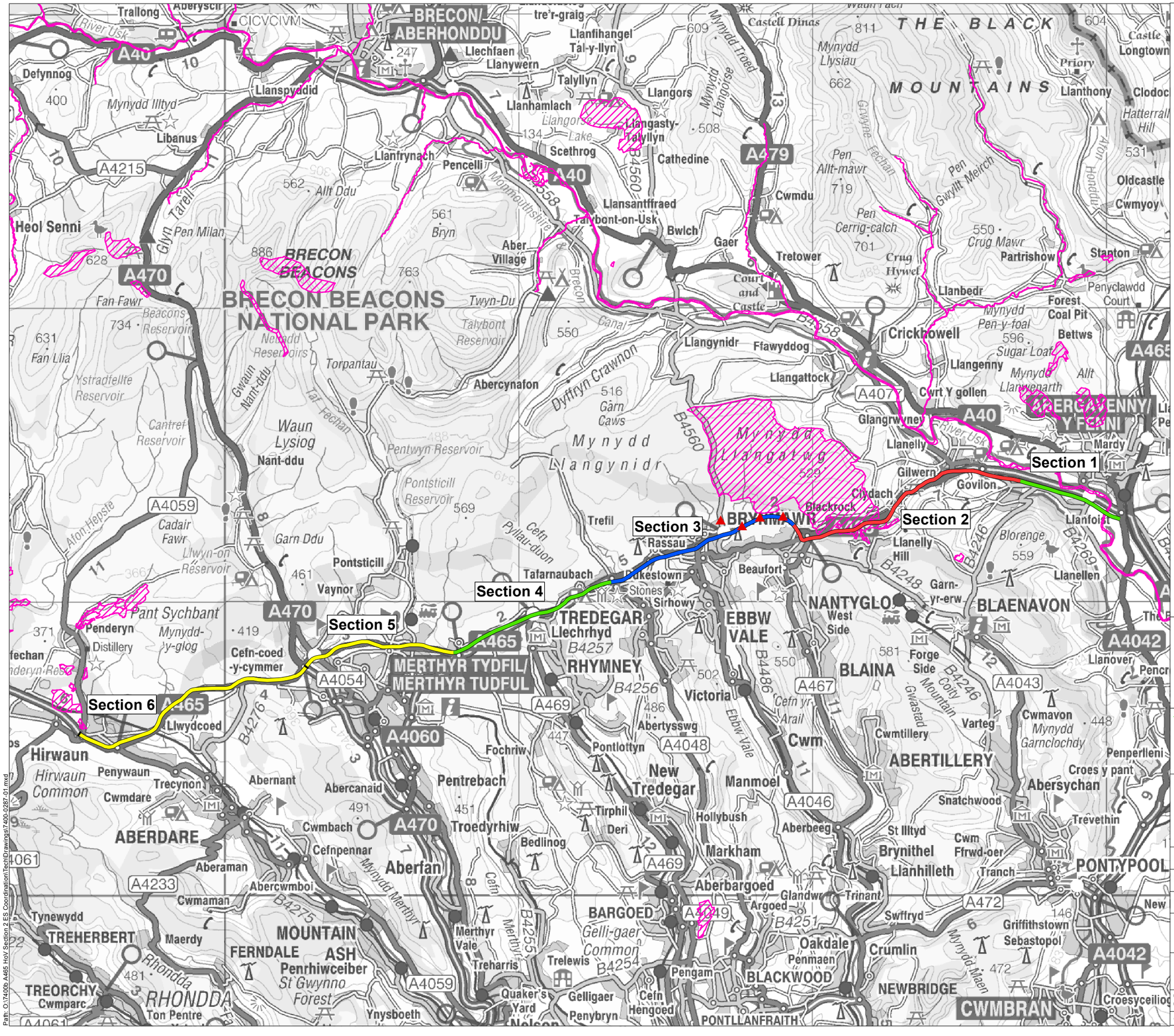
Job Title

A465
Heads of the Valleys Dualling
Section 2 Gilwern to Brynmawr

Drawing Title

Proposed Roost Locations as Compensatory Measures on A465 HoV Section 3 (based on the Section 3 EMP, courtesy of Carillion Arup TACP)

Date Feb 2014	Drawn by RM
Scale at A3 1 : 7500	Checked PI
Drawing Status **DRAFT**	Approved ..
Job No OXF8185	Figure No 7.1
Issue 1	



Legend

- LHB Roost Compensatory for Section 2
- Open to Traffic
- Under Construction
- Subject of this Report
- Yet to be Designed and Built
- SAC

dwg ref: 7400-0287-01

APPENDIX B – Assessment of Alternative Solutions Matrix

Project Name	A465 Heads of the Valleys Section 2 Gilwern to Brynmawr
Natura 2000 Site under Consideration	Usk Bat Sites Special Area of Conservation (SAC)

Date	Author (Name/Organisation)	Verified (Name/Organisation)
February 2014	Julie Hunt, Ben Matthews, Matt Jones, Jon Egdell (Halcrow) Robert Harvey, Richard Green (RPS)	Nigel Murphy (Halcrow) Peter Ireland (RPS)

The description and objectives of the project

The A465 Heads of the Valleys Road is recognised in the National Transport Plan (March 2010) as a strategically important route. On an international level, it forms part of the Trans European Transport Network (TEN-T). On a national level, it is the strategic link between the industrial centres of the Midlands and south west Wales. On a local level it provides an east-west link across the northern end or "heads" of the South Wales coalfield valleys between Abergavenny in the east and Neath in the west where it joins the M4 motorway. The unimproved sections do not meet current design standards.

The Section 2 scheme would extend for 8.45kms from west of the Intermediate Road bridge at Brynmawr to immediately west of the Glanbaiden Junction near Gilwern. Approximately 6.2km would be on-line (i.e. built over part of the existing road) and 2.25km off-line (i.e. built away from the existing road). At present approximately 17,000 – 20,000 vehicles per day use Section 2 of the existing A465. This is predicted to rise to 21,000 – 25,000 vehicles per day in 2017. The Scheme would improve the existing single three-lane carriageway to dual carriageway standard.

A clear and concise set of Scheme specific objectives were derived by mapping the general objectives in line with current Welsh Government strategic policy.

Scheme Objectives:

- To improve the A465 Heads of the Valleys Road between Gilwern and Brynmawr (Section 2 of the overall dualling programme) from a single 3-lane carriageway to a dual 2-lane carriageway in accordance with the Amendment Order and its associated Environmental Statement and to deliver the scheme to programme and budget.
- To maintain the current level of service and to carry out improvements.
- To reduce journey times for private and commercial road users.

- To facilitate economic regeneration.
- To enhance road safety and reduce casualties.
- To do all this with proper care for the environment.
- To deliver a scheme that is sustainable.
- To promote NMU provision, providing opportunities for healthy lifestyle.
- To deliver a scheme which minimises future maintenance and disruption to the network.
- To reduce journey time variability and improve resilience on the A465.
- To use the A465 to manage traffic effectively and improve resilience on the strategic road network in South East Wales.
- To deliver a scheme that integrates with public transport and the local transport network.
- To improve access to healthcare, education and leisure facilities.
- To reduce community severance.

The 'Do Nothing' Alternative

If no improvement was carried out then a 'Do Nothing' option would be necessary in order to maintain the existing road in its current condition. In order to do this, routine maintenance operations would be required. Typical activities would include, but are not limited to: winter maintenance, such as de-icing/gritting; line painting; resurfacing; pavement reconstruction; repairs to damage; dealing with traffic accidents; structural inspection works and maintenance work to structures, bridges, culverts and retaining walls; maintenance of the highway drainage network; and management and maintenance of roadside grass areas and vegetation trimming.

Predicted adverse effects of the project on the European Site following the Appropriate Assessment:

The Scheme would not affect the achievement of any of the conservation objectives set for any features of the Usk Bat Sites SAC, other than potentially for the lesser horseshoe bat feature.

After due consideration of the representations of NRW and further discussion, it remains the view of Welsh Government that there is an extremely small risk of a short term effect on the integrity of the Usk Bat Sites SAC due to the uncertainties associated with ecological systems and assessments, in relation to effects on lesser horseshoe bats during the period when replacement planting is maturing.

However, in line with HD 44/09, as there is no agreement with NRW on the level of confidence in the absence of adverse effects, on the Usk Bat Sites SAC, for the purposes of Regulation 61 of the Conservation of Habitats and Species Regulations 2010 there is a need to proceed on the

basis that it cannot be ascertained that the project will not adversely affect the integrity of the site.

Assessment of Alternative Solutions: Comparison with chosen project

Possible alternative solutions	Evidence of how the alternative solutions were assessed	Description of the relative effects on the conservation objectives of European Site (greater or less adverse)
Do Nothing		
Maintain the existing road	No short term impact on the SAC, but only slightly less effect in medium to long term. Option is not considered acceptable for the long term safety of road users and does not meet Scheme objectives and is therefore not an alternative solution.	Less adverse in the short term, with less difference in the medium to long term. Does not meet Scheme objectives sufficiently.
Alternative Means of Meeting Objectives		
Option AM1 – Rail Improvements (east-west)	This option would not achieve many scheme objectives and would incur significant cost and with significant feasibility and buildability issues. It would also offer no improvement in journey times or safety on the highway. It is therefore not considered an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AM2 – Rail Improvements (north-south)	This option would not achieve many scheme objectives and would incur significant cost and with significant feasibility and buildability issues. It would also offer no improvement in journey times or safety on the highway. It is therefore not an alternative solution.	Less adverse. Does not meet Scheme objectives sufficiently.
Option AM3 – Tram/Guided Bus	This option would achieve less scheme objectives at a higher cost, with feasibility and buildability issues associated with construction of a new communication route. It is therefore not an alternative	Greater adverse. Does not meet Scheme objectives sufficiently.

	solution.	
Option AM4 – Increased Bus Provision	An improved bus service along the A465 would achieve some localised improvements in NMU provision, but this option would not improve the safety of the route or achieve the wider route improvement and resilience objectives. It is therefore not an alternative solution.	Less adverse. Does not meet Scheme objectives sufficiently.
Alternative Routes		
Option AR1 – Over Llangatwg	Whilst this option could avoid direct SAC footprint it would still have an adverse impact on the SAC due to the proximity of increased traffic flows. It would not be feasible to construct and fails to reduce journey times or road safety on the A465. It is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AR2 - Along former Abergavenny to Merthyr Railway line	This option has an overall equal SAC footprint to the proposed scheme but would likely have greater adverse impact on bat habitats due to intrusive works to re-open the currently unused rail tunnel. The option would also require more complex construction works and more construction materials, with associated sustainability impact. The feasibility of the option would be lower with higher costs. For these reasons this is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AR3 - Original Public Inquiry (Orange) Route	This option has a significantly higher SAC footprint than the proposed scheme and would create a new corridor directly through the Usk Bat Sites SAC. For this reason it is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AR4 - A465 Llanfoist- B4246 - B4248 Blaenavon- A467 Brynmawr - A465	Whilst this option removes direct SAC footprint,there remains a risk of effects on lesser horseshoe bats it has environmental and sustainability issues such as significant new alignment through greenfield areas. It is also less able to meet key objectives relating	Less Adverse but there remains a risk of effects on lesser horseshoe bats. Does not meet Scheme objectives sufficiently.

	to journey time/network resilience improvements, would incur higher costs and be less feasible to construct. It is therefore not an alternative solution.	
Option AR6 - Strategic Re-Routing, using M4 east-west and A472	This option would avoid footprint within the SAC. This option may reduce some journey times on the wider network but would not reduce journey times along the A465 route. Lack of improvement of the A465 would mean little or no economic regeneration benefit to the study area and failure to achieve other objectives to improve the A465 and reduce its maintenance liability. It is assumed that this option would have remove impact on the Usk Bat Sites SAC. However there is a risk that improvements required to attract traffic away from A465 would have adverse impact on European Sites proximal to the A470 and M4. It is assumed that this option could be constructed in a sustainable manner, but it would fail to improve safety along the A465 or provision for NMUs. It is therefore not an alternative solution.	Less adverse. Does not meet Scheme objectives sufficiently.
Alternative Size and Scale		
AS1 - Decrease design speed/speed limit, no central reservation	This option would only marginally reduce the footprint within the SAC. In comparison to the existing road the level of service and safety of the road would be improved over the existing arrangement but journey time reduction would be low. Economic regeneration and network resilience objectives would be facilitated by this option but would be limited by the low journey time reduction.	Marginally less adverse. Does not meet Scheme objectives sufficiently.

	It is therefore not an alternative solution.	
AS2 - Increase design speed/speed limit	This scheme would deliver greater journey time reductions and therefore economic benefit than the proposed scheme but would require greater footprint within the Usk Bat Sites SAC. Therefore this is therefore not an alternative solution.	Greater adverse. Meets the majority of Scheme objectives sufficiently.
AS3 - 2 + 1 lanes	This option would achieve a reduction in scheme footprint within the Usk Bat Sites SAC but would fail to meet many scheme objectives such as reducing journey times, increasing resilience of the network and improving road safety. Therefore it is therefore not an alternative solution.	Marginally less Adverse. Does not meet Scheme objectives sufficiently.
AS4 – At grade junctions	Changing grade separated junctions to at-grade would not reduce SAC footprint as junctions are outside of the SAC. This option would also have a detrimental effect on the scheme's ability to achieve other strategic objectives. Therefore it is therefore not an alternative solution.	Equal. Does not meet Scheme objectives sufficiently.
AS11 – Tunnel	Whilst this option would avoid direct SAC footprint, it would affect caves which would result in a negative impact on the SAC equal to or greater than the proposed scheme. This option would have significant sustainability impacts and be highly un-cost effective. It is therefore not an alternative solution.	Risk of greater adverse impact. Does not meet Scheme objectives sufficiently.
AS12 – Double deck carriageway	This option would reduce the SAC footprint. However there is risk of adverse impact on the SAC resulting from strengthening works required to implement this option. This option would have a highly significant negative	Less adverse but with a risk of greater impact. Does not meet Scheme objectives sufficiently.

	impact on the road network as a result of closure during construction. Construction and operation costs would be very high and there would be sustainability issues regarding the volume of materials required. For these reasons this is therefore not an alternative solution.	
AS14 – Split level cantilever	This option would result in a marginally lower SAC footprint than the proposed scheme but would have sustainability, maintenance and cost issues. It is therefore not an alternative solution.	Marginally less adverse with a risk of greater impact. Does not meet Scheme objectives sufficiently.
AS15 – Employer's conceptual scheme	This option would increase the SAC footprint. This option achieves strategic network improvement objectives similarly to the proposed scheme, with similar cost, feasibility and buildability but the with greater impact on the SAC impact. It is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
AS25 – Do Minimum	Whilst this option would avoid additional SAC footprint it would fail to achieve many of the scheme objectives including those relating to safety, economic regeneration and transport resilience. This is therefore not an alternative solution.	Less adverse in the short term, with less difference in the medium to long term. Does not meet Scheme objectives sufficiently.
AS26 – Reduced carriageway cross section	This option would result in a marginal reduction in SAC footprint but would incur serious road safety implications. This is therefore not an alternative solution.	Marginally less adverse. Does not meet Scheme objectives sufficiently.
AS27 – Do Minimum with speed enforcement	Whilst this alternative would avoid additional SAC footprint it would fail to achieve many of the scheme objectives including those relating	Less adverse in the short term, with less difference in the medium to long term. Does

	to economic regeneration and transport resilience, and would not meet the safety objective as well as the proposed scheme. This is therefore not an alternative solution.	not meet Scheme objectives sufficiently.
Alternative Methods of Construction		
AC1 - Walls or steep slopes instead of batters (north of the road, between the sewage and water works)	Whilst this option would slightly reduce footprint within the SAC, the quality of the planting is low and would be replanted with higher quality planting in the proposed scheme and there would be sustainability issues associated with additional retaining wall. This is therefore not an alternative solution.	Equal. Does not meet Scheme objectives sufficiently.
AC7 - Viaduct in lieu of embankments/walls	This option would slightly reduce SAC footprint relative to the proposed scheme but would have a highly significant negative impact on the road network with associated safety risks, as a result of closure during construction. The costs would be high and there would be sustainability issues regarding the volume of materials required. This is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Alternative Decommissioning Methods		
Alternative Decommissioning Methods	Decommissioning the A465 would not meet the Scheme's objectives or the objectives set out for the A465 within the Welsh Government's National Transport Plan 2010. This is therefore not an alternative solution.	Not applicable
Alternative Operating Methods		
	No opportunity to reduce landtake from SAC with respect to operation	Not applicable
Alternative Timescales		

AT1 – Road closure (for all or part of the construction)	Temporary environmental effects associated with the construction period such as noise and vibration disturbance and effects of air quality would be experienced over a shorter period of time. Operational effects on the SAC would remain unchanged. Option dismissed due to unacceptable impact on the local transport infrastructure and associated disturbance to all road users, with associated road safety issues. Option therefore does not meet the scheme's safety and disruption objectives and is therefore not an alternative solution.	Equal, but does not meet Scheme objectives sufficiently.

Conclusions on Assessment of Alternatives

Throughout the course of the development of the Scheme, a number of different route options, alignments, and design and construction alternatives have been considered, all driven by the requirement to minimise the impacts on the SACs. This process of continual refinement of the design resulted in the proposed scheme, which is the option being promoted in the Draft Orders and assessed through the Environmental Impact Assessment as described in the Environmental Statement.

In order to carry out the Assessment of Alternative Solutions required under the Habitats Regulations, various alternative options to the proposed scheme have been assessed with regard to their implications for the SACs, the extent to which they are feasible and their ability to meet the Scheme Objectives. The focus of the alternatives assessment is primarily on impacts relating to the footprint of the project (net loss of land within the SAC), because these are readily quantified and can be directly compared between options; however consideration has also been given to other effects where they can be identified. The decisions on the alternatives have considered the integrity and the conservation objectives of relevant SACs and their contribution to the overall coherence of the Natura 2000 network.

Whilst a number of the alternatives would result in a reduced land take from the SAC, none would meet all the Scheme Objectives as sufficiently as the proposed scheme; and as such cannot be regarded as alternative solutions. Conversely, there were other alternatives that, whilst partially meeting the Scheme Objectives, would lead to greater land take from the SAC.

On the basis of this Assessment of Alternative Solutions, it is therefore concluded that there is no feasible alternative to the proposed scheme that would meet the Scheme Objectives sufficiently and have a lower impact on the SAC. It is concluded that for the purpose of regulation 62 of the Habitats Regulations there is no alternative solution.

Consultation on the Assessment of Alternatives

Who Carried out the Assessment

The assessment was carried out by Robert Harvey - RPS, Peter Ireland - RPS, Matt Jones – Engineer, Halcrow, Jon Egdell – Engineer, Halcrow, Ben Matthews - Transport Planner, Halcrow, Julie Hunt – Engineer, Halcrow, Mark Young –Costain, Sandy Halliday –Costain, in consultation with Len Wyatt of the Welsh Government, Transport department and Russell Cryer Jacobs

Sources of Data Consulted

An assessment of each option has been made on the basis of the same baseline ecological information used to inform the Environmental Statement, and Screening Report and the SIAA. The consideration of its feasibility, buildability and cost effectiveness has been assessed by using a combination of Scheme Assessment Report and preliminary design information produced on alternative options.

Level of Impact Assessment

A brief description of the option is presented; followed by an assessment of the option; an assessment how it meets the Scheme objectives; and consideration is given to its feasibility, buildability and cost effectiveness. Finally it is compared with the preferred option in line with the above consideration. An assessment has been carried based on the level of design work carried out as different levels of design work have been completed on the individual options.

List of Agencies consulted

Consultation on some of the alternatives has been carried out during design development, as described in Chapter 4 of the published Environmental Statement. Consultation on the alternatives described in this report will be carried out through the wider consultation, with NRW, Blaenau Gwent County Borough Council, Monmouthshire County Council, Brecon Beacons National Park Authority and interested parties/members of the public on publication of this document.

Response to consultation

To be completed.

APPENDIX C – Assessment of Alternatives Against Scheme Objectives

Appendix C - Assessment of Alternatives against Scheme Objectives - Summary Table

	Welsh Government Objective	Scheme Objective 1	Scheme Objective 2	Scheme Objective 3	Scheme Objective 4	Scheme Objective 5	Scheme Objective 6	Scheme Objective 7	Scheme Objective 8	Scheme Objective 9	Scheme Objective 10	Scheme Objective 11	Scheme Objective 12	Scheme Objective 13
	To improve the A465 Heads of the Valleys Road between Gilwern and Brynmawr (Section 2 of the overall project) from a single 3-lane carriageway to dual 2-lane carriageways in accordance with the made Line Order and its associated Environmental Statement and to deliver the scheme to programme and budget	To maintain or improve the current level of service and to carry out improvements.	To reduce journey times for private and commercial road users.	To facilitate economic regeneration.	To enhance road safety and reduce casualties.	To do all this with due consideration for the environment.	To deliver a scheme that is sustainable.	To improve NMU provision, providing opportunity for healthy lifestyle	To deliver a scheme which minimises future maintenance and disruption to the network.	To reduce journey time variability and improve resilience on the A465.	To use the A465 to manage traffic effectively and improve resilience on the strategic road network in South East Wales.	To deliver a scheme that integrates with public transport and the local transport network.	To improve access to healthcare, education and leisure facilities.	Reduce community severance.
Proposed Scheme	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DN1 - Do Nothing	N	N	N	N	N	Y	P	N	N	N	N	N	N	N
AM1 - Rail (east-west)	N	P	P	P	N	N	N	P	N	P	N	P	P	N
AM2 - Rail (north-south)	N	p	P	P	N	Y	P	P	N	P	N	P	P	N
AM3 - Tram/Guided Busway	N	N	N	P	N	N	N	Y	N	N	N	P	P	P
AM4 - Bus	N	N	N	P	N	Y	P	Y	N	P	N	Y	P	P
AR1 - Over Llangatwg	N	P	N	P	P	Y	N	P	P	Y	P	P	P	P
AR2 - Along former Abergavenny to Merthyr Tydfil Railway Line	N	P	Y	Y	P	N	P	P	Y	P	P	P	P	P
AR3 - Orange Route from 1990s route selection process	Y	Y	Y	Y	Y	N	N	P	P	P	P	P	P	P
AR4 - A465 Llanfoist-B4246-B4248 Blaenavon-A467 Brynmawr-A465	N	P	P	P	P	P	N	P	P	P	P	P	P	N
AR6 - Strategi Re-routing to M4 & A472	N	P	P	N	N	P	P	N	N	N	N	N	N	N
AS1 - Lower Design Speed/Speed Limit and omit central reserve	Y	P	P	P	Y	Y	P	Y	Y	P	P	Y	P	Y
AS2 - Increase Design Speed/Speed Limit	Y	Y	Y	Y	Y	P	P	P	Y	Y	Y	P	Y	Y
AS3 - 2+1 Lanes	P	P	P	P	P	Y	P	Y	P	P	P	Y	Y	Y
AS4 - At Grade Junctions	P	P	P	P	P	Y	P	P	P	P	P	Y	Y	Y
AS11 - Tunnel	P	Y	Y	Y	P	P	N	P	P	Y	Y	P	Y	P
AS12 - Double Deck Carriageway	P	Y	Y	Y	Y	P	N	P	P	Y	Y	Y	Y	Y
AS14 - Split Cantilever	Y	Y	Y	Y	Y	P	N	Y	P	Y	Y	Y	Y	Y
AS15 - Employer's Conceptual Design	Y	Y	Y	Y	Y	P	P	Y	Y	Y	Y	Y	Y	Y
AS25 - Do Minimum	N	P	N	N	N	Y	P	N	N	N	N	P	N	N
AS26 - Reduced Carriageway Cross Section	P	P	P	Y	P	Y	P	Y	P	P	P	Y	Y	Y
AS27 - Do Minimum with Speed Limit Enforcement	N	P	N	N	P	Y	P	N	N	N	N	P	N	N
AC1 - Walls instead of Batters	P	Y	Y	Y	Y	Y	P	Y	P	Y	Y	Y	Y	Y
AC7 - Viaduct in Lieu of Embankments/walls	P	Y	Y	Y	Y	Y	N	Y	P	Y	Y	Y	Y	Y
AT1 - Road Closure during construction	Y	P	P	P	P	Y	P	P	P	P	P	P	P	P

Key	
Y	Meets Objective as well as or better than the Proposed Scheme
P	Partially meets objective but not as well as the Proposed Scheme
N	Does not meet objective

APPENDIX D – Compensatory Measures Matrix

Form for submission of information to the European Commission according to Art. 6(4) of the Habitats Directive

Member State: Wales, United Kingdom

Date:

Information to the European Commission according to Article 6(4) of the Habitats directive (92/43/EEC)

Documentation sent for: ☒ information Art. 6(4).1 ☐ opinion Art. 6(4).2

Competent national authority: Welsh Government

Address: Cathays Park, Cardiff, CF10 3NQ

Contact person:

Tel., fax, e-mail:

Is the notification containing sensitive information? If yes, please specify and justify: No

1. Plan or Project

Name of the plan/project: A465 Heads of the Valleys Section 2 Gilwern to Brynmawr

Promoted by: Welsh Government

Summary of the plan or project having an effect on the site: Proposed upgrade of the existing single three-lane carriageway section of the A465 Heads of the Valleys Road between Gilwern and Brynmawr (referred to as Section 2) to dual carriageway standard.

Description and location of the elements and actions of the project having impacts and identification of the areas affected (including maps):

The project is located between Gilwern in Monmouthshire and Brynmawr in Blaenau Gwent, South Wales, between the end of a previously improved Section 1 (Abergavenny to Gilwern) at Gilwern to a point north of Brynmawr which will tie into Section 3 (Brynmawr to Tredegar) which commenced construction in 2013. The existing A465 between Gilwern and Brynmawr comprises three lanes over much of its length, with two lanes available for traffic travelling on the uphill section through Clydach Gorge. The Clydach Gorge, through which the River Clydach flows eastwards, is steep sided and wooded. The woodland supports Lesser Horseshoe Bats Rhinolophus hipposideros, a qualifying feature

of the Usk Bat Sites SAC.

The boundaries of the SACs in the vicinity of the Scheme are shown in Figure 1. The Scheme design is shown on Figure 3a-f.

2. Assessment of Negative Effects

Name and code of Natura 2000 sites(s) affected: : Usk BatSites SAC, Code UK0014784

This site is:

☐ a SPA under the 'Birds' directive

☒ hosting a priority habitat/species

☐ Priority habitats/species are affected

☒ a SCI/SAC under the Habitats directive

Site's conservation objectives and key features contributing to the site integrity:

The primary reason for the designation of the Usk Bat Sites SAC was the presence of the Annex II species Lesser Horseshoe Bat *Rhinolophus hipposideros*. Other qualifying features include the following Annex 1 habitats:

European dry heaths;
Degraded raised bogs still capable of natural regeneration;
Blanket bogs;
Calcareous rocky slopes with chasmophytic vegetation;
Caves not open to the public; and
Tilio-Acerion forests of slopes, screes and ravines.

Of these, 'Blanket bogs' and '*Tilio-Acerion* forests of slopes, screes and ravines' are Priority Features.

The Core Management Plan for then SAC sets out the conservation objectives for each of the features for which the Usk Bat Sites SAC is designated. Each conservation objective consists of the following two elements: Vision for the feature; and Performance indicators.

The performance indicators are aspects of the conservation objectives that are measureable, and are thus part of, not a substitute for, the conservation objectives.

The visions for each feature for which it was not possible to conclude in the SIAA that there were no adverse effects are set out

below, as taken from the Core Management Plan.

Lesser Horseshoe Bat

The conservation status of this feature within the site is considered to be 'Favourable' as of 2006.

The vision for Lesser Horseshoe Bat is that:

- The site will support a sustainable population of Lesser Horseshoe Bats in the River Usk area;
- The population will be viable in the long term, acknowledging the population fluctuations of the species;
- Buildings, structures and habitats on the site will be in optimal condition to support the populations;
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range;
- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat;
- There will be no loss or decline in quality of linear features (such as hedgerows and tree lines) which the bats use as flight lines - there will be no loss of foraging habitat use by the bats or decline in its quality, such as due to over-intensive woodland management; and
- All factors affecting the achievement of the above conditions are under control.

For Lesser Horseshoe Bats, performance indicators for condition of the lesser horseshoe bat population include roost counts, the condition of roosts, and the quality of foraging habitat. Identified factors affecting the bat population include maintenance of roost structures in a suitable condition, maintenance of the cave system in a suitable condition (including management of access and disturbance), and habitat management, including maintenance of habitat connectivity and management of bat foraging habitat to maximise invertebrate prey abundance and canopy cover.

Habitats and species that will be adversely affected (e.g. indicate their representativity, if applicable their conservation status according to Art.17 on national and biogeographic level and degree of isolation,. Their roles and functions in the site concerned).

The Scheme would not affect the achievement of any of the conservation objectives set for any features of the Usk Bat Sites SAC, other than potentially for the lesser horseshoe bat feature.

Representativity: "The Usk Valley area in south-east Wales contains one of the largest maternity roosts for lesser horseshoe bat *Rhinolophus hipposideros* as well as a number of important hibernacula in caves in the area. The area contains up to 5% of the UK population, though counts in hibernation sites suggest this may be an underestimate". (JNCC website).

Conservation status: The conservation status of lesser horseshoe bat on the site is favourable. (Core Management Plan)

Degree of isolation: The population of lesser horseshoe bats in UK is supported by 13 SACs across south west England and Wales. The Usk Bat Sites lies approximately in the centre of the spread of these SACs. There are many smaller populations of the species in

between these SACs. The Site is therefore not significantly isolated within the natural range of the species in the UK.

Roles and function of lesser horseshoe bat in the SAC: The species uses the caves, buildings and woodland habitats within the SAC and in similar habitats outside the SAC.

Importance of the site for the habitats and species that will be affected (e.g. explain the role of the site within the national and biogeographical region and in the coherence of the Natura 2000 network).

The SAC plays a role in the wider Favourable Conservation Status (FCS) of lesser horseshoe bat populations outside the site boundary. A particular feature of the SAC is its likely important long-term geographical role in supporting FCS of lesser horseshoe bat populations outside of the site, including the Ebbw valley to the west of the SAC.

Description of adverse effects expected (loss, deterioration, disturbance, direct and indirect effects, etc.); extent of the effects (habitat surface and species numbers or areas of occurrence affected by the project); importance and magnitude (e.g. considering the affected area or population in relation to the total area and population in the site, and possibly in the country) and location (include maps).

There remains an extremely small risk of a short term drop in the population of lesser horseshoe bats of the Usk Bat Sites SAC. . Any reduction of the number of individual bats within the population of the SAC would result from changes that occur outside the SAC, includingloss of foraging habitat and reduction in connectivity between roosts and foraging habitat. Both of these changes pose an extremely small risk in the short-term but are predicted to result in an increase in the population of lesser horseshoe bats in the medium and long-term.

The boundaries of the SAC in the vicinity of the Scheme are shown in Figure 1.

Potential cumulative impacts and other impacts likely to arise as a result of the combined action of the plan or project under assessment and other plans or projects.

No significant cumulative impacts with other plans or projects have been identified.

Mitigation measures included in the project (indicate how these will be implemented and how they will avoid or reduce negative impacts on the site).

. Mitigation measures proposed include:

- Provision of replacement roosts, including maternity, hibernation, day and night roosts;
- Provision of replacement woodland habitat at an overall ratio of 1.3:1;
- Sensitive roost destruction and timing of works to avoid mortality or significant disturbance;
- Maintaining a lit road during construction and operation to discourage bats from crossing over the road;
- Retaining all potential under-road crossings and designing extensions/changes so that bats can still fly through them;
- Employing pollution prevention and control measures; and

- Use of low-noise road surfacing.

These will be implemented as part of the construction of the proposed scheme and maintained by the Welsh Government in perpetuity as part of the management of the trunk road estate.

3. Alternative Solutions

Possible alternative solutions	Evidence of how the alternative solutions were assessed	Description of the relative effects on the conservation objectives of European Site (greater or less adverse)
Do Nothing		
Maintain the existing road	No short term impact on the SAC, but only slightly less effect in medium to long term. Option is not considered acceptable for the long term safety of road users and does not meet Scheme objectives and is therefore not an alternative solution.	Less adverse in the short term, with less difference in the medium to long term. Does not meet Scheme objectives sufficiently.
Alternative Means of Meeting Objectives		
Option AM1 – Rail Improvements (east-west)	This option would not achieve many scheme objectives and would incur significant cost and with significant feasibility and buildability issues. It would also offer no improvement in journey times or safety on the highway. It is therefore not considered an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AM2 – Rail Improvements (north-south)	This option would not achieve many scheme objectives and would incur significant cost and with significant feasibility and buildability issues. It would also offer no improvement in	Less adverse. Does not meet Scheme objectives sufficiently.

	journey times or safety on the highway. It is therefore not an alternative solution.	
Option AM3 – Tram/Guided Bus	This option would achieve less scheme objectives at a higher cost, with feasibility and buildability issues associated with construction of a new communication route. It is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AM4 – Increased Bus Provision	An improved bus service along the A465 would achieve some localised improvements in NMU provision, but this option would not improve the safety of the route or achieve the wider route improvement and resilience objectives. It is therefore not an alternative solution.	Less adverse. Does not meet Scheme objectives sufficiently.
Alternative Routes		
Option AR1 – Over Llangatwg	Whilst this option could avoid direct SAC footprint it would still have an adverse impact on the SAC due to the proximity of increased traffic flows. It would not be feasible to construct and fails to reduce journey times or road safety on the A465. It is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AR2 - Along former Abergavenny to Merthyr Railway line	This option has an overall equal SAC footprint to the proposed scheme but would likely have greater adverse impact on bat habitats due to intrusive works to re-open the currently unused rail tunnel. The option would also require more complex construction works and more construction materials, with associated sustainability impact. The feasibility of the option would be lower with higher costs. For these reasons this is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Option AR3 - Original Public Inquiry (Orange) Route	This option has a significantly higher SAC footprint than the proposed scheme and would create a new corridor directly through	Greater adverse. Does not meet Scheme objectives sufficiently.

	the Usk Bat Sites SAC. For this reason it is therefore not an alternative solution.	
Option AR4 - A465 Llanfoist- B4246 - B4248 Blaenavon- A467 Brynmawr - A465	Whilst this option removes direct SAC footprint,there remains a risk of effects on lesser horseshoe bats it has environmental and sustainability issues such as significant new alignment through greenfield areas. It is also less able to meet key objectives relating to journey time/network resilience improvements, would incur higher costs and be less feasible to construct. It is therefore not an alternative solution.	Less Adverse but there remains a risk of effects on lesser horseshoe bats. Does not meet Scheme objectives sufficiently.
Option AR6 - Strategic Re-Routing, using M4 east-west and A472	This option would avoid footprint within the SAC. This option may reduce some journey times on the wider network but would not reduce journey times along the A465 route. Lack of improvement of the A465 would mean little or no economic regeneration benefit to the study area and failure to achieve other objectives to improve the A465 and reduce its maintenance liability. It is assumed that this option would have remove impact on the Usk Bat Sites SAC. However there is a risk that improvements required to attract traffic away from A465 would have adverse impact on European Sites proximal to the A470 and M4. It is assumed that this option could be constructed in a sustainable manner, but it would fail to improve safety along the A465 or provision for NMUs. It is therefore not an alternative solution.	Less adverse. Does not meet Scheme objectives sufficiently.
Alternative Size and Scale		
AS1 - Decrease design speed/speed limit, no central reservation	This option would only marginally reduce the footprint within the SAC. In comparison to the existing road the level of service and safety of the road would be improved over the existing arrangement but	Marginally less adverse. Does not meet Scheme objectives sufficiently.

	journey time reduction would be low. Economic regeneration and network resilience objectives would be facilitated by this option but would be limited by the low journey time reduction. It is therefore not an alternative solution.	
AS2 - Increase design speed/speed limit	This scheme would deliver greater journey time reductions and therefore economic benefit than the proposed scheme but would require greater footprint within the Usk Bat Sites SAC. Therefore this is therefore not an alternative solution.	Greater adverse. Meets the majority of Scheme objectives sufficiently.
AS3 - 2 + 1 lanes	This option would achieve a reduction in scheme footprint within the Usk Bat Sites SAC but would fail to meet many scheme objectives such as reducing journey times, increasing resilience of the network and improving road safety. Therefore it is therefore not an alternative solution.	Marginally less Adverse. Does not meet Scheme objectives sufficiently.
AS4 – At grade junctions	Changing grade separated junctions to at-grade would not reduce SAC footprint as junctions are outside of the SAC. This option would also have a detrimental effect on the scheme's ability to achieve other strategic objectives. Therefore it is therefore not an alternative solution.	Equal. Does not meet Scheme objectives sufficiently.
AS11 – Tunnel	Whilst this option would avoid direct SAC footprint, it would affect caves which would result in a negative impact on the SAC equal to or greater than the proposed scheme. This option would have significant sustainability impacts and be highly un-cost effective. It is	Risk of greater adverse impact. Does not meet Scheme objectives sufficiently.

	therefore not an alternative solution.	
AS12 – Double deck carriageway	This option would reduce the SAC footprint. However there is risk of adverse impact on the SAC resulting from strengthening works required to implement this option. This option would have a highly significant negative impact on the road network as a result of closure during construction. Construction and operation costs would be very high and there would be sustainability issues regarding the volume of materials required. For these reasons this is therefore not an alternative solution.	Less adverse but with a risk of greater impact. Does not meet Scheme objectives sufficiently.
AS14 – Split level cantilever	This option would result in a marginally lower SAC footprint than the proposed scheme but would have sustainability, maintenance and cost issues. It is therefore not an alternative solution.	Marginally less adverse with a risk of greater impact. Does not meet Scheme objectives sufficiently.
AS15 – Employer's conceptual scheme	This option would increase the SAC footprint. This option achieves strategic network improvement objectives similarly to the proposed scheme, with similar cost, feasibility and buildability but the with greater impact on the SAC impact. It is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
AS25 – Do Minimum	Whilst this option would avoid additional SAC footprint it would fail to achieve many of the scheme objectives including those relating to safety, economic regeneration and transport resilience. This is therefore not an alternative solution.	Less adverse in the short term, with less difference in the medium to long term. Does not meet Scheme objectives sufficiently.

AS26 – Reduced carriageway cross section	This option would result in a marginal reduction in SAC footprint but would incur serious road safety implications. This is therefore not an alternative solution.	Marginally less adverse. Does not meet Scheme objectives sufficiently.
AS27 – Do Minimum with speed enforcement	Whilst this alternative would avoid additional SAC footprint it would fail to achieve many of the scheme objectives including those relating to economic regeneration and transport resilience, and would not meet the safety objective as well as the proposed scheme. This is therefore not an alternative solution.	Less adverse in the short term, with less difference in the medium to long term. Does not meet Scheme objectives sufficiently.
Alternative Methods of Construction		
AC1 - Walls or steep slopes instead of batters (north of the road, between the sewage and water works)	Whilst this option would slightly reduce footprint within the SAC, the quality of the planting is low and would be replanted with higher quality planting in the proposed scheme and there would be sustainability issues associated with additional retaining wall. This is therefore not an alternative solution.	Equal. Does not meet Scheme objectives sufficiently.
AC7 - Viaduct in lieu of embankments/walls	This option would slightly reduce SAC footprint relative to the proposed scheme but would have a highly significant negative impact on the road network with associated safety risks, as a result of closure during construction. The costs would be high and there would be sustainability issues regarding the volume of materials required. This is therefore not an alternative solution.	Greater adverse. Does not meet Scheme objectives sufficiently.
Alternative Decommissioning Methods		
Alternative Decommissioning Methods	Decommissioning the A465 would not meet the Scheme's objectives or the objectives set out for the A465 within the Welsh Government's National Transport Plan 2010.	Not applicable

	This is therefore not an alternative solution.	
Alternative Operating Methods		
	No opportunity to reduce landtake from SAC with respect to operation	Not applicable
Alternative Timescales		
AT1 – Road closure (for all or part of the construction)	Temporary environmental effects associated with the construction period such as noise and vibration disturbance and effects of air quality would be experienced over a shorter period of time. Operational effects on the SAC would remain unchanged. Option dismissed due to unacceptable impact on the local transport infrastructure and associated disturbance to all road users, with associated road safety issues. Option therefore does not meet the scheme's safety and disruption objectives and is therefore not an alternative solution.	Equal, but does not meet Scheme objectives sufficiently.

Evaluation of alternatives considered and justification of the alternative chosen (reasons why the competent national authorities have concluded that there is an absence of alternative solutions):

Throughout the course of the development of the Scheme, a number of different route options, alignments, and design and construction alternatives have been considered, all driven by the requirement to minimise the impacts on the SACs. This process of continual refinement of the design resulted in the proposed scheme, which is the option being promoted in the Draft Orders and assessed through the Environmental Impact Assessment as described in the Environmental Statement.

In order to carry out the Assessment of Alternative Solutions required under the Habitats Regulations, various alternative options to the proposed scheme have been assessed with regard to their implications for the SACs, the extent to which they are feasible and their ability to meet the Scheme Objectives. The focus of the alternatives assessment is primarily on impacts relating to the footprint of the project (net loss of land within the SAC), because these are readily quantified and can be directly compared between options; however consideration has also been given to other effects where they can be identified. The decisions on the alternatives have considered the integrity and the conservation objectives of relevant SACs, and their contribution to the overall coherence of the Natura 2000 network.

Whilst a number of the alternatives would result in a reduced land take from the SAC, none would meet all the Scheme Objectives as sufficiently as the proposed scheme; and as such cannot be regarded as alternative solutions. Conversely, there were other alternatives that, whilst partially meeting the Scheme Objectives, would lead to greater land take from the SAC.

On the basis of this Assessment of Alternative Solutions, it is therefore concluded that there is no feasible alternative to the proposed scheme that would meet the Scheme Objectives sufficiently and have a lower impact on the SAC. It is concluded that for the purpose of regulation 62 of the Habitats Regulations there is no alternative solution

4. Imperative Reasons of Overriding Public Interest

Reason to carry out this project in spite of its negative effects:

- ☒ Imperative reasons of overriding public interest, including those of a social or economic nature (in the absence of priority habitat/species)
- ☐ human health
- ☒ public safety
- ☐ beneficial consequences of primary importance for the environment
- ☐ other imperative reasons of over-riding public interest

Description and justification of the reasons and why they are overriding:

IROPI 1 - For Reasons of Agreed National Policy

The A465 provides strategic connectivity with the rest of the UK and Europe. Along with the M4, A40 and A477, it constitutes the Strategic Road Network (SRN) in the South of Wales and it forms part of the Trans-European Road Network (TERN), which is designed to improve the movement for goods, persons and services to reinforce economic and social cohesion within the EU.

The Wales Transport Strategy places an emphasis on enhancing international connectivity, citing connections within the UK and internationally as vital for business and tourism, with route reliability is least as important as journey time.

The Wales Spatial Plan also recognises the importance of strategic connectivity to the regeneration programme for the Heads of the Valleys – one of the most deprived areas in Wales. Indeed, it identifies the A465 dualling scheme as integral to providing opportunity for growth in the area.

The National Transport Plan also recognises the strategic importance of the route for East-West movements. It specifically identifies the A465 as a key corridor for allowing east to west travel in South Wales and in turn promoting economic growth.

It is reasonable that the Scheme's inclusion in policy and programmes provides an imperative reason of overriding public interest, in that the Scheme has been identified as a key catalyst for strategic connectivity and subsequently economic growth and regeneration.

IROPI 2 - For Reasons of Public Safety

Accident modelling shows that, over a 60 year period from the opening year, the Scheme will save 163 accidents and 246 casualties, including six fatal casualties. This is primarily as a result of transferring traffic on to the A465 which will be a modern dual carriageway, which lowers the predicted accident rate. In addition, grade separation of junctions will reduce the likelihood of vehicle conflict, particularly shunt type collisions.

Furthermore, from the analysis of recent accident records, it is clear that there are clusters of collisions on the A465 between Brynmawr and Gilwern where collisions occur due to reasons that would not be possible when the Scheme is constructed.

The Scheme is predicted to reduce collisions and save lives. This provides a clear reason of overriding public interest.

IROPI 3 - For Reasons of Economic Nature

The Scheme is likely to increase the accessibility of an area to a greater number of firms and workers, thereby increasing agglomeration, productivity and GDP. Furthermore, lower production costs (due to reduced transport costs) are likely to result in an increase in output which will be of value to consumers.

The proposed Scheme therefore represents a significant opportunity to support and enhance regional and national economic viability and growth, while supporting and improving access to education, employment and income and addressing the key underlying factor defining the highest levels of morbidity, mortality and health inequality in Wales for the last decade.The Section 2 Improvement is forecast to produce significant economic benefits for both consumer users and business users. Overall the total present value of benefits (PVB) is £248m (2010 prices) compared with the total present value of costs (PVC) of £170m, indicating a net present value (NPV) of £78m. This provides a Benefit

Cost Ratio (BCR) of 1.46.

Adding the wider economic benefits to the initial cost benefit analysis results in an improved BCR of 1.65, where the benefits outweigh the costs by a factor of 1.65. Thus, it can be stated with confidence, that journey time benefits to consumers and businesses as well as agglomeration benefits provide an overriding reason of public interest.

5. Compensatory measures

Objectives, target features (habitats and species) and ecological processes/functions to be compensated (reasons, why this measures are suitable to compensate the negative effects)

The proposed measures are designed to:

a) address, in comparable proportions, the species negatively affected;

b) provide functions comparable to those which had justified the selection criteria of the original site, particularly regarding the adequate geographical distribution.

c) Be within the same bio-geographical area

The assessment of the Compensatory Measures has used professional judgement, in consultation with NRW, to consider whether these criteria are met.

The objective of the proposed Compensatory Measures is to provide measures in line with the above; and provide additional opportunities for lesser horseshoe bats to roost between the SAC population in the Clydach Gorge and populations known to be present in the Ebbw Valley. These opportunities which would potentially support and enhance the ability of the species to remain in favourable conservation status.

Provision of a series of “stepping stone” roosting opportunities at key safe crossing points of the A465 Section 3 scheme is likely to increase the connectivity of this open moorland area between the wooded valleys of the Rivers Clydach and Ebbw.

Improving connectivity would increase the opportunity for genetic exchange between the SAC population and the Ebbw population and populations further west.

There may also be benefits to the SAC population in the Clydach Valley in the short-term by enhancing accessibility to foraging resources to the west of the maternity roosts within the valley, by reducing the energetic requirements required to fly back and forth between the roost and foraging resources, by providing day or night roosts. It has been demonstrated in Knight and Jones (2009) (Importance of night roosts for bat conservation: roosting behaviour of the lesser horseshoe bat Rhinolophus hipposideros) that night roosts are an important structural element of the habitat resource mix required by lesser horseshoe bat. Radio tracking studies undertaken for the proposed scheme have demonstrated that some bats from

the SAC population in the Clydach Gorge forage in this area and the foraging resource might be underutilised because of a lack of suitable night roosts to rest between foraging periods.

Extent of the Compensatory Measures (surface areas, population numbers)

It is proposed to provide artificial “stepping stone” roosting opportunities within the embankments of the A465 Heads of the Valleys Section 3 scheme which runs between Brynmawr and Tredegar that is currently under construction.

Identification and location of compensation areas (including maps)

The compensation area consists of the A465 Heads of the Valleys Section 3 construction site between the proposed scheme and the Ebbw Valley to the west. Figure 7.1 shows the Section 3 scheme layout, location of the proposed Compensatory Measures, as well as the context of the SAC and Ebbw valley. The locations were chosen after an analysis of the current connectivity of the locations to the SAC; and a consideration of the landscape after the Section 3 scheme is complete.

Former status and conditions in the compensation areas (existing habitats and their status, type of land, existing land uses, etc.)

The habitat connectivity between the Clydach and Ebbw Valleys is considered sub-optimal due to its open nature with limited woodland foraging, roosting and commuting resources. In particular, there are few buildings, trees or structures that might act as night roosts.

The design of mitigation for Section 2 and Section 3 schemes means that there should be no decrease in the connectivity between the two valleys for lesser horseshoe bats compared to the present situation. Therefore any Compensatory Measures that potentially improve the connectivity would constitute an enhancement of the role of the SAC in supporting the Ebbw populations and therefore support and potentially enhance the coherence of the Natura 2000 network overall.

Expected results and explanation of how the proposed measures will compensate the adverse effects on the integrity of the site and will allow preserving the coherence of the Natura 2000 network

Any Compensatory Measures that potentially improve the connectivity between the Clydach and Ebbw Valleys would constitute an enhancement of the role of the SAC in supporting the Ebbw populations and therefore enhance the coherence of the Natura 2000 network.

Time schedule for the implementation of the Compensatory Measures (including long term implementation), indicating when the expected results will be achieved.

It is intended that the work would be carried out by October 2014, which is before any risk of effects on the SAC is created by construction of Section 2 from October 2014

Methods and techniques proposed for the implementation of the Compensatory Measures, evaluation of their feasibility and possible effectiveness

The design of the roosts would consist of a concrete pipe of ideally 600mm diameter leading to a chamber of diameter 900mm and height 1,800mm. However, the detailed design of the roosts would be tailored for the individual sites, engineering constraints and an understanding of how bats would use / find the locations. Detailed design would be undertaken in consultation with NRW.

The roosts would be within land owned by the WG and managed in perpetuity as part of the trunk road estate.

The roosts would be incorporated into the embankment works of the Section 3 scheme, which is currently under construction. It is intended that the work would be carried out by October 2014, which is before any risk of effects on the SAC is created by construction of Section 2. It is proposed to provide artificial “stepping stone” roosting opportunities within the embankments of the A465 Heads of the Valleys Section 3 scheme that is currently under construction. The “stepping stone” roosting opportunities are proposed at key crossing points of the A465 Section 3 scheme which lies within the open area between the wooded valleys of the Rivers Clydach and Ebbw.

Professional judgement and consultation with NRW has led to a conclusion that installing the measures is feasible and any Compensatory Measures that potentially improve the connectivity would constitute an enhancement of the role of the SAC in supporting the Ebbw populations and therefore enhance the coherence of the Natura 2000 network overall.

Costs and financing of the proposed Compensatory Measures

The costs of the Compensatory Measures will be financed by Welsh Government as an additional measure within the Section 3 scheme. Additional monitoring will be financed by Welsh Government as an additional measure within the proposed scheme. Maintenance of the measures will be financed by Welsh Government through the maintenance programme of the trunk road estate.

Responsibilities for implementation of Compensatory Measures

The responsibility for implementation of the works within Section 3 would be with Carillion, The Welsh Government's contractor for that scheme. The responsibility for the monitoring would be with Costain Group, the Welsh Government's contractor for the proposed scheme.

Monitoring of the Compensatory Measures, where envisaged (e.g. if there are uncertainties concerning the effectiveness of the measures), assessment of results and follow-up

The objective of the proposed Compensatory Measures is to provide additional opportunities for lesser horseshoe bats to roost between the SAC population in the Clydach Gorge and populations known to be present in the Ebbw Valley which would potentially support and enhance the ability of the species to remain in favourable conservation status. As such, success is achieved simply by providing those opportunities i.e. providing the roosts.

However, to monitor whether the opportunities provided are used, Anabat Roost Loggers (or similar) will be employed annually (for a period of 2 months during the summer to record roosting lesser horseshoe bats) in each roost during the 5 year maintenance period.

The presence of bats using the roosts within the context of monitoring of bats on Section 3, would be used to confirm that the potential enhancement had been realised. Monitoring will cease after any lesser horseshoe bats have been shown to use the roosts.