



SNOWDONIA ENTERPRISE ZONE
LLANBEDR ACCESS IMPROVEMENTS
WELTAG STUDY

PLANNING STAGE AND APPRAISAL (STAGE 1)
REPORT

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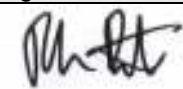

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Contents

Executive Summary	4
1.0 Introduction	6
1.1 Purpose of the Report	6
1.2 Study Background	6
1.3 WelTAG	7
1.4 Methodology	8
1.5 The study area	10
1.6 Previous studies	11
1.7 Policy Context	12
WelTAG Planning Stage	14
2.0 Problems, Opportunities and Constraints	14
3.0 Transport Planning Objectives	17
4.0 Option Development and Sifting	18
WelTAG Appraisal: Stage 1	21
5.0 Introduction	21
5.1 Public Participation	21
5.2 Refining the Options	22
5.3 Appraisal against the Transport Planning Objectives	25
5.4 Appraisal against the Welsh Impact Areas	30
6.0 Summary and Recommendations.	60

Appendices

Appendix A: Supporting Figures

Appendix B: Appraisal Summary Tables

Appendix C: Participation Report

Appendix D: Health Impact Assessment

Executive Summary

This report summarises the results of the Planning and Appraisal (Stage 1) phases of the WelTAG study that has been completed to investigate potential transport access improvements for the Llanbedr airfield component of the Snowdonia Enterprise Zone.

The following Transport Planning Objectives (TPO's) were established to define solutions with which to address the transport problems identified in the study area (ranked in order of local public perception):

1. Reduce traffic congestion at the Mochras Road/A496 junction.
2. Reduce the negative impact of traffic on the community of Llanbedr.
3. Improve transport connectivity to and from Llanbedr Airfield.
4. Improve the efficiency and reliability of all transport to and from Llanbedr Airfield.
5. Improve the actual and perceived safety of travel for all travellers within Llanbedr and along Mochras Road.
6. Improve freight transport access to and from Llanbedr Airfield.
7. Improve travel opportunities for pedestrians and cyclists within Llanbedr and along Mochras Road.
8. Minimise the impact of transport improvements on local environmental and heritage features.
9. Be resilient to local effects of climate change, particularly future increases in flood events.

The solutions identified at the WelTAG Planning stage were sifted to produce refined options that have been evaluated in greater detail as part of the WelTAG Appraisal (Stage 1) process. Public participation has contributed to various stages of the WelTAG process, such as identifying the local transport problems and constraints and appraising the options.

The following options have been appraised against the TPO's and the Welsh Impact Areas of economy, environment and society, as well as public and stakeholder acceptability, financial affordability and technical and operational feasibility:

Option 1: Provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr.

Option 2: Bypass Llanbedr to the west (between the A496 and the railway line), with the section of Mochras Road between the A496 junction and new bypass junction remaining open to all traffic.

Option 3: Bypass Llanbedr following the previous bypass route announced in 1992.

Option 4: Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then follow the route of the railway line and access track north to Mochras Road.

Option 5: Improved car parking facilities and double yellow lines within Llanbedr (which would be implemented in-combination with Options 1 – 4), and;

Option 6: Do nothing and continue to maintain the current situation.

Following the completion of the WelTAG Appraisal (Stage 1), the following recommendations have been made:

1. Options 1, 3, 4 and 6 are not recommended for any further assessment due to the significant disadvantages associated with them.
2. Option 2 is considered to be an optimal route that offers the largest contribution to achieving the TPO's while avoiding the disadvantages associated with Options 1, 3 and 4; it should therefore be investigated further with a view to defining an optimal route alignment.
3. Option 5 should be considered in further detail, in combination with Option 2.
4. Once the future business use of Llanbedr airfield is confirmed, an assessment of the potential impacts of the proposed access improvement (positive and negative) on the local economy of Llanbedr and the surrounding area should be completed.

1.0 Introduction

1.1 Purpose of the Report

This document is the combined Planning and Appraisal (Stage 1) report for the Llanbedr Access Improvements Welsh Transport Planning and Appraisal Guidance (WelTAG) study. WelTAG¹ requires an objective-led approach to transport planning by first identifying relevant problems, opportunities and constraints, then developing specific transport planning objectives (TPO's) and defining solutions to help deliver the TPO's and address the key issues.

This report presents the findings of the WelTAG study in a logical format and provides a clear audit trail of the decisions that have been made during key stages. In doing so, the report summarises the work completed for the WelTAG Planning stage² and the WelTAG Appraisal (Stage 1) process.

1.2 Study Background

YGC were commissioned by Gwynedd Council to investigate options for improving transport access associated with the proposed Llanbedr Aviation Centre and Enterprise Park element of the Snowdonia Enterprise Zone via a WelTAG study.

The development of strategically-located Enterprise Zones throughout Wales is a Welsh Government-led initiative to encourage new business opportunities and foster economic growth³. There are currently seven Enterprise Zones within/proposed for Wales, with each one targeting a specific business sector. The Snowdonia Enterprise Zone is located in Gwynedd, north-west Wales and consists of two sites; the former nuclear power station at Trawsfynydd and the former military airfield at Llanbedr.

The overall vision for the Snowdonia Enterprise Zone is that:

- Snowdonia will be a preferred location for high quality digital and low carbon technology enterprises;
- The Zone will make the most of its unique characteristics; including its nationally important energy infrastructure and location at the heart of the National Park, and;
- The Zone will build upon the strengths of its knowledge and skills base to contribute positively to the area's economic prospects.

The long term strategic vision for Llanbedr airfield seeks to utilise the existing aviation infrastructure and encourage specialist, skilled engineering sectors to locate there, including the Remotely-piloted

¹ Welsh Transport Planning and Appraisal Guidance (WelTAG), Issue 6, Version 7.1, Welsh Assembly Government, June 2008

² Snowdonia Enterprise Zone: Llanbedr Access Improvements WelTAG Planning stage report, YGC 2014

³ Enterprise Zones, Welsh Government, 2012.

Aircraft Systems (RPAS) sector⁴. An increase in people commuting to/from new employment sources and a rise in associated freight and commercial transport could lead to greater pressure on the existing transport infrastructure within the Llanbedr area. Additionally, in order for the Llanbedr airfield component of the Snowdonia Enterprise Zone to successfully attract new businesses it will be important to ensure that there is adequate site access and effective links with the surrounding transport network of a suitable standard for the volume and type of traffic that may be expected to use them, in addition to the local and seasonal traffic that already relies on the current transport infrastructure.

The scope of this WelTAG study therefore encompasses identifying and appraising solutions to improve transport access for Llanbedr airfield, considering both the current transport issues and the potential future transport issues and demands that could arise from any further development of Llanbedr airfield.

1.3 WelTAG

The Welsh Transport Planning and Appraisal Guidance (WelTAG) was formally published by the then Welsh Assembly Government in June 2008. Paragraph 1.1.1 of the WelTAG guidance states that it: *“has been developed with the intention that it is applied to all transport strategies, plans and schemes being promoted or requiring funding from the Welsh Assembly Government”*.

WelTAG has two primary purposes:

- 1) *“To assist in the development of proposals enabling the most appropriate scheme to be identified and progressed – one that is focused on objectives, maximises the benefits and minimises negative impacts, and;*
- 2) *To allow the comparison of competing schemes on a like-for-like basis, so that decision-makers can make funding decisions”*.

WelTAG is separated into two main phases, which are summarised as follows:

1) Planning Stage

The initial tasks of the WelTAG Planning stage are to establish the study area’s conditions, its transport problems, opportunities and constraints and to generate objectives for the ensuing steps. This is followed by the identification of possible solutions which are tested against the objectives (the transport planning objectives), leading in due course to the Appraisal stage. The Planning stage for this study was completed by YGC in 2014 and the key findings are summarised in this report.

⁴ <http://business.wales.gov.uk/enterprisezones/enterprise-zone-locations/snowdonia/about-snowdonia-zone>

2) Appraisal Stage

WelTAG requires selected options from the Planning stage, which have the potential to fulfil transport planning objectives, to be subjected to a two-stage appraisal process. The appraisal of improvement options is based on WelTAG guidelines and includes the following elements:

- assessment against the Welsh Impact Areas of the economy, environment and society;
- assessment of how well the options perform against the transport planning objectives, and;
- evaluation against other criteria including public and stakeholder acceptability, technical and operational feasibility, financial affordability, deliverability and risk.

Testing against the objectives defined at the WelTAG Planning stage should allow a better fit between the problems identified and the options taken forward to be appraised. The assessment of a range of options at the Appraisal stage should enable the most suitable option(s) to be defined in order to produce a satisfactory solution.

WelTAG aims to ensure that transport proposals contribute to the wider policy objectives for Wales. The contribution of options towards the three pillars of sustainability which underpin policy in Wales is measured during appraisal; these are known as the 'Welsh Impact Areas' and consist of the following:

- Economy: this reflects the importance of a strong and developing economy for Wales;
- Environment: this reflects both the legal requirements and desire to protect and enhance the condition of the built and natural environment, and;
- Society: this reflects the desire to address issues of social exclusion and to promote social justice and a high quality of life for Welsh people.

1.4 Methodology

The current version of WelTAG⁵ has been used for this study. Prior to commencing with the Appraisal (Stage 1) the following information from the WelTAG Planning stage⁶ has been summarised and included in this report in order to provide a clear audit trail of the key outcomes:

- The problems, opportunities and constraints identified and used to inform the Transport Planning Objectives;
- The Transport Planning Objectives established to address the key transport issues in the study area, and;
- The solutions identified for testing and sifting at the end of the Planning stage and those taken forward to be appraised as options.

⁵ Welsh Transport Planning and Appraisal Guidance (WelTAG), Issue 6, Version 7.1, Welsh Assembly Government, June 2008

⁶ Snowdonia Enterprise Zone: Llanbedr Access Improvements WelTAG Planning stage report, YGC 2014

The WelTAG Appraisal (Stage 1) process involved evaluating the options progressed from the Planning stage in greater detail against the Welsh Impact Areas and other key factors, in accordance with WelTAG, which include: public acceptability, acceptability to other stakeholders, technical and operational feasibility, financial affordability and deliverability and risks to delivery. The results of this process are presented in Appraisal Summary Tables (AST's) which are appended to this report (see Appendix B).

WelTAG requires baseline information to be collected in order to inform the decisions made during the Planning stage and Appraisal (Stage 1). Baseline information has been obtained where possible regarding environmental and transport aspects within the study area and has been used to inform the decisions made throughout this WelTAG study. The baseline information used to inform this WelTAG study has been derived from a variety of sources including desk-based research, published data and discussions with stakeholders and the public. The baseline studies covered the following key topic areas:

- Transport facilities and networks;
- The natural and built environment, and;
- Geotechnics and ground conditions.

Chapter 5 explains the baseline information that has been gathered for the WelTAG study and summarises the methods that have been applied for each topic area, along with the key findings of the Appraisal (Stage 1). Professional judgment has been applied throughout, particularly where there is any uncertainty and lack of objective information at this early stage of the consideration of transport improvements.

Public participation

Public and stakeholder engagement is an important aspect of WelTAG, since it enables interested parties to be involved with the decision-making process and helps to ensure that the issues most relevant to transport in the study area are considered. In order to ensure that the views of the local public were fully considered within the WelTAG study the following participation events were held in Llanbedr village hall:

- 1) 5th June 2014: An initial event held at the start of the Planning stage in order to establish the public's perception of the transport-related problems, opportunities and constraints within the study area.
- 2) 2nd October 2014: This event was arranged in order to provide an update on the outcomes of the Planning stage and how the public's views had contributed to determining the Transport Planning Objectives and solutions. The proposed options to be taken forward to Appraisal (Stage 1) were also presented in order to ascertain public opinion before they were refined further.

- 3) 6th November 2014: The final event associated with the current WelTAG study was organised to present the refined options following the second public participation event and receive feedback which contributed to their appraisal.

Feedback from the events was recorded via bilingual questionnaires, specially developed for each event. The feedback has been used to inform key elements of the WelTAG study, including; identifying the problems, opportunities and constraints within the local area, establishing the transport planning objectives and contributing to the appraisal of options. The key feedback received from each event is summarised within Chapters 2 to 5 of this report. Further details about the public participation events, including the results, are summarised in Appendix C (Participation Report).

Health Impact Assessment

A Health Impact Assessment (HIA) is a mandatory requirement in addition to considering economic, environmental and social factors as part of a WelTAG study. A HIA of each appraised option has been completed and the results are summarised in tabular format in Appendix D. The HIA has used the criteria provided in Table 9.1 of the WelTAG guidance.

1.5 The study area

Llanbedr village (SH 585 268) is located on the A496 county road between Harlech and Barmouth; it is within the boundaries of the Snowdonia National Park and is close to the popular tourist destination and designated conservation area of Mochras (Shell Island). The nearest trunk roads are the A487 at Maentwrog 12.5 miles to the north and the A470 at Llanelltyd 15.4 miles to the south, both connecting with the A496 which follows the coastline between Llanelltyd and Maentwrog via Llanbedr.

The proposed Llanbedr Aviation Centre and Enterprise Park is located at Llanbedr airfield (SH 569 258) immediately to the west of Llanbedr and will utilise the existing airfield infrastructure, along with any associated new developments. The current vehicular access route is via Mochras Road, which links with the A496 in Llanbedr village; a distance of 0.9 miles each way.

The WelTAG study area encompasses Llanbedr village and the A496 west towards Llanbedr airfield (see Figure A.1, Appendix A), located within a low-lying, coastal part of Gwynedd, North Wales with the Rhinogs to the east and the Morfa Dyffryn dunes and coastline to the west. The Afon Artro flows west through Llanbedr and is the most significant watercourse in the study area.

1.6 Previous studies

Prior to this WelTAG study various other studies have been completed regarding transport issues in and around Llanbedr. Therefore, these were reviewed and considered during the WelTAG Planning stage⁷ and are summarised here as they provide useful background context for the WelTAG study.

Llanbedr local transport issues

The main issues associated with local transport movements in and around Llanbedr that have been identified in the past involve congestion and safety concerns associated with traffic travelling along the A496 through the centre of Llanbedr and seasonal holiday traffic accessing Mochras (Shell Island) via Mochras Road and its junction with the A496.

A previous solution to address these issues was a 7.3m wide single carriageway bypass taking traffic to the west of Llanbedr between the village and the airfield, which was proposed by Gwynedd County Council and presented to the public in October 1992. However, no further development has taken place regarding this proposal and Gwynedd Council have since confirmed that the proposals were no longer feasible due to financial and transport policy constraints⁸.

To address local transport issues in the absence of a bypass, a list of potential smaller-scale improvements was suggested by the Llanbedr Community Council⁹, including improved off-street parking and traffic management. Along with a bypass, many of these measures have been considered within this WelTAG study.

Llanbedr Aviation Centre and Enterprise Park

Since this WelTAG study is focused on identifying transport solutions driven by providing improved access for Llanbedr airfield, any transport solutions identified and taken forward must consider the future development aspirations for Llanbedr airfield.

The Llanbedr Aviation Centre and Enterprise Park Development Context Study¹⁰ and Masterplan Report¹¹ identifying the constraints and optimum proposals associated with developing the Llanbedr Aviation Centre and Enterprise Park were commissioned by the Welsh Government and completed in January 2014. These reports provide useful details on the context of the strategic proposals at Llanbedr airfield to be considered when developing solutions to address access and transport issues for this site.

⁷ Snowdonia Enterprise Zone: Llanbedr Access Improvements WelTAG Planning stage report, YGC 2014

⁸ Letter from Gwynedd Council (Transportation and Street Care) to Llanbedr Community Council, 25th November 2010

⁹ Letter from Gwynedd Council (Transportation and Street Care) to Llanbedr Community Council, 8th March 2010

¹⁰ Llanbedr Aviation Centre & Enterprise Park Development Context Study, Arup, January 2014

¹¹ Llanbedr Aviation Centre & Enterprise Park Masterplan Report, Arup, January 2014

The Development Context Study provides the context to inform the Masterplan report. The key objective of the Llanbedr Aviation Centre and Enterprise Park is defined as: “*efficient use of space whilst minimising environmental impacts*”. HGV access is described as being essential and is expected to require improvements to the local road network.

The Masterplan report incorporates the aspirations of the Welsh Government and the airfield owners with regard to the future development of Llanbedr Airfield and sets out the design strategy for the development of the Llanbedr Aviation Centre and Enterprise Park. The report refers to the key constraints associated with the proposals, several of which (including site access) are of particular relevance to this WelTAG study.

1.7 Policy Context

It is important that any transport solutions are cognizant of relevant planning and development policies and plans within the study area. National (Wales), regional (North-west Wales) and local (Gwynedd) policies, plans and strategies considered relevant to transport infrastructure improvements in the Llanbedr area were therefore reviewed during the WelTAG Planning stage¹² and are summarised here. Many of these highlight the importance of providing/improving transport infrastructure to encourage economic growth in Wales. The increasing obligations to promote sustainable modes of travel in order to reduce the environmental impact of transport, increase the efficiency of existing transport infrastructure and improve the health of the Welsh nation are also key themes.

National scale:

- The Wales Transport Strategy: One Wales - Connecting the Nation, Welsh Government, April 2008.
- National Transport Plan, Welsh Government, March 2010 (prioritised in December 2011).
- A Walking and Cycling Action Plan for Wales 2009 – 2013, Welsh Government, December 2008.
- Wales Infrastructure Plan for Growth and Jobs, Welsh Government, 2012.

Regional scale:

- Regional Transport Plan, Trafnidiaeth Canolbarth Cymru/Mid Wales Transportation (TraCC), September 2009.
- Draft TraCC Regional Highways Strategy and Programme, Hyder Consulting, December 2012.
- The North West and Mid Wales Integrated Transport Network Technical Report, AECOM, April 2014.
- TraCC Walking and Cycling Strategy, TraCC / Hyder Consulting, February 2012.

¹² Snowdonia Enterprise Zone: Llanbedr Access Improvements WelTAG Planning stage report, YGC 2014

- TraCC Regional Rail Strategy and Actions, Hyder Consulting 2013.

Local scale:

- Eryri Local Development Plan (2007 – 2022) adopted version, Snowdonia National Park Authority, July 2011.
- Local Transport Plans (currently in development, yet to be published).

The policy review (see WelTAG Planning stage report¹³ for further details) identified the hierarchical nature of transport planning in Wales, particularly the close links between national policies and their influence on the content of the Regional Transport Plans, which will form the basis for the emerging Local Transport Plans. It is expected that the updated National and Local Transport Plans (due for preparation in 2015) will strongly feature references to the Welsh Enterprise Zones and subsequent developments to transport infrastructure, which are likely to be required to allow such areas to function effectively.

¹³ Snowdonia Enterprise Zone: Llanbedr Access Improvements WelTAG Planning stage report, YGC 2014

WelTAG Planning Stage

Chapters 2 to 4 summarise the outcomes of the key phases of the WelTAG Planning stage.

2.0 Problems, Opportunities and Constraints

This chapter summarises the problems, opportunities and constraints that were identified during the Planning stage of this WelTAG study via the following methods and sources:

- Public participation: a public event was held in Llanbedr village hall on 5th June 2014 and feedback was recorded via completed questionnaires (see Appendix C, Participation Report);
- Desk studies: baseline information was obtained about the current transport patterns and environmental features within the study area;
- Previous work: related previous studies and reports were reviewed, particularly regarding the proposed development of the Llanbedr airfield site, and;
- Other development: proposals for additional new development within the study area were considered since these could influence future transport issues.

The key points arising from the public participation event held on 5th June 2014 that are considered most relevant to this chapter are:

- 1) The majority of respondents were local residents that use the A496 and Mochras Road frequently. This indicates that the main target audience for the study were involved in the participation process.
- 2) The main problem identified by the majority of respondents (55%) is that the current A496/Mochras Road junction is too narrow and inhibits vehicle access to Mochras Road destinations; this supports the view that the junction is substandard.
- 3) Other problems mentioned by over 20% of respondents include:
 - high seasonal traffic volumes and congestion;
 - lack of parking facilities in Llanbedr, and;
 - speeding traffic through Llanbedr.
- 4) Flooding was identified as the main constraint to achieving transportation improvements in the study area (45%), with environmental designations also featuring highly.

Following the 5th June 2014 public participation event and the consideration of baseline information the problems, opportunities and constraints associated with both current transport issues and potential future transport issues resulting from the proposed development of the Llanbedr Aviation Centre and Enterprise Park are summarised as follows:

2.1 Problems

The following problems associated with current and future transport access within the study area have been ranked in order of the number of responses provided following the public participation event held on 5th June 2014:

1. The bridge/junction of the A496/Mochras Road is too narrow and has tight radii, which makes access to Llanbedr Airfield and Mochras (Shell Island) difficult, especially for larger vehicles (this was the commonest problem identified from the 5th June 2014 public participation event).
2. The high volume of traffic during peak holiday seasons and associated traffic congestion.
3. The lack of parking areas/car parks in Llanbedr, leading to on-street parking.
4. Speeding traffic – motorists ignoring the relevant speed limits, especially through Llanbedr.
5. The lack of pedestrian/cyclist provision in Llanbedr and along the access road to Mochras (Shell Island) / Llanbedr Airfield.
6. The A496 through Llanbedr, and sections of it outside of Llanbedr, are too narrow.
7. Mochras Road, leading to Mochras (Shell Island) and Llanbedr Airfield, is too narrow.

2.2 Opportunities

The following opportunities were identified to improve transport access within the study area:

- Improve traffic flow through Llanbedr.
- Improve access to Llanbedr Airfield and Mochras (Shell Island).
- Provide car parking facilities within Llanbedr.
- Consider how the current speed limit through Llanbedr can be effectively managed.
- Improve visibility for road users (e.g. remove or trim back trees outside Maes Artro).
- Improve pedestrian and cycling provision within Llanbedr and along Mochras Road (e.g. foot/cycleways).
- Initiate a series of road improvements on the A496 north and south of Llanbedr.
- Enhance local public transport links and services.
- Consider improvements to the interfaces of rail and road infrastructure e.g. the un-gated, signal control on Mochras Road.

2.3 Constraints

The following aspects about the study area were considered to currently restrict transport access and/or could restrict future transport access improvement solutions:

- *Flooding*: Much of the study area, particularly north of the Afon Artro, lies within both a fluvial and tidal floodplain and has been affected by flooding in the past.
- *Environmental features/designations*: In addition to the Snowdonia National Park there are various designated conservation sites, listed features and protected species present within the study area.

- *Properties:* There are various properties in the location of the Mochras Road/A496 junction and along Mochras Road which would inhibit the scope for changes to the existing local road infrastructure within Llanbedr, but also currently suffer from the adverse effects of traffic congestion.
- *Development restrictions:* These include the previous protected route corridor for a bypass and Obstacle Limitation Surfaces associated with Llanbedr airfield. While the former is not included in the current Eryri Local Development Plan its presence in previous development plans is well acknowledged and therefore could bias opinions on preferred solutions and route options. The latter could inhibit the scope for providing features that may be associated with certain transport access improvements, such as bridge structures and lighting.
- *Rail infrastructure:* The Cambrian Railway Line runs north-south between Llanbedr and the airfield. However, there may also be opportunities to address/improve current rail constraints, such as the crossing over Mochras Road.
- *Limited alternative transport options:* Bus and rail services would currently offer limited appeal to commuters and/or visitors to Llanbedr Airfield using these forms of transport due to the infrequency of the stops (approximately every 2 hours). There is also a lack of dedicated, linked pedestrian/cycling facilities between Llanbedr railway halt and Llanbedr airfield and a lack of consistent facilities between Llanbedr and Llanbedr railway halt leading to travel constraints for non-motorised users.

3.0 Transport Planning Objectives

This chapter summarises the Transport Planning Objectives (and hence the study objectives) that were defined during the WelTAG Planning stage. In accordance with the principles of WelTAG, the Transport Planning Objectives (TPO's) were derived with consideration of the problems, opportunities and constraints identified during the desk study and the first public participation event (see Chapter 2), as well as consideration of the outcomes of the Wales Transport Strategy and the Mid-Wales Regional Transport Plan's Regional Transport Priorities.

Since WelTAG specifies that, where possible, objectives should be Specific, Measurable, Attainable, Relevant and Timed (SMART) the TPO's have been refined to conform as far as possible to SMART principles. In order to ensure they are fit for purpose the TPO's were screened against the Wales Transport Strategy outcomes, Wales Strategic Priorities and Regional Transport Priorities respectively. Professional judgment was applied throughout this process along with consideration of the baseline information and outcome of public participation. The process demonstrated that, collectively, the TPO's effectively contribute to addressing the identified problems and constraints and are also in synergy with the relevant policy outcomes, as well as reflecting the feedback provided by the local community.

The WelTAG study TPO's (ranked in terms of their importance to the local public based on feedback from the second public participation event, held on 2nd October 2014) are as follows:

1. Reduce traffic congestion at the Mochras Road/A496 junction.
2. Reduce the negative impact of traffic on the community of Llanbedr.
3. Improve transport connectivity to and from Llanbedr Airfield.
4. Improve the efficiency and reliability of all transport to and from Llanbedr Airfield.
5. Improve the actual and perceived safety of travel for all travellers within Llanbedr and along Mochras Road.
6. Improve freight transport access to and from Llanbedr Airfield.
7. Improve travel opportunities for pedestrians and cyclists within Llanbedr and along Mochras Road.
8. Minimise the impact of transport improvements on local environmental and heritage features.
9. Be resilient to local effects of climate change, particularly future increases in flood events.

4.0 Option Development and Sifting

This chapter provides a summary of the solutions that were initially identified during the WelTAG Planning stage and those that were chosen to be evaluated in further detail, following the sifting process, during Appraisal (Stage 1).

Following the identification of problems, opportunities and constraints and the establishment of Transport Planning Objectives (TPO's) it was possible to define the potential solutions that could be implemented to help achieve the TPO's. Solutions were identified by a combination of the following methods:

- Consideration of the feedback from the public participation event held on 5th June 2014.
- A workshop of project team members which involved using the identified problems, opportunities and constraints to identify potential solutions and then verifying that these would be in synergy with the TPO's. An open-minded approach was adopted, regardless of previous proposals and options, since the overall aim was to identify all potential solutions that could be implemented.

In addition to the transport improvement solutions a Do Nothing scenario was considered *i.e.* retain the existing situation with associated maintenance being completed as and when required.

The key points arising from the first public participation event (5th June 2014) that are considered relevant to this chapter are:

- A bypass for Llanbedr was identified as the most popular opportunity for improving transportation in the study area (45% of responses), with access roads from the south, north and car parking provisions also mentioned in over 20% of responses.
- Of the top three ranked options for transportation improvements a bypass of Llanbedr was the most popular choice (24 points), closely followed by a southern access route and then a northern access route.

Following the identification of initial solutions each was broadly appraised against the TPO's in order to aid their refinement and provide transparency in the decision-making process. Those solutions remaining after the initial screening against the TPO's were then sifted against the Wales Transport Strategy outcomes and for their likely degree of public acceptability, construction and operational feasibility and financial affordability. The outcomes of the sifting exercise are summarised in Table 4.1. Note that the sifting exercise was based on a broad level of baseline information and public feedback so there is some uncertainty associated with the conclusions, although professional judgment has been applied in order to minimise this as far as possible.

Table 4.1: Summary of WelTAG Planning stage solutions before and after sifting

Initial Planning stage solutions	Options remaining after sifting
<ol style="list-style-type: none"> 1. Provide designated car parking facilities within Llanbedr and link with suitable pedestrian access. 2. Improve the A496/Mochras Road junction; this could require demolishing adjacent buildings and replacing the listed Pont Llanbedr. 3. Culvert the Afon Artro from the A496/Mochras Road junction west opposite the residential properties and realign Mochras Road northwards to improve access. 4. Remove the south-western corner parapet constraint from Pont Llanbedr to improve HGV access on to Mochras Road from the north. 5. Provide a cantilever structure from the A496/Mochras Road junction west over the Afon Artro to carry traffic along Mochras Road to/from the A496. 6. Provide traffic calming measures through Llanbedr village and along the A496 junction approach on Mochras Road e.g. double yellow lines, flashing speed restriction reminder signs, right of way islands and removal of overhanging roadside vegetation. 7. Provide a traffic light system in Llanbedr village centre to control traffic at the A496/Mochras Road junction. 8. Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new bypass and A496 remaining open to all traffic. 9. Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new bypass and A496 closed except for access and foot/cycle traffic. 10. Bypass Llanbedr to the west of the railway line. 11. Provide a one-way bypass to the west of Llanbedr for southbound or northbound traffic only (traffic travelling in the other direction would continue to use the A496 through Llanbedr). 12. Bypass Llanbedr to the east of the A496. 13. Provide a new link road to the north (west of 	<ol style="list-style-type: none"> 1. Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new bypass and A496 remaining open to all traffic. 2. Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new bypass and A496 closed except for access and foot/cycle traffic. 3. Provide a new link road to the north (west of Llanbedr) connecting Mochras Road and the A496. 4. Provide a new link road to the south (west of Llanbedr) connecting Mochras Road and the A496. 5. Provide designated car parking facilities within Llanbedr and link with suitable pedestrian access (in combination with Solution 1, 2, 3, 4 or 5). 6. Provide traffic calming measures through Llanbedr village and along the A496 junction approach on Mochras Road e.g. double yellow lines, flashing speed restriction reminder signs, right of way islands and removal of overhanging roadside vegetation (in combination with Solution 1, 2, 3, 4 or 5). 7. Do Minimum/Nothing and retain the existing situation.

<p>Llanbedr) connecting Mochras Road and the A496.</p> <p>14. Provide a new link road to the south (west of Llanbedr) connecting Mochras Road and the A496.</p> <p>15. Improve Mochras Road to meet current standards between Llanbedr and Llanbedr Airfield.</p> <p>16. Provide passing bays for HGV's along Mochras Road between Llanbedr and Llanbedr Airfield.</p> <p>17. Develop the existing emergency access to Llanbedr Airfield from the south to accommodate HGV's.</p> <p>18. Move the Mochras Road/A496 junction to the north.</p> <p>19. Move the Mochras Road/A496 junction to the south.</p> <p>20. Develop the Llanbedr railway halt into a rail transport hub with freight facilities, including rail access into Llanbedr airfield.</p> <p>21. Provide a sea-based transport/freight hub where the surfaced section of Mochras Road terminates and becomes a tidal causeway.</p> <p>22. Use Llanbedr Airfield as a hub for air freight transport.</p> <p>23. Do Minimum/Nothing and retain the existing situation.</p>	
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WelTAG Appraisal (Stage 1)

5.0 Introduction

This chapter summarises the results of the WelTAG Appraisal (Stage 1) process, which followed the completion of the WelTAG Planning stage and involved the appraisal of each option against:

- 1) the Transport Planning Objectives (see Chapter 3);
- 2) the Welsh Impact Areas (economy, environment and society), and;
- 3) Other relevant WelTAG criteria including public and stakeholder acceptability, feasibility, affordability and risks.

The results of the WelTAG Appraisal process are presented in the Appraisal Summary Tables (see Appendix B). The Appraisal (Stage 1) process also involved further public participation (events were held in Llanbedr on 2nd October and 6th November 2014) and subsequent refining of the options taken forward from the WelTAG Planning stage.

5.1 Stakeholder Participation

Following the completion of the WelTAG Planning stage and before commencement of the Appraisal (Stage 1) process a second public participation event was held in Llanbedr village hall on Thursday 2nd October 2014 (12:30 – 20:00) in order to provide a summary of the work undertaken since the previous public event on 5th June 2014 and demonstrate how the previous feedback had been used to inform the WelTAG Planning stage. The outline sifted options were also presented and the public asked to provide their feedback on these and the identified problems and objectives by completing a short questionnaire. The results were used to verify that the problems, opportunities and constraints previously identified were relevant to the local community and to ascertain which Transport Planning Objectives are of most importance locally. Feedback on the outline options presented contributed to informing their further refinement and subsequent appraisal.

The results of the public feedback are presented in Appendix C and summarised as follows:

- A total of 53 local residents completed the questionnaires, with 77 individuals recorded attending the actual exhibition.
- The main problems initially identified following the first event (5th June 2014) and used to inform the WelTAG study were still consistent with those raised during the second event; these being the substandard nature of the A496/Mochras Road junction and the high seasonal volume of traffic and congestion. Conversely, speeding traffic through Llanbedr was ranked lower and the substandard nature of Mochras Road higher than during the initial event on 5th June 2014.
- The most popular objectives involve reducing traffic congestion at the A496/Mochras Road junction (which corresponds with the highest ranking problem) and reducing the negative impacts of transport on Llanbedr, which highlights the opportunity to provide benefits for both the local community and the airfield. Improving transport connectivity along Mochras Road to and from the airfield was also ranked highly (third).

- The most popular option was to provide a bypass to the west of Llanbedr village, with Mochras Road remaining open to all traffic. This option was much more popular (224 points) than the bypass option proposing to close Mochras Road to through traffic (155 points). Another popular option was to provide both northern and southern link roads, connected via a section of Mochras Road (208 points).
- The biggest obstacle to achieving a preferred option is considered to be the associated cost / funding requirement.
- The most important aspects to consider for any preferred option are the local economy and local community.

The plan of the sifted options presented at the public participation event (see Figure A.13, Appendix A) was also issued to the relevant statutory environmental and planning authorities for their information and comment. Responses were received from Cadw, Gwynedd Archaeological Planning Service (GAPS), Natural Resources Wales (NRW) and Snowdonia National Park Authority (SNPA) and key points raised are summarised in Section 5.4 and in the Appraisal Summary Tables in Appendix B.

5.2 Refining the Options

Following the public participation event on 2nd October 2014 the previously sifted options were further refined for appraisal based on the feedback received. Since the option to provide a bypass west of Llanbedr was ranked most popular, two additional possible bypass routes were also defined and appraised. The option involving bypassing Llanbedr and closing Mochras Road to through traffic (previously Option 5) was omitted following the feedback since it did not compare as favourably with its alternative option, which involved keeping Mochras Road open to through traffic.

The options to provide improved car parking facilities and traffic calming measures in Llanbedr were previously proposed to be implemented in-combination with the other options as they would not satisfy many of the TPO's individually. Following the public participation event on 2nd October 2014 they were ranked 4th and 7th respectively out of 7 options presented. In order to appraise them effectively they have since been investigated further and the results of this are summarised as follows:

Provide designated car parking facilities within Llanbedr and link with suitable pedestrian access into the village.

- The Victoria Inn private car park could be used to provide off-street parking, but the entrance would need to be improved. The entry and exit point of the car park is shared and the visibility of the car park junction would need to be improved. Any changes to the car park would be subject to agreement with the land owner.

- Another off-street car park could be located behind the general convenience shop. The entry and exit point of the car park is shared and the visibility of the car park junction would need to be improved.

Both locations have therefore been considered within the WelTAG Appraisal stage, but their potential use as public facilities would be subject to further feasibility assessment and landowner agreement.

Provide traffic calming measures through Llanbedr village and along the A496 junction approach on Mochras Road.

The following measures, based on suggestions from the public participation event held on 5th June 2014, were previously considered to achieve this option. A preliminary study to investigate the feasibility of these in more detail concluded the following:

1) *Lower the speed limit through the village and improve enforcement*

Reducing the current 30mph speed limit could improve the safety of pedestrians, but would not solve the congestion as the residential parking would still obstruct vehicles travelling through Llanbedr, as would the narrowness of Pont Llanbedr.

2) *Right of way islands*

There is not considered to be sufficient space to provide a right of way island in Llanbedr and this could exacerbate congestion issues by inhibiting traffic flow.

3) *Parking constraints at junctions (e.g. double yellow lines)*

Double yellow lines could be implemented north and south of Pont Llanbedr. This would be expected to improve traffic flow through the village, but residents would lose parking space. This option would not improve the visibility of oncoming traffic approaching Pont Llanbedr.

4) *Provide a double white line through Llanbedr*

Traffic Signs Manual chapter 5, paragraph 5.1 states: “*No vehicle shall stop on any length of road along which the marking has been placed at any point between the ends of the marking*”.

Paragraph 5.4 states: “*Having regards to the road width required by buses and goods vehicles, particularly on bends, double line markings should not normally be used where the carriageway is less than 6.1m wide*”.

Paragraph 5.8 states: “*Double lines should not normally be used in built-up areas, as preventing vehicles from stopping could be unduly restrictive.*”

Implementing a double white line is therefore not considered to be feasible in Llanbedr as the A496 carriageway is less than 6.1m wide through the majority of the village centre and the village is considered to represent a built-up area.

5) *Pedestrian and cycle provision (e.g. footpaths/pavements)*

The Design Manual for Roads and Bridges guidance states that the minimum carriageway width for such facilities to be provided should be 6m. While the carriageway is at least 6m in width through much of the village centre, there is considered to be insufficient space to create such a provision through Llanbedr when considering the effects of further reducing the

carriageway width on the current congestion issues and requirement for HGV's, buses and towing vehicles to travel unimpeded through the village.

The only feasible small-scale measure to improve traffic flows and safety through Llanbedr is concluded to be the provision of double yellow lines to prevent on-street parking. Since this could also result in negative effects on residents and businesses alike, and considering the previous low public popularity of this option in general, it has been packaged with the option to provide improved car parking facilities within Llanbedr and appraised as such, although this option (Option 7) would be expected to be implemented in-combination with Options 1 – 6 rather than as a unique option as it would not be expected to meet many of the TPO's. The refined options for WelTAG Appraisal are summarised as follows (see Figure A.13, Appendix A for indicative option locations):

- **Option 1:** Provide a new link road connecting Mochras Road and the A496 to/from the north of Llanbedr. The section of Mochras Road between the railway crossing and the river would be improved to current highway standards. A bridge structure would be required to cross the Afon Artro and the new carriageway would need to be elevated above the floodplain. The link road would tie in to the A496 north of Llanbedr.
- **Option 2:** Provide a new link road connecting Mochras Road and the A496 to/from the south of Llanbedr. A short section of Mochras Road between the railway crossing and new junction would be improved to current highway standards.
- **Option 3:** Combine Options 2 and 3 to provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr. The section of Mochras Road between the railway crossing and the river would be improved to current highway standards. A bridge structure would be required to cross the Afon Artro and the new carriageway north of the Artro would need to be elevated above the floodplain. The link roads would tie in to the A496 north and south of Llanbedr. The A496 would still provide the main route for all through traffic.
- **Option 4:** Bypass Llanbedr to the west (between the A496 and the railway line) with the section of Mochras Road between the A496 junction and new bypass tie in remaining open to all traffic. A bridge structure would be required to cross the Afon Artro and the new carriageway north of the Artro would need to be elevated above the floodplain. The bypass would tie in with Mochras Road via a short link road and junction. There would be improvements to Mochras Road between the new junction and railway crossing in order to ensure it meets current highway standards.
- **Option 5:** Bypass Llanbedr following the previous bypass route announced in 1992. A bridge structure would be required to cross the Afon Artro and the new carriageway north of the Artro would need to be elevated above the floodplain. Mochras Road would be improved to current highway standards between the new bypass junction and the railway crossing.
- **Option 6:** Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then follow the route of the railway line and access track north to Mochras Road. The route would

tie in with Mochras Road via two new junctions and then continue north across the river and floodplain to tie in with the A496 north of Llanbedr close to the water treatment works. A bridge structure would be required to cross the Afon Artro and the new carriageway north of the Artro would need to be elevated above the floodplain.

- **Option 7:** Improved car parking facilities and double yellow lines within Llanbedr (implemented in-combination with Options 1 – 6).
- **Option 8:** Do nothing and continue to maintain the current situation.

5.3 Appraisal against the Transport Planning Objectives

In accordance with WelTAG, each refined option was appraised against the Transport Planning Objectives previously established for the WelTAG Planning stage (see Chapter 3); the results are presented in Table 5.1 and summarised as follows:

- **Option 1:** Providing a dedicated link road catering for travel to/from one direction would provide some benefit to achieving the TPO's, but only for transport travelling to/from that direction. Being located in a floodplain and close to a Scheduled Ancient Monument results in a negative performance against the climate change resilience and environmental/heritage TPO's.
- **Option 2:** As with Option 1, the beneficial effects on transport would be restricted to one direction only. This option would not be located within the floodplain so would not have a negative effect on the climate change resilience TPO, although it would still result in an adverse environmental and heritage impact.
- **Option 3:** This represents a combination of Options 1 and 2 and would therefore provide improved performance against many of the TPO's as it would cater for traffic travelling to/from both the north and south, with the A496 still providing the main through route. However, the larger scale of this option compared to Options 1 or 2 would result in a greater negative environmental effect.
- **Option 4:** A standard bypass would deliver significant positive effects against the TPO's regarding improved access and connectivity and reduced congestion in Llanbedr. Mochras Road remaining open to all traffic would ensure that access to Llanbedr continued to be available. The large area of land affected would result in adverse environmental effects and threats to flood risk resilience.
- **Option 5:** The previously-announced bypass route was suggested by several stakeholders during the public participation event held on 2nd October 2014. As with Option 4, this option would deliver significant positive effects against many of the TPO's and would result in less agricultural land take and reduced landscape impact. However, it could lead to considerable disturbance for some residents and businesses as it would pass more closely to Llanbedr and it is unlikely to be feasible to provide access onto/from Mochras Road for Llanbedr to the east without loss of residential property.

- **Option 6:** This option would largely follow the existing railway line and would accord with most of the TPO's regarding transport access improvements. It was also popular during the public participation event held on 2nd October 2014 as it would pass the furthest away from Llanbedr when compared with the other route options. However, it would involve more land take from flood-prone areas than the other route options, considerable disturbance to nearby residential receptors and potential loss of property, and would potentially conflict with the adjacent Cambrian railway line due to its close proximity.
- **Option 7:** By removing obstructions caused by parked vehicles on the A496 and providing alternative off-street parking, traffic flows through Llanbedr would be expected to be improved, which in turn could lead to reduced congestion and improved safety. However, the restricted access caused by the layout of the A496/Mochras Road junction would still pervade for traffic requiring access along Mochras Road to/from Llanbedr airfield.
- **Option 8 (Do Nothing):** Maintaining the current situation would not positively contribute to any of the TPO's for this WelTAG study relating to transport access improvements, and the current problems associated with seasonal traffic congestion and inhibited access to Llanbedr airfield would be expected to continue.

Table 5.1: Appraising the options against the WelTAG study TPO's

<p>Key:</p> <ul style="list-style-type: none"> ✓ Minor Positive / Negative ✕ ✓✓ Moderate Positive / Negative ✕✕ ✓✓✓ Major Positive / Negative ✕✕✕ - No distinct positive or negative correlation 	<p>Improve travel opportunities for pedestrians and cyclists within Llanbedr and along Mochras Road</p>	<p>Improve the actual and perceived safety of travel for all travellers within Llanbedr and along Mochras Road</p>	<p>Improve transport connectivity to and from Llanbedr Airfield</p>	<p>Reduce traffic congestion at the Mochras Road/A496 junction</p>	<p>Improve the efficiency and reliability of all transport to and from Llanbedr Airfield</p>	<p>Improve freight transport access to and from Llanbedr Airfield</p>	<p>Be resilient to local effects of climate change, particularly future increases in flood events</p>	<p>Reduce the negative impact of traffic on the community of Llanbedr</p>	<p>Minimise the impact of transport improvements on local environmental and heritage features</p>
<p>Options</p>									
<p>1) Provide a new link road connecting Mochras Road and the A496 to/from the north of Llanbedr.</p>	✓	✓	✓	✓	✓	✓	✕✕	✓	✕
<p>2) Provide a new link road connecting Mochras Road and the A496 to/from the south of Llanbedr.</p>	✓	✓	✓	✓	✓	✓	-	✓	✕
<p>3) Provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr (effectively a combination of Options 1 and 2)</p>	✓	✓	✓✓	✓✓	✓✓	✓✓	✕✕	✓	✕✕
<p>4) Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new junction and the A496 junction remaining open to all traffic.</p>	✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✕✕	✓✓	✕✕
<p>5) Bypass Llanbedr following the previous bypass route announced in 1992.</p>	✓	✓	✓✓	✓✓✓	✓✓	✓✓	✕✕	✓	✕✕

6) Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then following the route of the railway line and access track north to Mochras Road.	✓	✓	✓✓	✓✓✓	✓✓	✓✓	xxx	✓✓	xx
7) Improved car parking facilities and double yellow lines within Llanbedr	✓✓	✓	-	✓	-	-	-	✓	-
8) Do Nothing (continue to maintain the current situation)	-	-	-	-	-	-	-	-	✓

Summary of Appraisal against the Transport Planning Objectives

Each option would contribute to achieving the majority of the objectives; with the exception of Option 8 (*Do nothing*). Since all involve new development of varying scale, each option (except Option 8) would also result in negative effects on two of the TPO's; resilience to climate change and impacts on environmental/heritage features. Therefore, further detailed consideration of any options taken forward from this WelTAG study would be required to ensure that the sensitive environment and flood risk at this location are fully addressed. The bypass options (Options 4 – 6) would provide the largest contribution to the TPO's since they would result in the largest changes to the existing transport scenario, particularly by providing improved vehicular access to/from Llanbedr Airfield.

While Option 1 (*Provide a dedicated link road catering for travel to/from the north*) and Option 2 (*Provide a dedicated link road catering for travel to/from the south*) would provide some benefit to achieving the TPO's, this would only be for transport travelling to/from the direction served and would not address the access/congestion issues at the A496/Mochras Road junction for traffic using the other direction. Option 3 involving a combination of these would provide a greater contribution to achieving the TPO's as it would enable travel in/from both directions to be served and would hence provide a more effective alternative to the A496/Mochras Road junction. This was also considered more popular than the single direction options during the public participation event on 2nd October 2014. Therefore, Options 1 and 2 were scoped out of further appraisal in favour of Option 3, which is a combination of both northern and southern link roads.

Following the appraisal against the TPO's, the revised options to be appraised against the Welsh Impact Areas are referred to as follows (see Figures A.14 to A.17, Appendix A for Options 1 to 4):

- **Option 1:** Provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr.
- **Option 2:** Bypass Llanbedr to the west (between the A496 and the railway line) with the section of Mochras Road between the A496 junction and new bypass tie in remaining open to all traffic.
- **Option 3:** Bypass Llanbedr following the previous route announced in 1992.
- **Option 4:** Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then follow the route of the railway line and access track north to Mochras Road.
- **Option 5:** Improved car parking facilities and double yellow lines within Llanbedr (implemented in-combination with Options 1 – 4).
- **Option 6:** Do nothing and continue to maintain the current situation.

A third public participation event was held in Llanbedr on 6th November 2014 in order to provide an update of the options to be appraised and invite feedback to help inform their appraisal.

5.4 Appraisal against the Welsh Impact Areas

The following is a summary of the WelTAG Appraisal (Stage 1) that has been completed for each Welsh Impact Area topic including the baseline information, methods used, any limitations/assumptions and the key outcomes. Each topic appraisal identifies the associated receptors that could be affected (positively and negatively) and then ascertains the level of change (positive or negative) that could occur to the receptors as a result of each option.

For the purposes of this study the appraisal has been completed under the assumption that standard mitigation measures to reduce the magnitude of significant impacts as well as established good practice would be implemented for each option. Such mitigation measures would be expected to include:

- Landscaping measures, such as replacement tree and hedgerow planting;
- Visual and noise screening where required;
- Protected species licences and associated habitat replacement mitigation;
- Water pollution control protocols;
- Flood consequence assessment, and;
- Archaeological recording.

The WelTAG guidance for each topic area has been referred to throughout. WelTAG recommends that the significance of residual effects (positive or negative) is assigned using a seven-point scale (*i.e.* neutral, minor +/-, moderate +/- or large +/-). In order to maintain objectivity the value of each receptor, magnitude of impact (change) and consequent significance of overall effect have been assigned using the guidance provided by the Design Manual for Roads and Bridges, Volume 11, Section 2¹⁴. For the Landscape topic this was assigned using Interim Advice Note 135/10: Landscape and Visual Impact Assessment¹⁵ since this supersedes the 2008 DMRB guidance.

Please see Table 5.4.12 (presented at the end of this section) for a summary of the options appraisal findings.

5.4.1 Transport Economic Efficiency (TEE)

Introduction

Roads

In terms of traffic flow through Llanbedr the Annual Average Daily Traffic (AADT) volume north of Llanbedr in 2009 was 3,482 vehicles, whereas in 2013 this had decreased slightly to 3,207. Similarly, the AADT south of Llanbedr in 2009 was 3,240, whereas in 2013 it had decreased slightly to 3,099. There is no typical morning and afternoon peak; traffic flows are constant between 08:00

¹⁴ Part 5, HA205/08, Assessment and Management of Environmental Effects, Highways Agency, August 2008

¹⁵ Highways Agency, November 2010

and 19:00. However, there is significant seasonal variation, with a markedly higher volume in August 2009 compared to November 2009 (e.g. 5,915 and 2,584 respectively); this highlights that the study area is within a popular holiday destination. There is also significant seasonal variation along Mochras Road, with a markedly higher value in August 2006 compared to November 2006; e.g. 2,059 and 150 vehicles respectively.

Traffic speed data show that the 85th percentile and mean speeds are lower than the mandatory 60mph speed limit along the A496 outside Llanbedr (between 38.9 mph and 54.8 mph), but conversely they are higher than the mandatory 30mph speed limit within the village of Llanbedr (between 33.7 mph and 47.1 mph). The latter point supports concerns raised by the local public about speeding vehicles travelling through the village.

Rail

There is a mainline rail connection between Pwllheli and Birmingham New Street, which passes within 500m of Llanbedr airfield. This Cambrian Coast line currently has a station (halt) at Llanbedr, which is located approximately 600m from the village centre and is a request stop.

The frequency of trains travelling on the Cambrian Coast line is currently approximately every 2 hours, with the first train leaving Pwllheli at 05:45 and the last return train from Llanbedr at 22:45. The journey time from Pwllheli to Llanbedr takes approximately 1 hour, 40 minutes. The journey from Birmingham New Street to Llanbedr takes approximately 3 hours, 50 minutes, with the first train leaving Birmingham New Street at 06:25 and the last train leaving Llanbedr to Birmingham at 18:43.

Pont Briwet railway bridge to the north of Llanbedr has recently been rebuilt to current standards.

Bus

Express Motors Bus number 38 (the Tan y Bwlch – Harlech – Barmouth - Dolgellau route) travels from the Oakeley Arms (on the A487 close to Maentwrog) to Llanbedr during weekdays and Saturdays. The journey takes approximately 35 minutes. The timetable is complex and many journeys of this bus start and terminate at Harlech Railway station and Barmouth, so the No. 38 bus only travels its complete journey once a day in either direction and therefore does not link Llanbedr directly with the existing trunk road network. The X94 (Wrexham to Barmouth bus) connects Dolgellau to Barmouth, where a connection with the No. 38 can be made for travel to Llanbedr. Travel by train from population centres north and south of Llanbedr (Pwllheli, Porthmadog, Penrhyndeudraeth, and Barmouth) would currently be quicker than travelling by bus.

Long distances buses (e.g. the T2) currently run from Bangor to Aberystwyth daily, with a reduced service on Sundays and public holidays, and it is possible to connect to Llanbedr by alighting at stops such as Dolgellau, Maentwrog, and Porthmadog with an onward journey by bus or train.

There are no private coach companies currently based in Llanbedr.

Taxi

Several taxi firms are based in the local area including Llanbedr, Dyffryn Ardudwy, Harlech, Penrhyndeudraeth and Porthmadog.

Methods and Limitations

Two fixed traffic counters located on the A496 (one north of Llanbedr near Pont Pen-y-Sarn-Hir and the other south of Llanbedr near Cerrig Gleision) have been used to record the Annual Average Daily Traffic (AADT) through the study area since 2009. In 2006 / 2007 a temporary traffic counter was installed on the Class 3 Mochras Road and has been used to supply the AADT along this road during this period.

Traffic speeds were obtained using historical data from four temporary traffic counters installed along the A496 between Llanfair and Dyffryn Ardudwy and on the Class 3 Mochras Road leading to Mochras (Shell Island), where traffic speeds were recorded. The 7-day traffic count surveys were undertaken between 05/03/2014 and 03/04/2014 for the sites located north and south of Llanbedr, on the 11/02/2013 and 28/02/2013 for the site located in Llanbedr, and on the 12/03/2007 and 30/03/2007 for the site located on the Class 3 Mochras Road.

Information about rail, bus and taxi services was obtained via a desk study of internet resources.

A Cost-Benefit analysis has been undertaken for Options 1 to 4, with each option appraised against the Do Nothing scenario (Option 6) using COBA software. In order to carry out the analyses a number of assumptions have been made for the purposes of this WelTAG study, namely the year of opening for each option has been assumed to be 2017, the Enterprise Zone would be assumed to generate 1,184 vehicle movements per day (based on previously-estimated car parking requirements for the Llanbedr airfield site), 1,000 vehicles would be assumed to still pass through the centre of Llanbedr, while the predicted traffic flows on Mochras Road would be 300 vehicles a day for options 1, 2 and 4 with 50 vehicles expected per day for Option 3. All proposed junctions were assumed to be either simple T-junctions or cross-road junctions.

A proposed scheme is justified by the COBA in purely economic terms if it displays a Net Present Value (NPV) greater than zero *i.e.* the sum of its stream of discounted benefits exceeds the sum of its stream of discounted costs. If the NPV is negative, this indicates that its discounted benefits are less than its discounted costs; therefore the 'Do-Minimum' is preferred in economic terms. Because the 'Do-Minimum' acts as the base case by reference to which the stream of net discounted benefits of the 'Do-Something' are measured, it by definition has an NPV of zero. If there are a number of

competing 'Do-Something' options, the preferred option in economic terms is selected using incremental analysis.

For each option the COBA calculated a Net Present Value (NPV) and a benefit to cost ratio; it also estimated the effect each option has on journey times and predicted the number of future personal injury accidents (see Section 5.4.11).

In addition to the COBA the estimated construction costs of Options 1 to 4 were calculated in a consistent manner for each option considering the length of each option (in linear metres), the construction of a bridge over the Afon Artro and the likely ground conditions. The resulting figures are considered to be broad estimates only to give an outline indication of the potential construction costs of each option. The figures do not include other associated costs such as detailed design and assessment or acquisition of property/land.

Summary of Key Findings

The results of the COBA are summarised in Table 5.4.1.

Table 5.4.1: Summary of COBA analysis of Options 1 to 4, included estimated construction costs of Option 1 – 4

Option	Net Present Value	Benefit to Cost Ratio	Predicted change in journey time	Estimated Construction Cost
1	-£0.630m	0.920	23.2 second reduction	£11,562,500.00
2	£3.542m	1.501	49.7 second reduction	£11,015,000.00
3	£3.740m	1.472	53.7 second reduction	£12,415,000.00
4	£4.305m	1.537	43.6 second reduction	£12,285,000.00

Options 2 to 4 would each provide an overall positive benefit in terms of net present value. However, **Option 1** would result in a negative net present value. **Option 4** would provide the most additional value for money while **Option 1** would provide the least value for money, compared with the other options, in terms of benefit to cost ratio.

Option 3 would provide the largest predicted journey time reduction while **Option 1** would provide the least reduction.

In terms of estimated construction cost, **Option 3** would be the most expensive, closely followed by **Option 4**. **Option 2** has the lowest estimated construction cost.

The implications for Transport Safety and personal injury accidents are discussed in Section 5.4.11.

5.4.2 Economic Activity and Location Impacts (EALI)

Introduction

One of the main aims of improved access to the Llanbedr airfield component of the Snowdonia Enterprise Zone is to increase the potential of the site to attract new businesses to locate there, which in turn would be expected to stimulate economic growth and opportunities. Therefore, while the scope of this WelTAG study does not directly address the future use of the airfield, the outcome (*i.e.* local transportation improvements) is expected to have an indirect effect on local economic and employment opportunities as a result of improved access to the Llanbedr airfield site.

In 2003, the Welsh Government announced that eight businesses are operating on the Llanbedr airfield site employing more than thirty people in total¹⁶. In terms of the future use of the site, the Welsh Government¹⁷ have previously stated that: “*The long-term strategic vision for Llanbedr is linked to the Unmanned Air Systems (UAS) sector, with potential for local businesses expanding or companies moving into Wales from the international UAS and broader sectors. It is hoped that the site will also allow for the development of key engineering skills*”. Therefore, it is assumed that any new businesses locating to the airfield would have strong links with the aviation sector. The airfield has also been confirmed as one of eight national (United Kingdom) sites that are being considered for the location of the UK’s first space port¹⁸. However, Llanbedr airfield has not currently been confirmed as the preferred site.

With a population of approximately 1,098¹⁹ Llanbedr is a small community in rural Gwynedd and employment opportunities can be limited unless travel to larger sources of employment such as Porthmadog, Harlech, Barmouth and further afield is possible. Within the village there are currently several active local employers which could potentially be affected by the improvement options, including: 2x general stores, a butcher, hardware store, hair and beauty salon, several guesthouses and a public house. In addition, the Shell Island campsite is a well-known, significant tourist destination.

Anecdotal evidence²⁰ suggests that the number of local businesses in Llanbedr has been dwindling recently, possibly due to an increase in alternative retail options, such as internet shopping, and subsequent changes in retail behaviour. However it is important that the potential effects on the remaining businesses as a result of any changes to transport infrastructure within the local area are considered, and this was emphasised by feedback received during the public participation events.

¹⁶ <http://business.wales.gov.uk/enterprisezones/news/new-business-opportunities-being-created-llanbedr-airfield>

¹⁷ <http://business.wales.gov.uk/enterprisezones/enterprise-zone-locations/snowdonia/about-snowdonia-zone>

¹⁸ <http://business.wales.gov.uk/enterprisezones/news/llanbedr-airfield-potential-location-space-port>

¹⁹ <http://www.ons.gov.uk/ons/interactive/census-map-1-4/index.html>

²⁰ Pers. Comm. with local residents during public participation event on 2nd October 2014

The 2001 and 2011 economic activity census data²¹ have been compared between Llanbedr and Gwynedd to provide an indication of recent trends in local and regional economic activity (see Table 5.4.2).

Table 5.4.2: Changes in economic activity and employment in Llanbedr and Gwynedd between 2001 and 2011

	Llanbedr ward		Gwynedd	
	2001	2011	2001	2011
Economically active %	53.7	63.5	57.1	59.1
Employed %	53	59.2	51	54.8
Unemployed %	3.5	3	4.1	2.6

The results show an increase in the percentage of economically active individuals in Llanbedr between 2001 and 2011, with a smaller corresponding increase in Gwynedd. The percentage of those employed also increased within both locations. The percentage of unemployed individuals has declined in both areas between 2001 and 2011; there has been a larger reduction in Gwynedd over this time period compared to Llanbedr.

Methods and Limitations

Considering the current limitations regarding the predicted overall economic impact of the Snowdonia Enterprise Zone, a qualitative assessment of the potential changes that could occur within the study area in terms of local economic growth and employment opportunities, balanced against impacts on existing local businesses, has been completed to ascertain the likely effects of each option.

A key limitation associated with the assessment of EALI at present is the current uncertainty regarding which businesses are likely to locate to Llanbedr airfield. Much speculation has been made about this previously, so in order to maintain objectivity for this WelTAG study the information provided on the Welsh Government's Business Wales website²² has been used to indicate the most likely businesses involved at present.

Summary of Key Findings

The key constraint to transport access for Llanbedr airfield is considered to be the junction with Mochras Road and the A496 in the centre of Llanbedr. An alternative means of access to the current junction would be expected to improve accessibility for the Llanbedr airfield site and hence increase its desirability for business use and consequent economic benefit.

²¹ <http://www.ons.gov.uk/ons/interactive/census-map-2-1---economic-activity/index.html>

²² <http://business.wales.gov.uk/enterprisezones/enterprise-zone-locations/snowdonia/about-snowdonia-zone>

Options 1 to 4 would each provide an alternative access for Llanbedr airfield to the current A496/Mochras Road junction and hence contribute to the economic success of the Snowdonia Enterprise Zone. However, each could also result in varying degrees of impact on local businesses, with the net effect of this depending on the scale and type of future business use of Llanbedr airfield. Access for vehicles using the Shell Island campsite would be improved by avoiding the need to use the constrained A496/Mochras Road junction.

Option 1 would provide two link roads (north and south of Llanbedr) rather than a complete bypass. A new junction with Mochras Road would also be provided to allow local access. Traffic associated with Llanbedr airfield and other destinations along Mochras Road would use the northern or southern link roads instead. Therefore through traffic would still be expected to continue to use the A496 and pass through Llanbedr and provide passing trade to local businesses, although there may be a slight adverse effect due to slightly reduced traffic passing through the village. Access to local services and facilities within Llanbedr would continue to be available as at present.

The Maes Artro holiday park could be adversely affected by the close proximity of the southern link road.

Three outbuildings would be lost to the southern link road. The elevated highway to the north of the Afon Artro and large cutting and embankment to the south could adversely affect views from overlooking properties and hence their financial value.

Options 2 to 4 would provide a complete bypass of Llanbedr for all traffic travelling along the A496. Local traffic would still be able to use the current route through the village as at present. North-south connectivity to employment sources and commercial businesses would be improved by providing an alternative to travelling through Llanbedr and associated constraints. Businesses in Llanbedr could be adversely affected by a reduced volume of traffic passing through the village, although reduced congestion/traffic flows through Llanbedr would be expected to provide improved opportunity to encourage passers-by to spend time in the village.

Option 2 would improve access to Llanbedr airfield via a new junction with Mochras Road further to the west. In order to ensure that Mochras Road and Llanbedr continued to be accessible east of the new junction, a new junction with Mochras Road would be provided. Mochras Road and Llanbedr would continue to be accessible from all directions.

The amenity of the Maes Artro holiday park could be adversely affected by the close proximity of the bypass.

One outbuilding would be lost to the new bypass route. The elevated highway to the north of the Afon Artro and large cutting and embankment to the south could adversely affect views from overlooking properties and hence their financial value. The large bridge structure to the west of the two westernmost properties (Swn yr Afon and Lismore) on Mochras Road could also adversely affect views from these.

With **Option 3**, access to Mochras Road from the A496 would be provided via a new junction to the west of the existing. However, continued local access for Llanbedr via Mochras Road would be difficult to provide without the loss of properties to the east of the new bridge structure over the Afon Artro. The adverse effect on local businesses in Llanbedr would be exacerbated if Mochras Road was not accessible from the bypass or Shell Island east to Llanbedr, because traffic using the bypass or travelling from Shell Island would not be able to access Llanbedr directly via Mochras Road or *vice versa*, as it can at present.

The Maes Artro holiday park would be severely adversely affected by the close proximity of the bypass route.

One outbuilding, understood to be have been recently converted, would be lost to the new bypass route. In addition, a recently renovated chapel (Capel Bach) may need to be demolished to accommodate the new bridge structure immediately adjacent to it, which would also adversely affect views from properties to the east and west. Three properties west of the new bridge structure on Mochras Road would be adversely affected by the revised Mochras Road access requiring land from their frontage. The elevated highway to the north of the Afon Artro would pass very close to adjacent properties on the eastern side of the A496 and adversely affect their open views to the west.

Option 4 would improve access to Llanbedr airfield via a new junction with Mochras Road just east of the railway line. In order to ensure that Mochras Road and Llanbedr continued to be accessible, a new junction with Mochras Road would also be provided just to the north. Mochras Road and Llanbedr would continue to be accessible from all directions.

At least three properties and associated outbuildings could be lost to accommodate the new bypass route opposite the Llanbedr railway halt. Views from adjacent properties to the south would also be adversely affected (including Talartrö, Pen y Bryn hall and the Grade II-listed Pen y Bryn farm).

Option 5 would not result in a significant transport access improvement for Llanbedr airfield. However, the provision of dedicated car parking would be expected to encourage passers-by and locals to visit Llanbedr and use the local services. The addition of double yellow lines would need to be carefully considered so as not to detract road users from stopping in the village and using local businesses.

With **Option 6**, access to and from Mochras Road would continue to be constrained by the A496/Mochras Road junction. In particular, the lack of adequate access for larger vehicles travelling to/from a northerly direction is likely to be an inhibiting factor for some businesses locating to the Snowdonia Enterprise Zone in the future.

Businesses in Llanbedr would be expected to continue as normal, subject to any future changes in local retail patterns. The current A496 would remain as the main route for all traffic travelling through Llanbedr and any associated congestion would be expected to continue as at present.

5.4.3 Noise

Introduction

Llanbedr is located in a predominantly quiet, rural location on the western coast of Gwynedd. Currently the main source of noise within the study area is considered to be from vehicle traffic using the A496, which is the main route to and from the nearby town of Harlech to the north and Barmouth to the south, and connects Llanbedr to the trunk road network at Maentwrog and Dolgellau. As vehicle traffic increases significantly during peak tourism seasons, it is expected that noise levels associated with traffic would also increase during these periods. Additional short-term increases in noise levels are generated periodically by low-flying military aircraft from the RAF site in Valley, Anglesey.

Receptors are chiefly residential and located across the whole study area. While most are concentrated along the A496 and Mochras Road, other dwellings are scattered throughout the agricultural landscape to the west of Llanbedr. Non-residential noise receptors include the popular campsite at Shell Island and the primary school in Llanbedr.

Local noise levels could change (both positively and negatively) as a result of any alterations to the existing road infrastructure and changes in traffic flow and volumes. The development of Llanbedr airfield, with any associated transport improvements, is likely to increase traffic flow to the area, including the number of Heavy Goods Vehicles (HGV's). Therefore, any proposals would need to consider the effects of changes to noise levels on the local receptors. There is also scope for achieving beneficial effects through reduced noise levels if traffic is diverted away from the village centre, especially during peak holiday seasons.

Methods and Limitations

Without knowing the exact nature of the businesses that may be based at the airfield, and hence associated traffic volumes and vehicle types, it is not considered feasible to provide a quantitative assessment of the likely changes to noise levels in the local area at this stage. However, a qualitative assessment has been completed in order to determine the likely changes in noise levels that could be expected to be associated with each option (including the Do Nothing scenario), and

hence the likely scale of the impact on receptors. The assessment also identifies the locations where noise levels are likely to change the most by considering factors such as changing vehicle speeds and distance of noise sources from receptors.

Summary of Key Findings

With **Option 1** traffic travelling to/from Llanbedr airfield and Shell Island would be diverted away from Llanbedr, while through traffic for other destinations via the A496 would be encouraged to continue to use the A496 through Llanbedr. This could lead to slight improvements in traffic noise levels for residential receptors along the A496 and Mochras Road due to reduced traffic volumes. Increased noise levels could occur to the Maes Artro holiday park and the properties immediately south-west of the southern link road. The elevation of the northern link road above the floodplain could result in higher traffic noise levels to properties to the east, in combination with traffic already using the A496.

For **Options 2 to 4** through traffic would be diverted further to the west of Llanbedr. This could lead to slight improvements for residential receptors along the A496 and Mochras Road due to reduced noise levels along these routes. However, adverse impacts due to increased noise levels could occur to the Maes Artro holiday park and the nearby westernmost properties along Mochras Road. Increased vehicle speeds on the bypass (national speed limit assumed to apply) could also lead to a change in traffic noise for surrounding receptors.

Option 3 is located closest to a larger number of residential properties in Llanbedr and the Maes Artro holiday park than the other options (especially Mochras Road) and could result in an increase in noise levels for these receptors due to the traffic flow along the bypass.

Option 4 would pass closest to a number of more isolated residential properties that are currently likely to be subjected to lower traffic noise levels than those already adjacent to the road network. This would result in an increase in noise levels for these receptors due to the proximity of the new route.

Options 5 and 6 would not be expected to have a discernible effect on noise levels. With **Option 6**, there could be a slight adverse long-term effect if there is an increase in traffic associated with the use of Llanbedr airfield.

5.4.4 Local Air Quality

Introduction

The main contributor to local air pollution in the study area is considered to be vehicle traffic currently using the A496 carriageway and local road network, with the main local pollutants likely to be Particulate Matter (PM₁₀) and Nitrogen Dioxide (NO₂).

The closest NO² monitoring station was located on Pont Llanbedr in the centre of the village, but monitoring at this location ceased in 2011 due to historic low readings; results prior to 2011 show that the NO² levels recorded at Pont Llanbedr were well below the annual mean air quality NO² objective.

Local air quality could change (positively and negatively) as a result of any alterations to the existing road infrastructure and changes in traffic flow and volumes. As local air quality is currently not considered to be a problem in Llanbedr it is important that this situation is not adversely affected. The current traffic congestion during peak holiday periods may lead to a temporary reduction in local air quality so there is also an opportunity to address this.

Methods and Limitations

Without knowing the exact nature of the businesses that may be based at the airfield, and hence associated traffic volumes and vehicle types, it is not considered feasible to provide a quantitative assessment of the likely changes to local air quality at this stage. Therefore, a qualitative assessment has been completed using professional judgement based on the expected likely changes to traffic flows associated with each option, and the subsequent potential net changes in pollutant emissions, compared with the Do Nothing scenario.

Summary of Key Findings

Options 1 to 4 would each facilitate a predicted increase in the number of vehicles accessing Llanbedr airfield, which in turn would be expected to result in an increase in exhaust emissions in addition to current traffic flows. However, this could be balanced by a reduced volume of through traffic passing through Llanbedr village resulting in improved traffic flow through Llanbedr and an associated reduction in congestion levels, which could generate improvements to local air quality within Llanbedr itself.

Options 5 and 6 would not be expected to result in a discernible impact on local air quality.

5.4.5 Greenhouse Gas Emissions

Introduction

The main contributor to greenhouse gas emissions from the study area is considered to be Carbon Dioxide (CO²) emitted by vehicle traffic using the A496 and local road network. The introduction of new transport proposals with improved design standards would not be expected to increase traffic flow significantly, although the number of freight and commuter traffic using the route could increase depending on which businesses are located at the airfield. Therefore, such proposals would need to consider the potential effects on greenhouse gas emissions. Beneficial effects as a result of transport infrastructure improvements leading to reduced engine strain and lower greenhouse gas emission levels may also be possible.

Methods and Limitations

Without knowing the exact nature of the businesses that may be based at the airfield, and hence associated traffic volumes and vehicle types, it is not considered feasible to provide a quantitative assessment of the likely changes to greenhouse gas emissions at this stage. Therefore, a qualitative assessment has been completed using professional judgement based on the expected likely changes to traffic flows associated with each option, and the subsequent potential net changes in greenhouse gas emissions, compared with the Do Nothing scenario.

Summary of Key Findings

As with Local Air Quality, **Options 1 to 4** would each facilitate a predicted increase in the number of vehicles accessing Llanbedr airfield, which in turn would be expected to result in an increase in exhaust emissions in addition to current traffic flows. However, this could be balanced by a reduced volume of through traffic passing through Llanbedr village resulting in improved traffic flow through Llanbedr and an associated reduction in congestion levels, which could generate a reduction of greenhouse gas emissions from within Llanbedr itself.

Options 5 and 6 would not be expected to result in a discernible impact on greenhouse gas emissions.

5.4.6 Landscape and Townscape

Introduction

The scenic location of the study area is underlined by its inclusion within the Snowdonia National Park (see Figure A.2, Appendix A). The study area includes the village of Llanbedr, which is surrounded by a predominantly rural landscape with stone walls, agricultural fields, scattered woodland and a strongly coastal feel. The wide open expanse of Llanbedr airfield is a dominant feature on the local landscape and any changes to the current appearance of this would be noticeable from the A496 and higher ground to the east. Receptors therefore include the landscape and associated designations, views from the surrounding area and the townscape of Llanbedr.

LANDMAP is a GIS (Geographical Information System)-based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent dataset that is defined by five methodological chapters; the Geological Landscape, Landscape Habitats, Visual and Sensory, Historic Landscape and Cultural Landscape.

LANDMAP summarises the Visual and Sensory aspect of the Morfa Mawr coast as: *‘a strong coastal feel - area of coastal farming. Airfield and caravan parks are visual detractors. Attractive views along coast’*. The overall evaluation is given as *“Moderate (attractive accessible views along coast notable quality, together with relatively few detractors and moderate sense of place)”*. Throughout

the evaluation the airfield is identified as compromising the overall visual and sensory aspect of the area.

Methods and Limitations

A qualitative assessment has been completed to identify the likely impacts on the local landscape and townscape and the locations of such impacts. In accordance with the WelTAG guidance the importance of the landscape has been considered and the scale of impact judged accordingly. Baseline information has been obtained via a desk study to identify landscape designations and perusal of the LANDMAP website²³ to establish the landscape context.

Summary of Key Findings

Either of **Options 1 to 4** would result in some significant change to the local landscape as each would involve the loss of varying amounts of agricultural land, floodplain and woodland. The townscape of Llanbedr could benefit overall due to the reduced number of vehicles travelling through the village.

Option 1 would result in large visual impacts from the construction of the southern link road necessitating a wide, deep cutting through an area of raised land to the south, which is fairly prominent in the local landscape as it rises above the flat, open land to the north and west.

With **Option 2** visual impacts would arise from the construction of a new bypass across the floodplain north of the Afon Artro and cutting through the area of raised land to the south, but the latter would be more reduced in extent than Option 1.

Option 3 would require the loss of approximately half of an area of woodland between Maes Artro and Mochras Road currently protected by a Tree Preservation Order. Visual impacts would arise from the construction of an elevated route across the floodplain north of the Afon Artro, affecting views from properties to the east, and cutting through the area of TPO woodland to the south. The new bridge structure over Mochras Road would result in a major adverse impact for properties at this location as it would be very close to them.

Option 4 would result in similar impacts to Options 2 and 3, but since the route would largely follow existing transport infrastructure such as Mochras Road, access tracks and the railway it could be less pronounced as an additional feature.

Option 5 could result in an overall positive impact on the townscape of Llanbedr due to a reduction in on-street parking.

²³ <http://test.landmap.ccw.gov.uk>

Option 6 would not have a discernible effect on landscape and townscape.

5.4.7 Biodiversity

Introduction

The study area includes various designated international and national protected sites for biodiversity conservation, including the following:

Special Areas of Conservation (SAC) (see Figure A.3, Appendix A):

SAC's present within 2km of the study area include:

- Pen Llyn a'r Sarnau – along the shoreline west of Llanbedr airfield;
- Morfa Harlech a Morfa Dyffryn – within the tidal range along the shoreline west of Llanbedr airfield, and;
- Coedydd Derw a Safleoedd Ystlumod Meirion – several components of this site are located on the eastern side of the A496 near Llanbedr.

Sites of Special Scientific Interest (SSSI) (see Figure A.4, Appendix A):

SSSI's present within 2km of the study area, mainly to the east of Llanbedr, include:

- Morfa Dyffryn – along the western boundary of Llanbedr airfield;
- Caeau Bwlch;
- Coed Aberartro;
- Coed Lletywalter;
- Rhinog, and;
- Coed Cors y Gedol.

Other notable biodiversity designations within the study area include:

- Morfa Dyffryn National Nature Reserve (NNR) – along the shore and up to the western boundary of Llanbedr airfield (see Figure A.5, Appendix A)
- Ancient Semi-Natural Woodlands – several woodlands to the east of Llanbedr (490m north-east, 520m south-east, 1km east and 1.3km north-east).

LANDMAP summarises the Landscape Habitat in the study area as being of two types:

Dry (Relatively) Terrestrial Habitats/Grassland & Marsh/Improved Grassland (Level 3)

“Moderate (There are no priority habitats within this aspect area but there are high priority UK BAP species within this aspect.)”

The Landscape Habitat summary explains that: *“the aspect is dominated by improved grassland which covers most of the aspect. Interspersed are patches of semi natural broadleaved woodland,*

marshy grassland and buildings and caravan sites. There are some ditches within this aspect which are probably habitat for the Water Voles, a UK BAP species which is also listed on Schedule 5 of the WCA, 1981, which are present within this aspect. There are no priority habitats”.

Dry (Relatively) Terrestrial Habitats/Woodland & Scrub/Broadleaved Woodland (Level 3)

“Outstanding (This aspect contains a significant amount of internationally protected habitats and species and also BAP habitats and species.)”

The Landscape Habitat summary explains that: *“the aspect area is dominated by upland oakwood which is an internationally protected habitat and also a UK priority BAP habitat. The condition of the habitat within this aspect is good. The aspect is located within a SSSI and SAC. The aspect area contains a bat site, with several bat species which are internationally protected (on Schedule 5 of the WCA, 1981 and most are on Annex II and IV of the Habitats Directive). There are also bird species which are on the Snowdonia BAP, these include: Pied Flycatcher (*Ficedula hypoleuca*), Redstart (*Phoenicurus phoenicurus*), Wood Warbler (*Phylloscopus sibilatrix*)”.*

An extended Phase 1 habitat survey and bat survey of the land between Llanbedr and the railway line was completed during the summer of 2014. The various habitats confirmed to be present include: improved grassland, dune grassland, dense saltmarsh, open dunes, coniferous woodland, semi-natural broadleaved woodland and river corridor. The following protected species are considered likely to be present and therefore potentially affected by transport improvements:

- Otter;
- Water Vole;
- Barn owl;
- Breeding birds;
- Great Crested Newt;
- Bat species;
- Reptiles, and
- Badger.

The high number of protected sites and wide variety of interlinked habitats with potential to support a range of protected species highlights the value of the study area for biodiversity.

Methods and Limitations

A qualitative assessment has been completed in order to describe the characteristic biodiversity features of the study area, appraise their importance and describe and assess the likely impact and significance respectively in accordance with WelTAG guidance. Information has been obtained via a desk study to search for designated biodiversity sites and local historical biodiversity records (Cofnod

database) and consultation with Natural Resources Wales. The LANDMAP²⁴ website was used to provide contextual information about the habitats present in the overall study area.

An extended Phase 1 habitat and bat survey was completed in the summer of 2014 to identify habitats present and evidence of protected species within the land between Llanbedr and the railway line. A limitation of the field survey was that permission to access some areas of land was not granted. Therefore public rights of way were used instead, where possible, to provide a general overview of such areas.

Summary of Key Findings

Despite the presence of a large number of protected biodiversity conservation sites in the vicinity, none are expected to be directly affected by any of the options appraised in this study.

For **Options 1 to 4** adverse impacts on biodiversity would be caused by the loss of various habitats, including semi-improved grassland, a small area of saltmarsh, woodland and a small area of marshland. Potentially suitable habitat for otters, badgers, breeding birds, Barn Owls, water voles and bat species could be lost.

With **Option 1** the large cutting to the south could create significant severance to various protected species commuting routes and result in fragmentation of habitats. **Option 2** would also require some cutting to the south of the Afon Artro which, although smaller in scale, would result in similar effects. **Option 3** is likely to result in a Lesser Horseshoe bat roost being lost and having to be compensated for with a similar structure elsewhere. This option would also require the loss of around half of an area of woodland between Maes Artro and Mochras Road. **Option 4** would result in the loss of a small area of marshland adjacent to the railway.

Options 5 and 6 would have no discernible effect on biodiversity.

5.4.8 Soils

Introduction

The majority of the study area to the west of the A496 is underlain by superficial deposits which mask the solid geology. The superficial deposits comprise areas of Glacial Till predominantly south of Llanbedr village and to the east and west of the A496. There is also a small raised area of glacial till forming Shell Island on the western fringe of the study area.

²⁴ <http://test.landmap.ccw.gov.uk>

No Regionally Important Geological Sites (RIGS) or designated sites in connection with geology or geodiversity are present in the study area. LANDMAP summarises the geological landscape value of the study area as follows:

- Afon Artro aspect area: “*Outstanding (SSSI Rhinog SH 640 300 Quaternary periglacial stone stripes, fault controlled valley, Cambrian type area)*”.
- Mochras Farm aspect area: “*Outstanding (SSSI Morfa Harlech SH 560 350 - Quaternary dune plain; Morfa Dyffryn SH564254)*”.

Neither of these SSSI’s would be affected by any of the options.

Soil types in the study area are predominantly acid or very acid loamy soils which are typically wet or with naturally high groundwater. These soils generally correspond with areas of alluvium and fluvial soils and areas of peat. To the east of the A496 and at Shell Island free-draining, slightly acid loamy soils are present, typically where the Glacial Till or bedrock underlies the soil. In the south-west of the study area sand dune soils are present, generally corresponding with areas of blown sand.

The provisional Agricultural Land Classification (ALC) grades for Llanbedr and the surrounding area are a mix of Grade 4 (poor), Grade 5 (very poor) and non-agricultural.

Methods and Limitations

A qualitative assessment has been completed to describe the key characteristics of soils in the study area and provide a statement of likely effects on them. Information to describe the baseline conditions was obtained via a desk study using the British Geological Society’s Sheet 135, Provisional Drift Edition, the LANDMAP website²⁵ and the provisional ALC maps.

A limitation of this study is that the ALC maps are currently provisional and there is therefore uncertainty over how informative they are for appraising different options beyond a strategic level. This area has never been surveyed in detail according to the latest criteria for grading agricultural land in England and Wales.

Summary of Key Findings

Options 1 to 4 would involve the loss and severance, to varying degrees, of mostly semi-improved agricultural land along with smaller areas of saltmarsh and improved grassland.

The large area required to accommodate the cutting for **Option 1** would result in the loss of a large area of farmland for the southern link road, which would also be severed in two. A large field to the north of the Afon Artro would be severed in half and saltmarsh lost. **Option 2** would result in a

²⁵ <http://test.landmap.ccw.gov.uk>

similar impact, but as it is located further east the amount of farmland lost and severed south of the Afon Artro would be slightly less than for Option 1.

Option 3 is located closest to Llanbedr so the impact on farmland south of the Afon Artro would be the least of Options 1 to 4, although some land would still be lost to improve Mochras Road. However, at least two fields to the north of the Afon Artro would be severed by this option.

With **Option 4**, a similar amount of land north of the Afon Artro would be affected as with Option 1. There would also be loss and severance of farmland to the south of the Afon Artro, further to the south than that affected by Options 1, 2 and 3.

Options 5 and 6 would not have a discernible effect on soils.

5.4.9 Heritage

Introduction

The study area is located wholly within the Arduwy Landscape of Outstanding Historic Interest (LOHI) (see Figure A.8, Appendix A). The designated area stretches from the vale of Ffestiniog (Afon Dwyryd) in the north to near Barmouth in the south, and from the tops of the Rhinogau mountains in the east down to the coast in the west. It includes a variety of different terrains and habitats, and different historic landscape types, such as open mountain tops, heavily-wooded valley sides, low-grade agricultural land, small villages and beaches. It is particularly noted for its wealth of extensive relict archaeological remains, mainly dating from the late prehistoric period and for its World Heritage Site (Harlech)²⁶.

The Arduwy LOHI is divided into smaller landscape areas which have been classified through a process called Historic Landscape Classification. Of these, the study area overlaps with areas 11 (Royal Aerospace Establishment, Llanbedr), 14 (Coastal plain behind RAE Llanbedr), 15 (Fieldscape, mid-hill slopes, Cae'r Meddyg) and 18 (Llanbedr village).

LANDMAP summarises the Cultural Landscape of the study area as follows:

- Llanbedr-Dyffryn Arduwy-Tal y Bont aspect area: *“High (as part of the Register Landscape of Arduwy.)”*
- Coastal Arduwy aspect area: *“Outstanding (and also, in a different sense, moderate, owing to the impact of the caravan parks.) The richness of the historic landscape justifies this aspect area’s evaluation as outstanding, yet this is somehow despite itself.*

²⁶ <http://www.heneb.co.uk/ardudwycharacter/ardudwyintro/ardudwythemeseng.html>

The Historic Landscape is summarised by LANDMAP as follows:

- Ardudwy coastal strip aspect area: *“Moderate (given that what survives alongside the fish and chip outlets and the caravans no longer dominates the landscape.)”*
- Ardudwy lower slopes aspect area: *“Outstanding (for its distinctive landscape of dry-stone walls and scattered multi-period farmsteads.)”*

Overall, the study area is considered to have good archaeological potential reflecting the multiple phases of activity referred to in the Register of Historic Landscapes. This may include areas of relict or buried archaeological landscape, providing complementary evidence to the extensive upland relict landscapes to the east, and thus of potentially considerable research value²⁷.

Various designated features of Heritage significance are located within and adjacent to the study area, including the following listed features (see Figure A.6, Appendix A):

- St. Peter Church (Grade II*): within a sub-rectangular churchyard set well back from the north-east side of the A496 at the north end of Llanbedr village.
- Taltreuddyn Fawr (Grade II* - listed): on the northern side of a lane which runs west from the A496, some 2.5km north of Dyffryn Ardudwy
- Wenallt stores (Grade II): located at the south-west side of the A496 in the centre of Llanbedr, opposite the junction with the road to Pentre Gwynfryn and to the north-west of Pont Llanbedr.
- Pont Llanbedr (Grade II): carries the A496 and spans the Afon Artro in the centre of Llanbedr. This bridge is also a Scheduled Ancient Monument.
- Moriah Calvinist Chapel (Grade II): located on the eastern side of the A496 at the southern end of Llanbedr. Set back slightly from the street in a raised, railed yard.
- Milestone (Grade II): set alongside the eastern side of the A496 at the southern end of Llanbedr, and;
- Old Dairy, Plas-Y-Bryn Farm (Grade II): located approximately 500m south-west from the village centre.

Those considered as having the highest potential to be affected by transport improvements (directly or indirectly) include: Wenallt stores, Pont Llanbedr, Moriah Calvinist Chapel and the Milestone.

The following Scheduled Ancient Monuments are present within the study area (see Figure A.7, Appendix A):

- Pont Llanbedr: carries the A496 and spans the Afon Artro in the centre of Llanbedr.
- Llanbedr Standing Stones: a prehistoric standing stone pair, located 285m north-west of Llanbedr.

²⁷ Gwynedd Archaeological Planning Service, correspondence dated 13th October 2014

In addition, the fields in the south of the study area contain an extensive complex of well-preserved earthworks comprising a defended enclosure with associated terraced field system. These are likely to be of late prehistoric to early medieval date and there is potential for this complex to be considered nationally important²⁸.

Methods and Limitations

A qualitative assessment has been completed in accordance with WelTAG guidance to describe the features present within the study area, appraise their value, describe the likely impact on them for each option and assess the significance. Information has been obtained via a desk study using GIS to identify designated heritage features within the study area, the LANDMAP website²⁹ to identify the cultural and historical landscape context, and consultation with Cadw and Gwynedd Archaeological Planning Service.

Summary of Key Findings

All of the options are located within the Arudwy Landscape of Outstanding Historic Interest and any changes to the local landscape due to the addition of new transport infrastructure associated with **Options 1 to 4** could be expected to result in adverse effects on this feature. An Assessment of the Significant Impacts of Development on Historic Landscape (ASIDOHL) is therefore likely to be required for any of these options.

Options 1 to 4 (especially Options 2 to 4) could result in a positive effect on Pont Llanbedr (Grade II-listed and a Scheduled Ancient Monument) due to potentially lower numbers of vehicles crossing it in future, particularly larger towing vehicles, and therefore reduced future strain and damage to the structure.

The area of cutting required for **Options 1 and 2** south of the Afon Artro is likely to have an adverse effect on the complex of well-preserved earthworks within the area (which is also located within the Arudwy Lower Slopes Historic Landscape aspect area, considered by LANDMAP to be of “*outstanding*” value).

With **Option 3**, the route north from the Afon Artro would pass very close to the Llanbedr Standing Stones Scheduled Ancient Monument (SAM) resulting in a likely significant change to the setting of this heritage feature. **Options 1, 2 and 4** would pass within approximately 100-150m west of this feature so would be less likely to have a large impact on its setting.

Option 4 would pass close to the Grade II-listed Pen y Bryn farm and could therefore result in an adverse effect on the setting of this feature.

²⁸ Gwynedd Archaeological Planning Service, correspondence dated 13th October 2014

²⁹ <http://test.landmap.ccw.gov.uk>

Option 5 could result in a slight adverse impact on the setting of Wenallt stores (Grade II-listed) if a car park were to be located behind the building. The introduction of double yellow lines through the village could also potentially affect the setting of Wenallt stores and Pont Llanbedr.

Option 6 would not have a discernible effect on heritage features. However, Pont Llanbedr would continue to be at risk from strain and damage associated with traffic flow and congestion from vehicles using the Mochras Road/A496 junction. This risk could potentially increase depending on the future development of Llanbedr airfield.

5.4.9 Water Environment

Introduction

The following Main Rivers are present within the study area (see Figure A.9, Appendix A):

- The Afon Artro passes through the centre of Llanbedr, from where it flows north and passes Pensarn Wharf.
- The Afon Cwmnantcol joins the Afon Artro at Pont Glyn-Artro in Pentre Gwynfryn approximately 1.5km east of Llanbedr.
- A network of un-named main drains is located on the low and level land adjacent and to the east of Llanbedr airfield.

In addition there are several complex networks of ordinary watercourses present across the study area (see Figure A.10, Appendix A); these include small streams, field drains, ditches and cuts.

The study area lies within the Ardudwy Marsh Internal Drainage District (IDD), which stretches from Llandanwg to the north of Llanbedr, follows the western side of the A496 carriageway towards Llanbedr, then follows the western side of the railway line to Llaneddwyn. This is one of 11 such areas in north-west Wales which are administered by Natural Resources Wales to manage drainage in areas which have special drainage requirements.

Flood Risk

Development Advice Maps (produced by the Welsh Government) show differing levels of flood risk in an area and are used alongside Planning Policy Wales and TAN 15 to manage development in respect to flooding. There are three Development Advice Zones: A, B and C1/C2. Zones A and B are areas of generally low risk (*i.e.* outside the main river flood plain). Zone C represents the extreme flood outline and is further subdivided into two zones, as follows:

- C1: “*Areas of the floodplain which are developed and served by significant infrastructure, including flood defences*” and;
- C2: “*Areas of the floodplain without significant flood defence infrastructure.*”

There are various Zone B designations restricted to scattered locations along the Afon Artro within Llanbedr. A large area to the west of Llanbedr falls within Zone C1, which includes the airfield and part of Mochras Road. Zone C2 occurs along the shoreline and along the floodplains of the Afon Artro and Afon Cwmnantcol, including large areas of Llanbedr village. The area of land to the south of the Afon Artro and west of the A496 is not classified within any DAM zones. See Figure A.11, Appendix A for locations of DAM's within the study area.

Methods and Limitations

A qualitative assessment has been completed to identify the water features and flood risk areas within the study area that could be affected and consider the overall effect in accordance with WelTAG guidance. Information has been obtained via a desk study using GIS to identify water features and designated flood risk areas, and consultation with Natural Resources Wales.

Summary of Key Findings

One of the key constraints associated with **Options 1 to 4** is that all require an area of (mainly fluvial) floodplain to be traversed *i.e.* the fields immediately north of the Afon Artro and west of the A496. As a result further development of any of the options is likely to require hydraulic modelling and detailed assessment to assess the potential consequences on flood risk in the local area. The West of Wales Shoreline Management Plan 2 (SMP2) suggests potential options for changing the shape of the Artro estuary in the future and this should also be carefully considered as part of any transport access improvement design, in terms of implications for both land use and flooding.

Flood defences maintained by Natural Resources Wales (NRW) could also be adversely affected by **Options 1 to 4** and therefore any detailed design work would need to consider this. There may also be an opportunity to provide an improved flood defence as part of any engineering works north of the Afon Artro. **Options 1 and 4** would affect flood defences on the western and eastern banks of the Afon Artro, while **Option 2** would affect the eastern flood defence only. **Option 3** would also affect the eastern flood defence only, but this would sever a shorter length and be closer to the A496 than the route taken by Option 2.

Each of **Options 1 to 4** would require a bridge structure over the Afon Artro as well as crossing several smaller watercourses.

Option 4 would also result in the potential loss of a small area of marshland adjacent to the railway line, which is within a tidal floodplain.

Both potential car park locations affected by **Option 5** are within areas predicted to be at flood risk. TAN15 requires a presumption against introducing such developments into areas vulnerable to

flooding. Any proposals to raise the ground at these locations would therefore need to be assessed to ensure that there is no third party impact due to the displacement of flood water.

Option 6 would not be likely to have a discernible effect on the water environment.

5.4.11 Transport Safety

Introduction

Between 2009 and 2013 there were five Personal Injury Accidents (PIA's) within the study area in total, all along the A496; four slight and one serious. Three were to the north and two were to the south of Llanbedr.

Methods and Limitations

The number of PIA's on the A496 between Llanfair and Dyffryn Ardudwy from 2009 to 2013 inclusive was collated from previous records. There may have been other vehicle accidents during this period (*i.e.* involving vehicle/property damage only) which were unrecorded. The Cost-Benefit Analysis described in Section 5.4.1 included a prediction of future PIA's associated with each option. These are shown in Table 5.4.11 and summarised in the following section.

Summary of Key Findings

Between 2009 and 2013 there were two PIA's, both of slight severity, recorded on the A496 between where Options 1 to 4 would link with the A496. Based on national figures, an additional junction on **Options 1 to 4** and an increase in vehicle speeds on each of the proposed options could result in an increase in future PIA's (see Table 5.4.11). **Option 3** would result in the smallest increase (5.9 PIA's over 60 years) while **Option 4** would generate the largest increase (36.3 PIA's over 60 years).

Table 5.4.11: Summary of COBA analysis of Options 1 to 4 regarding predicted change in personal injury accidents

Option	Predicted change in personal injury accidents (number of collisions over 60 years)
1	Increase by 28.7
2	Increase by 20.6
3	Increase by 5.9
4	Increase by 36.3

A likely reduction in larger, towing vehicles travelling through Llanbedr on the A496 and Mochras Road could lead to improved transport safety in the village as a result of **Options 1 to 4**, especially for pedestrians and cyclists. However, there would be less of a change with **Option 1** as through traffic would still be expected to continue to pass through Llanbedr.

Options 2 and 3 are likely to require departures from current highway standards in order to provide a junction with the A496 to the north of Llanbedr as the two routes could converge together closely at an acute angle. **Option 4** would also likely require highway standard departures, particularly for the radii that would enable the southern section of the bypass to integrate with the topography. The addition of a new junction on Mochras Road close to the railway crossing, as well as another new junction for Mochras Road slightly to the north, would also present a potential safety concern.

With **Option 5**, a reduced number of vehicles parked on the A496 through Llanbedr would be expected to lead to a slight increase in transport safety by removing obstacles from the flow of traffic. Pedestrians and cyclists would be able to manoeuvre through the village more easily without having to avoid parked vehicles.

Without any changes (**Option 6**) the current transport infrastructure would remain substandard, particularly at the Pont Llanbedr/Mochras Road junction. This could result in a future reduction in transport safety if there is an increase in vehicles (particularly larger vehicles) accessing Mochras Road to/from Llanbedr airfield.

5.4.12 Personal Security

WelTAG defines personal security as meaning “*relative freedom from risk or fear of attack or robbery*”, including personal possessions.

There is not expected to be a discernible change to Personal Security as a result of any of the options being appraised.

5.4.13 Permeability

Introduction

For the purposes of WelTAG, permeability refers to the ease with which people in the study area can travel by non-motorised modes e.g. cycling, foot and horseback.

Cycling facilities within the study area consist of the National Cycle Route Number 8 (Lôn Las Cymru), which runs from Cardiff to Holyhead and passes through Llanbedr along the A496. There is also a local cycle route which runs from Llanbedr towards the coast.

There are several local Public Rights of Way (PRoW) within the study area (see Figure A.12, Appendix A). PRoW Llanbedr Number 1 runs north and west of the village utilising the existing flood defence provisions adjacent to the Afon Artro. PRoWs Llanbedr 70, 73, 79 and 80 are located to the east of the A496 approximately 600m south of Llanbedr village centre. A pedestrian footway connects the car park on Mochras Road with Llanbedr railway halt. There is also a pedestrian

footway present alongside Mochras Road from opposite Capel Bach to Pont Llanbedr. However, there is a gap of approximately 260m between this footway and the Mochras Road car park.

There is a PRoW/bridleway (Llanbedr number 43) which connects Llanbedr railway halt on Mochras Road to the A496 approximately 530m south of Llanbedr.

Methods and Limitations

A qualitative assessment was completed, considering the current provisions for non-motorised travel within the study area and the ease with which these can be used. Any potential changes to these as a result of each option have been identified and considered.

Summary of Key Findings

Option 1 could result in a partial reduction in through traffic using the A496 and Mochras Road in Llanbedr, creating a minor beneficial impact for non-motorised users in this area. **Options 2 to 4** would provide an alternative route for through traffic so would be expected to improve the amenity of the A496 and Mochras Road for pedestrians and cyclists more significantly. National Cycle Route 8 (Holyhead – Chepstow) passes through the centre of Llanbedr and the amenity of this would be expected to increase as a result of reduced traffic flows.

Options 1 to 4 could each possibly sever a public right of way (PRoW 1) along the flood defence embankment to the north of the Afon Artro.

Option 1 would involve the loss of the village/railway halt car park adjacent to the Afon Artro reducing the option to walk to the railway halt from this location (although an alternative parking area would be assumed to be provided, subject to suitable land being available).

With **Option 2** the village/railway halt car park would be unaffected, but there would be a potential loss of the current footway to the railway halt unless it was realigned adjacent to the new Mochras Road tie-in. There may also be opportunities to improve the footway provision between Llanbedr and the car park, which currently terminates opposite Capel Bach.

Option 3 could create a potential opportunity to provide a non-motorised user route along the disused section of Mochras Road to improve connectivity between Llanbedr and the village/railway halt car park.

Option 4 would result in the loss/severance of a bridleway. Mochras Road would be severed to non-motorised users due to them having to travel along a short section of the new bypass, between the two new Mochras Road junctions. As with Option 1, the village/railway halt car park and pedestrian access to the railway halt would also be lost (unless an alternative could be provided).

With **Option 5**, a reduced number of vehicles parked on the A496 through Llanbedr would be expected to increase the amenity of the village for pedestrians and cyclists.

Option 6 would mean that the current traffic volume along the A496 would be expected to remain the same as at present and continue to intimidate pedestrians/cyclists in the vicinity.

5.4.14 Physical Fitness

Introduction

For the purposes of this study, Physical Fitness is considered to have close links with Permeability since it relates to active travel, which generally involves travel by foot, bicycle or horse. Therefore, the baseline information collated for the Permeability appraisal has also been used when considering the effects of each option on Physical Fitness.

Methods and Limitations

A qualitative assessment has been completed, using the baseline information gathered for Permeability, by considering whether each option is likely to result in an increase or decrease in travel via active modes.

Summary of Key Findings

With **Options 1 to 4**, there would be potential to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them, particularly **Options 2 to 4**, which would enable through traffic to bypass Llanbedr. **Options 2 and 3** could also provide opportunities to improve non-motorised user travel between Llanbedr and the village/railway halt car park.

Improved permeability within Llanbedr for non-motorised users as a result of **Option 5** would be expected to generate a slight increase in foot and cycle travel and hence contribute to an improvement in physical fitness.

With **Option 6** there would be no discernible change to the current situation.

5.4.15 Social Inclusion

WelTAG considers social inclusion to be the “*degree with which members of society are able to lead a full life*”, which includes accessibility to key services.

There is not expected to be a discernible change to Social Inclusion as a result of any of the options being appraised.

5.4.16 Equality, Diversity and Human Rights

WelTAG refers to equality, diversity and human rights as encompassing all demographic groups, particularly under-represented groups. The Welsh Government's statutory equality duties focus on gender, race and disability, but acknowledge that all equality impact groups should be considered, including age, sexual orientation, religion or belief and human rights generally.

There is not expected to be a discernible change to equality, diversity and human rights as a result of any of the options being appraised.

Table 5.4.12: Summary of Options Appraisal

Appraisal Criteria	Summary of Significance					
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Welsh Impact Areas						
Economy						
Transport Economic Efficiency						
<i>Net Present Value</i>	Slight – (-£0.630m)	Slight + (£3.542m)	Moderate + (£6.633m)	Moderate + (£4.305)	N/A	Neutral (£0m)
<i>Journey times</i>	Slight +	Slight +	Slight +	Slight +	Slight +	Slight -
EALI						
<i>Airfield</i>	Large +	Large +	Large +	Large +	Neutral	Large -
<i>Llanbedr</i>	Slight -	Moderate -	Large -	Large -	Moderate +	Neutral
Environment						
<i>Noise</i>	Slight -	Slight -	Moderate -	Slight -	Neutral	Slight -
<i>Local Air Quality</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
<i>Greenhouse Gas Emissions</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
<i>Landscape and townscape</i>	Large -	Moderate -	Moderate -	Moderate -	Slight +	Neutral
<i>Biodiversity</i>	Moderate -	Slight -	Moderate -	Slight -	Neutral	Neutral
<i>Soils</i>	Moderate -	Moderate -	Slight -	Slight -	Neutral	Neutral
<i>Heritage</i>	Moderate -	Moderate -	Large -	Moderate -	Slight -	Slight -
<i>Water environment</i>	Moderate -	Moderate -	Moderate -	Moderate -	Slight -	Neutral
Society						
<i>Transport safety</i>	Moderate -	Moderate -	Slight -	Moderate -	Slight +	Slight -
<i>Personal security</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
<i>Permeability</i>	Slight +	Moderate +	Slight +	Slight +	Slight +	Moderate -
<i>Physical fitness</i>	Slight +	Slight +	Slight +	Slight +	Slight +	Neutral
<i>Social inclusion</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
<i>Equality, Diversity and Human Rights</i>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Transport Planning Objectives						
<i>TPO 1</i>	✓	✓	✓	✓	✓✓	0
<i>TPO 2</i>	✓	✓	✓	✓	✓	0
<i>TPO 3</i>	✓✓	✓✓✓	✓✓	✓✓	✓	0
<i>TPO 4</i>	✓✓	✓✓✓	✓✓✓	✓✓✓	✓	0
<i>TPO 5</i>	✓✓	✓✓✓	✓✓	✓✓	✓	0
<i>TPO 6</i>	✓✓	✓✓✓	✓✓	✓✓	✓	0

TPO 7	xx	xx	xx	xxx	0	0
TPO 8	✓	✓✓	✓	✓✓	✓	0
TPO 9	xx	xx	xx	xx	0	✓
Public acceptability	Favoured route option following participation event on 06/11/14 (32 points). Main benefit associated was that through traffic could still use the A496 and hence provide trade for local businesses.	Ranked 4 th route option of 4 following participation event on 06/11/14 (26 points).	Ranked 2 nd route option of 4 following participation event on 06/11/14 (29 points). Familiarity with route as it largely follows line of 1992 bypass route. Less land take than Options 1, 2 & 4.	Ranked 3 rd route option of 4 following participation event on 06/11/14 (27 points). Some strong support as furthest from village.	Public support expressed for improvements in village during participation events.	Likely to be favoured by those adversely affected by options 1 – 4. Possible perception of wasted opportunity by others.
Stakeholder acceptability	Local community council favoured this option following participation event on 06/11/14. Several landowners affected due to large area of cut required for the southern link road.	Local business owner concerns over bypass options. Several landowners affected due to large area of land required.	Local business owner concerns over bypass options. Close proximity to Maes Artro holiday park and residential properties on Mochras Road. Lack of access east into Llanbedr from new bypass route and Shell Island via Mochras Road could deter seasonal visitor access to Llanbedr.	Local business owner concerns over bypass options. Potential loss of at least three properties unlikely to be acceptable.	Likely to be acceptable to most, but need to consider location of double yellow lines and effect on businesses.	Unlikely to be acceptable to developers/promoters of the Snowdonia Enterprise Zone. Does not address TPO's.
Technical/Operational Feasibility	Large area of cut for southern	Large area of cut for southern	Constrained working space	Departures from standards	Two potential car park locations –	Continued routine maintenance as at

	section, but could contribute to fill for northern section.	section, but could contribute to fill for northern section.	for Afon Artro/Mochras Road crossover due to adjacent properties and river. Cut required in southern section.	required for southern section. Longest bypass option (c. 1950m).	access improvements potentially required	present
Financial affordability	c.£11.6m* Negative NPV (-£0.630m) and lowest benefit:cost ratio (0.920).	c.£11m* Positive NPV (£3.542m) and positive benefit:cost ratio (1.501).	c.£12.4m* Positive NPV (£3.740m) and benefit:cost ratio (1.472).	c.£12.3m* Highest positive NPV (£4.305m) and benefit:cost ratio (1.537).	Low expected cost	Routine maintenance costs only
Risks	Large area of land affected - landowner objections likely. Flood risk considerations required for northern link.	Business owner objections likely. Flood risk considerations required for northern link.	Business owner objections likely. Loss of half of a TPO area. Very close to Standing Stones SAM. Potential conflict with Eryri LDP housing allocation area. Large structure required between residential properties on Mochras Road and Afon Artro. Flood risk considerations required for northern link.	Business owner objections likely. Very close to live railway. Overhead power lines. Flood risk considerations required for northern link.	Land owner agreement required for car parking areas.	Failure of Snowdonia Enterprise Zone to meet its aims.

* Estimated construction cost only e.g. does not include purchase of land/property or preliminary design/assessment.

6.0 Summary and Recommendations

This report summarises the results of the Planning and Appraisal (Stage 1) phases of the WeITAG study that has been completed to investigate potential transport access improvements for the Llanbedr airfield component of the Snowdonia Enterprise Zone.

Transport Planning Objectives have been established in order to define solutions with which to address the transport problems identified in the study area. The solutions identified at the WeITAG Planning stage were sifted to produce refined options that have been evaluated in greater detail as part of the WeITAG Appraisal (Stage 1) process.

Public participation has contributed to identifying the problems, opportunities and constraints within the study area. The local public have also provided input with regard to the relevance of the transport planning objectives and their views on the proposed options, which has been considered as part of the WeITAG study. Baseline information from desk studies, consultation with environmental stakeholders and an ecological field survey has also been used to support the WeITAG study.

Option 1 would meet many of the TPO's; in particular ensuring that transport connectivity to and from Llanbedr airfield was improved. This option was also the most-favoured by the public and the local community council at the last public participation event (6th November 2014). Maintaining the A496 through Llanbedr as the through route for traffic would also allay concerns raised by local businesses about a potential reduction in passing trade associated with a bypass option. However, Option 1 would result in a negative net present value for money, meaning it is not cost effective compared to Options 2 to 4. This option would also not completely address some of the TPO's, such as reducing traffic congestion at the Mochras Road/A496 junction and reducing the negative impact of traffic on Llanbedr. This option would also result in a large landscape and land use impact as a result of an extensive cutting being required for the southern link road, with associated land take and severance.

Options 2 to 4 would provide an opportunity to address the TPO's relating to both improving access for Llanbedr airfield and improving the amenity of Llanbedr village. However, concerns have been raised by local business owners about the potential adverse effects of a bypass option.

Option 2 would be expected to provide the largest contribution to achieving the TPO's by following a an alignment that minimises the adverse impact on the landscape and land use and provides continued local access along Mochras Road to and from Llanbedr, while improving vehicular access to Llanbedr airfield. Option 2 is also estimated to be the cheapest to construct.

Option 3 benefits from having the least impact on surrounding land use and landscape. However, it would not be possible to provide local access along Mochras Road east of the bypass without a high likelihood of residential properties being lost. This option would also have a large adverse impact on a Scheduled Ancient Monument and woodland protected by a Tree Preservation Order, and is estimated to be the most expensive to construct.

Option 4 has the highest positive net present value and benefit:cost ratio. However, there is a high probability that properties close to the railway crossing would be lost, or severely affected. This option would also be likely to require the most departures from highway standards (particularly through the southern section) and would need to traverse an area of wet ground adjacent to the Cambrian railway line. The close proximity to the railway line also presents significant construction feasibility and safety risks.

Option 5 would not address most of the TPO's and would therefore not be expected to be implemented on its own. However, in combination with a transport access improvement option (1 to 4) it could contribute to delivering improvements to Llanbedr village centre by removing obstructions from on-street parking and providing improved car parking facilities for visitors and residents alike.

Option 6 (Do Nothing) would not result in most of the TPO's being achieved, particularly improved access for Llanbedr airfield, but was included in this WelTAG study as a baseline against which to compare other options.

6.1 Recommendations

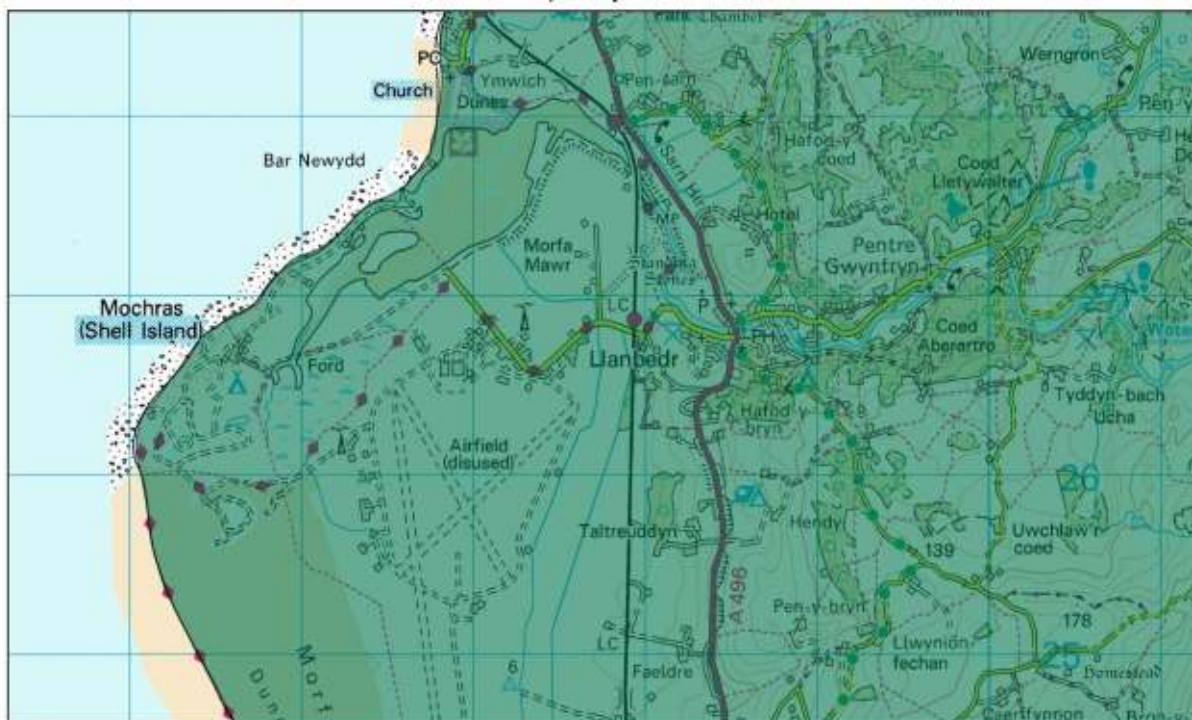
1. Options 1, 3, 4 and 6 are not recommended for any further assessment due to the significant disadvantages associated with them and summarised previously.
2. Option 2 is considered to be an optimal route that offers the largest contribution to achieving the TPO's while avoiding the disadvantages associated with Options 1, 3 and 4; it should therefore be investigated further with a view to defining an optimal route alignment.
3. Option 5 should be considered in further detail, in combination with Option 2.
4. Once the future business use of Llanbedr airfield is confirmed an assessment of the potential impacts of the proposed access improvements (positive and negative) on the local economy of Llanbedr and the surrounding area should be completed.

Appendices

Appendix A: Supporting Figures



Figure A.1: Study area location




 Area within Snowdonia National Park

Figure A.2: Snowdonia National Park



Figure A.3: Special Areas of Conservation within 2km of the study area

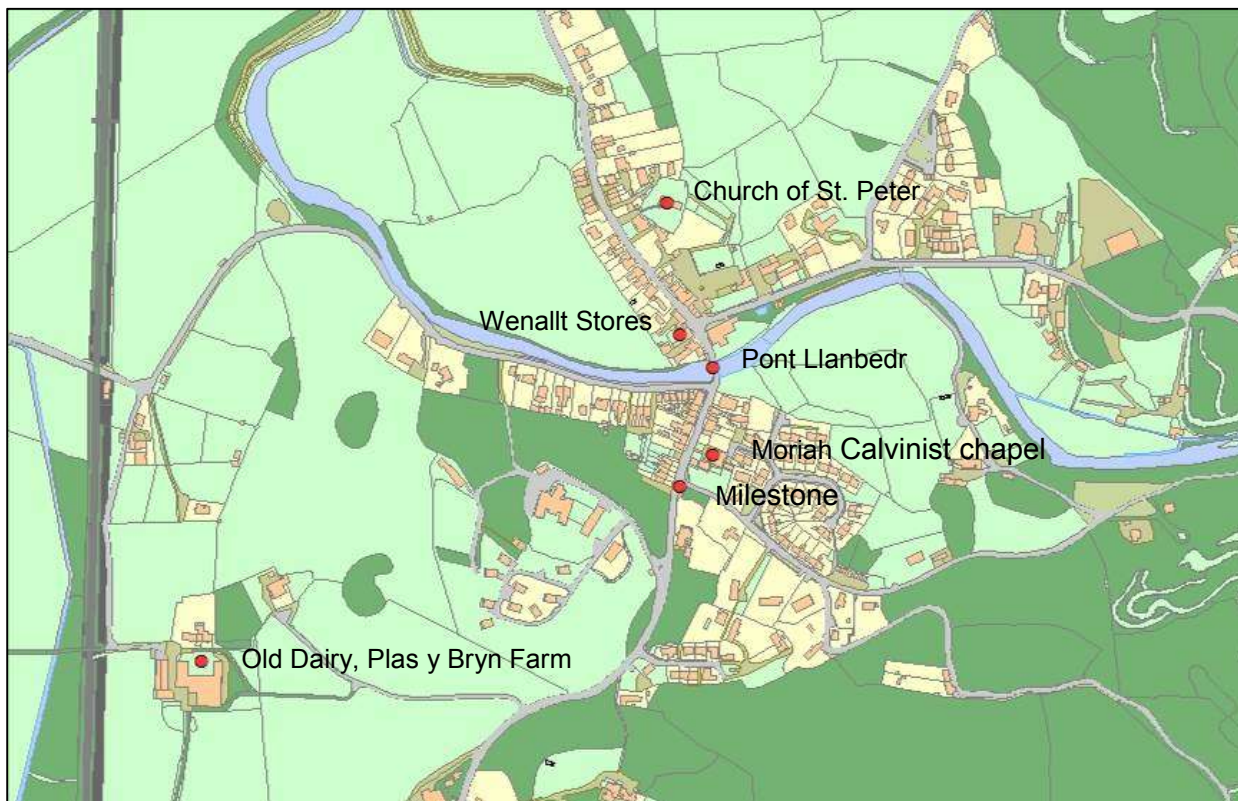


Figure A.4: Sites of Special Scientific Interest within 2km of the study area



 Morfa Dyffryn National Nature Reserve

Figure A.5: Morfa Dyffryn National Nature Reserve



● Listed buildings potentially affected

Figure A.6: Listed Buildings



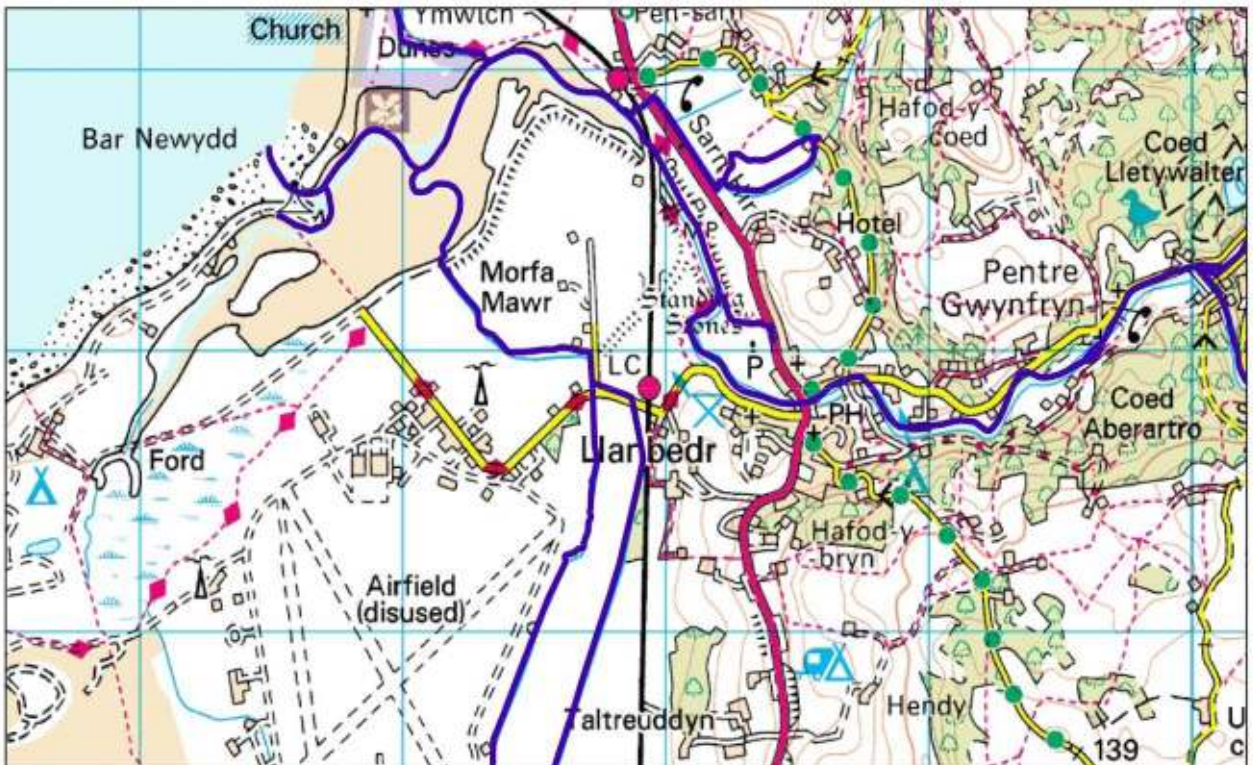
■ Scheduled Ancient Monuments

Figure A.7: Scheduled Ancient Monuments



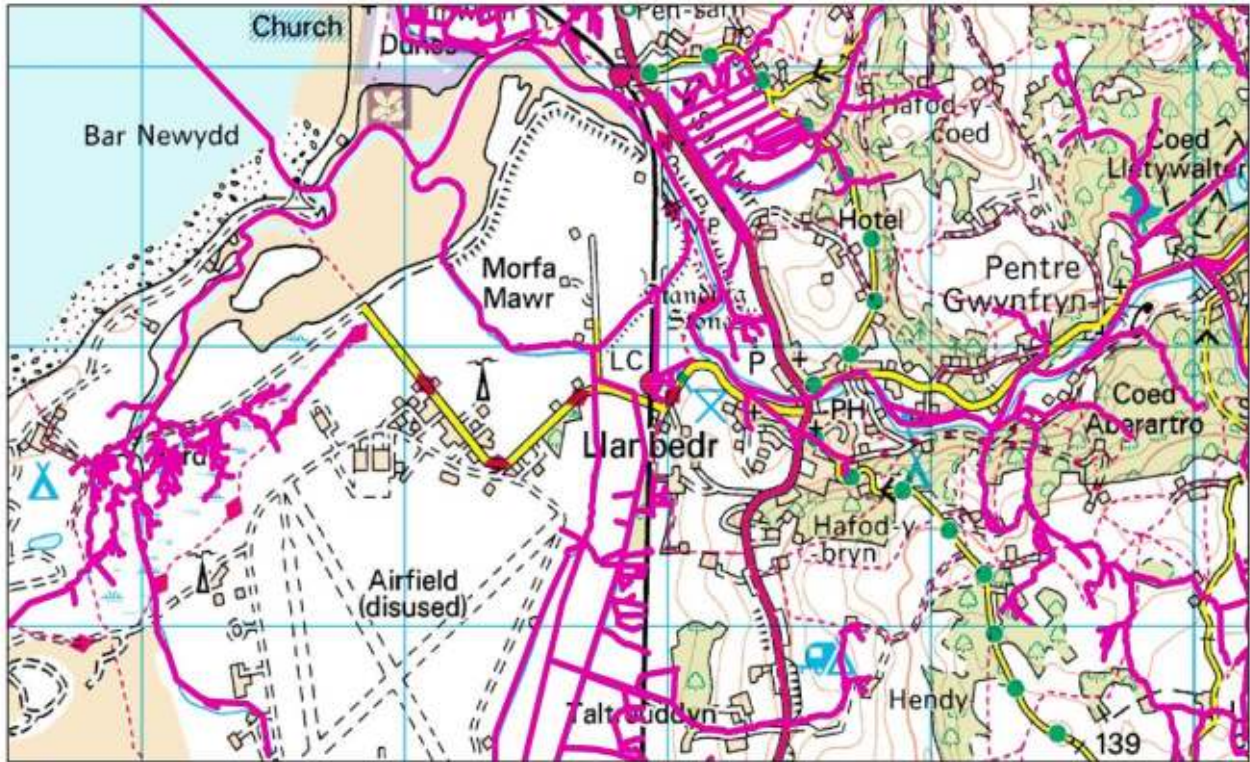
■ Area within Arudwy Landscape of Outstanding Historic Interest

Figure A.8: Arudwy Landscape of Outstanding Historic Interest



— Main rivers

Figure A.9: Main rivers



— Ordinary Watercourses

Figure A.10: Ordinary watercourses



- Development Advice Map Zone B
- Development Advice Map Zone C1
- Development Advice Map Zone C2

Figure A.11: Development Advice Maps showing zones B, C1 and C2



--- Bridleway

— Link path

--- Footpath

— Unclassified Road

A.12: Public Rights of Way

Appendix B: Appraisal Summary Tables

Option 1: Provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	<p>The cost-benefit analysis calculated a negative Net Present Value (NPV) of £0.630m and a Benefit to Cost Ratio (BCR) of 0.920; this relates to a poor value for money using the Department for Transport's guidance.</p> <p>It is predicted that journey times from the south to the north of Llanbedr will reduce by an average of 23.2 seconds for vehicles using this option when compared with journey times for vehicles passing through the centre of Llanbedr.</p>	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	<p>NPV: Slight —</p> <p>Journey times: Slight +</p>
EALI	<p>Improved access to the Llanbedr Airfield Snowdonia Enterprise Zone and Shell Island campsite to/from the A496 to the north and south. An alternative means of access to the current Pont Llanbedr/A496 junction would be expected to improve the feasibility of the Llanbedr Airfield site to be used by businesses in the future.</p> <p>Businesses in Llanbedr could be adversely affected by reduced traffic passing through the village although through traffic would still continue to use the A496. The Maes Artro holiday park could be adversely affected by the close proximity of the southern link road. Local access would continue to be available. Access for vehicles using the Shell Island campsite would be improved by avoiding the need to use the constrained A496/Mochras Road junction.</p> <p>Three outbuildings would be lost to the southern link road. The elevated highway to the north of the Afon Artro and large cutting and embankment to the south could adversely affect views from overlooking properties and hence their financial value.</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite, Maes Artro holiday park and businesses in Llanbedr. Affected properties.	<p>Airfield: Large +</p> <p>Llanbedr: Slight -</p>
<i>Environment</i>			
Noise	Traffic travelling to/from Llanbedr Airfield and Shell Island would be diverted away from Llanbedr, although through traffic would still be likely to use the A496 (except possibly during busy times). This could lead to slight improvements in traffic noise levels for residential receptors along the A496 and Mochras Road due to reduced traffic volumes. Adverse impacts due to increased noise levels could occur to the Maes Artro holiday park and the properties immediately south-west of the southern link road, although the large cutting to the south could attenuate noise levels. The elevation of the northern link road above the floodplain could result in higher traffic noise levels to properties to the east, in combination with traffic already using the A496.	Local residents and seasonal visitors in Llanbedr	Slight -
Local air quality	An increase in the number of vehicles accessing Llanbedr airfield, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in air pollutants. However, a reduction in traffic congestion and traffic flowing through Llanbedr could also result in an improvement in local air quality	Local residents and environmental receptors	Neutral

	within Llanbedr itself.		
Greenhouse Gas Emissions	An increase in the number of vehicles accessing Llanbedr airfield, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in greenhouse gas emissions. However, a reduction in traffic congestion and traffic flowing through Llanbedr could result in a reduction in greenhouse gas emissions within Llanbedr itself.	Local residents and environmental receptors	Neutral
Landscape and townscape	Adverse landscape impacts would be created by the loss of agricultural land and floodplain. Visual impacts would arise from the construction of a new highway across the floodplain north of the Afon Artro and wide, deep cutting through the area of raised land to the south, which could also help to conceal the new highway from some views. The Townscape of Llanbedr could receive a minor beneficial impact due to the reduced number of vehicles travelling through the village.	Local landscape: Snowdonia National Park Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr including Mochras Road.	Large -
Biodiversity	No designated conservation sites would be directly affected. Adverse impacts on biodiversity would be caused by the loss of semi-improved grassland and a small area of saltmarsh. Potentially suitable habitat for badgers, Barn Owls, water voles and bat species could be lost and an otter resting site could be affected by the new bridge structure over the Afon Artro. The large cutting to the south could create severance of wildlife commuting areas and result in fragmentation of habitats.	Habitats and species within the study area between the A496 and railway	Moderate -
Soils	There would be loss and severance of mostly semi-improved agricultural land, along with smaller areas of saltmarsh and improved grassland. The farmland affected to the north and south would also be severed.	Grazing land within the study area between the A496 and railway	Moderate -
Heritage	This option is wholly within the Ardudwy LOHI and would represent a large new development within this site. An extensive complex of well-preserved earthworks would be adversely affected by the southern link road (within the Ardudwy Lower Slopes Historic Landscape aspect area). The new northern link road would be located at least 150m west of the Standing Stones SAM so there could be an adverse impact on the setting of this feature. There would be a positive impact from reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.	Ardudwy LOHI Local heritage features	Moderate -
Water environment	The land affected by the southern link road is not within a floodplain and no flood defences or watercourses would be affected. However, the land to the north is within a fluvial floodplain and there would be an adverse impact on the floodplain capacity upstream of this location, which could result in an increased flood risk to Llanbedr. There would also be a need to traverse the existing flood defences in at least two locations. However, there could also be an opportunity to incorporate a flood defence feature within the highway design. Two main rivers and four ordinary watercourses could be adversely affected.	Local water features and floodplain/flood assets	Moderate -
<i>Social</i>			
Transport safety	Between 2009 and 2013 there were two Personal Injury Accidents of slight severity recorded on the A496 between where the two new link road junctions would tie in	Road users within Llanbedr and along Mochras Road.	Moderate -

	<p>with the A496. It is predicted that there will be a 38.7 increase (based on national figures) in personal injury collisions over the 60 year assessment period; this is due to there being an additional junction provided and that vehicle speeds would be higher on the option route when compared to the existing route through Llanbedr.</p> <p>A likely reduction in larger, towing vehicles travelling through Llanbedr on the A496 and Mochras Road could lead to improved transport safety in the village.</p>		
Personal security	No discernible changes to personal security levels are envisaged as a result of this option.	All people within the study area	Neutral
Permeability	Partially reduced through traffic using the A496 and Mochras Road in Llanbedr could create a minor beneficial impact for non-motorised users in this area. The new link roads would be designed to current standards where possible and would therefore be more amenable to cyclists. There would be severance of PRoW 1 along the flood defence to the north and the loss of the village/railway halt car park adjacent to the Afon Artro reducing the option to walk into the village/railway halt from this location (although an alternative provision would be expected to be provided).	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Slight +
Physical fitness	There would be potential to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them.	All people within the study area	Slight +
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
<p>Public acceptability:</p> <ul style="list-style-type: none"> This option was ranked 2nd out of the 7 options presented at the public consultation event held on 2nd October 2014 and 1st out of the 4 options presented at the public consultation event held on 6th November 2014. The main benefit associated with this option during the public consultation event on 6th November 2014 was that through traffic could still use the A496 and hence provide trade for local businesses. 			
<p>Acceptability to other stakeholders:</p> <ul style="list-style-type: none"> EIA required by the SNPA. Potential for lack of support for local road improvement project from Welsh Government. Several landowners affected, especially due to large area of cutting required for the southern link road. ASIDOHL2 likely to be required to assess significant effects on the Arduwy LOHI. Hydraulic model required by NRW to satisfy flood risk considerations. The local community council favoured this option over the other options presented during the public consultation event held on 6th November 2014. High potential for objections from affected landowners due to large scale severance and land/property loss. 			
<p>Financial affordability and deliverability:</p> <ul style="list-style-type: none"> Estimated construction cost: £11.6m (<i>n.b.</i> this does not include acquisition of properties and land). Negative Net Present Value (-£0.630m) and lowest benefit:cost ratio of options 1 – 4 (0.920). Large area of cut for southern link could be expensive but could also contribute to fill required for northern link. 			

- Bridge structure required to traverse the Afon Artro.

Risks:

- Consideration of the floodplain (Zone C1) and flood defences plus large amount of cut could lead to expensive engineering solution being required.
- Transport improvement with the National Park – potential planning policy conflict.
- Large area of cut required for southern link.
- Extensive late prehistoric to early medieval earthworks south of the Artro, possibly of national importance.
- Potential large number of objections from local land owners.

Option 2: Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new junction and the A496 junction remaining open to all traffic.			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	<p>The cost-benefit analysis calculated a Net Present Value (NPV) of £3.542m and a Benefit to Cost Ratio (BCR) of 1.501. This relates to a low value for money using the Department for Transport guidance.</p> <p>It is predicted that journey times from the south to the north of Llanbedr will reduce by an average of 49.7 seconds for vehicles using this option when compared with journey times for vehicles passing through the centre of Llanbedr.</p>	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	<p>NPV: Slight +</p> <p>Journey times: Slight +</p>
EALI	<p>Improved access to the Llanbedr Airfield Snowdonia Enterprise Zone and Shell Island campsite to/from the A496. An alternative means of access to the current Pont Llanbedr/A496 junction would be expected to improve the feasibility of the Llanbedr Airfield site to be used by businesses in the future.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p> <p>Businesses in Llanbedr could be adversely affected by reduced traffic passing through the village although reduced congestion/traffic flows through Llanbedr would provide improved opportunity to encourage passers-by to spend time in the village. The Maes Artro holiday park could be adversely affected by the close proximity of the bypass. Access for vehicles using the Shell Island campsite would be improved by avoiding the need to use the constrained A496/Mochras Road junction.</p> <p>One outbuilding would be lost to the new bypass route. The elevated highway to the north of the Afon Artro and large cutting and embankment to the south could adversely affect views from overlooking properties and hence their financial value. The large structure to the west of the two westernmost properties (Swn yr Afon and Lismore) on Mochras Road could also adversely affect views from these.</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite, Maes Artro holiday park and businesses in Llanbedr.	<p>Airfield: Large +</p> <p>Llanbedr: Moderate -</p>
<i>Environment</i>			
Noise	Through traffic and traffic travelling to/from Llanbedr Airfield and Shell Island would be diverted further to the west of Llanbedr. This could lead to slight improvements for residential receptors along the A496 and Mochras Road due to reduced noise levels along these routes. However, adverse impacts due to increased noise levels could occur to the Maes Artro holiday park and the nearby westernmost properties along Mochras Road. Increased vehicle speeds on the bypass (national speed limit) could also lead to a change in traffic noise for surrounding receptors.	Local residents and seasonal visitors in Llanbedr	Slight -

Local air quality	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in air pollutants. However, a reduction in traffic congestion and traffic flowing through Llanbedr could also result in an improvement in local air quality within Llanbedr itself.	Local residents and environmental receptors	Neutral
Greenhouse Gas Emissions	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in greenhouse gas emissions. However, a reduction in traffic congestion and traffic flowing through Llanbedr could result in a reduction in greenhouse gas emissions within Llanbedr itself.	Local residents and environmental receptors	Neutral
Landscape and townscape	Adverse landscape impacts would be created by the loss of agricultural land, floodplain and a small area of woodland. Visual impacts would arise from the construction of a new bypass across the floodplain north of the Afon Artro and cutting through the area of raised land to the south, which could also help to conceal the highway from some views. The Townscape of Llanbedr could receive a moderate beneficial impact due to the reduced number of vehicles travelling through the village.	Local landscape: Snowdonia National Park Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr and along Mochras Road.	Moderate -
Biodiversity	No designated conservation sites would be directly affected. Potential adverse impacts on biodiversity would be caused by the loss of semi-improved grassland and a small area of saltmarsh. Potentially suitable habitat for badgers, Barn Owls, water voles and bat species could be lost and two otter resting sites could be affected by the new bridge structure over the Afon Artro.	Habitats and species within the study area between the A496 and railway	Slight -
Soils	This option would involve loss and some severance of mostly semi-improved agricultural land, along with smaller areas of saltmarsh and improved grassland.	Grazing land within the study area between the A496 and railway	Moderate -
Heritage	This option is wholly within the Arduwly LOHI and would represent a large new development within this site. An extensive complex of well-preserved earthworks would be adversely affected to the south (within the Arduwly Lower Slopes Historic Landscape aspect area). The northern section of the bypass would be within the vicinity of the Standing Stones SAM so there could be a minor adverse impact on the setting of this feature. There would be a positive impact from reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.	Arduwly LOHI Local heritage features within the study area	Moderate -
Water environment	The land affected to the south is not within a floodplain and no flood defences or watercourses would be affected. However, the land to the north is within a fluvial floodplain and there would be an adverse impact on the floodplain capacity upstream of this location, which could result in an increased flood risk to Llanbedr. There would also be a need to traverse the existing flood defence. However, there could also be an opportunity to incorporate a flood defence feature within the highway design. Two main rivers and four ordinary watercourses could be	Local water features and floodplain/flood assets	Moderate -

	adversely affected.		
<i>Social</i>			
Transport safety	<p>Between 2009 and 2013 there were two Personal Injury Accidents recorded on the A496 between where the new route would tie in with the A496, both of slight severity. It is predicted that there will be a 20.6 increase (based on national figures) in personal injury collisions over the 60 year assessment period; this is due to there being an additional junction on the option and that vehicle speeds would be higher on the option route when compared to the existing route through Llanbedr.</p> <p>A likely reduction in larger, towing vehicles travelling through Llanbedr on the A496 and Mochras Road could also lead to improved transport safety in the village, especially for pedestrians and cyclists.</p>	Road users within Llanbedr and along Mochras Road.	Moderate -
Personal security	No discernible changes to personal security levels are envisaged as a result of this option.	All people within the study area	Neutral
Permeability	Reduced through traffic using the A496 and Mochras Road in Llanbedr would be expected to create a minor beneficial impact for non-motorised users in this area, especially for pedestrians and cyclists using local services. National Cycle Route 8 (Holyhead – Chepstow) passes through the centre of Llanbedr and the amenity of this would be expected to increase as a result of reduced traffic flows. PRoW 1 along the eastern flood defence would be severed by the new bypass route. The village/railway halt car park would be unaffected but there would be a potential loss of the current footway to the railway halt unless it was realigned adjacent to the new Mochras Road tie-in. There could be an opportunity to improve footway connectivity between the car park and Llanbedr.	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Moderate +
Physical fitness	Potential to encourage increased non-motorised user travel within Llanbedr due to through traffic using the bypass instead.	All people within the study area	Slight +
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
<p>Public acceptability:</p> <ul style="list-style-type: none"> This option was ranked 1st out of the 7 options presented at the public consultation event held on 2nd October 2014) but 4th out of the 4 options presented at the public consultation event held on 6th November 2014. 			
<p>Acceptability to other stakeholders:</p> <ul style="list-style-type: none"> EIA required by SNPA. 			

- Large area of private land required.
- ASIDOHL2 likely to be required to assess significant effects on the Arduwy LOHI.
- Hydraulic model required by NRW to satisfy flood risk considerations.
- Concerns have been raised by local business owners due to through traffic using the alternative bypass route instead of the A496 and potential reduction in trade as a consequence.

Financial affordability and deliverability:

- Estimated construction cost: £111m (*n.b.* this does not include acquisition of properties and land).
- Positive present value (£3.542m) and benefit:cost ratio (1.501).
- Large area of cut for southern link could be expensive but could also contribute to fill required for northern link.
- Bridge structure required to traverse the Afon Artro.

Risks:

- Large transport improvement within the Snowdonia National Park – potential conflict with planning policies.
- Northern section located within TAN15 Zone C1 floodplain.
- Large area of cut required in southern section.
- Extensive late prehistoric to early medieval earthworks south of the Artro, possibly of national importance.
- Potential large number of objections from local business owners.

Option 3: Bypass Llanbedr following the previous bypass route announced in 1992.			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	<p>The cost-benefit analysis calculated a Net Present Value (NPV) of £6.633m and a Benefit to Cost Ratio (BCR) of 1.882. This relates to a low value for money using the Department for Transport guidance.</p> <p>It is predicted that journey times from the south to the north of Llanbedr will reduce by an average of 53.7 seconds for vehicles using this option when compared with journey times for vehicles passing through the centre of Llanbedr.</p>	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	<p>NPV: Moderate +</p> <p>Journey times: Slight +</p>
EALI	<p>An alternative means of access to the current Pont Llanbedr/A496 junction would be expected to improve the feasibility of the Llanbedr Airfield site to be used by businesses in the future. Improved access to the Llanbedr Airfield Snowdonia Enterprise Zone and Shell Island campsite to/from the A496.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p> <p>Businesses in Llanbedr could be adversely affected by reduced traffic passing through the village, which would be exacerbated if Mochras Road was not accessible from the bypass east to Llanbedr. Reduced congestion/traffic flows through Llanbedr and improved traffic management/facilities would provide an opportunity to encourage passers-by to spend time in the village. The Maes Artro holiday park would be severely adversely affected by the close proximity of the bypass. Access for vehicles using the Shell Island campsite would be improved by avoiding the need to use the constrained A496/Mochras Road junction.</p> <p>One outbuilding, understood to have been recently converted, would be lost to the new bypass route. In addition, a recently renovated chapel (Capel Bach) may need to be demolished to accommodate the new bridge structure immediately adjacent to it, which would also adversely affect views from properties to the east and west. Three properties west of the new bridge structure on Mochras Road would be adversely affected by the revised Mochras Road access requiring land from their frontage. The elevated highway to the north of the Afon Artro would be very close to adjacent properties on the eastern side of the A496 and adversely affect open views from these to the west.</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite, Maes Artro holiday park and businesses in Llanbedr.	<p>Airfield: Large +</p> <p>Llanbedr: Large -</p>
<i>Environment</i>			
Noise	Traffic travelling to/from Llanbedr Airfield and Shell Island would be diverted away from Llanbedr. This could lead to slight improvements for residential receptors along the A496 and moderate improvements for residents along Mochras Road. However, this bypass route is located close to a larger number of residential	Local residents and seasonal visitors in Llanbedr, Maes Artro holiday park	Moderate -

	properties in Llanbedr than other bypass options (especially Mochras Road) and could result in an increase in noise levels for these receptors due to the traffic flow along the bypass. There would be a large adverse impact on the Maes Artro holiday park due to the close proximity of the bypass.		
Local air quality	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in air pollutants. However, a reduction in traffic congestion and traffic flowing through Llanbedr could also result in an improvement in local air quality within Llanbedr itself.	Local residents and environmental receptors	Neutral
Greenhouse Gas Emissions	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in greenhouse gas emissions. However, a reduction in traffic congestion and traffic flowing through Llanbedr could result in a reduction in greenhouse gas emissions within Llanbedr itself.	Local residents and environmental receptors	Neutral
Landscape and townscape	Moderate adverse landscape impacts would be created by the loss of agricultural land, floodplain and woodland. The wood between Maes Artro and Mochras Road is covered by a Tree Preservation Order and the route would result in the loss of around half of this area. Visual impacts would arise from the construction of an elevated route across the floodplain north of the Afon Artro, affecting views from properties to the east, and cutting through the area of woodland to the south. The Townscape of Llanbedr could receive a moderate beneficial impact due to the reduced number of vehicles travelling through the village and along Mochras Road. However, the new bridge structure over Mochras Road would result in a major adverse impact for properties at this location.	Local landscape: Snowdonia National Park, Tree Preservation Order Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr and along Mochras Road.	Moderate -
Biodiversity	No designated conservation sites would be directly affected. Potential adverse impacts on biodiversity would be caused by the loss of semi-improved grassland and woodland, as well as disturbance to the Afon Artro. Potentially suitable habitat for badgers, Barn Owls, water voles and bat species (including bat roosts) could be lost. Maes Artro Lesser Horseshoe bat roost likely to be directly affected and potentially lost.	Habitats and species within the study area between the A496 and railway.	Moderate -
Soils	This option would involve the loss of improved and semi-improved agricultural land. There would also be some small severance to the north and along the realigned Mochras Road.	Grazing land within the study area between the A496 and railway	Slight -
Heritage	This option is wholly within the Arduwy LOHI and would represent a large new development within this site. The route would pass very close (approx. 30m) to the Standing Stones SAM so there would likely be a major adverse impact on the setting of this feature, which could potentially be lost if the route needs to be aligned further west to ensure that the original A496 remains open. There could also be an adverse impact on some well-preserved earthworks to the south (within the Arduwy Lower Slopes Historic Landscape aspect area). There would be a positive impact from reduced strain/damage on the Grade II-listed/SAM Pont	Arduwy LOHI. Local heritage features within the study area	Large -

	Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.		
Water environment	The land affected to the south is not within a floodplain and no flood defences or watercourses would be affected. However, the land to the north is within a fluvial floodplain and there would be an adverse impact on the floodplain capacity upstream of this location, which could result in an increased flood risk to Llanbedr. However, there could also be an opportunity to incorporate a flood defence feature within the highway design. There would also be a need to traverse a small section of the existing flood defence. Two main rivers and one ordinary watercourse could be adversely affected.	Local water features and floodplain/flood assets	Moderate -
<i>Social</i>			
Transport safety	Between 2009 and 2013 there were two Personal Injury Accidents recorded on the A496 between where the new bypass would tie in with the A496, both of slight severity. It is predicted that there will be a 5.9 increase (based on national figures) in personal injury collisions over the 60 year assessment period, this is due to there being an additional junction on the option and that vehicle speeds would be higher on the option route when compared to the existing route through Llanbedr. A reduction in larger, towing vehicles travelling through Llanbedr on the A496 and Mochras Road could also lead to improved transport safety in the village, especially for pedestrians and cyclists.	Road users within Llanbedr and along Mochras Road.	Slight -
Personal security	No discernible changes to personal security levels are envisaged as a result of this option.	All people within the study area	Neutral
Permeability	Reduced through traffic using the A496 and Mochras Road in Llanbedr would be expected to create a minor beneficial impact for non-motorised users in this area, especially for pedestrians and cyclists using local services. National Cycle Route 8 (Holyhead – Chepstow) passes through the centre of Llanbedr and the amenity of this would be expected to increase as a result of reduced traffic flows. PRoW 1 would be severed from the eastern flood defence. Potential opportunity to provide a non-motorised user route along the disused section of Mochras Road.	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Slight +
Physical fitness	Potential to encourage increased non-motorised user travel within Llanbedr due to through traffic using the bypass instead.	All people within the study area	Slight +
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
Public acceptability:			
<ul style="list-style-type: none"> While this specific option was not presented at the second public consultation event held on 2nd October 2014 there were several requests for it to be considered. This option was ranked 2nd out of the 4 options presented at the public consultation event held on 6th November 2014. Proposals for a bypass of Llanbedr have been forthcoming for several decades and the local community are very familiar with such plans. While the driving factors behind the previous bypass 			

proposal are different to those behind the current WelTAG study, this bypass route appears to be widely acknowledged as the most suitable route considering land take factors.

Acceptability to other stakeholders:

- EIA likely to be required by SNPA.
- Likely ASIDOHL required to assess significant effects on the Arduwy LOHI.
- Potential for lack of support for local road improvement project from Welsh Government.
- Close proximity to Maes Artro holiday park and residential properties on Mochras Road likely to be unacceptable.
- Lack of access east from new bypass route onto Mochras Road could deter seasonal visitor access to Llanbedr and exacerbate impacts on local businesses.
- High potential for objections from local residents on Mochras Road affected by large new structure over the Afon Artro.

Financial affordability and deliverability:

- Estimated construction cost: £12.4m (*n.b.* this does not include acquisition of properties and land).
- Positive present value (£3.740m) and benefit:cost ratio (1.472).
- Bridge structure required to traverse Afon Artro.

Risks:

- Large transport improvement within the Snowdonia National Park – potential conflict with planning policies, especially Eryri LDP housing allocation area.
- Northern section located within TAN15 Zone B, C1 and C2 floodplain – design measures required to ensure resilience to flooding.
- Large area of cut required in southern section.
- Very close to Standing Stones SAM and potential loss of feature – unlikely to be acceptable to stakeholders without change to alignment.
- Large structure required between residential properties on Mochras Road and Afon Artro.
- Loss of half of a TPO area.

Option 4: Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then following the route of the railway line and access track north to Mochras Road.			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	<p>The cost-benefit analysis calculated a Net Present Value (NPV) of £4.305m and a Benefit to Cost Ratio (BCR) of 1.537. This relates to a low value for money using the Department for Transport guidance.</p> <p>It is predicted that journey times from the south to the north of Llanbedr will reduce by an average of 43.6 seconds for vehicles using this option when compared with journey times for vehicles passing through the centre of Llanbedr.</p>	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	<p>NPV: Moderate +</p> <p>Journey times: Slight +</p>
EALI	<p>An alternative means of access to the current Pont Llanbedr/A496 junction would be expected to improve the feasibility of the Llanbedr Airfield site to be used by businesses in the future. Improved access to the Llanbedr Airfield Snowdonia Enterprise Zone and Shell Island campsite to/from the A496.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p> <p>Businesses in Llanbedr could be adversely affected by reduced traffic passing through the village although the Pont Llanbedr/Mochras Road junction would remain open to all traffic and reduced congestion/traffic flows through Llanbedr and improved traffic management/facilities would provide an opportunity to encourage passers-by to spend time in the village. Several properties close to the Llanbedr railway halt would be severely affected and potentially lost to the route, as it currently stands. Access for vehicles using the Shell Island campsite would be improved by avoiding the need to use the constrained A496/Mochras Road junction.</p> <p>At least three properties and associated outbuildings would be lost to accommodate the new bypass route opposite the Llanbedr railway halt. Views from adjacent properties to the south would also be adversely affected (including Talartro, Pen y Bryn hall and the Grade II-listed Pen y Bryn farm).</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite and businesses in Llanbedr.	<p>Airfield: Large +</p> <p>Llanbedr: Large -</p>
<i>Environment</i>			
Noise	Traffic travelling to/from Llanbedr Airfield and Shell Island would be diverted away from Llanbedr. This could lead to slight improvements for residential receptors along the A496 and moderate improvements for residents along Mochras Road. However, the bypass route would pass closer to a number of residential properties that are currently likely to be subjected to lower traffic noise levels than those already adjacent to the road network. This would result in an increase in noise levels for these receptors due to the traffic flow along the bypass.	Local residents and seasonal visitors in Llanbedr	Slight -

Local air quality	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in air pollutants. However, a reduction in traffic congestion and traffic flowing through Llanbedr could also result in an improvement in local air quality within Llanbedr itself.	Local residents and environmental receptors	Neutral
Greenhouse Gas Emissions	An increase in the number of vehicles accessing Llanbedr airfield and vehicle speeds on the option route, and hence the associated volume of exhaust emissions, would be expected to lead to a slight increase in greenhouse gas emissions. However, a reduction in traffic congestion and traffic flowing through Llanbedr could result in a reduction in greenhouse gas emissions within Llanbedr itself.	Local residents and environmental receptors	Neutral
Landscape and townscape	Adverse landscape impacts would be created by the loss of agricultural land, floodplain and woodland. Visual impacts would arise from the construction of a new bypass across the floodplain north of the Afon Artro and elevation of the new route through the area of farmland to the south, although the new route would largely follow existing transport infrastructure such as Mochras Road, access tracks and the railway. The Townscape of Llanbedr could receive a moderate beneficial impact due to the reduced number of vehicles travelling through the village and along Mochras Road.	Local landscape: Snowdonia National Park Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr and along Mochras Road.	Moderate -
Biodiversity	No designated conservation sites would be directly affected. Potential adverse impacts on biodiversity would be caused by the loss of semi-improved grassland and an area of marshland adjacent to the railway, as well as disturbance to the Afon Artro. Potentially suitable habitat for Barn Owls, water voles and bat species could be lost, along with two other resting sites	Habitats and species within the study area between the A496 and railway.	Slight -
Soils	This option would involve the loss and severance of improved and semi-improved agricultural land.	Grazing land within the study area between the A496 and railway	Slight -
Heritage	This option is wholly within the Arduwy LOHI and would represent a large new development within this site. The bypass route would pass close to the Grade II-listed Pen y Bryn farm and could result in an adverse effect on the setting of this feature. An extensive complex of well-preserved earthworks could be adversely affected to the south (within the Arduwy Lower Slopes Historic Landscape aspect area). The bypass would pass within the vicinity of the Standing Stones SAM (approximately 150m) so there could be an adverse impact on the setting of this feature. There would be a positive impact from reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.	Arduwy LOHI. Local heritage features within the study area	Moderate -
Water environment	The marshland adjacent to the railway is within a tidal floodplain, while the land affected to the north is within a fluvial floodplain (and beyond this a tidal floodplain) and there would be an adverse impact on the floodplain capacity. There would also be a need to traverse the existing flood defences in at least two locations. However, there could also be an opportunity to incorporate flood defence features within the highway design. Two main rivers and six ordinary watercourses could	Local water features and floodplain/flood assets	Moderate -

	be adversely affected.		
<i>Social</i>			
Transport safety	<p>Between 2009 and 2013 there were two Personal Injury Accidents recorded on the A496 between where the new bypass would tie in with the A496, both of slight severity. It is predicted that there will be a 36.3 increase in personal injury collisions (based on national figures) over the 60 year assessment period, this is due to there being an additional junction on the option and that vehicle speeds would be higher on the option route when compared to the existing route through Llanbedr.</p> <p>The addition of a new junction on Mochras Road close to the railway crossing, as well as another new junction for Mochras Road slightly to the north would also present a potential safety concern.</p> <p>A reduction in larger, towing vehicles travelling through Llanbedr on the A496 and Mochras Road could lead to improved transport safety in the village.</p>	Road users within Llanbedr and along Mochras Road.	Moderate -
Personal security	No discernible changes to personal security levels are envisaged as a result of this option.	All people within the study area	Neutral
Permeability	<p>Reduced through traffic using the A496 and Mochras Road in Llanbedr would be expected to create a minor beneficial impact for non-motorised users in this area, especially for pedestrians and cyclists using local services. National Cycle Route 8 (Holyhead – Chepstow) passes through the centre of Llanbedr and the amenity of this would be expected to increase as a result of reduced traffic flows.</p> <p>Potential severance of PRoW 1 along the flood defence. Loss/severance of a bridleway through the southern part of the affected land. Mochras Road would be severed to non-motorised users due to having to travel along a short section of the new bypass, between the two Mochras Road junctions, and the loss of the village/railway car park and pedestrian access to the railway halt (unless an alternative was provided).</p>	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Slight +
Physical fitness	Potential to encourage increased non-motorised user travel within Llanbedr due to through traffic using the bypass instead.	All people within the study area	Slight +
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
<p>Public acceptability:</p> <ul style="list-style-type: none"> While this specific bypass option was not presented at the public consultation event held on 2nd October 2014 it was developed in response to concerns raised about the bypass option initially presented and was ranked 3rd out of the 4 options presented at the public consultation event held on 6th November 2014. 			

Acceptability to other stakeholders:

- Close proximity to railway line and risk of displacement affecting line likely to be unacceptable.
- EIA likely to be required by SNPA.
- Likely ASIDOHL2 required to assess significant effects on the Arduwy LOHI.
- Potential for lack of support for local road improvement project from Welsh Government.
- Loss of at least three properties.
- Large section to the south likely to require departure from highway standards.

Financial affordability and deliverability:

- Estimated construction cost: £12.3m (*n.b.* this does not include acquisition of properties and land).
- Highest positive present value (£4.305) and benefit:cost ratio (1.537).
- Overhead power lines passing through area of marshland likely to be expensive to relocate.
- Expensive engineering solutions likely to be required to traverse area of marshland.
- Longest bypass option (approx. 1950m)
- Bridge structure required to traverse Afon Artro.

Risks:

- Large transport improvement within the Snowdonia National Park – potential conflict with planning policies.
- Largest amount of floodplain affected (Zone C1) – design measures required to ensure resilience to flooding.
- Very difficult to achieve highway standards in southern section due to topography and residential dwellings/access.
- High potential for objection from Network Rail due to close proximity of highway and new junction.

Option 5: Improved car parking facilities and double yellow lines within Llanbedr			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	A reduction in the number of parked vehicles within Llanbedr could result in a slight beneficial effect in terms of reducing congestion and improving traffic flow through the village.	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	Slight +
EALI	<p>The current access provisions to Llanbedr airfield would not change significantly as a result of this option, although there may be a slight improvement to traffic flow in general due to the reduced number of parked vehicles in the village. However, the current problem caused by the A496/Mochras Road junction layout would not be improved.</p> <p>The provision of dedicated car parking would be expected to encourage passers-by and locals alike to visit the village and use the services provided. The addition of double yellow lines would need to be carefully considered so as not to detract road users from stopping in the village.</p> <p>No properties would be lost as a result of this option. Views from some surrounding properties could be slightly adversely affected by an increase in cars parking in the newly-designated areas.</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite and businesses in Llanbedr.	Airfield: Neutral Llanbedr: Moderate +
<i>Environment</i>			
Noise	No discernible changes to noise levels are envisaged as a result of this option.	Local residents and seasonal visitors in Llanbedr	Neutral
Local air quality	No discernible changes to local air quality are envisaged as a result of this option.		Neutral
Greenhouse Gas Emissions	No discernible changes to greenhouse gas emissions are envisaged as a result of this option.		Neutral
Landscape and townscape	No discernible changes to the local landscape or views are envisaged as a result of this option. However, the townscape of Llanbedr could be slightly improved as a result of a reduced number of parked vehicles on the A496.	Local landscape: Snowdonia National Park Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr and along Mochras Road.	Slight +
Biodiversity	No discernible changes to biodiversity are envisaged as a result of this option.	Habitats and species within the study area between the A496 and railway.	Neutral
Soils	No discernible changes to soils are envisaged as a result of this option.	Grazing land within the study area between the A496 and railway	Neutral

Heritage	There could be a potential slight adverse impact on the setting of Wenallt stores (Grade II-listed) if a car park were to be located behind the building. The introduction of double yellow lines through the village could also potentially affect the setting of Wenallt stores and also Pont Llanbedr.	Arduwy LOHI. Local heritage features within the study area	Slight -
Water environment	Both potential car park locations affected are within areas predicted to be at flood risk. TAN15 requires a presumption against introducing such developments into areas vulnerable to flooding. Any proposals to raise the ground at these locations would therefore need to be assessed to ensure that there is no third party impact due to the displacement of flood water.	Local water features and floodplain/flood assets	Slight -
<i>Social</i>			
Transport safety	A reduced number of vehicles parked on the A496 through Llanbedr would be expected to lead to a slight increase in transport safety by removing obstacles from the flow of traffic. This would also mean that pedestrians and cyclists would be able to manoeuvre through the village more easily without having to avoid parked vehicles.	Road users within Llanbedr and along Mochras Road.	Slight +
Personal security	No discernible changes to personal security levels are envisaged as a result of this option.	All people within the study area	Neutral
Permeability	A reduced number of vehicles parked on the A496 through Llanbedr would be expected to increase the amenity of the village for pedestrians and cyclists.	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Slight +
Physical fitness	Improved permeability within the village for non-motorised users would be expected to generate a slight increase in foot and cycle travel and hence contribute to an improvement in physical fitness.	All people within the study area	Slight +
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
<p>Public acceptability:</p> <ul style="list-style-type: none"> This option and similar variants have been supported by the local public during past consultation events as they would be expected to improve facilities within the village, particularly if a new highway scheme were implemented. 			
<p>Acceptability to other stakeholders:</p> <ul style="list-style-type: none"> Potential lack of support from funding bodies as this option alone would not improve access to Llanbedr airfield. 			
<p>Financial affordability and deliverability:</p> <ul style="list-style-type: none"> This is considered to be a relatively low-cost option to provide some benefit to the village of Llanbedr. Locations would need to be close enough to shops/services to encourage use of car parks. 			
<p>Risks:</p> <ul style="list-style-type: none"> Land required from private landowners to provide the necessary additional car parking space. Careful consideration of locations of double yellow lines required in order to avoid adverse impacts on local businesses. 			

Option 6: Do Nothing (i.e. do not provide any access improvements to Llanbedr airfield and continue to maintain the current situation)			
Criteria	Assessment	Distribution	Significance
Welsh Impact Areas			
<i>Economy</i>			
Transport Economic Efficiency (TEE)	There would be no discernible improvements to traffic flow through the study area as a result of this option. Adverse effects could occur in the future depending on the uptake of Llanbedr airfield by businesses and associated increase in related traffic volume, which could hinder traffic flow through the village and congestion at the A496/Mochras Road junction.	Local residents, seasonal visitors, employees of the proposed enterprise park and users of the A496.	Slight -
EALI	<p>Access to and from Mochras Road and north-south connectivity along the A496 would continue to be constrained by the Pont Llanbedr/Mochras Road junction. In particular, the lack of adequate access for larger vehicles travelling to/from a northerly direction is likely to be an inhibiting factor for some businesses locating to the Snowdonia Enterprise Zone in the future.</p> <p>Businesses in Llanbedr would be expected to continue as normal, subject to any future changes in local retail patterns. The current A496 would remain as the main route for all traffic travelling through Llanbedr and any associated congestion would be expected to continue as at present.</p>	The local economy and associated employees/suppliers, particularly Llanbedr Airfield, Shell Island campsite and businesses in Llanbedr.	Airfield: Large - Llanbedr: Neutral
<i>Environment</i>			
Noise	The existing noise levels through Llanbedr would be expected to remain the same (subject to natural changes in traffic flows). There may be a slight increase in noise levels depending on the future uptake of the Llanbedr airfield facilities by other businesses, resulting in an increase in the volume of commuter and trade traffic passing through the centre of Llanbedr.	Local residents and seasonal visitors in Llanbedr	Slight -
Local air quality	There would be no discernible change to the current situation.	Local air quality	Neutral
Greenhouse Gas Emissions	There would be no discernible change to the current situation.	Local air quality	Neutral
Landscape and townscape	There would be no discernible change to the current landscape and visual identity of the study area. The Townscape of Llanbedr could possibly receive an adverse impact if traffic flow linked with Llanbedr airfield increases in the future.	Local landscape: Snowdonia National Park, Arduwy LOHI. Visual impact: local residents and visitors Townscape: residents and visitors of Llanbedr and along Mochras Road.	Neutral
Biodiversity	There would be no discernible change to the current situation.	Habitats and species within the study area between the A496 and railway.	Neutral

Soils	There would be no discernible change to the current situation.	Grazing land within the study area between the A496 and railway	Neutral
Heritage	There would be no discernible change to the current situation. Pont Llanbedr could receive adverse impacts due to continued strain from vehicle passage and potentially increased future strain if traffic levels linked to the airfield increase.	Local heritage features within the study area	Slight -
Water environment	There would be no discernible change to the current situation.	Local water features and floodplain/flood assets	Neutral
<i>Social</i>			
Transport safety	Between 2009 and 2013 there were two Personal Injury Accidents recorded on the A496 within the study area, both of slight severity. Without any changes the current transport infrastructure would remain substandard, particularly at the Pont Llanbedr/Mochras Road junction. This could result in a future reduction in transport safety if there is an increase in vehicles (particularly larger vehicles) accessing Mochras Road to/from Llanbedr airfield.	Road users within Llanbedr and along Mochras Road.	Slight -
Personal security	No discernible changes to personal security levels are envisaged.	All people within the study area	Neutral
Permeability	Traffic volume along the A496 would be expected to remain the same as at present and continue to intimidate pedestrians/cyclists in the vicinity.	Non-motorised users (pedestrians, cyclists, equestrians) within the study area.	Moderate -
Physical fitness	There would be no discernible change to the current situation.	All people within the study area	Neutral
Social inclusion	No discernible changes to social inclusion are envisaged as a result of this option.	All people within the study area	Neutral
Equality, diversity and human rights	No discernible changes to equality, diversity or human rights are envisaged as a result of this option.	All people within the study area	Neutral
<p>Public acceptability:</p> <ul style="list-style-type: none"> Maintaining the status quo with a Do Minimum option is likely to be a favoured approach by many of the local community that could be adversely affected by other transport improvement options (e.g. local landowners and business owners). Other members of the local community may feel frustrated at the lack of improvements to transport access in the future, particularly following previous proposals that have not been pursued any further. 			
<p>Acceptability to other stakeholders:</p> <ul style="list-style-type: none"> The Do Minimum option would not address the current deficiencies caused by the current substandard transport access to Llanbedr airfield. Therefore, it is likely to continue to contribute to detracting businesses from locating at the site. 			
<p>Financial affordability and deliverability:</p> <ul style="list-style-type: none"> There is minimal funding required for this option, beyond that required from the routine maintenance programme. 			
<p>Risks:</p> <ul style="list-style-type: none"> The key risk associated with this option is that the Snowdonia Enterprise Zone fails to attract sufficient businesses to meet its aims of contributing to local economic growth. 			

Appendix C: Participation Report

Llanbedr Access Improvements: WelTAG study

Participation Report

Introduction

Public and stakeholder engagement is an important aspect of WelTAG, since it enables interested parties to be involved with the decision-making process and helps to ensure that the issues most relevant to transport in the study area are considered. In order to ensure that the views of the local public were considered within the WelTAG study the following participation events were held in Llanbedr village hall:

- 1) 5th June 2014: An initial public consultation event held at the start of the Planning Stage in order to establish the public's perception of the transport-related problems, opportunities and constraints within the study area.
- 2) 2nd October 2014: This event was arranged in order to provide an update on the outcomes of the Planning stage and how the public's views had contributed to determining the Transport Planning Objectives and solutions. The proposed options to be taken forward to Stage 1 Appraisal were also presented in order to ascertain public opinion on these.
- 3) 6th November 2014: The final event associated with the current WelTAG study was organised to present the options that were favoured after the second public consultation event and have therefore been appraised in more detail.

Feedback from the participation events was recorded via completed bilingual questionnaires, specially developed for each event. The responses received are summarised in the following text.

Participation Event 1 (5th June 2014)

A total of 22 completed questionnaires were received. The questions were largely open-ended as the main aim was to obtain a clear understanding of what the public considered to be the transport-related problems, opportunities and constraints within the study area without prejudicing their answers in any way. One question (number 5) allowed for the top three options for improving transportation in the study area to be ranked accordingly. The corresponding answers are summarised as follows:

1) What is your interest in the A496 and the entrance road to Llanbedr Airfield? (E.g. use the road regularly for business, local resident, responsibility for managing flooding or biodiversity issues etc.)

<i>Interest group</i>	<i>Number of responses</i>	<i>Percentage of responses</i>
Local resident	13	59
Local business	5	23
Statutory responsibility/interest	1	5
Other	3	14

The majority of respondents were local residents (59% of responses) followed by Local business owners (23%).

2) How often do you use: a) The A496 b) the entrance road to the Airfield? (Frequently e.g. every day/week, occasionally e.g. monthly, rarely e.g. annually or less)?

<i>A) The A496</i>		
<i>Frequency of use</i>	<i>Number of responses</i>	<i>Percentage of responses</i>
Frequently	15	68
Occasionally	4	18
Rarely	0	0
Never	1	5
No answer	11	50

<i>B) Mochras Road</i>		
<i>Frequency of use</i>	<i>Number of responses</i>	<i>Percentage of responses</i>
Frequently	8	36
Occasionally	2	9
Rarely	0	0
Never	0	0
No answer	12	55

Although 50% of respondents failed to provide an answer, most of those that did use the A496 frequently (68% of responses). A further 18% use the A496 occasionally and only 1 respondent never uses it. A lower number of respondents use Mochras Road frequently (36%) although many (55%) did not provide an answer.

3) What do you feel are the existing problems on this section of road, if any?

<i>Problems Identified</i>	<i>Total number of responses</i>	<i>Percentage of responses</i>
The bridge/junction is too narrow and makes access to Mochras/Airfield/SEP difficult, especially for LGV, caravans, etc.	12	55
High volume of traffic during peak holiday season and traffic congestion	7	32
Lack of parking areas/car parks in the village – on street parking.	6	27
Speeding traffic – motorists ignoring speed limits.	5	23
No pedestrian provision in the village and/or down access road to Mochras/Airfield	4	18
A496 through village is too narrow	3	14
Access road to Mochras/Airfield/SEP too narrow.	2	9
No problem	2	9

The highest number of responses (55%) referred to the A496/Mochras Road junction area as being too narrow and inhibiting access to and from Mochras Road. Other responses included seasonal congestion and traffic volumes (32%), lack of parking facilities (27%) and speeding traffic (23%). Below these were lack of pedestrian provision (18%), the narrowness of the A496 (14%) and Mochras Road (9%). In addition 9% of responses considered that there are no problems.

4) What do you feel are the opportunities to improve transportation in this area, if any?

<i>Opportunities Identified</i>	<i>Total number of responses</i>	<i>Percentage of responses</i>
By-pass Llanbedr	10	45
New access road from the southern side of the village to the Airfield/Mochras/SEP	8	36
New access road north of Llanbedr to the Airfield/Mochras/SEP	6	27
Car Park provision	6	27
Lower speed limit through village and enforcement	3	14
Pedestrian and cycle provision (footpaths/pavements)	3	14

Traffic lights system at each end of village	2	9
Parking constraints at junctions (e.g. double yellow lines)	1	5
Double white lines through village	1	5
Improve viability for road users (e.g. remove or trim back trees outside Maes Artro)	1	5
A one way by-pass (e.g. diverting south bound traffic onto the by-pass and diverting northbound traffic through village)	1	5
Series of road improvements on the A496 north and south of Llanbedr	1	5
Reduce the need to travel back and forth to and from the airfield	1	5

A wide range of responses (13) was received for this question. Of these, a bypass of Llanbedr received the majority of representations with 45%. The next popular options involved providing new access roads from the south and north; 36% and 27% respectively. The provision of car parking facilities was also as popular as providing a northern access road (27%). Reducing the speed limit through Llanbedr and providing improved pedestrian/cyclist facilities were also mentioned in over 10% of responses, with 14% each.

5) Please rank in order of importance (1 being most important) your top three options for improving transportation along this section.

The following options represent the top three based on the questionnaire responses:

- 1) Bypass Llanbedr (24 points)
- 2) New access road from the south side of Llanbedr to the Airfield/Mochras (22 points)
- 3) New access road from the north side of Llanbedr to the Airfield/Mochras/SEP (15 points)

6) What do you think are the potential constraints or problems associated with improving transportation in this area (e.g. biodiversity features, flooding issues etc.)?

<i>Constraints Identified</i>	<i>Total number of responses</i>	<i>Percentage of responses</i>
Flooding	10	45
No Comment/irrelevant	4	18
Conservation Area / Environmental designations	4	18
Properties	2	9
Sections of the A496 outside of Llanbedr are narrow	2	9
Historic features	2	9
Lack of Finances	1	5
Biodiversity	1	5

The majority of responses (45%) identified flooding as a key constraint to improving transportation within the study area; much of the land north of the Afon Artro and west of the A496 is within either a tidal or fluvial floodplain. The environmental sensitivity of the area was also acknowledged with 18% of responses identifying environmental designations as a constraint. The term ‘conservation area’ was assumed to mean designated conservation sites for the purposes of this study since Llanbedr village is not within a designated architectural Conservation Area.

Summary (Participation Event 1)

The responses received following Consultation Event 1 were used to inform the identification of Problems, Opportunities and Constraints within the study area, the identification of potential solutions and the ‘public acceptability’ element of the solutions sifting exercise. The key points arising from the feedback received are summarised as follows:

- The majority of respondents were local residents that use the A496 and Mochras Road frequently. This indicates that the main target audience for the study were involved.
- The main problem identified by the majority of respondents (55%) is that the current A496/Mochras Road junction is too narrow and inhibits vehicle access to Mochras Road destinations. This supports the view that the junction is substandard. Other problems mentioned by over 20% of respondents include; high seasonal traffic volumes and congestion, lack of parking facilities in Llanbedr and speeding traffic through Llanbedr.

- A bypass for Llanbedr was identified as the most popular opportunity for improving transportation in the study area (45% of responses), with access roads from the south, north and car parking provisions also mentioned in over 20% of responses.
- Of the top three ranked options for transportation improvements a bypass of Llanbedr was the most popular choice (24 points), closely followed by a southern access route and then a northern access route.
- Flooding was identified as the main constraint to achieving transportation improvements in the study area (45%), with environmental designations also featuring highly.

Participation Event 2 (2nd October 2014)

The second participation event was organised on completion of the Planning Stage. The aim of this event was to:

- a) summarise how the feedback received during the first exhibition had been used to inform the WelTAG study, and;
- b) provide an indication of the options that had been proposed for consideration in the WelTAG Appraisal (Stage 1) process.

A total of 77 individuals were recorded in the visitor log, although it is considered that this figure was closer to 100 as several were observed leaving without signing the log and there was also a visit from the Llanbedr Community Council. In addition, consultation letters were sent to the following statutory environmental bodies: Cadw, Gwynedd Archaeological Planning Service (GAPS), Natural Resources Wales (NRW) and the Snowdonia National Park Authority (SNPA). Responses were received from GAPS, NRW and SNPA and used to inform the appraisal of each option.

In order to obtain clear, unequivocal answers regarding synergy with public opinion and understanding of public preferences regarding each option the questionnaire was developed differently to the previous one by providing closed-ended questions ranking opinions in order of preference. This approach helped to provide a firm indication of the level of support for key aspects of the WelTAG study, including: the problems identified, the transport planning objectives and the options proposed for appraisal. Two open-ended questions allowed for the provision of comments regarding potential obstacles to achieving the options and the main aspects to be considered when selecting a preferred option. The questions and corresponding answers are summarised as follows:

1) What is your interest in Llanbedr and the surrounding area?

<i>Interest group</i>	<i>Number of responses</i>
Local resident	53
Local business	14
Statutory responsibility/interest	3

The largest number of responses was provided by local residents (53) with 14 local business interests also providing a response. Note that 11 of the local business respondents are also local residents.

2) The following transport problems were identified from the last stakeholder exhibition. Please prioritise them in order of highest importance to you (1 = most important, 7 = least important)

Problems ranked in order of importance:

Rank	Problem	Total score
1	The bridge/junction of the A496/Mochras Road is too narrow and restricts larger turning vehicles.	314
2	The high volume of traffic during peak holiday seasons and associated traffic congestion.	281
3	The A496 through Llanbedr, and sections outside of Llanbedr, is too narrow.	263
4	Mochras Road (leading from Llanbedr to Shell Island) is too narrow.	246
4	A lack of parking areas/car parks in Llanbedr, leading to on-street parking.	246
6	A lack of pedestrian/cyclist provision in Llanbedr and along Mochras Road	234
7	Speeding traffic through Llanbedr.	186

The highest ranking problem is the substandard nature of the A496/Mochras Road junction (314 points). The high seasonal volume of traffic and congestion is the second highest concern (281) with the substandard nature of the A496 third (263). The substandard nature of Mochras Road being too narrow and the lack of parking areas were ranked equal fourth (246). A lack of pedestrian/cyclist provision was sixth while speeding traffic through Llanbedr was ranked seventh.

3) The following objectives were identified to address the problems. Please prioritise them in order of highest importance to you (1 = most important, 9 = least important)

Objectives ranked in order of importance:

Rank	Objective	Total score
1	Reduce traffic congestion at the Mochras Road/A496 junction	424
2	Reduce the negative impact of traffic on the community of Llanbedr	319
3	Improve transport connectivity to and from Llanbedr Airfield	317
4	Improve the efficiency and reliability of all transport to and from Llanbedr Airfield	309
5	Improve the actual and perceived safety of travel for all travellers within Llanbedr and along Mochras Road	289
6	Improve freight transport access to and from Llanbedr Airfield	278
7	Improve travel opportunities for pedestrians and cyclists within Llanbedr and along Mochras Road	269
8	Minimise the impact of transport improvements on local environmental and heritage features	231
9	Be resilient to local effects of climate change, particularly future increases in flood events.	210

The most popular objective was to reduce traffic congestion at the Mochras Road/A496 junction (424), which also corresponds with the highest ranking problem (see Question 2). The second most popular objective (319) was to reduce the negative impact of traffic on the community of Llanbedr; this highlights the strong local community interest in any transport proposals affecting the area and the potential opportunity to provide benefits for both Llanbedr and the airfield. A close third was the objective to improve transport connectivity to and from Llanbedr airfield (317); this links with Objectives 1 and 2 in that there is an opportunity to provide an option that meets all of these objectives. Improving the efficiency and reliability of all transport to and from Llanbedr Airfield was ranked fourth (309) with improved travel safety in Llanbedr and along Mochras Road fifth (289). Improving freight access to and from the airfield was ranked sixth (278) above improving travel opportunities for pedestrians and cyclists (269). The lowest ranking objectives were minimising the impact on local environmental/heritage features (231) and resilience to climate change (210) in eighth and ninth respectively.

4a) The options below have been identified to achieve the objectives. In order of preference please rate which you think would best improve transport and access in the Llanbedr area (1 = best, 7 = worst)

Options ranked in order of preference:

Rank	Problem	Total score
1	Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the bypass and A496 remaining open to all traffic.	224
2	Provide both new northern and southern link roads, connected via a section of Mochras Road.	208
3	Provide a new link road to the north (west of Llanbedr) connecting Mochras Road and the A496.	178
4	Provide designated car parking facilities within Llanbedr and link with pedestrian access (in combination with Option 1, 2, 3, 4 or 5).	173
5	Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the bypass and A496 closed except for access and foot/cycle traffic.	155
6	Provide a new link road to the south (west of Llanbedr) connecting Mochras Road and the A496	144
7	Provide traffic calming measures through Llanbedr and along the A496 junction approach on Mochras Road (in combination with Option 1, 2, 3, 4 or 5).	113

The highest scoring option with 224 points was providing a bypass to the west of Llanbedr (with Mochras Road remaining open to all traffic). The second most popular option was providing both northern and southern link roads via a section of Mochras Road (208 points). A new link road to the north was the third most popular choice (178 points), just above providing designated car parking facilities in Llanbedr (173 points). Bypassing Llanbedr to the west with Mochras Road closed was much less popular in fifth (155 points) than the option that would keep Mochras Road open. Providing a new link to the south was sixth (144 points) and traffic calming measures through Llanbedr was ranked seventh (113 points).

4b) Please also feel free to recommend any further options which have not been identified below.

The following additional options were suggested, some of which have already been incorporated with the options listed in Question 4a:

- Pedestrian ways through village on A496.
- Better public transport.
- Partial one-way traffic system.
- Change double yellow lines to opposite side of Mochras Road to improve HGV access.
- Cycle paths.
- Land beyond toilets could be sold for parking
- A car park behind y Wenallt

5) What do you believe would be the biggest obstacle to realising your preferred option?

Obstacle	Number of responses
Cost / Finance	25
Flooding	6
Local / Public Objection	6
Justification - does it warrant a new road?	3
Land / topography	2
Environment	2
Safety	1

By far the most highly acknowledged obstacle to achieving a preferred option is the cost / finance required and the uncertainty regarding this (25 responses). The joint second highest obstacles identified (6 responses each) are flooding and objections from local landowners and the public. Justification for whether any changes are actually required received three responses. The local topography and local environment each received two responses while safety was raised by one respondent.

6) What do you think should be the most important aspects to consider when selecting a preferred option?

Aspects	Number of responses
Local Economy	16
Llanbedr Community	14
Landscape, Environment and Historic Features	8
Parking provisions	7
Highway design and safety	6
Flooding	3
Traffic flow	3
Pedestrian and Cycle Provisions	2
Cost and Value for money	2

The local economy (16 responses) and Llanbedr community (14 responses) were the most important aspects to be considered when selecting a preferred option. The sensitive landscape, environment and heritage features were third (8 responses). Other aspects included parking provisions (7 responses) and highway design and safety (6 responses) then flooding and traffic flow (three responses each) and finally pedestrian/cyclist provisions and cost/value for money (two responses each).

Summary (Participation Event 2)

The responses received following Participation Event 2 were used to refine and guide the appraisal of the options presented and ensure that the key public concerns regarding the most important and relevant problems and transport planning objectives have been correctly interpreted for the appraisal phase. The key points arising from the feedback are summarised as follows:

- It was encouraging that a total of 53 local residents completed the questionnaires, with 77 individuals recorded attending the actual exhibition.
- The main problems initially identified following Exhibition 1 and used to inform the WelTAG study were still consistent with those raised by the public at Exhibition 2; these being the substandard nature of the A496/Mochras Road junction and the high seasonal volume of traffic and congestion. Conversely, speeding traffic through Llanbedr was ranked lower, and the substandard nature of Mochras Road higher than the previous responses from Exhibition 1.
- The most popular objectives involve reducing traffic congestion at the A496/Mochras Road junction (which corresponds with the highest ranking problem) and reducing the

negative impacts of transport on Llanbedr, which highlights the opportunity to provide a benefit to both the local community and the airfield. Improving transport connectivity along Mochras Road to and from the airfield was also ranked highly (third).

- The most popular option was to provide a bypass to the west of Llanbedr village, with Mochras Road remaining open to all traffic. This option was much more popular (224 points) than the bypass option proposing to close Mochras Road to through traffic (155 points). Another popular option was to provide both new northern and southern link roads, connected via a section of Mochras Road (208 points).
- The biggest obstacle to achieving a preferred option is considered to be the associated cost / funding requirement.
- The most important aspects to consider for any preferred option are the local economy and local community.

Participation Event 3 (6th November 2014)

The final event associated with the current WelTAG study was organised to present the options that were favoured after the second participation event (2nd October 2014) and have therefore been appraised in more detail. The options being appraised were displayed to the participants as well as a summary of progress made since the last participation event and an explanation of what happens next with the feedback obtained.

A total of 23 individuals were recorded in the visitor log, although it is considered that this figure was closer to 30 as several were observed leaving without signing the log. The questionnaire used to record feedback was more succinct as the main purpose of the event was to record the local public's preferences and comments regarding the options displayed. The questions and corresponding results are summarised as follows:

What is your interest in Llanbedr and the surrounding area?

<i>Interest group</i>	<i>Number of responses</i>
Local resident	14
Local business	3
Statutory responsibility/interest	3

It was disappointing to have received a lower number of attendees and subsequent responses than the previous participation event. The reasons for this are unclear; some have mentioned that the event was inadequately advertised. However, the same methods

were used as for the previous event, which was well-attended. Other reasons may be that this event followed the previous event too closely, or that those who attended the previous event and realised that they would not be directly affected by any of the options proposed decided not to attend this event.

Once again, the largest number of responses was provided by local residents (14) with 3 local business interests also providing a response and 3 members of the public with a statutory responsibility/interest.

Please rank the options displayed in order of your preference (1 = highest, 4 = lowest)

Rank	Option	Total score
1	Option 1: Two new link roads connecting Mochras Road with the A496 north and south of Llanbedr.	32
2	Option 3: Bypass Llanbedr following the previous bypass route announced in 1992.	29
3	Option 4: Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr, following the route of the railway line and access track north to Mochras Road.	27
4	Option 2: Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Rd between the bypass and A496 remaining open to all traffic.	26

The scoring between Options 1 to 4 was very close, with just 6 points between the most and the least preferred options. The highest scoring option was Option 1 (32 points), which offers an alternative to a complete bypass of Llanbedr village. The previous bypass route (Option 3) was ranked second with 29 points. Option 4 was ranked third (27 points) and several members of the public commented that this was their preferred choice due to it being located furthest away from the village. Option 2 was ranked fourth (26 points).

Comments regarding the options were also requested and are summarised as follows:

- **Option 1:** two respondents suggested that link roads are a better option, but one suggested it would not generate any improvement whereas the other options would solve two problems at once.
- **Option 3:** one respondent commented that the original route would have the least effect.

- **Option 4:** one person highlighted potential rail issues associated with this option while another suggested that it was the preferred choice as it was the furthest away from Llanbedr. Reduced pressure on Pont Llanbedr was also suggested with this option (although this would apply to all Options 1 – 4).
- **General:** other comments included that there is no need for a bypass (two respondents). Other individuals mentioned the lack of cycling facilities on Mochras Road and pedestrian facilities on the A496. The impact on businesses in Llanbedr was highlighted by one respondent, while another suggested the importance of reducing the noise impact on Llanbedr.

Summary (Participation Event 3)

The responses received following Participation Event 3 were used to inform the appraisal of the options presented. The key points arising from the feedback are summarised as follows:

- Of those that provided a response via completed questionnaires the majority were local residents, with 3 also being local business owners and 3 representing a statutory interest.
- The public's preferred option is Option 1 and the least preferred is Option 2.
- A wide range of comments were received regarding the advantages and disadvantages of each option (except Option 2), as well as general comments about access improvements in the area.

Appendix D: Health Impact Assessment

Table D.1: HIA for Option 1

Option Description: Provide two new link roads connecting Mochras Road with the A496 north and south of Llanbedr			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	<p>This option could provide an opportunity to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them.</p> <p>Severance of Public Right of Way north of Afon Artro.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Slight -</p>
Social and Community	<p>A slight reduction in the number of vehicles travelling through Llanbedr could result in improved travel opportunities for pedestrians and cyclists.</p> <p>This option would result in an adverse impact on the local historic landscape, especially due to the large cutting required, which would also sever a large area of farmland.</p> <p>Reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Moderate –</p> <p>Slight +</p>
Living conditions	<p>Potential decreases in noise levels for receptors in Llanbedr but potential increases for those living close to the new route.</p> <p>Adverse effects on views from properties overlooking the new link roads, especially the large cut to the south and the embankment to the north.</p> <p>Potential beneficial impact on safety and townscape in Llanbedr due to slightly reduced traffic volume.</p>	Local residents within Llanbedr	<p>Slight –</p> <p>Moderate –</p> <p>Slight +</p>
Working conditions	<p>This option would result in improved access to employment sources west of Llanbedr, with potential large benefits for future employment depending on the future use of the airfield.</p> <p>Slight reduction in traffic volume passing through Llanbedr could adversely affect local businesses</p>	Local residents and businesses within Llanbedr	<p>Large +</p> <p>Slight –</p>
Services	Partially reduced through traffic using the A496 and Mochras Road in Llanbedr could create a minor beneficial impact for non-motorised users accessing local services.	Local residents and visitors within Llanbedr	Slight +
Socio-economic, cultural and environmental and sustainability factors	Adverse biodiversity impacts due to loss of semi-improved grassland and a small area of saltmarsh. The large cutting could sever wildlife commuting areas and result in fragmentation of habitats.	Local residents and visitors within Llanbedr	Moderate –

Table D.2: HIA for Option 2

Option Description: Bypass Llanbedr to the west (between the A496 and railway line) with the section of Mochras Road between the new junction and the A496 junction remaining open to all traffic.			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	<p>This option could provide an opportunity to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them.</p> <p>Severance of Public Right of Way north of Afon Artro.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Slight -</p>
Social and Community	<p>A reduction in the number of vehicles travelling through Llanbedr would be expected to result in improved travel opportunities for pedestrians and cyclists.</p> <p>This option would result in an adverse impact on the local historic landscape, especially due to the cutting required in the south.</p> <p>Reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Moderate –</p> <p>Slight +</p>
Living conditions	<p>Potential decreases in noise levels for receptors in Llanbedr but potential increases for those living close to the new route.</p> <p>Adverse effects on views from properties overlooking the new bypass, especially the large cut to the south and embankment to the south, and embankment to the north.</p> <p>Likely beneficial impact on safety and townscape in Llanbedr due to reduced through traffic volume.</p>	Local residents within Llanbedr	<p>Slight –</p> <p>Moderate –</p> <p>Slight +</p>
Working conditions	<p>This option would result in improved access to employment sources west of Llanbedr, with potential large benefits for future employment depending on the future use of the airfield.</p> <p>Reduction in through traffic volume passing through Llanbedr could adversely affect local businesses.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p>	Local residents and businesses within Llanbedr	<p>Large +</p> <p>Moderate –</p> <p>Moderate +</p>
Services	<p>Reduced through traffic using the A496 and Mochras Road in Llanbedr could create a beneficial impact for non-motorised users accessing local services.</p> <p>Improved access to local services north and south of Llanbedr.</p>	Local residents and visitors within Llanbedr	<p>Moderate +</p> <p>Moderate +</p>
Socio-economic, cultural and environmental and sustainability factors	<p>Potential adverse impacts on biodiversity due to the loss of semi-improved grassland and a small</p>	Local residents and visitors within Llanbedr	Slight –

	area of saltmarsh.		
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Table D.3: HIA for Option 3

Option Description: Bypass Llanbedr following the previous bypass route announced in 1992.			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	<p>This option could provide an opportunity to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them.</p> <p>Potential opportunity to provide a non-motorised user route along the disused section of Mochras Road.</p> <p>Severance of Public Right of Way north of Afon Artro.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Slight +</p> <p>Slight –</p>
Social and Community	<p>A reduction in the number of vehicles travelling through Llanbedr would be expected to result in improved travel opportunities for pedestrians and cyclists.</p> <p>The route would pass very close to the Standing Stones SAM so there would likely be a major adverse impact on the setting of this heritage feature.</p> <p>Reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Large –</p> <p>Slight +</p>
Living conditions	<p>This route is located close to a number of residential properties in Llanbedr (especially Mochras Road) and could result in an increase in noise levels for these receptors due to the traffic flow along the bypass. There would be a large adverse impact on the Maes Artro holiday park due to the close proximity of the bypass.</p> <p>Adverse effects on views from properties overlooking the new bypass, especially those located close to the new bridge structure on Mochras Road.</p> <p>Likely beneficial impact on safety and townscape in Llanbedr due to reduced through traffic volume.</p>	Local residents within Llanbedr	<p>Moderate –</p> <p>Moderate –</p> <p>Slight +</p>
Working conditions	<p>This option would result in improved access to employment sources west of Llanbedr, with potential large benefits for future employment depending on the future use of the airfield.</p> <p>Reduction in through traffic volume passing through Llanbedr could adversely affect local businesses.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p>	Local residents and businesses within Llanbedr	<p>Large +</p> <p>Moderate –</p> <p>Moderate +</p>
Services	<p>Reduced through traffic using the A496 and Mochras Road in Llanbedr could create a beneficial</p>	Local residents and visitors within Llanbedr	Moderate +

	<p>impact for non-motorised users accessing local services.</p> <p>Improved access to local services north and south of Llanbedr.</p>		Moderate +
<p>Socio-economic, cultural and environmental and sustainability factors</p>	<p>Potential adverse impacts on biodiversity due to the loss of semi-improved grassland and woodland, as well as disturbance to the Afon Artro. Maes Artro Lesser Horseshoe bat roost likely to be directly affected and potentially lost.</p>	<p>Local residents and visitors within Llanbedr</p>	Moderate -

Table D.4: HIA for Option 4

Option Description: Bypass Llanbedr from the A496 lay-by on the southern approach to Llanbedr then following the route of the railway line and access track north to Mochras Road.			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	<p>This option could provide an opportunity to encourage increased non-motorised user travel along the A496 and Mochras Road in Llanbedr if reduced traffic is passing along them.</p> <p>Severance of Public Right of Way north of Afon Artro and bridleway south of Afon Artro.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Slight –</p>
Social and Community	<p>A reduction in the number of vehicles travelling through Llanbedr would be expected to result in improved travel opportunities for pedestrians and cyclists.</p> <p>The route would pass close to the Grade II-listed Pen y Bryn farm and could result in an adverse effect on the setting of this feature.</p> <p>Reduced strain/damage on the Grade II-listed/SAM Pont Llanbedr due to lower numbers of vehicles crossing it in future, particularly larger towing vehicles.</p>	Local residents and visitors within Llanbedr	<p>Slight +</p> <p>Moderate –</p> <p>Slight +</p>
Living conditions	<p>Potential decreases in noise levels for receptors in Llanbedr but potential increases for those living close to the new route.</p> <p>Adverse effects on views from properties overlooking the new bypass, especially those close to the railway line.</p> <p>Likely beneficial impact on safety and townscape in Llanbedr due to reduced through traffic volume.</p>	Local residents within Llanbedr	<p>Slight –</p> <p>Moderate –</p> <p>Slight +</p>
Working conditions	<p>This option would result in improved access to employment sources west of Llanbedr, with potential large benefits for future employment depending on the future use of the airfield.</p> <p>Reduction in through traffic volume passing through Llanbedr could adversely affect local businesses.</p> <p>Improved north-south connectivity to employment sources and commercial businesses.</p>	Local residents and businesses within Llanbedr	<p>Large +</p> <p>Moderate –</p> <p>Moderate +</p>
Services	<p>Reduced through traffic using the A496 and Mochras Road in Llanbedr could create a beneficial impact for non-motorised users accessing local services.</p> <p>Improved access to local services north and south of Llanbedr.</p> <p>Mochras Road would be severed to non-motorised users. The village/railway car park and pedestrian access to the railway</p>	Local residents and visitors within Llanbedr	<p>Moderate +</p> <p>Moderate +</p> <p>Moderate -</p>

	halt would also be lost (unless an alternative could be provided).		
Socio-economic, cultural and environmental and sustainability factors	Potential adverse impacts on biodiversity due to the loss of semi-improved grassland and an area of marshland adjacent to the railway, as well as disturbance to the Afon Artro.	Local residents and visitors within Llanbedr	Slight -

Table D.5: HIA for Option 5

Option Description: Improved car parking facilities and double yellow lines within Llanbedr			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	Improved permeability within the village for non-motorised users would be expected to generate a slight increase in foot and cycle travel and hence contribute to an improvement in physical fitness.	Local residents and visitors within Llanbedr	Slight +
Social and Community	Potential adverse impact on the setting of Wenallt stores (Grade II-listed) if a car park were to be located behind the building. The introduction of double yellow lines through the village could potentially affect the setting of Wenallt stores and also Pont Llanbedr.	Local residents and visitors within Llanbedr	Slight – Slight -
Living conditions	No discernible changes to noise or local air quality levels are envisaged as a result of this option. Views from some surrounding properties could be slightly adversely affected by an increase in cars parking in the newly-designated areas. Likely beneficial impact on safety and townscape in Llanbedr due to reduced on-street parking causing obstructions.	Local residents within Llanbedr	Neutral Slight - Slight +
Working conditions	The provision of dedicated car parking would be expected to encourage passers-by and locals alike to visit the village and use the services provided.	Local residents and businesses within Llanbedr	Slight +
Services	A reduced number of vehicles parked on the A496 through Llanbedr would be expected to increase the amenity of the village for pedestrians and cyclists.	Local residents and visitors within Llanbedr	Slight +
Socio-economic, cultural and environmental and sustainability factors	No discernible changes are envisaged as a result of this option.	Local residents and visitors within Llanbedr	Neutral

Table D.6: HIA for Option 6

Option Description: Do Nothing (i.e. do not provide any access improvements to Llanbedr airfield and continue to maintain the current situation)			
Appraisal Criteria	Assessment	Distribution	Significance
Lifestyle/capacities affecting health	There would be no discernible change to the current situation.	Local residents and visitors within Llanbedr	Neutral
Social and Community	There would be no discernible change to the current situation. Pont Llanbedr could receive adverse impacts due to continued strain from vehicle passage and potentially increased future strain if traffic levels linked to the airfield increase.	Local residents and visitors within Llanbedr	Neutral Slight -
Living conditions	Possible slight increase in noise levels depending on the future uptake of the Llanbedr airfield facilities by other businesses, resulting in an increase in the volume of commuter and trade traffic passing through the centre of Llanbedr. Possible future reduction in transport safety if there is an increase in vehicles (particularly larger vehicles) accessing Mochras Road to/from Llanbedr airfield. Traffic speed and volume along the A496 would be expected to remain the same as at present and continue to intimidate pedestrians/cyclists in the vicinity.	Local residents within Llanbedr	Slight – Moderate – Moderate -
Working conditions	There would be no discernible change to the current situation.	Local residents and businesses within Llanbedr	Neutral
Services	There would be no discernible change to the current situation.	Local residents and visitors within Llanbedr	Neutral
Socio-economic, cultural and environmental and sustainability factors	There would be no discernible change to the current situation.	Local residents and visitors within Llanbedr	Neutral