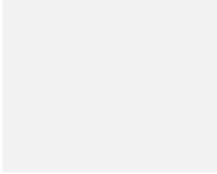


IMPROVING STRATEGIC TRANSPORT ENCOMPASSING CORRIDORS FROM M4 JUNCTION 34 TO THE A48

WelTAG Stage Two: Impacts Assessment Report

APRIL 2018

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Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48

WelTAG Stage Two: Impacts Assessment Report

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This report dated 12 April 2018 has been prepared for the Vale of Glamorgan Council (the "Client") in accordance with the terms and conditions of appointment dated 14 July 2017 (the "Appointment") between the Client and **Arcadis Consulting (UK) Limited** ("Arcadis") for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

CONTENTS

1	INTRODUCTION	1
1.1	Background	1
1.2	Stage Two Impacts Assessment Report	1
1.3	Report Structure.....	1
2	POLICY, LEGISLATION AND BACKGROUND DOCUMENTS.....	2
2.1	Overview.....	2
2.2	National Policy	2
2.3	Local Policy	4
2.4	Background Documents	8
2.5	Committed Developments.....	12
3	BASELINE INFORMATION.....	14
3.1	Introduction	14
3.2	Local Appraisal Area and Vale of Glamorgan Context	14
3.3	Environmental and Land-use Characteristics.....	17
3.3.1	Cultural Heritage.....	17
3.3.2	Landscape and Land Use	22
3.3.3	Noise and Vibration	23
3.3.4	Water Resources.....	24
3.3.5	Nature Conservation.....	24
3.3.6	Air Quality.....	26
3.4	Access to Employment	27
3.5	Access to Services and Recreation.....	29
3.6	Access to Cultural Facilities	30
3.7	Walking and Cycling	31
3.8	Rail	32
3.9	Bus.....	33
3.10	Highway Network	35
3.10.1	Background	35
3.10.2	Local Highway Network	35
3.10.3	Appraisal Area Junctions	36
3.10.4	Personal Injury Accidents	36
3.10.5	South East Wales Transport Model.....	38

4	DATA SOURCE.....	42
4.1	Overview.....	42
4.2	Data Sources	42

FIGURES

Figure 1 Demand/ Capacity during the AM Peak (Vale of Glamorgan Line)	11
Figure 2 Metro Priorities.....	12
Figure 3 Study Area.....	14
Figure 4 Age Profiles 2011 Census	16
Figure 5 Distance Travelled to Work (%)	27
Figure 6 Access to Key Local Services within the Appraisal Area	30
Figure 7 Public Rights of Way	31
Figure 8 Map of South Wales Railway Stations	33
Figure 9 Local Bus Stops	34
Figure 10 Strategic Routes and Junctions in the Vale of Glamorgan.....	35
Figure 11 Sycamore Cross Junction - Base Year 2017 Turning Flows	37
Figure 12 Accidents by Severity within the Appraisal Area (2011-15).....	37

TABLES

Table 1 National Transport Finance Plan Schemes (December 2017)	3
Table 2 Key Strategic Policies Relevant to the Study Area	5
Table 3 Junction Capacity Assessment Results.....	8
Table 4 Usual Resident Population Statistics.....	15
Table 5 Employment Statistics Census 2011	16
Table 6 Scheduled Monuments within the Appraisal Area	17
Table 7 Scheduled Monuments outside the Appraisal Area	18
Table 8 Listed Buildings within and immediately surrounding the Appraisal Area	19
Table 9 Potential Noise and Vibration Receptors within the Appraisal Area	24
Table 10 Method of Journey to Work (2011 Census)	28
Table 11 2011 Comparison of Census Journey to Work Commuter Flows by Local Authority	28
Table 12 2011 Census Location of Usual Residence and Place of Work	29
Table 13 Rail Frequency (Direct Services Monday - Saturday)	32

Table 14 Railway Station Patronage32

Table 15 Bus Routes retained within the Appraisal Area.....33

Table 16 South East Wales Traffic Model – Output Traffic Flows40

1 Introduction

1.1 Background

Arcadis Consulting (UK) Limited has been commissioned by Vale of Glamorgan Council to develop and appraise potential options for improving the strategic transport network encompassing corridors from M4 Junction 34 to the A48 (Five Mile Lane) including the Pendoylan Corridor (or alternative). The appraisal of options has been undertaken in accordance with the Welsh Government's latest version of WelTAG (December 2017¹) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals².

1.2 Stage Two Impacts Assessment Report

This report is the Stage Two: Outline Business Case Impacts Assessment Report. The WelTAG guidance states that each stage of WelTAG should be supported by an Impacts Assessment Report. The Impacts Assessment Report *'is a live document which is maintained and grows throughout the five WelTAG stages. It becomes a permanent record of the appraisal work on the proposed transport intervention. It contains the detailed evidence behind the summary information provided to decision makers in the Stage reports'*. As such, this report has been updated from the Stage One document to include new or revised information available since the previous report was prepared.

1.3 Report Structure

The structure of this report is as follows:

- Chapter 2 presents a summary of the policy framework at the local, regional and national level;
- Chapter 3 presents the context of the study; and
- Chapter 4 summarises the data sources used within the study, in accordance with the WelTAG guidance.

¹ <https://beta.gov.wales/sites/default/files/publications/2017-12/welsh-transport-appraisal-guidance.pdf>

² <https://beta.gov.wales/sites/default/files/publications/2017-12/weltag-2017-supplementary-guidance-the-well-being-of-future-generations-wales-act-2015.pdf>

2 Policy, Legislation and Background Documents

2.1 Overview

This section provides a summary of the policy and legislative framework and background studies and documents which provide the context for this study.

2.2 National Policy

One Wales: Connecting the Nation - Wales Transport Strategy (2008)

The Wales Transport Strategy (WTS) published in 2008 sets out the Welsh Government's aim to improve transport. The WTS focuses on the role that transport can play in delivering the wider policy agenda of integrating transport with spatial planning, economic development, education, health, social services, and environment and tourism, whilst meeting the strategic agenda and the implementation framework of the (then) Wales Spatial Plan. The vision of the WTS is *'to promote sustainable transport networks that safeguard the environment while strengthening our country's economic and social life'*.

The WTS sets out five priorities, which provide additional strategic direction and work towards the long-term outcomes and maximise the scope for local solutions to transport challenges within a consistent national framework. The five priorities are:

- Reducing greenhouse gas emissions and other environmental impacts;
- Improving public transport and better integration between modes;
- Improving links and access between key settlements and sites across Wales and strategically important all-Wales links;
- Enhancing international connectivity; and
- Increasing safety and security.

The WTS has three key sustainable transport themes and a number of desired outcomes, which underpin the strategy. The three themes underpinning the strategy are:

- Achieving a more effective and efficient transport system;
- Achieving greater use of the more sustainable and healthy forms of travel; and
- Minimising demand on the transport system.

The WTS noted at the time that Cardiff International Airport has experienced steady growth over the last ten years, however, Bristol and Liverpool experienced significantly stronger growth than Cardiff International Airport and serve passengers originating in Wales. It is the first preference for Cardiff International Airport to improve rail and bus connections; developing a more sustainable approach to air travel. A surface access strategy is also noted as a key action for Cardiff International Airport.

Active Travel (Wales) Act (2013)

The Active Travel (Wales) Act makes provision for the mapping of active travel routes and related facilities. The Act was passed by the National Assembly of Wales and also seeks to secure new and enhanced active travel routes and facilities, improving provision for walkers and cyclists. The purpose of the Act is for local authorities to continuously improve their facilities and routes for pedestrians and cyclists, through provision of shelter, resting and/ or storage facilities for example. The Act further requires Welsh Ministers to publish public annual reports regarding the extent to which walkers and cyclists make active travel journeys in Wales.

Well-being of Future Generations (Wales) Act (2015)

The Act strives to improve the social, economic, environmental and cultural well-being of Wales. The vision is *'in 2050, Wales will be the best place to live, learn, work and do business'*. The Act makes the public bodies listed in the Act consider the longer-term perspective; engage with people and communities and each other; prevent problems; and to deliver a joined-up approach. The draft goals to represent what the long-term economic, social and environmental well-being of Wales would look like are:



National Transport Finance Plan (2017 Update)

The National Transport Finance Plan was first published in July 2015. The purpose of the plan being to provide the timescale for financing schemes, the timescale for delivering schemes, detail the estimated expenditure, and identify the likely source of financing to enable delivery. The National Transport Finance Plan 2017 Update provides information on progress since publication and sets out a revised programme for the next three years and beyond.

The plan includes both revenue and capital initiatives, ranging from specific schemes to others where further investigatory and development work is required. The schemes which are stated as currently under construction include (R6) M4 Junction 33 west / A4232 and (R14) Improvements to Five Mile Lane, Vale of Glamorgan. Other relevant schemes are as shown in Table 1. Notably reference NEW 3 refers to the options being considered in this Stage Two WelTAG study.

Table 1 National Transport Finance Plan Schemes (December 2017)

NTS Reference	Description
R32	Explore, and where practicable, apply measures to improve air quality in Air Quality Management Areas (AQMA) which relate to the WG network.
NEW 3	Five Mile Lane – Explore options from Sycamore Cross to [M4] Junction 34.
R27g	M4 J32 to J35 Corridor.
R27h	M4 J35 to J49 Corridor.
AT1b	Ensure the Active Travel (Wales) Act 2013 is delivered (Integrated Network Maps).
AT1c	Ensure the Active Travel (Wales) Act 2013 is delivered (Active Travel Schemes).
AT2	Delivering the actions set out in the Active Travel Action Plan.
AT3	Work with partners to deliver a programme of improvements to the National Cycle Network and that contribute to the objectives of the Active Travel Act.

NTS Reference	Description
BCT12	Work with local authorities and bus operators to identify congestion and pinch points on the network that impact on bus reliability and punctuality and ensure that solutions are integrated into wider highway improvements programme.
A1	Manage funding for the delivery of two return services a day between Anglesey Airport and Cardiff Airport.
A2	We will continue to work with Cardiff Airport and airlines to improve international connectivity to promote Wales as a destination for business and leisure, including taking forward measures to improve surface access to the airport.
IT1	Make grant funding available to local authorities for transport, including schemes that will help to improve access to employment sites, road safety schemes and schemes that will deliver the Welsh Government's wider priorities.
IT3	Review opportunities already identified by others to improve access between and to/ from Enterprise Zones and Local Growth Zones, and working with others, identify further opportunities. Develop and deliver an improvement programme or support others to do this.

It should be noted that the Wales Spatial Plan will soon be superseded by the new National Development Framework (NDF). The NDF will set out a 20-year land-use framework for Wales and will:

- Set out where nationally important growth and infrastructure is needed and how the planning system - nationally, regionally and locally - can deliver it;
- Provide direction for Strategic and Local Development Plans and support the determination of Developments of National Significance;
- Sit alongside Planning Policy Wales, which sets out the Welsh Government's planning policies and will continue to provide the context for land-use planning; and
- Support national economic, transport, environmental, housing, energy and cultural strategies and ensure they can be delivered through the planning system.

Whilst the detail of the NDF has not yet been published, the key point of note is that an additional layer of planning will be added into the system, with Strategic Development Plans (SDP) where appropriate acting a bridge between the NDF and Local Development Plans (LDP). It is likely that the Cardiff Capital Region and Swansea Bay City Region will benefit from a SDP, which will support the determination of 'Developments of National Significance'. From a Vale of Glamorgan perspective, the Enterprise Zone will potentially be defined as such a development within any Capital Region SDP. This would provide an added layer of policy support for improving connectivity to and from the Vale of Glamorgan.

2.3 Local Policy

Vale of Glamorgan Adopted LDP (2013)

The Vale of Glamorgan LDP 2011-2026 was adopted on the 28th June 2017, superseding the previous adopted Unitary Development Plan (UDP). The LDP will be the basis for decisions on land use planning in the Vale of Glamorgan and will be used by the Council to guide and manage new development proposals. The plan has been written mindful of the need to regenerate and support communities and in doing so seeks to achieve a balance between economic growth, social cohesion and environmental impact.

Pendoylan, Bonvilston, St Nicholas and Peterston-super-Ely are identified as minor rural settlements with the LDP Settlement Hierarchy. The LDP refers to the minor rural settlements as functionally linked, emphasising the importance of safeguarding facilities as well as facilitating new development opportunities. The LDP Strategy comprises four key elements *'to promote development opportunities in Barry and the South East*

Zone. The St Athan area to be a key development opportunity and Cardiff Airport a focus for transport and employment investment. Other sustainable settlements to accommodate further housing and associated development.'

A summary the key strategic policies relevant to the study have been included within Table 2, with an applicable section of the Vale of Glamorgan LDP proposals map (2017) relevant to the study area shown in [Appendix A](#).

Table 2 Key Strategic Policies Relevant to the Study Area

Policy	Description
Policy SP1	Delivering the Strategy (including 4. Promoting Sustainable Transport).
Policy SP2	Strategic Sites – Land is allocated for development at strategic sites including mixed use at St Athan and employment uses at land adjacent to the airport and Port Road, Rhose, as part of the St Athan – Cardiff Airport Enterprise Zone.
Policy SP5	Employment Requirements – To ensure the continued prosperity of the Vale of Glamorgan and promote growth in the capital region.
Policy SP7	<p>Transportation – Sustainable transport improvements that serve the economic, social and environmental needs of the Vale of Glamorgan and promote the objectives of the South East Wales Regional Transport Plan (RTP) and the Local Transport Plan (LTP) will be favoured. Priority will be given to schemes that improve highway safety and accessibility, public transport, walking and cycling. Surface and public transport access to Cardiff Airport is highlighted as in need of significant improvements if the potential of the airport is to be realised.</p> <p>This will include bus priority measures to the airport, a new Northern Access Road, with the latter incorporating walking and cycling infrastructure. The provision of a strategic highway network is further described as vital to the efficient movement of people and goods throughout the Vale of Glamorgan, with particular emphasis on providing improvements in access to Barry, Cardiff Airport and St Athan from the M4.</p>
Policy SP10	<p>Built and Natural Environment – Development proposals must preserve and where appropriate enhance the rich and diverse built and natural environment and heritage of the Vale of Glamorgan including:</p> <ul style="list-style-type: none"> • The architectural and/ or historic qualities of buildings or conservation areas, including locally listed buildings; • Historic landscapes, parks and gardens; • Special Landscape Areas (SLA); • The Glamorgan Heritage coast; • Sites designated for their local, national and European nature conservation importance; and • Important archaeological and geological features.
Policy MD7	Environmental Protection – Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and/ or the natural environment.
Policy MD8	Historic Environment – Development proposals must protect the qualities of the built and historic environment of the Vale of Glamorgan.
Policy MD9	Promoting Biodiversity – New development proposals will be required to conserve and where appropriate enhance biodiversity interests unless certain conditions can be demonstrated.

Policy	Description
Policy MG9	Employment Allocations – including at Land to the South of Junction 34 M4 Hensol; Land adjacent to Cardiff Airport and Port Road, Rhoose; and Aerospace Business Park, St Athan Rhoose.
Policy MG10	St Athan – Cardiff Airport Enterprise Zone – including provision of sustainable transport infrastructure.
Policy MG11	Land to the south of Junction 34 M4, Hensol – Land is allocated to the south of Junction 34 M4 (Hensol) for employment purposes to meet local need.
Policy MG16	Transport Proposals – Land for the following transportation schemes (relevant to the study) is allocated: <ul style="list-style-type: none"> • Walking and cycling: A4050 Port Road to Cardiff Airport; • Rail: Modernisation of the Valley Lines; and • Highways: Northern Access Road (St Athan Enterprise Zone); Improvements to the A4226 between Waycock Cross, Barry and Sycamore Cross, A48 (Five Mile Lane); North of A48, Bonvilston Road Improvements.
Policy MG17	Special Landscape Areas – have been designated to protect areas of the Vale of Glamorgan that are considered to be important for their geological, natural, visual, historic or cultural significance. The designation of SLAs is not intended to prevent development but to ensure that where development is acceptable, careful consideration is given to the design elements of the proposal such as siting, orientation, layout and landscaping, to ensure that the special qualities and characteristics for which the SLAs have been designated are protected.
Policy MG19	Sites and Species of European Importance – Development proposals likely to have a significant effect on a European site will only be permitted under certain conditions.
Policy MG20	Nationally Protected Sites and Species – Development likely to have an adverse effect either directly or indirectly on the conservation value of a Site of Special Scientific Interest (SSSI) will only be permitted under certain conditions.
Policy MG21	Sites of Importance for Nature Conservation, Regionally Important Geological and Geomorphological Sites and Priority Habitats – Development proposals likely to have an adverse impact on sites of importance for nature conservation or priority habitats and species will only be permitted under certain conditions.
Policy MG22	Development in Minerals Safeguarding Areas – Known mineral resources of sandstone, sand and gravel and limestone are safeguarded. New development will only be permitted in any area of known mineral resource under certain conditions.

Vale of Glamorgan LTP (2015)

The Vale of Glamorgan LTP has been established to recognise the diverse economic and social geography, and overlapping labour and housing markets that exist throughout the Capital Region (encompassing Cardiff, Blaenau Gwent, Bridgend, Caerphilly, Merthyr Tydfil, Monmouthshire, Newport, Rhondda Cynon Taf, Torfaen and the Vale of Glamorgan).

Whilst acknowledging the requirement for a collaborative approach for the future development of the Capital Region, the LTP seeks to identify the sustainable transport measures required to ensure Vale of Glamorgan Council adheres to current requirements and good practice, to allow for a sustainable transport environment for the period 2015 to 2020, as well as looking forward to 2030.

The plan therefore seeks to secure better conditions for pedestrians, cyclists and public transport users and to encourage a modal shift away from the single occupancy car. The LTP also *‘seeks to tackle traffic*

congestion by securing improvements to the strategic highway corridors for commuters who may need to travel by car'. The plan highlights actions required including:

- In partnership with bus operators, negotiate expansion of current bus services, linking to key settlements and interchanges.
- Encourage use of community transport provision to sustain and entice bus operators/ community transport providers to take over once grown to acceptable sustainable level of patronage.
- To deliver existing safe routes in communities' schemes identified by schools and the public and encourage more schemes to come forward for consideration and implementation.
- In partnership with bus operators, negotiate expansion of current services, linking routes where there needs to be interchange and ensuring timings of connections are acceptable. Encourage use of integrated ticketing for services. Increase Community Transport to cater for demand.
- Deliver highway/ junction improvement schemes at key locations.
- Deliver bus infrastructure improvement schemes/ corridors.
- Provide Park & Ride/ Park & Share.

Bridgend LDP 2006-2021 (2013)

The adopted Bridgend LDP sets out its objectives for the development and use of land in Bridgend County Borough. The LDP sets out a plan to deliver sustainable development and guide growth and change, while protecting local diversity, character and sensitive environments. Objective 1 is to produce high quality sustainable places including supporting integrated transport solutions and measures that will encourage modal shift to more sustainable forms of transport for people and freight.

Rhondda Cynon Taf LDP 2006-2021 (2011)

The adopted LDP provides a policy framework that integrates and balances the social, economic and environmental issues in order to meet the needs of those people living, working and visiting Rhondda Cynon Taf. Key policies relevant to this study include the following.

Policy CS 2	Policy CS 8	Policy SSA 2
<ul style="list-style-type: none"> •Development in the South: 8) Promoting and enhancing transport infrastructure services to support growth and investment. 	<ul style="list-style-type: none"> •Transportation: b1) The implementation of a strategic transport corridor management system in the following strategic corridor areas including the A4119/ A473 Corridor. 	<ul style="list-style-type: none"> •Park and Ride/ Park and Share Provision: 5) Pontyclun Railway Station.

Key developments relevant to this study include the following:

- A major business park is proposed for B1 office development fronting the A4119 at Mwyndy Cross with a grade-separated junction.
- A residential development of 400 dwellings adjoining the existing residential area, served from the existing spine road roundabouts, new primary school and local centre at Cefn-yr-Hendy.

City of Cardiff Council

The following documents have also been noted:

- Cardiff LTP (2015)
- Cardiff LDP 2006 – 2026 (adopted 2016)

2.4 Background Documents

Highway Impact Assessment, Deposit LDP Background Paper (2013)

Capita Symonds was commissioned by Vale of Glamorgan Council to undertake a capacity assessment of the impact of possible future LDP residential development sites on the strategic highway network. This forms part of the evidence base for the deposit LDP.

Table 3 presents the link and junction capacity assessment results within the appraisal area (based on Ratio of Flow to Capacity (RFC) / degree of saturation) for the base year and the future year with the LDP proposals having been implemented.

The table shows that one junction within the appraisal area (Sycamore Cross) is forecast to be over capacity in the future 2026 year with or without pedestrians. In 2012, the table shows that the junction is over capacity with pedestrians, but within capacity without pedestrians. Junction improvements have been made to the Sycamore Cross junction since the report was published. Sycamore Cross was previously a priority junction, however it is now a signalised junction with turning lanes and formal pedestrian crossing facilities.

Table 3 Junction Capacity Assessment Results

Link / Junction Name	2012 AM	2012 PM	2026 AM	2026 PM
A48/Five Mile Lane/Road to Pendoylan (Sycamore Cross)	Over Capacity with Pedestrians	Over Capacity with Pedestrians	Over Capacity with or without Pedestrians	Over Capacity with or without Pedestrians
A48 (nr the Old Post Public House) EB	Within Capacity	Within Capacity	Within Capacity	Within Capacity
A48 (nr the Old Post Public House) WB	Within Capacity	Within Capacity	Within Capacity	Within Capacity
A48 (nr St Nicholas) EB	Within Capacity	Within Capacity	Within Capacity	Within Capacity
A48 (nr St Nicholas) WB	Within Capacity	Within Capacity	Within Capacity	Within Capacity

Sustainable Transport Assessment, Deposit LDP Background Paper (2013)

The Sustainable Transport Assessment forms part of a series of topic papers prepared by Vale of Glamorgan Council as part of the evidence base used to inform the production of policies and site allocations for the Deposit LDP. This assessment seeks to identify the sustainable transport measures required to create and ensure a sustainable transport environment in the Vale of Glamorgan.

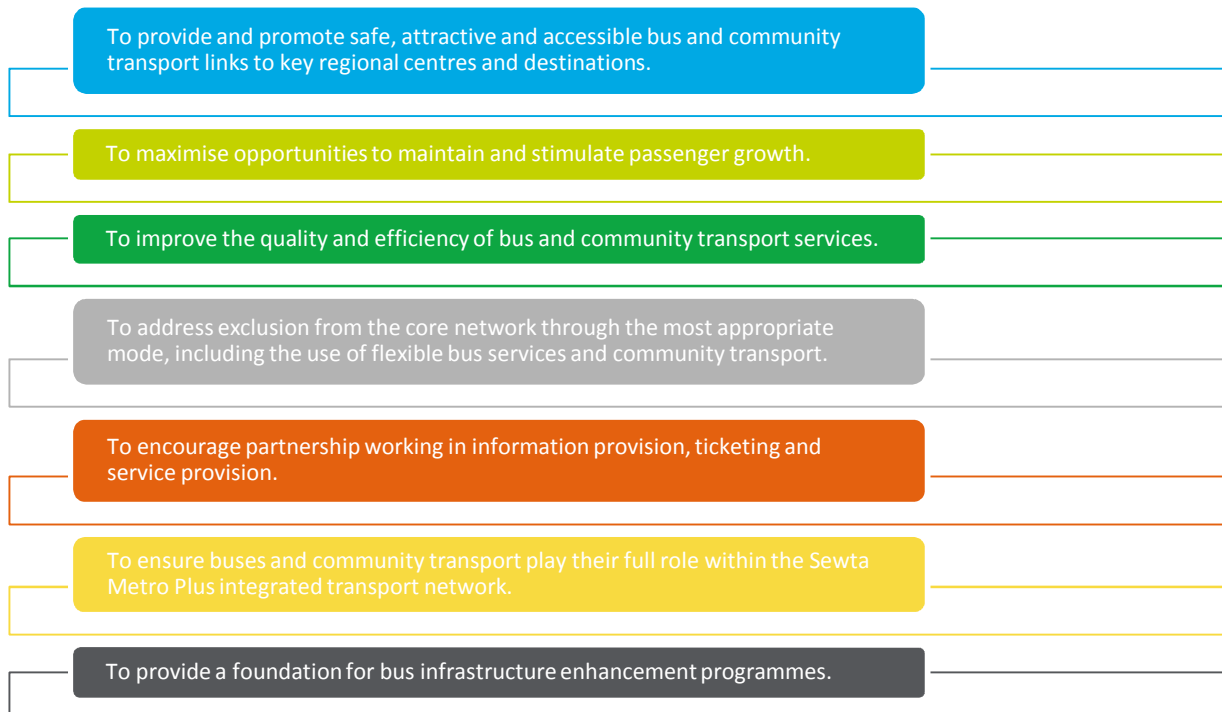
Vale of Glamorgan Council is committed to reducing the environment impact of its activities and as such seeks to provide transport infrastructure and transport services to assist the public to choose sustainable travel modes for all journeys where possible. This includes for all new developments to include off-road shared use walking/ cycling routes where possible and cycle signs on main roads where off-road facilities are not practical.

Walking and Cycling

A number of walking and cycling schemes have been funded/ proposed in the appraisal area since the RTP Capital programme implementation began in April 2010. This includes NCN88 (£311,000) – Match funding European Creative Rural Communities Grant over a 3-year programme to deliver walking and cycling routes throughout the rural Vale, including around Cardiff Airport.

Bus

The report notes that at the time of writing within the last five years, funding for bus services had declined. There had been a reduction of £8m of Grant throughout Wales despite the agreed objectives of increased patronage and improved services still standing. The objectives for bus services are as follows:



The LDP supports Bus-Based Park & Ride initiatives as a transport planning tool that can be used to encourage car users to switch to public transport. Locations identified as suitable for developing Park and Ride sites include M4 Corridor Junction 34/ Hensol (of which it is noted that no land has so far been identified). It is noted that bus based Park and Ride sites need to be large enough to significantly reduce car traffic on the target corridors and that for regional sites, parking for a minimum of 500 cars will be required along with bus priority measures along the line of route. Essential factors to address in the design and implementation of Park and Ride sites include:

- Clear and conspicuous signposting;
- Ease of access to the site;
- Comparative Bus-Based Park & Ride and central area parking tariffs;
- The quality, frequency and reliability of the transit service;
- Journey time advantages over the car; and
- Site facilities, such as shelter, passenger information and security measures.

Cardiff City Region Transport Implementation Plan (2010)

The City Region Transport Implementation Plan prioritised measures for funding and delivery, as part of Cardiff Council's sustainable travel centre initiative.

The plan notes how an informal Park and Share site is already located at M4 Junction 34, illustrating a latent demand for such a facility. The creation of a formal Park and Share site could accommodate existing demand and encourage other Park & Share user trips. The site may be an opportunity to make use of the nearby mainline railway to develop the site as a multi-modal transport hub. The plan suggests an initial 250 spaces to be constructed with potential for future extension.

International Connectivity through Welsh Ports and Airports (July 2012) – National Assembly Enterprise and Business Committee

The International Connectivity through Welsh Ports and Airports report provides recommendations for the Welsh Government, whilst acknowledging the need to engage with other stakeholders including the UK Government where appropriate. The aim of this inquiry by the National Assembly's Enterprise and Business Committee was to explore:

- How important major Welsh ports and airports are to the economy of their own regions and to Wales as a whole;
- What factors limit realisation of the potential offered by major Welsh ports and airports; what opportunities are available to develop this potential, and how these can be realised; and
- How effectively Welsh Government policies support the development of major Welsh ports and airports.

The report notes that around 73% of passengers travel to Cardiff Airport via car whilst the remainder use public transport, in particular buses³. Recommendations included in the report are as follows:

- Recommendation 5: The Welsh Government should introduce an improved, dedicated express bus service between Cardiff Airport and the city centre, and explore options for funding that service with partners and other key stakeholders.
- Recommendation 8: The Welsh Government should integrate connectivity to Welsh Airports with transport and infrastructure policy for Wales as a whole, and seek to negotiate the provision of better cross-border transport links and prospective electrification of rail services such as for Swansea and the Valleys.

Sewta Rail Strategy 2013 (Jacobs)

The Sewta Rail Strategy is a report prepared by Jacobs which set out the investment which the combined local authorities in South East Wales believed are needed to ensure a robust and efficient rail network over the next 20 years. The strategy is planned to accommodate passengers in comfort and encourage growth of both rail passengers and freight in an environmentally sustainable form.

The Sewta vision for improving the rail network seeks to provide a more attractive transport option with a minimum frequency of half hourly services made up of higher capacity electric trains. The Cardiff Area Signalling Renewal project offers the scope to secure additional capacity at the core of the Valley Lines network, through an enhancement option which will require continued Welsh Government funding support.

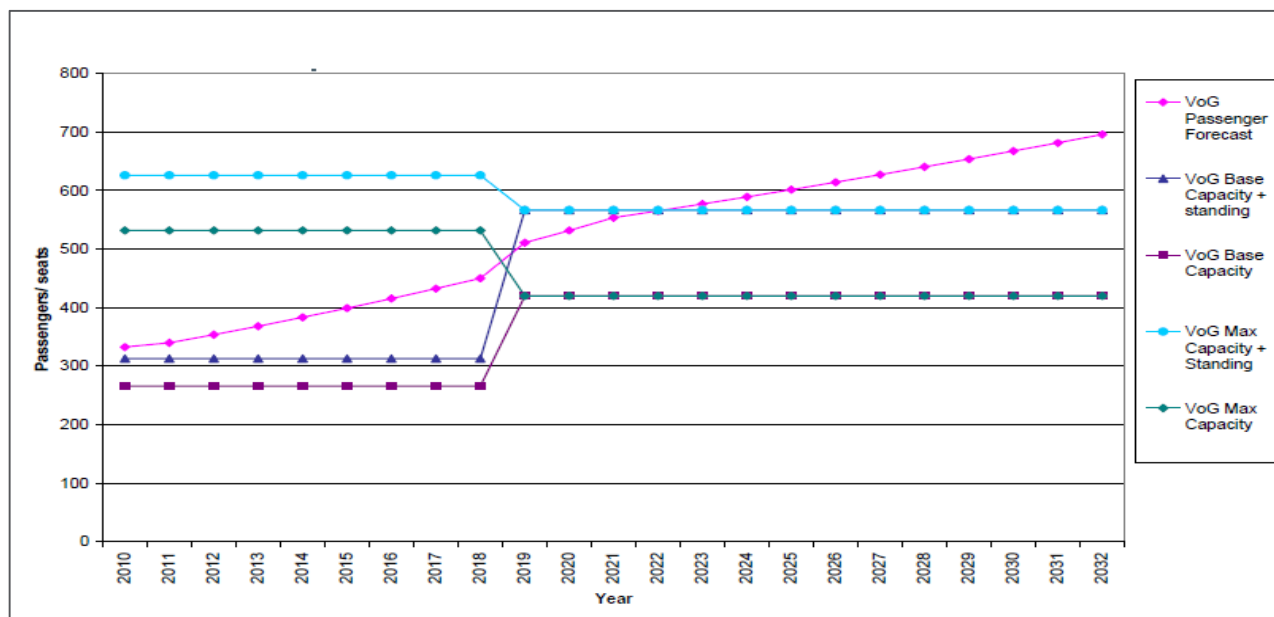
Rail demand on the Vale of Glamorgan Line (as indicated in Figure 1), interconnecting Valley Lines and elsewhere in South East Wales has been growing at a rate significantly above GDP. In order to avoid overcrowding at this high growth rate, significant short-term investment in additional rolling stock is needed as well as medium term rolling stock renewal through Valley Lines electrification. The rail strategy is based on provisions such as providing longer trains to accommodate passenger growth and improving the frequency of existing passenger services.

Investment opportunities identified for the Vale of Glamorgan Line:

- Additional rolling stock required to strengthen peak train to address passenger growth and to avoid overcrowding; and
- Station enhancements including improved station facilities, information, security and access.

³ Department for Transport, Record of Proceedings paragraph 138, 8 March 2012 (am)

Figure 1 Demand/ Capacity during the AM Peak (Vale of Glamorgan Line)



Cardiff Capital Region Metro Study (2013)

The Metro Study sets out a strategic regional plan for developing the Metro, which is:

'A turn up and go integrated transport network that will connect over 70% of the population of the Cardiff City Region, developed in a way that enables and/ or enhances developments at strategic sites, maximises economic benefits & facilitates regeneration'.

The study identifies a number of relevant existing transport problems and key trends:

- Limited integration between rail and bus services;
- Problems many people in the region encounter in accessing work, education and healthcare because of lack of available, affordable transport;
- Limited public transport access to some of the region's major hospitals, schools and other public services; and
- The Vale of Glamorgan rail line generally has poor frequencies (with one train an hour).

The Metro's extent includes routes east of Cardiff including to Cardiff Airport and Pontyclun, towards Maesteg. The study notes the need for invested improved connectivity for Cardiff Airport, stating *'There is much evidence that demonstrates a link between the economic performance of a region and its level of international connectivity. Whilst better access to Heathrow and its extensive range of long haul flights is essential to the economy of South East Wales, so is the need to provide access to international markets from Cardiff Airport. Such connectivity will support the case for inward investment to the region. Whilst Cardiff Airport has a limited natural catchment area, it can be extended with the appropriate investment in transport infrastructure. This may help the airport secure untapped demand for services to destinations in the Middle East, some European cities and locations in the US & Canada (predominantly served via Heathrow and Bristol'.*

Cardiff Airport is noted to be a pivotal regional asset whose performance can be enhanced by increasing its catchment area by public transport. From a Metro perspective this is said to require a new or upgraded airport station - either on the current Vale of Glamorgan line or at the current airport site via a new spur. New services from across the region and from out of the region will be able to access the airport either directly or via a change at Cardiff central. In line with the National Transport Plan 2010, half hourly services would then be introduced on the Vale of Glamorgan line to facilitate access to airport. M4 Junction 34 (M4 Junction 32-34) is referred to as an area experiencing congestion and as an existing transport problem that is in need of addressing. An overview of the Metro priorities is shown in Figure 2.

Figure 2 Metro Priorities⁴



2.5 Committed Developments

Land South of M4 Junction 34, Hensol

In 2011, Renishaw plc purchased the former Bosch site and surrounding land to the south of M4 Junction 34. In June 2016, Vale of Glamorgan Council approved plans for 'development comprising class B1, B2, B8 uses; a hotel/residential training centre (class C1/ C2); and ancillary uses within class A1, A2, A3; associated engineering and ground modelling works and infrastructure, car parking, drainage and access for all uses; provision of infrastructure (including energy centre(s)); landscaping and all ancillary enabling works'. The provision of a work bus service through the day and night is noted within the Travel Plan submitted as part of the planning application package.

Land at Sycamore Cross, Pendoylan Lane and North of A48, Bonvilston

Planning permission was granted on 2nd February 2017 for a 'development of 120 homes including affordable homes, new vehicle, pedestrian and cycle access, improvement works to Pendoylan Lane, regrading of site, drainage, landscape works, provision of public open space, demolition of existing modern timber stables and all associated works'. It is proposed that the existing road on Pendoylan Lane will be remodelled to provide a suitable vehicle access to the site, along with pedestrian and cyclist connection on a 2.5m wide shared surface, connecting to A48. Cycle improvements will be created along the A48 between Culverhouse Cross and Bridgend. It is noted that all new transport infrastructure should be well lit and have real time information.

Land Adjacent to A4226, Five Mile Lane

A 'proposal for on-line improvements to the existing A4226 between Waycock Cross Roundabout in Barry and the lay-by to the north of the Welsh Hawking Centre and an off line new road provision to the east of the existing A4226 which will reconnect with the existing A4226 just to the south of Blackland Farm' was

⁴ Cardiff Capital Region Metro Study (2013)

approved on 16 December 2016 and are now under construction. Works consist of constructing a new and upgraded single lane carriageway (7.3m wide with a 1m wide hard strip) making the total carriageway 9.3m wide, except for the carriageway section approaching Waycock Cross junction which will be 7.3m wide due to the absence of hard strips. A proposed cycleway/ footpath will be located on the west side of on-line road comprising a 2.5m wide verge. Three new junctions will be constructed along the route including two priority T-junctions and one staggered junction all of which will have ghost islands.

At the Sycamore Cross junction, the westbound carriageway of the A48 will be widened to provide a dedicated lane for turning left onto Five Mile Lane. Road markings will be amended to enable two lanes of traffic to therefore travel westbound through the existing junction. For eastbound traffic, there will be two lanes of traffic provided through the junction on the A48 from Bonvilston, heading east towards Culverhouse Cross. The existing bus lane will be re-aligned further towards the north side of the junction in order to provide sufficient lane width for traffic on the A48.

Land to the East of Mink Hollow (St Nicholas)

Planning was approved for a proposed residential development for 17 dwellings and associated highway and ancillary works, in November 2016. A new ghost island junction access arrangement will be constructed to serve the proposed 20 dwellings, as well as an additional 100 dwellings situated to the west of the site. A right-turn lane with a width of 3m and through lanes with a width of 3.55m will be created.

Land to the East of St Nicholas

A development of 100 houses and associated open space vehicular and pedestrian access, landscaping and infrastructure, including the demolition of 'Emmaville' was approved by the Vale of Glamorgan in December 2016. The development will be accessed via a new priority T-junction with the A48, to be located through the land currently occupied by 'Emmaville'. The house will be removed to allow for the construction of the new access road. The access road will be 5.5m wide and will also provide 2m wide footways on both sides of the highway.

Improvements will be made to the existing speed limit change gateway feature will include extending the red surface treatment across the whole highway as well as providing white lined channels on both edges to introduce a visual narrowing effect, thus slowing westbound traffic. This will be reinforced with 'dragon's teeth' road markings on the eastern side of the feature to ensure drivers are aware they are entering a village and the speed limit changes to 30mph. Eastbound traffic will have to negotiate a change in road alignment that will be introduced by the ghost island site access junction.

Land to the North of Junction 33 (Creigiau)

A planning application for a comprehensive development of 'Land to the North of Junction 33 of the M4' was approved in September 2017. The proposal is to create a new community containing: a range of new homes, including houses, apartments and some sheltered accommodation for the elderly (Use Classes C2 and C3), a Park and Ride facility and transport interchange or hub community facilities including a new primary school and community centre (Use Class D1), a local centre including shops (Use Class A1), financial and professional (Use Class A2), food and drink (Use Class A3) and a clinic or surgery (Use Class D1), new offices, workshops and research and development facilities (Use Classes B1 with Ancillary B2 and B8), a network of open spaces including parkland, footpaths, sports pitches and areas for informal recreation new activities and requiring, site preparation, the installation or improvement of services and infrastructure, the creation of drainage channels, improvements/works to the highway network and other ancillary works and activities.

The proposed development includes 1,500 new homes and a Park and Ride facility with a maximum of 1,000 spaces. The development is designed to accommodate the aspirational Mass Rapid Transport proposal currently being investigated and included in the Cardiff Council LDP.

3 Baseline Information

3.1 Introduction

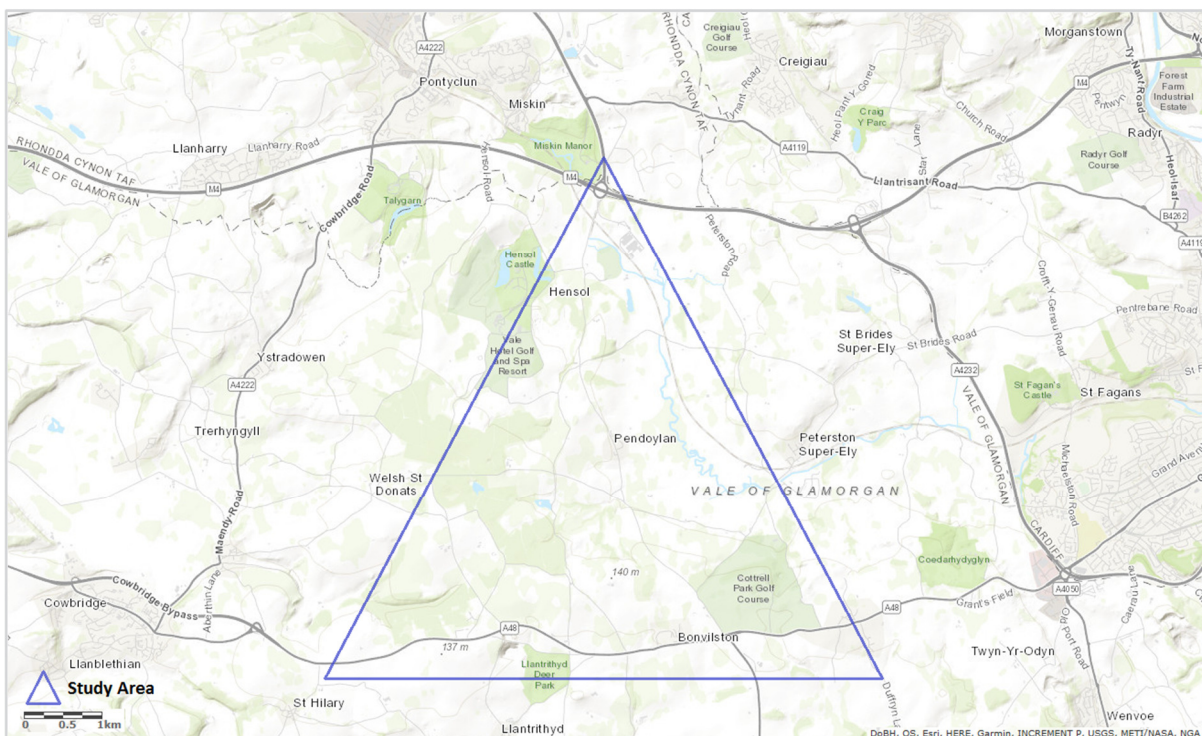
This section presents a summary of the baseline context of the appraisal area encompassing:



3.2 Local Appraisal Area and Vale of Glamorgan Context

The study area is as shown in Figure 3.

Figure 3 Study Area



The Vale of Glamorgan administrative area is situated to the west of Cardiff predominantly south of the M4 corridor and is extensively rural with a pattern of small settlements. The Vale of Glamorgan has a population of approximately 128,500 (2016 Census) which has increased by circa 5% since 2001, with population statistics presented in Table 4. The neighbouring local authorities are Bridgend County Borough Council to the west, Cardiff Council to the east and Rhondda Cynon Taff County Borough Council to the north, with the local authority boundary including the M4 Junction 34.

Table 4 Usual Resident Population Statistics⁵

Location	2011 Population	Population Change (since 2001)
Appraisal Area	2,289	+2%
Vale of Glamorgan	126,336	+5%
RCT	234,410	+1%
Bridgend	139,178	+8%
Cardiff	346,090	+13%

The deposit LDP (2013) recognises the M4 and A48 as key strategic road links within the county, connecting with to the wider south-east region and beyond. The Pendoylan corridor connects to the strategic network via M4 Junction 34 to the north and to the A48, east of Bonvilston, to the south. Redway Road/ unnamed road runs parallel to and also connects to the Pendoylan corridor, to the west. The carriageway connects to the Pendoylan corridor through Pendoylan at Clawdd-côch, to the north, and the A48 west of Bonvilston to the south.

The appraisal area is not connected to the region via rail directly, however Pontyclun station (South Wales Mainline) is located within proximity of the appraisal area, providing services to Maesteg, Bridgend and Cardiff Central (approximately 5.5km north-west of Pendoylan). In addition, Cardiff Airport is located in proximity to Rhoose (approximately 11km south of Pendoylan).

Bonvilston, Pendoylan and Peterston-super-Ely have been identified as minor rural settlements in the LDP Settlement Hierarchy⁶. These settlements are noted to contribute towards the special character of the rural Vale and also play an important role in underpinning sustainable rural communities.

The age profile of the population in the appraisal area comprises a population aged 0-15 of 19%, working age 61% and 20% of retirement age which is higher for children and retired people, and lower for working age adults than that for the Vale of Glamorgan overall. This is shown in Figure 4.

The Vale of Glamorgan exhibits considerable socio-economic diversity containing some of the most affluent and the most deprived communities in Wales in respect of employment, income, education, health and community safety. The Welsh Index of Multiple Deprivation (WIMD) 2014⁷, shows that of the 79 lower super output areas (LSOA) in the Vale of Glamorgan, 5% of which are contained with the most deprived 10% LSOA in Wales⁸.

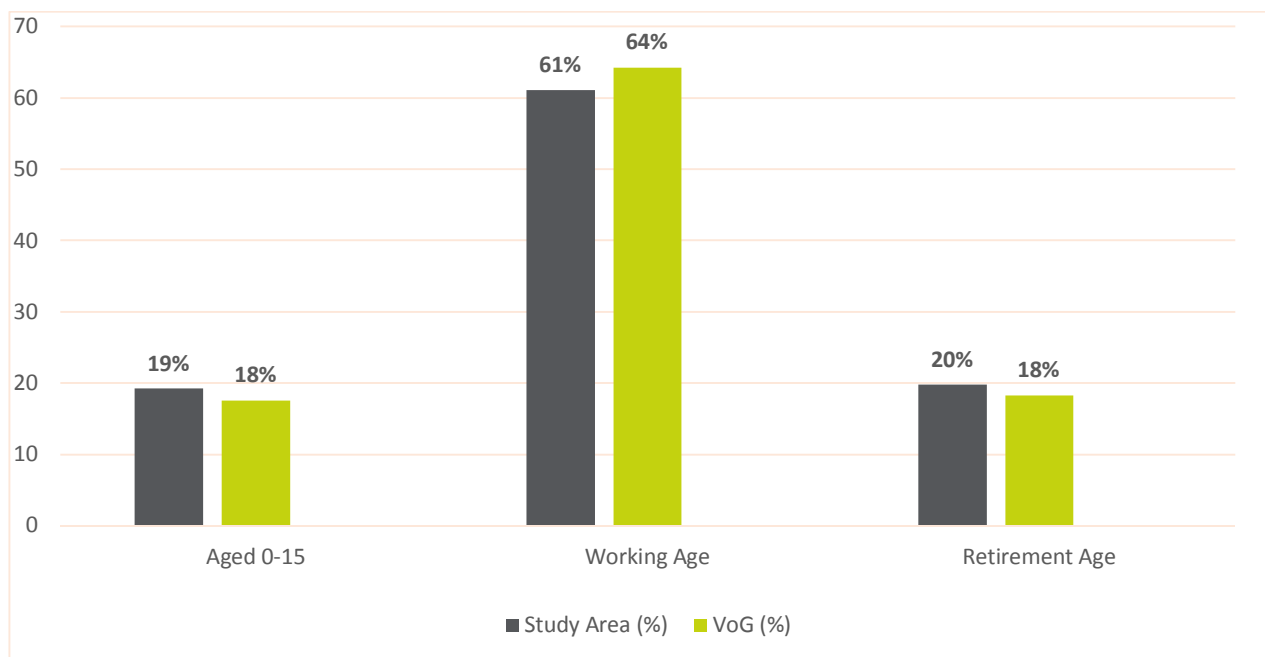
⁵ Census (2011, 2001)

⁶ Vale of Glamorgan LDP 2011-2026 – Written Statement – June 2017

⁷ Welsh Government – Welsh Index of Multiple Deprivation 2014 <http://gov.wales/docs/statistics/2015/150812-wimd-2014-summary-revised-en.pdf>

⁸ Welsh Government – Welsh Index of Multiple Deprivation 2014 Local Authority Analysis - <https://stats.wales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-2014/wimd2014localauthorityanalysis>

Figure 4 Age Profiles 2011 Census



The appraisal area contains some of the least deprived areas. The average gross weekly full time pay in the Vale of Glamorgan was £534.60 in 2014, which was almost £50 a week more than the figure for Wales⁹. Whilst at local authority level, the Vale of Glamorgan points to a higher income than other parts of Wales, at lower geographies it is evident that there is a great deal of variation. Four LSOAs within the local authority have incomes 60% below the GB median income.¹⁰

A summary of employment statistics for the appraisal area has been included as Table 5 against regional and national statistics. Census data (2011) shows that there was a higher percentage of those employed within the appraisal area and also the Vale of Glamorgan as a whole (figures at 63 and 62%) compared with 58% for SE Wales and Wales as a whole. There is a significantly higher population of retired people within the appraisal area compared to the Vale of Glamorgan, South East Wales and Wales as a whole.

Table 5 Employment Statistics Census 2011

Economic Activity	Appraisal Area	The Vale of Glamorgan	South East Wales	Wales
Employed	63%	62%	58%	58%
Unemployed	2%	4%	5%	4%
Retired	21%	16%	15%	16%
Student	7%	7%	10%	9%
Other	8%	10%	13%	12%

*Figures rounded

⁹ Annual Survey of Hours and Earnings 2014

¹⁰ Vale of Glamorgan LSB Tackling Poverty Report - <https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-2014/wimd2014localauthorityanalysis>

3.3 Environmental and Land-use Characteristics

There are a wide range of environmental resources within the Appraisal Area. A desk-top study has been undertaken to identify environmental features and constraints using mapping associated with the LDP (2017).

3.3.1 Cultural Heritage

This desk study has included a search for known heritage assets within a 1km radius study area from the appraisal area. Known heritage assets listed below have been identified using LLe Wales/MAGIC and an archaeological desk-based assessment using the Archwilio and Historic Wales HER data portals.

Scheduled Monuments

There are ten Scheduled Monuments located within the appraisal area as shown in Table 6 and nine Scheduled Monuments within proximity to the appraisal area, listed in Table 7.

Table 6 Scheduled Monuments within the Appraisal Area¹¹

Scheduled Monument	National Grid Reference	Location Description
Felin Isaf Castle Mound	ST 06071 79267	Felin Isaf Castle Mound is located 500m south of the M4 and lie to the north of the appraisal area.
The Two Cooking Mounds E of Ty'n-y-Pwll	ST 07177 75660	The Two Cooking Mounds E of Ty'n-y-Pwll are separated as two Scheduled Monuments, the midpoint between the two mounds is located 1.35km south east from Pendoylan and 1.2km south west of Peterston-super-Ely.
Y Gaer	ST 06337 74738	Y Gaer is located within a small woodland, 430m north of Bonvilston; 660m north of the A48.
Maes-y-Hwyaid Round Barrow	ST 03620 75007	Maes-y-Hwyaid Round Barrow is located 1.25km south/south east of Welsh St Donats.
Two Round Barrows 300m North of Tair Onnen	ST 04182 74914	Two Round Barrows 300m North of Tair Onnen are separated in two closely located points. The midpoint between the two Scheduled Monuments can be found, 1.7km south east of Welsh St Donats and 2km north of Llantrithyd.
Coed-y-Cwm Chambered Cairn	ST 08104 73794	Coed-y-Cwm Chambered Cairn is located 280m south of the A48 and 550m south west of St Nicholas.
Coed y Cwm Ringwork	ST 08277 73675	Coed y Cwm Ringwork is located 460m south of the A48 and is located on the southern boundary of the appraisal area. The site is located 520m south west of St Nicholas.
Cottrell Castle Mound	ST 08089 74506	Cottrell Castle Mound is located 340m north of A48 and is located 480m north west of St Nicholas.
Cottrell Ringwork	ST 08472 74726	Cottrell Ringwork is located within close proximity to the south-eastern boundary of the appraisal

11 LLe Geo-Portal

Scheduled Monument	National Grid Reference	Location Description
		area. Cottrell Ringwork is located 460m north of the A48 and 320m north/north west of St Nicholas.
Castell Moel	ST 05428 73442	Castell Moel is located adjacent to the midpoint along the southern boundary of the appraisal area. Castell Moel is located 420m south of the A48 and 730m south west of Bonvilston.

Table 7 Scheduled Monuments outside the Appraisal Area¹²

Scheduled Monument	National Grid Reference	Location Description
Miskin Roman fort	ST 04395 80788	Miskin Roman fort is located 200m north of the M4. The Scheduled Monument lies adjacent to the west of the appraisal area (south of Miskin).
Caer Gwanaf	ST 04768 80027	Caer Gwanaf is located 250m south of the M4 and lies directly adjacent to the west of the north end of the appraisal area, 700m north of Hensol.
Llanquian Wood Camp	ST 02155 74472	Llanquian Wood Camp is located immediately outside of the appraisal area. The site is located to the south west of the appraisal area, 1.8km east from Cowbridge and 1km north of St Hilary.
Llanquian Castle	ST 01888 74408	Llanquian Castle is located immediately outside of the appraisal area to the south west. Llanquian Castle is 1.6km east from Cowbridge and 1km north from St Hilary.
Castle Ringwork 850m ENE of Ty'n-y-Coed	ST 07053 73351	Castle Ringwork 850m ENE of Ty'n-y-Coed is located outside of the appraisal area; 700m south of Bonvilston.
Llantrithyd Camp	ST 03860 73182	Llantrithyd Camp is located outside the appraisal area, 900m south of the A48 and 520m north west of Llantrithyd.
Stalling Down Round Barrow	ST 01165 74901	Stalling Down Round Barrow is located outside of the appraisal area and is 250m directly south of Aberthin.
Castell Tal-y-Fan	ST 02098 77188	Castell Tal-y-Fan is located outside of the appraisal area and is found 700m south east from Ystradowen and 1.2km north west of Welsh St Donats.
Tinkinswood Burial Chamber	ST 09268 73292	Tinkinswood Burial Chamber is located along Duffryn Lane. 900m south of the A48 and St Nicholas.

¹² Lle Geo-Portal

Listed Buildings

There are approximately 45 Listed Buildings within the appraisal area, these are presented in Table 8 (those Listed Buildings that are within close proximity to one another have been grouped together). In terms of the grade of listing, there are two Grade I listed buildings, three Grade II* and the remainder are Grade II.

Table 8 Listed Buildings within and immediately surrounding the Appraisal Area¹³

Scheduled Monument	Grade	National Grid Reference	Location Description
Hensol Castle (including attached Courtyard Ranges to north)	I	ST 04726 78995	Located approximately 70m east of Hensol Lake.
Church of St Donat	I	ST 02773 76211	Located within the centre of Welsh St Donats village.
Church of St Cadog (St Cattwg)	II*	ST 05988 76685	Located within central Pendoylan.
Parish Church of St Nicholas	II"	ST 09018 74367	Located within the village centre of St Nicholas, adjacent to the Well Lane.
Church of St Peter	II*	ST 08263 76406	Church of St Peter is located north of the River Ely and approximately centre of Peterston-super-Ely along Fford-yr-Eglwys.
Lower terrace wall on west side of Miskin Manor; Upper terrace wall and pavilion on west side of Miskin Manor; Pair of King's Beasts at west entrance to Miskin Manor; Miskin Manor, including one-storey range to north and Pair of King's Beasts at east entrance of Miskin Manor (5)	II	ST 05698 80292	Miskin Manor is located 200m north of the M4.
Kitchen garden walls	II	ST 05720 80372	Miskin Manor kitchen is located 300m north of the M4.
Bridge on man drive to Hensol Castle; Hafod Lodge to Hensol Castle (Also known as Bottom Lodge) (2)	II	ST 05034 79233	The building is located east of Hensol, 1km directly south of the M4 road.
Dyffryn Mawr Farmhouse	II	ST 06321 78031	The farmhouse is located 1.7km directly south of the M4 and 700m north east from Clawdd-côch.
Pendoylan Cottages; Telephone Call-box (2)	II	ST 05988 76685	Located within the village centre of Pendoylan.
Ty Fry Lodge	II	ST 04883 76359	Located 1km west of Pendoylan.
Great House; Churchyard Wall of Church of St Donat	II	ST 02773 76211	These two listed buildings are located within the centre of Welsh St Donats village.
Pigsty at Ty-draw	II	ST 04360 75343	The listed building is located south of Hensol Forest and south west of Pendoylan.

¹³ Historic Wales

Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48
WelTAG Stage Two: Impacts Assessment Report

Scheduled Monument	Grade	National Grid Reference	Location Description
Cae'rwigau Isaf	II	ST 06006 75788	The listed building is located approximately 700m south of Pendoylan.
Cae'rwigau Uchaf	II	ST 06038 74577	The listed building is located approximately 900m south of Pendoylan.
Croes-y-Parc Baptist Chapel; Monument to Dafydd William at Croes-y-Parc chapel	II	ST 07939 75826	The two listed buildings are located 2km south east from Pendoylan.
1-10 Pwll-y-Min Crescent Wyndham Park, CF5 6LR (Ten properties along Pwll-y-Min)	II	ST 08457 76063	Ten properties located along Pwll-y-Min Crescent, located south of River Ely (Peterston-super-Ely) and adjacent to Wyndham Park).
Nos 4 and 6 Cory Crescent; Nos 8 and 10 Cory Crescent; Nos 16 and 18 Cory Crescent	II	ST 08521 75970	The six properties are located along Cory Crescent located south of River Ely (Peterston-super-Ely) and adjacent to Wyndham Park.
Telephone Call-box outside Fircot	II	ST 08309 76393	The Telephone Call-box is located north of the River Ely and approximately centre of Peterston-super-Ely along Ffordd-yr-Eglwys.
Rectory House (aka The Old Rectory)	II	ST 08015 76559	Rectory House is located at the end of unnamed path to the north west of Peterston-super-Ely.
Bonvilston Cottage; Parish Church of St Mary the Virgin; Churchyard Cross at Parish Church of St Mary; Ty Mawr (Great House)	II	ST 06454 74019	The four listed buildings are located within Bonvilston, adjacent to the A48.
Village Farmhouse	II	ST 06736 74065	The listed building is located to the east of Bonvilston, adjacent to the A48.
Cottrell Lodge	II	ST 07934 74185	Cottrell Lodge is located along the A48 at the midpoint between Bonvilston and St Nicholas.
The Three Tuns	II	ST 09182 74338	Located towards the eastern edge of the St Nicholas village.
Cory Family Chest-Tomb at Parish Church of St Nicholas	II	ST 08993 74371	Located within the village centre of St Nicholas, adjacent to Well Lane.
Telephone Call-box on corner with road to St Nicholas' Church; GPO Pillar on corner with Road to St Nicholas' Church; St Nicholas Church Hall; Church Hall House (next to St Nicholas Church Hall); Smiths Row (also known as Blacksmiths Cottages); Blacksmith's Cottages	II	ST 09027 74259	The listed buildings are located within close proximity to one another along the A48 within St Nicholas.

Conservation Areas

There are four Conservation Areas located within the appraisal area¹⁴ encompassing the:

- Pendoylan Village Conservation Area;
- Peterston-super-Ely Conservation Area is located in the east of the appraisal area and covers approximately half of the village area;
- Bonvilston Conservation Area covers the majority of the village, extending laterally encompassing the A48 to an unnamed road to the east and ending 300m west of Redway Road (the Conservation Area boundary falls south of the A48); and
- St Nicholas Conservation Area covers the majority of the village. St Nicholas is located towards the south-east edge of the appraisal area.

There are four Conservation Areas located outside of the appraisal area, including the:

- Llantrithyd Conservation Area is located 1.1km south of the A48 and 1.5km south west of Bonvilston;
- St Hilary Conservation Area lies south west, outside of the appraisal area approximately 500m south of the A48 and 1.8km south east of Cowbridge;
- Miskin Conservation Area is located to the north west, outside of the northern end of the appraisal area and to the north of the M4; and
- Talygarn Conservation Area lies outside the appraisal area, south of the M4 and approximately 1.1km north west from Hensol.

Registered Parks and Gardens

There are three Registered Parks and Gardens located within the appraisal area¹⁵:

- Hensol Castle Historic Park and Garden is located to the north west of the appraisal area at Hensol. NGR: ST 04498 78764;
- Llantrithyd Place Historic Park and Garden is located 120m south of the A48 and 300m north east of Llantrithyd. NGR: ST 04999 73695; and
- Miskin Manor Historic Park and Garden lies to the north of the M4 and lies within the northern end of the appraisal area. NGR: ST 05316 80462.

There are three Registered Parks and Gardens located outside the appraisal area:

- Talygarn Historic Park and Garden is located immediately south of the M4 and Pontyclun, Talygarn is located west of the northern end of the appraisal area. NGR: ST 03070 79833;
- Coerdarhydyglyn Historic Park and Garden is located outside the appraisal area to the south east, within close proximity to the A4232 and 1.4km south east of Peterston-super-Ely. NGR: ST 10385 75128; and
- Dyffryn Historic Park and Garden is located 1.1km south of the A48 and St Nicholas. NGR: ST 09491 72493.

Registered Landscapes of Outstanding Historic Interests

Llancarfan, a Vale of Glamorgan Historic Landscape is located immediately south of the A48 and falls within the south of Bonvilston. The Llancarfan Historic Landscape falls within the southern boundary of the appraisal area. The Llancarfan Historic Landscape extends from Bonvilston in the east and 1.2km west of Bonvilston and southwards to Penmark in the south east and Llancadle to the south west¹⁶.

¹⁴ Archwilio

¹⁵ Archwilio

¹⁶ Lle Geo-Portal

Archaeology

A review of Archaeological records using Archwilio and the Historic Wales portals has revealed there are approximately 110 archaeological records within and immediately surrounding the appraisal area, with approximately 14 being north of the M4¹⁷.

There are a total 98 non-designated heritage assets recorded by the HER within the study area, the majority of which are Post Medieval in date although most periods are represented. There are 16 non-designated assets of Prehistoric date, 13 of which are recorded as extant and the remaining three are non-extant. Many of these assets are burial monuments with the remainder of the assets dating to the prehistoric period include standing stones, an urn and a field system. The HER does not record any non-designated assets which date to the Roman period, however the National Museum Archaeology Collection does record Roman pottery in the Welsh St Donats Area.

The Portable Antiquities Scheme also records several Roman coins and 'findspots' throughout the study area, the most prominent of which is a hoard of 91 coins found near to Bonvilston (Portable Antiquities Scheme 2017). The HER records nine Medieval non-designated assets which include churchyards, a hillfort, motte, landscape park, deserted settlement and pottery kiln. The majority of the non-designated assets that are located within the study area date to the Post Medieval period, 30 of these assets are extant and the remaining 18 are non-extant.

There are two Modern non-designated assets within the study area, one of which is the site of a Spitfire collision. Two Spitfires collided in mid-air, both pilots were killed however it is not known whether or not the site is a Military War Grave, neither is it known if the wreckage was recovered (Aviation Safety 2017). There are 23 non-designated assets of unknown date, 14 of which are extant and the remainder are non-extant. The majority of the heritage assets of unknown date are earthworks of varying extents and character.

A key area of archaeological concern is at Welsh St Donats. This area has the Welsh St Donats cemetery (03827s) which contains at least 12 burial mounds dating to the prehistoric period. There is also the potential for previously unrecorded archaeology, particularly below ground archaeological remains associated with this ceremonial landscape.

Welsh St Donats is the site of the Spitfire collision (04010s). If this area were to be affected by proposals it would be important to establish the exact location of the wreckage, if it has not been recovered and to establish whether the site is a Military War Grave.

Another key area of built heritage is the settlement of Pendoylan. This settlement has a high concentration of both designated and non-designated assets which will have settings that extend beyond their physical location. These settings will partially be informed by the views from and to them.

3.3.2 Landscape and Land Use

The Historic Wales HER data portals, Lle Geo-Portal, MAGIC and Google Maps have been used to detail the Landscape and Land Use within the appraisal area. There are no National Parks, Areas of Outstanding Natural Beauty (AONB) or Heritage Coasts located within 5km of the appraisal area¹⁸.

Land use within the appraisal area is predominantly rural with the main residential developments located south of the M4 at Hensol, Pendoylan, Peterston-super-Ely, Welsh St Donats, St Nicholas and Bonvilston. Throughout the remaining appraisal area, land use is limited to individual residential properties and agricultural land and rural businesses such as equestrian uses and golf facilities. Additionally, there is the railway line that enters from the north west from the M4, the line moves south, south east, before then leaving the appraisal area eastwards through Peterston-super-Ely.

¹⁷ Archwilio

¹⁸ Magic Application (2017)

There is no registered common land within the appraisal area. There is approximately 60ha of registered common land located 1.5km to the southwest of Welsh St Donats and to the east of Cowbridge (this falls outside of the appraisal area)¹⁹.

An analysis from the Agricultural Land Classification of England and Wales 1985 (ALC009)²⁰ details that within the appraisal area, the Agricultural Land Classifications (ALC) that form the majority of the area are Grade 3 and Grade 4. Along the south of appraisal area lies a small area of Grade 2 ALC;

- Grade 2 - very good quality agricultural land (land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1).
- Grade 3 - good to moderate quality agricultural land (land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2).
- Grade 4 - poor quality agricultural land (land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land).

In terms of impacts, the main concern would be the loss of any Best and Most Versatile (BMV) agricultural land which includes Grades 1, 2 and 3a. The extent of BMV land affected by a scheme would need to be quantified using more recent draft mapping from Welsh Government at a more detailed stage.

Special Landscape Area (SLA)

An SLA is a non-statutory conservation designation used by local government to categorise sensitive landscapes which are, either legally or as a matter of policy, protected from development or other man-made influences. The majority of the appraisal area falls under the SLA designation with only Bonvilston and the area north of Llantrithyd not coming under this designation²¹.

3.3.3 Noise and Vibration

Noise maps and associated plans are managed by the Welsh Government and local authorities to find where noise levels are high and help create noise action plans to address the issue²².

Within the appraisal area there are Noise Action Priority Areas (NAPPAs) for roads located to the north west and south east of the appraisal area.

To the north west, outside of the appraisal area, there are two NAPPA – Roads. The closest of which is located along the M4, approximately 1km west, north west of the M4 junction. Additionally, the furthest NAPPA is located approximately 2km to the west/north west outside of the appraisal area.

There are two NAPPA located in the south east of the appraisal area. The NAPPA are located at the south end of the appraisal area at Bonvilston and to the south east of the appraisal area at St Nicholas. Both of these NAPPA are located along the A48. Additionally, there is a Noise Action Planning Priority Area – Railway located within the centre of Peterston-super-Ely.

There are six settlements located within the appraisal area, three of which are currently located along the existing route and the remaining three are located to the North, West and South East of the appraisal area. The potential noise and vibration receptors of the scheme are highlighted in Table 9.

¹⁹ Lle Geo-Portal

²⁰ Natural England – Agricultural Land Classification of England and Wales 1985 (ALC009) (2013)

²¹ Vale of Glamorgan Council Designation of Special Landscape Areas (2008)

²² Noise Priority Areas (2017)

Table 9 Potential Noise and Vibration Receptors within the Appraisal Area²³

Location	Residential Area	British National Grid Reference
The Pendoylan corridor passes through or is within close proximity to:	Clawdd-côch	ST 05552 77697
	Pendoylan	ST 06001 76651
	Bonvilston	ST 06593 74156
St Nicholas is located south east of the appraisal area and directly 2km east from Bonvilston	St Nicholas	ST 08938 74313
Welsh St Donats is located 3km directly west of Pendoylan	Welsh St Donats	ST 02840 76174
Hensol is located 1km north west of Clawdd-côch	Hensol	ST 04720 78752

3.3.4 Water Resources

The appraisal area and the surrounding area falls within three separate flood risk zones. The majority of the appraisal area falls within Planning Policy Wales TAN 15 Flood Risk Zone A (i.e. area considered to be at little or no risk of fluvial or coastal/tidal flooding). Flood Risk Zone A ranges across the centre and western extent of the appraisal area, the A48 to the south falls within Flood Risk Zone A²⁴.

Planning Policy Wales TAN 15 Flood Risk Zone B (i.e. areas known to have flooded in the past) is located in pockets surrounding the area of Flood Risk Zone C2. The majority of the pocketed areas are located in close proximity to the south of the M4. Planning Policy Wales TAN 15 Flood Risk Zone C2 (i.e. areas without significant flood defence infrastructure) extends from the north of the M4 at Miskin and follows the River Ely downstream in a south easterly direction. The Flood Risk Zone C2 designation expands in its area of extent to the east of Pendoylan. Flood Risk Zone C2 then extends eastwards, narrowing in surface area, south of Peterston-super-Ely and eastwards towards the A4232.

The River Ely flows south east from Miskin outside of the appraisal area through the appraisal area. The River Ely is classified as a 'main river'. Available data from the 2016 second cycle regarding water quality, indicates that the waterbody is currently achieving an overall status of Bad. The waterbody currently achieves an overall ecological status of 'Bad' and chemical status of 'Fail'.

To the east of Clawdd-côch and Pendoylan and west of the railway line, there are numerous tributaries that are also classified as 'main rivers', these include the Pendoylan Moors, Nant Tynyplancau and the Peterson Moors. Within the remainder of the appraisal area, to the west of the on-line route there are a number of ponds and minor unnamed watercourses²⁵.

3.3.5 Nature Conservation

Statutory Designated Sites

The MAGIC website has been used to identify all statutory designated sites of importance for nature conservation within and immediately outside of the appraisal area. The search was extended to 10km for identification of statutory sites designated for their bat interest.

²³ Google Maps (2017)

²⁴ Natural Resources Wales' Flood Risk Map Viewer – Long-term flood risk (2017)

²⁵ Natural Resources Wales' Flood Risk Map Viewer – Long-term flood risk (2017)

There are no Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Ramsar sites (a wetland of international importance) within the appraisal area or potential strategic area boundary²⁶.

Within the surrounding area there are a number of statutory designated sites:

International

The Cardiff Beech Woods SAC - National Grid Reference (NGR): ST 11700 82500. The SAC is located 4.8km northeast of the appraisal area. This site is of high (international) importance:

- Cardiff Beech Woods SAC: Designated for its Annex I habitats (containing one of the largest concentrations of Asperulo-Fagetum beech forests in Wales, and the SAC represents the habitat close to the western limit of its past native range in both the UK and Europe).
- The Severn Estuary SAC, Special Protection Area (SPA) and Ramsar site, a wetland of international importance, is located 6km south east of St Nicholas (NGR: ST 18345 69850). These sites are all of high (international) importance:
- Severn Estuary SAC: Designated for its Annex I habitats (including estuaries, Atlantic salt meadows and mudflats and sandflats not covered by seawater at low tide) and Annex II species (including sea lamprey, river lamprey and twaite shad) which form primary reasons for the selection of this site;
- Severn Estuary SPA: Designated for its internationally important bird populations (including the Annex I species Bewick's swan over winter as well as ringed plover, dunlin, pintail, redshank and curlew) and for regularly supporting at least 20,000 waterfowl; and,
- Severn Estuary Ramsar site: Designated for its Annex I habitats (including estuaries, Atlantic salt meadows and mudflats and sandflats not covered by seawater at low tide), its migratory fish populations (including salmon, sea trout and sea lamprey) and for its internationally important assemblage of waterfowl (including gadwall, dunlin and redshank).

National

There are two SSSIs located within the boundary of the appraisal area. These are of high (national) importance:

- Pysgodlyn Mawr SSSI - Located National Grid Reference: ST 04200 76000. The site is located 1.6km west of Pendoylan. Pysgodlyn Mawr SSSI is designated for its small area of wetland which supports a wide range of habitats ranging from open water, through reed swamp, to heath and bog, which are very unusual in the lowland Vale area. There is an excellent dragonfly fauna which includes the nationally scarce downy emerald dragonfly (*Cordulia aenea*).
- Ely Valley SSSI - Located National Grid Reference: ST 05100 80500: ST 08172 76200. The Ely Valley is located in the north east of the appraisal area and runs south, south east, flowing south of Peterston-super-Ely as it leaves the appraisal area. The Ely Valley site comprises a 9.5km section of the River Ely which runs through the north-eastern part of the Vale near Cardiff. The Ely Valley supports the largest known population of the nationally scarce plant monk's-hood (*Aconitum napellus*).

There are two SSSIs located within 2km of the appraisal area, these are of high (national) importance:

- Brofiscin Quarry, Groes Faen SSSI: Located National Grid Reference: ST 06900 81200. Brofiscin Quarry, Groes Faen is located 800m north east of the appraisal area. The Brofiscin Quarry, Groes Faen site is a disused limestone quarry near Llantrisant in South Wales. It has been designated a SSSI due to the exposed early carboniferous geological formations on the site;
- Nant Whitton Woodlands SSSI: Located National Grid Reference: ST 06500 72000. The Nant Whitton Woodlands is located approximately 1.5km south of Bonvilston. Nant Whitton Woodlands site is a narrow strip of limestone woodland near Llancafarn supporting a diverse canopy of oak, ash, hazel (*Corylus avellanus*), field maple (*Acer campestre*) and spindle (*Euonymus europaeus*) etc, and a species rich ground flora which includes the uncommon herb Paris (*Paris quadrifolia*) and adder's-tongue fern.

²⁶ Magic Application (2017)

There are no SACs designated for their bat interest within 10km of the appraisal area²⁷.

There are no National Nature Reserves (NNR) within the appraisal area and no NNR within 2km of the appraisal area.

There are no Marine Conservation Zones (MCZ) and no Marine Nature Reserves (MNR) within the appraisal area and no MCZ/MNR within 2km of the appraisal area²⁸.

Non-Statutory Designated Sites

The MAGIC website and the Vale of Glamorgan LDP (2011-2026) has been used to identify all non-statutory designated sites of importance for nature conservation within the appraisal area and the area immediately outside surrounding the appraisal area of the M4 Junction 34 to A48.

Local nature reserve or LNR is a designation for nature reserves in Great Britain.

- There are no Local Nature Reserves (LNR) within the appraisal area or within 1km of the study area.

Sites of Nature Conservation Importance (SINC)

- There are a number of SINC's (approximately twenty-six) located within the appraisal area. Eleven of the SINC's are located in the south east (between Peterston-super-Ely, St Nicholas and Bonvilston). The remaining SINC's are scattered throughout the centre and to the west of Pendoylan within the appraisal area.

Within the appraisal area there are numerous pockets and rows of trees with Tree Preservation Orders (TPO):

- There are seven pockets of trees with TPOs located in the north of the appraisal area (surrounding M4 Junction 34). These are located approximately 800m to the north east of Hensol, located eastwards of the railway line (within the appraisal area).
- The area surrounding Hensol Lake and Hensol Castle has multiple rows, pockets and individual trees with TPOs.
- Within the centre of Pendoylan, there are multiple rows, pockets and individual trees located along the Pendoylan corridor road that run through the village.
- To the east of Welsh St Donats, a small pocket of TPOs are located within a network of roads at Heol Mynydd.

In the south east of the appraisal area, there are three areas of high concentrations of TPOs. These include:

- The area of Peterston-super-Ely south of the railway line.
- Bonvilston has TPOs located along and adjacent to the north and south of the A48.
- St Nicholas has TPOs on both the north and south sides of the A48. Additionally, further TPOs are located southwards along Duffryn Lane (a minor B-road off the A48), which falls just outside of the appraisal area.
- Located within close proximity to the appraisal area, there are a collection of TPOs located south westerly within St Hilary village (outside of the appraisal area)²⁹.

3.3.6 Air Quality

Concentrations of pollutants Nitrogen Dioxide (NO₂), Particulate Matter (PM₁₀), Particulate Matter (PM_{2.5}) and Sulphur Dioxide (SO₂) in the Vale of Glamorgan do not exceed the nationally set levels and the Vale of

²⁷ Magic Application (2017)

²⁸ Lle Geo-Portal

²⁹ Vale of Glamorgan Council Deposit LDP 2011-2026 (2013)

Glamorgan has not designated any AQMAs. The nearest AQMA is Mwyndy AQMA which falls within the Rhondda Cynon Taff County Borough Council boundary³⁰.

Mwyndy AQMA is located to the east of Miskin along the A4119, the AQMA is approximately 1.4km north of the M4 and 900m north west of Groes-faen. Mwyndy AQMA falls just outside of the northern point of the appraisal area. NO2 is the only pollutant currently monitored. There are no other AQMAs within the potential strategic area.

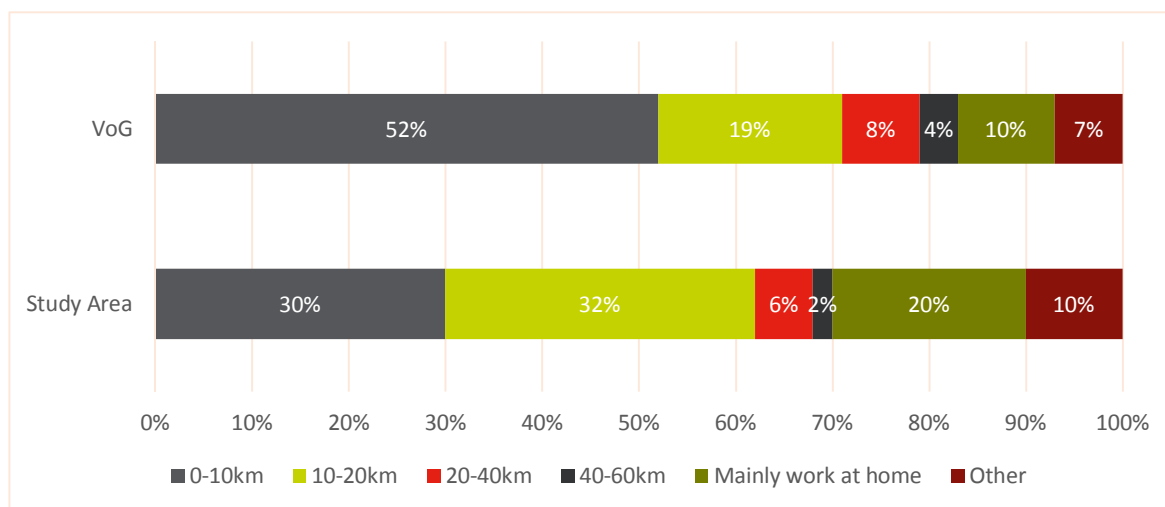
Based upon the 2016 Air Quality Progress Report for Vale of Glamorgan, the overall air quality across the county complies with regulations to protect human health³¹. Data from the 2012 Air Quality Progress Report highlighted that at some locations road traffic emissions of Nitrogen Dioxide (NO2) were at, or close to, the relevant annual average concentration of 40 ug/m3. These were recorded at Windsor Road, Penarth; Cogan Roundabout; Railway Terrace, Cardiff Road, Dinas Powys; Tynewydd Road, Barry; and Culverhouse Cross (Vale of Glamorgan, 2013). The closest, Culverhouse Cross, is located on the strategic road network and thus within the influence of transport proposals for the study area³².

3.4 Access to Employment

The appraisal area provides limited opportunities for sustainable access to employment within the appraisal area; thus, travel by car is the dominant mode. The following subsequently provides a summary of key characteristics for access to employment affecting the appraisal area.

- 30% of workers travel less than 10km to work from the appraisal area compared to 52% within the Vale of Glamorgan as a whole (2011 Census Distance Travelled to Work) (Figure 5). The dominant distance to work from the appraisal area is between 10 and 20km, with 32% of the area travelling this distance to work, in comparison to just 19% of the Vale of Glamorgan.

Figure 5 Distance Travelled to Work (%)³³



- The car (or van) is the dominant mode of travel to work across the appraisal area, as with the Vale of Glamorgan and South East Wales as a whole. 92% of those from the appraisal area drive to work (including passengers) compared with 76% of South East Wales as a whole.

³⁰ Air Quality Management Areas: <https://uk-air.defra.gov.uk/aqma/maps>

³¹ Vale of Glamorgan Council Air Quality Progress Report 2016

³² Vale of Glamorgan Council Air Quality Progress Report (2013)

³³ 2011 Census

- Only 4% of workers in the appraisal area travel to work on foot, nearly a third of the percentage of the Vale of Glamorgan as a whole (11%) (2011 Census Method of Journey to Work).
- 2% of workers use bus services to travel to work, slightly lower than for the Vale of Glamorgan (3%).
- Only 1% of the appraisal area's workers travel by train to work compared with the average of 6% for the Vale of Glamorgan as a whole (2011 Census Method of Journey to Work).
- 38% of workers within the Vale of Glamorgan also live in the Vale of Glamorgan (2011 Census Journey to Work Commuter Flows by Local Authority).
- More people commute out of the Vale of Glamorgan compared to those commuting into the Vale of Glamorgan. 26,715 people out-commute from the Vale of Glamorgan compared to 13,305 people who in-commute establishing a net flow of -13,410 (2011 Census Journey to Work Commuter flows by Local Authority).
- 12% of workers from the appraisal area work in Cardiff and 2% of workers in the appraisal area live in Cardiff.

Table 10 Method of Journey to Work (2011 Census)³⁴

Mode	Appraisal Area	The Vale of Glamorgan	South East Wales
Car or Van Driver	89%	72%	69%
Car or Van Passenger	3%	6%	7%
Taxi	0%	0%	1%
Motorcycle, Scooter or Moped	0%	1%	1%
Bus, Minibus or Coach	2%	3%	6%
Train	1%	6%	3%
Bicycle	1%	2%	2%
On Foot	4%	9%	11%
Other	0%	1%	1%

Table 11 2011 Comparison of Census Journey to Work Commuter Flows by Local Authority³⁵

Authority	Out Commuting	In Commuting	Net Flow	% Working in Own Area
Bridgend	18,040	17,256	-784	56%
Cardiff	32,845	73,126	40,281	65%
RCT	36,609	19,365	-17,244	48%
Vale of Glamorgan	26, 715	13,305	-13,410	38%

³⁴ 2011 Census

³⁵ AECOM Mid and North Wales – 2011 Journey to Work Analysis (2014)

Table 12 2011 Census Location of Usual Residence and Place of Work

Currently Residing	Place of Work	Number of People
Vale of Glamorgan	Cardiff	17,773 (Total)
Appraisal Area		367 (2%)
Cardiff	Vale of Glamorgan	5,576 (Total)
	Appraisal Area	670 (12%)

Note: The places have been represented by SOA – Mid Layers

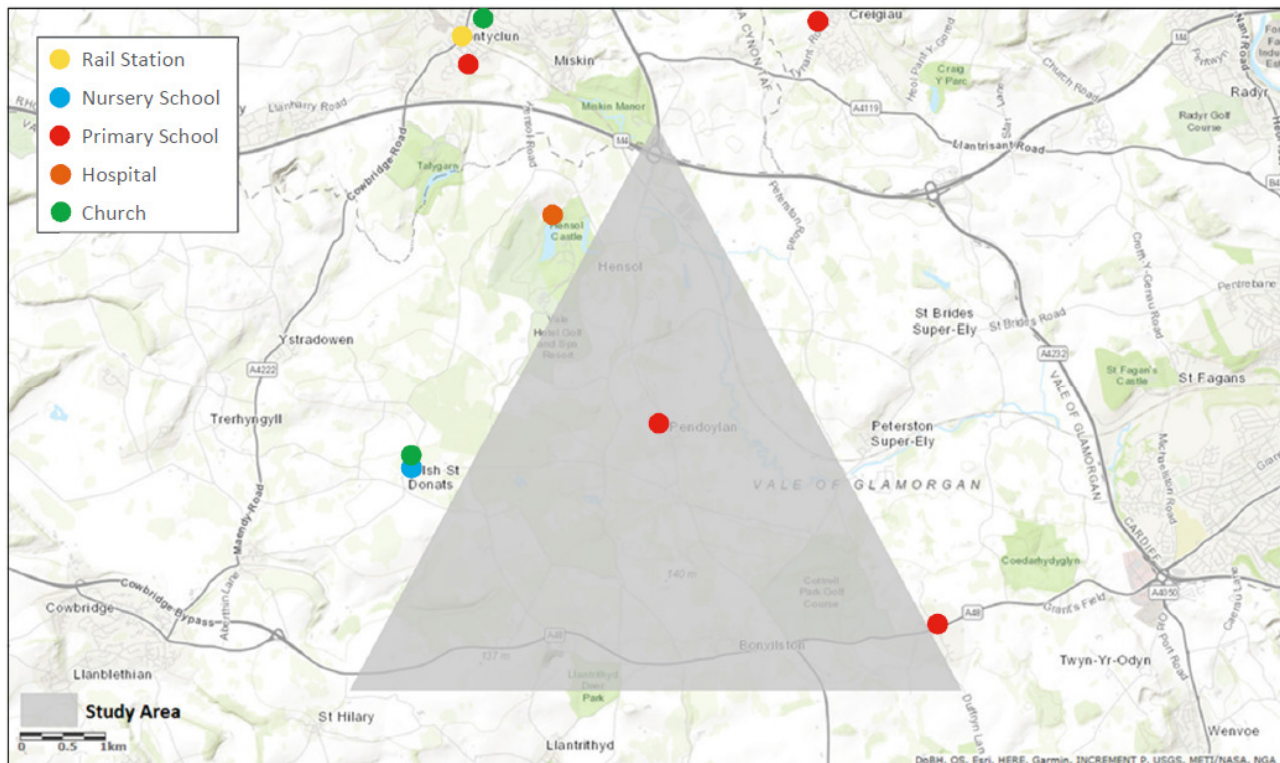
3.5 Access to Services and Recreation

Access to services within the appraisal area are generally poor as demonstrated within Figure 6. There are a limited number of facilities and services within 5km of Pendoylan (central point), including education, healthcare, employment, retail, public transport and recreation.

- St Athan is located within approximately 14km via a combination of rural roads and the B4265 to the south-west of Pendoylan. There are no direct bus routes from the appraisal area.
- Barry is located approximately 12km south-east of Pendoylan via Pendoylan Corridor and Five Mile Lane. There are no direct bus routes from the appraisal area.
- Cardiff is located approximately 15km to the east of Pendoylan via either the M4 or the A48. There are direct routes into Cardiff from the Red Lion Inn, Pendoylan.
- The Miskin, Pontyclun (including Pontyclun railway station) and Talbot Green area is approximately 5km to 7km to the north of Pendoylan. There are direct bus routes between this area and Pendoylan.
- Cardiff Airport is located south of the appraisal area, approximately 9.3km from Pendoylan. There is currently no direct access by rail or bus services.
- Nuffield Health (The Vale Hospital) is located west off Hensol Road approximately 3km north-west of Pendoylan. The hospital benefits from a number of bus stops close by and is also within 2.5km of Pontyclun Railway Station.
- The Vale Resort, a golf, spa and leisure hotel is located approximately 2.2km north-west of Pendoylan. There are bus stops located within approximately 1km of the resort.
- Hensol Castle is located within 2.6km to the north-west of Pendoylan. There are bus stops located within 500m of the resort.
- Hensol Golf Academy is located approximately 1km north of Pendoylan and is within approximately 900m of the nearest bus stop.
- Llanerch Vineyard, a vineyard, restaurant, bistro, hotel and cookery classes location is located approximately 3km north-west of Pendoylan. Bus stops are situated adjacent to the site.
- Cottrell Park Gold Resort and Club is situated approximately 2.2km south-east of Pendoylan. The resort benefits from bus stops located to the south of the site, along the A48.
- There are several schools within the vicinity of the appraisal area encompassing:
 - Abracadabra Playgroup is situated along Heol Mynydd. The playgroup is located in Welsh St Donats. There are poor pedestrian facilities near to the playgroup owing to the area's rural character.
 - Pendoylan Church in Wales Primary School is situated along the Pendoylan corridor road passing through Pendoylan. A zebra crossing comprising tactile paving is located at the entrance of the

- school's car park. A bus stop is located within approximately 150m to the south of the school, with footways interlinking.
- St Nicholas Church in Wales Primary School is situated along School Lane, off the A48. There are limited pedestrian facilities near to the primary school owing to the area's rural character. A bus stop is located within approximately 250m to the south-east of the school; footway provision is limited with the exception of along the A48.
- There are limited evening and weekend bus services leading to potential difficulties in accessing essential services and leisure opportunities thus encouraging greater reliance on the private car.

Figure 6 Access to Key Local Services within the Appraisal Area



3.6 Access to Cultural Facilities

A cultural facility has been defined in this study as a place for activity associated with the arts; sport and other attractions. Cultural facilities entail a broad spectrum of facilities comprising, although not exclusive to, the following: arts and craft centres; beaches and marinas; country parks; golf courses and ranges; heritage attractions and museums; leisure centres and stadia; outdoor activities; trekking and riding centres; visitor attractions.

The Future Generations of Wales Act (2015) has a well-being goal of: 'A Wales of vibrant culture and thriving Welsh language'. It is noted that this well-being goal will be achieved through 'a society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.'

Appendix B illustrates the locations of various cultural facilities throughout the Vale of Glamorgan as well as within the vicinity of the north of the study area. Appendix C provides a list the cultural facilities identified. Cultural facilities have largely been identified as presented in the Vale of Glamorgan Tourism Strategy.

Clusters of cultural facilities concentrate around the areas of Pontyclun to the north-west and Barry to the south. Cultural facilities are sparsely spread throughout the study area and consist largely of golf facilities and tourist attractions.

- Vale of Glamorgan Golf and Country Club;

- Golf Driving Range, Hensol;
- Hensol Forest;
- Hendrewennol Fruit Garden;
- Warren Mill Farm, Pendoylan; and
- Cottrell Park Golf Club, Bonvilston.

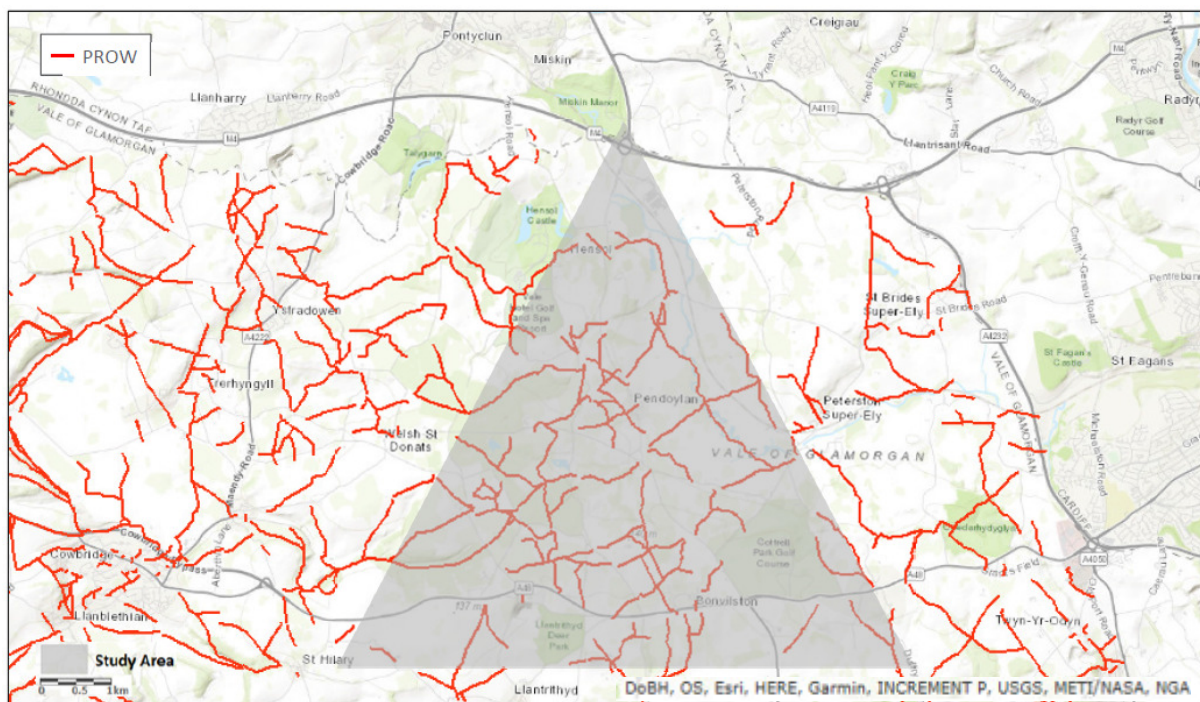
3.7 Walking and Cycling

Walking

The provision of segregated footways throughout the appraisal area is limited given the rural nature of the area with provision in certain built up locations. There is reasonable footway provision through Pendoylan Village on at least one side of the carriageway, and to the south of the appraisal area footways are provided on at least one side of the A48. In addition, there is limited footway provision along the A4226 with the exception of footways on both sides of the carriageway on the approach of its junction with the A48, and limited provision is also evident along Redway Road.

A signalised pedestrian crossing comprising tactile paving and refuge island with barriers is located at the A4226/ A48 junction. A signalised crossing comprising tactile paving is also located adjacent to the Red Lion Public House along the A48 and at the Pendoylan corridor/ A48 junction. There are numerous Public Rights of Way (PRoW) within the area including a network of footpaths linking Pendoylan to Bonvilston. There are also PRoW linking Bonvilston through to Cardiff Airport. An outline of the existing local PRoW affecting the study area is as shown on Figure 7.

Figure 7 Public Rights of Way



Cycling

There are no National Cycle Network (NCN) routes within the appraisal area. The nearest route is NCN route 88 which is situated approximately 6km south of Pendoylan Village and which interconnects from Newport to Margam Country Park along a mostly coastal route. Cycling provision between the M4 Junction 34 and A48 is very limited with no cycle markings or signs throughout the Pendoylan corridor. There are minor on-line cycle markings provided along a small section of the A48, adjacent to the Shepherds Lodge.

Proposals

As set out in the policy section, there are some proposed improvements since the RTP Capital programme for which implementation began in April 2010. These include: £311,000 match funding European Creative Rural Communities Grant over a 3-year programme to deliver walking and cycling routes throughout the rural Vale, including around the airport; £17,000 for Hensol Forest Bridleway Improvements; and The Five Mile Lane Improvement scheme also includes provision for enhanced walking and cycling facilities interconnecting with the A48 Sycamore Cross junction.

3.8 Rail

Local Rail Provision

There are no railway stations located within the study appraisal area with rail use for travelling to work subsequently very low at just 1%. The nearest railway stations within the vicinity of the appraisal area are located north of the M4 corridor within Pontyclun (South Wales Main Line) and at Barry and Rhoose (Vale of Glamorgan Line). Pontyclun Railway Station provides one service per hour running west towards Maesteg and Bridgend, and east towards Cardiff Central and Newport stations (Table 13). Over the last five years (2012/13 – 2016/17), significant railway station patronage increases have been observed at Pontyclun railway station from 256,302 to 302,896 passengers (16.7% increase).

The Vale of Glamorgan Line was reopened between Barry and Bridgend in 2005 including new stations at Rhoose and Llantwit Major with Park and Ride facilities³⁶. A dedicated shuttle bus also operates between Cardiff Airport and Rhoose Station. The stations provide one service per hour running to Bridgend and Cardiff Central, and one service every one to two hours to Aberdare. Between 2011 and 2016, a slight railway station patronage decrease has been observed at Rhoose Railway Station (Cardiff International Airport) from 184,468 to 181,272 passengers representing a 1.7% decrease).

Table 13 Rail Frequency (Direct Services Monday - Saturday)³⁷

Railway Station	To/ Destination	Journey Time	Frequency
Pontyclun	Maesteg	43 minutes	1 per hour
	Bridgend	16 minutes	1-2 per hour
	Cardiff Central	14 minutes	1 per hour
Rhoose	Aberdare	1 hour 40 minutes	1 per hour
	Bridgend	27 minutes	1 per hour
	Cardiff Central	33 minutes	1 per hour

Table 14 Railway Station Patronage³⁸

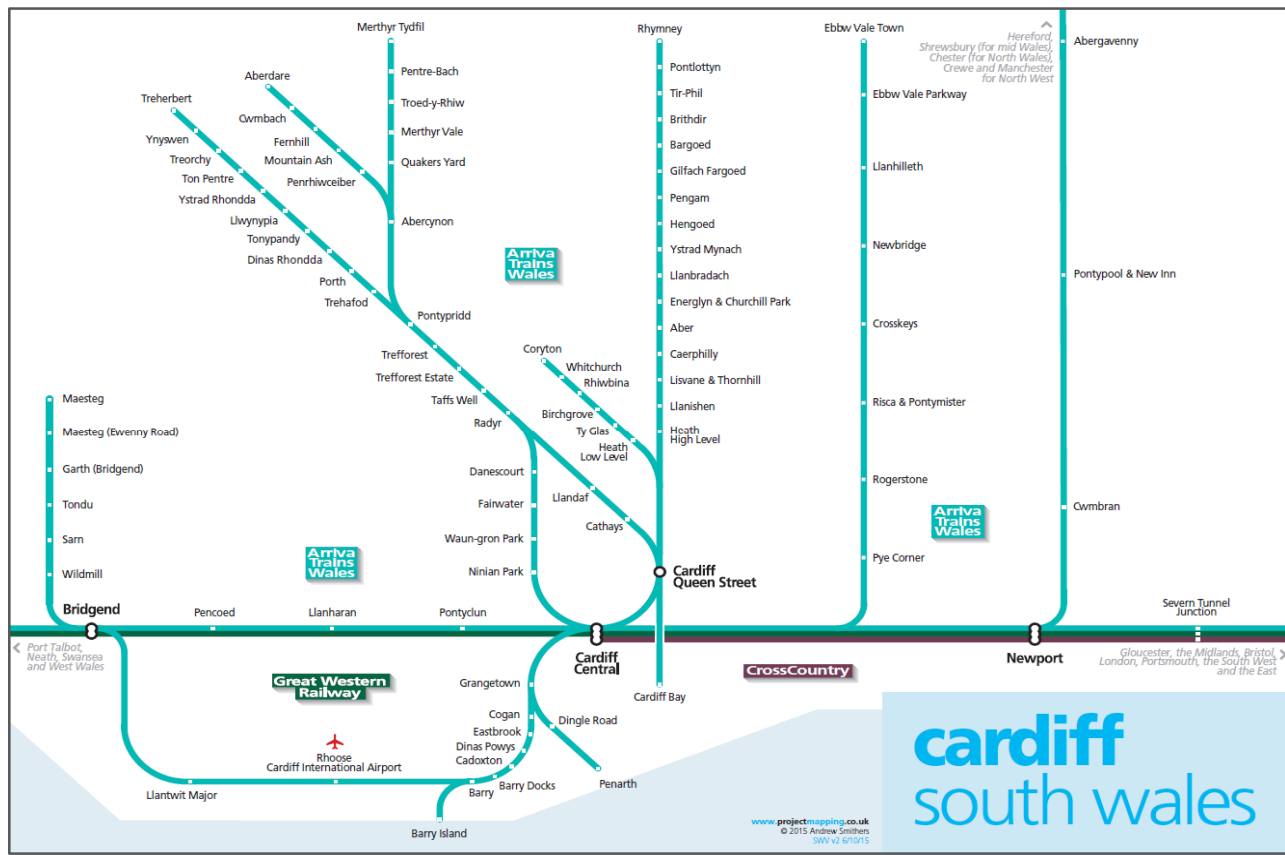
Railway Station	Patronage (2012/13)	Patronage (2016/17)	Percentage Change
Pontyclun	256,302	302,896	+16.7%
Rhoose	184,468	181,272	-1.7%

³⁶ Vale of Glamorgan Deposit LDP 2011-2026 (2013)

³⁷ National Rail

³⁸ Office of Road and Rail – Station Usage Data

Figure 8 Map of South Wales Railway Stations³⁹



3.9 Bus

Bus Connectivity within the Appraisal Area

Bus transport modal share for journeys to work within the area is 2% compared to 3% in the Vale of Glamorgan and 6% in South East Wales as a whole.⁴⁰ However, it is noted that the appraisal area is extensively rural with no large urban settlements. There are various bus services serving the area with the frequency of service varies with Sunday services being very sparse. There are no direct services from the appraisal area to Cardiff Airport or the St Athan area. Bus routes are as described in Table 15 with regards to the appraisal area.

Table 15 Bus Routes retained within the Appraisal Area

Bus Service	Description
32B	Westgate Street Cardiff to Talbot Green, including stops in Pontcanna, Canton, Fairwater, St Fagans, Llanillterne.
122	Greyfriars Road to Tonypany, including stops in Llandaff, Creigiau, Pontyclun, Tonyrefail and Penygraig.

³⁹ National Rail Enquiries

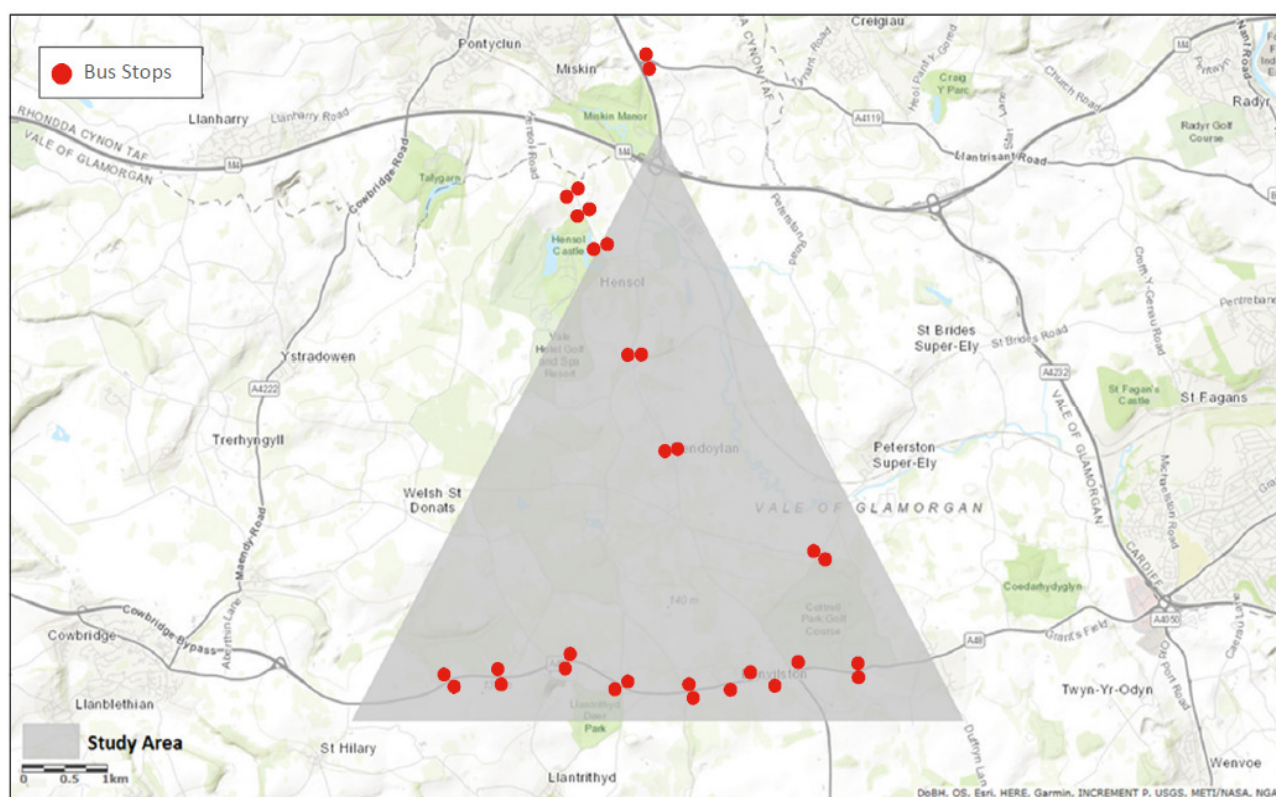
⁴⁰ 2011 Census

Bus Service	Description
124	Greyfriars Road to Maerdy, including stops in Pontcanna, Creigiau, Coedely, Trebanog and Ferndale.
320	Westgate Street Cardiff to Talbot Green including stops in Llandaff, Pendoylan, Hensol and Pontyclun.
X2	Wood Street Cardiff to Porthcawl including stops in Bonvilston, Tair Onen and Corntown, along the A48.

Figure 9 subsequently shows the location of bus stops within and near to the appraisal area. Bus stops are generally equipped with timetables however there is no real-time passenger information. Within the appraisal area, there are 30 bus stops, 10 of which comprise shelters with seating, flag poles and timetable, 15 have poles with timetables and five of which have no facilities. Footway provision to bus stops is inconsistent, with many bus stops without any footway provision or very limited provision.

It is a regional and local aspiration to standardise bus stops to ensure well maintained infrastructure in order to deliver a fully accessible bus service⁴¹. The existing bus network varies in provision in the region and increased pressure on budgets mean that supported services are increasingly under pressure. There are currently no direct services from the appraisal area to Cardiff Airport or the strategic employment sites in the St Athan area. There are a number of community transport operations within the Vale of Glamorgan including Greenlinks, Voluntary Emergency Services Transport (VEST), East Vale Community Transport (EVCT), The Intersensory Club, and Non-Emergency Patient Transport.

Figure 9 Local Bus Stops



⁴¹ Vale of Glamorgan LDP 2011-2026 Sustainable Transport Assessment

3.10 Highway Network

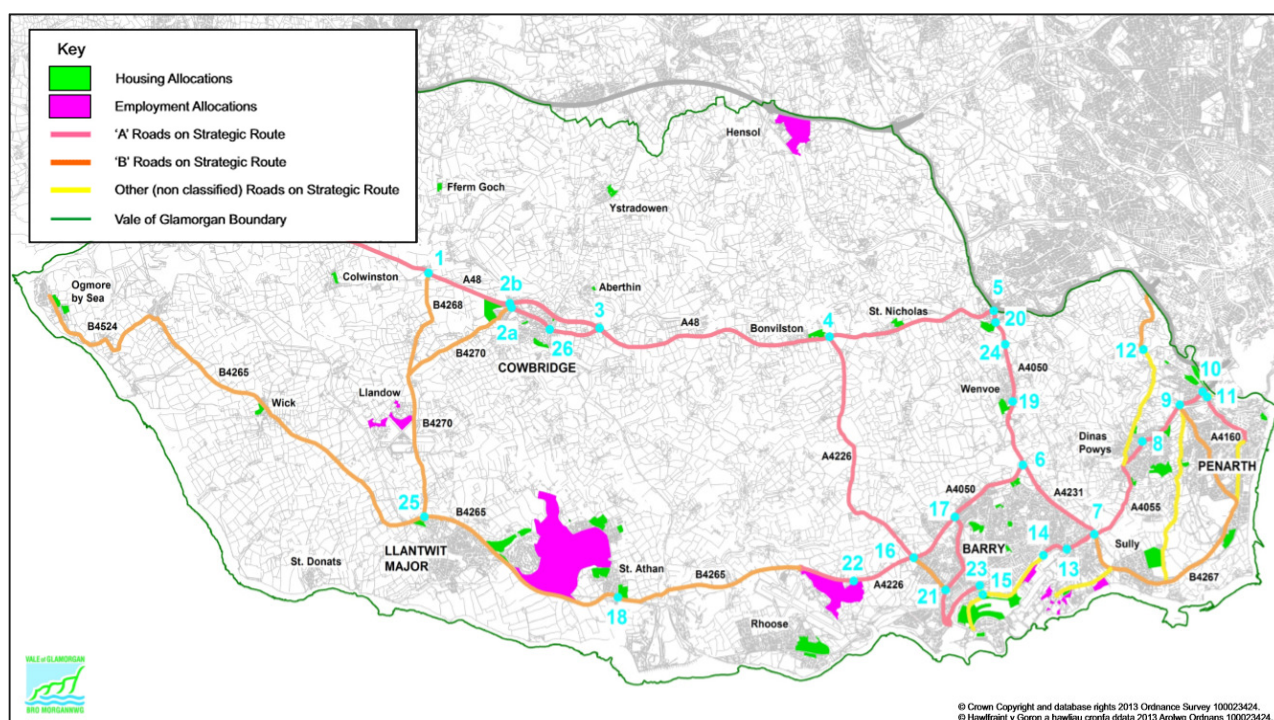
3.10.1 Background

The highway network forms the principal transport network within the appraisal area predominantly encompassing the Pendoylan corridor from M4 Junction 34 through Pendoylan/ Clawdd Coch to the A48 at the Sycamore Cross junction, Redway Road/ unnamed road (linking Clawdd-côch and the A48) as well as a section of the A48 through St Nicholas and Bonvilston.

3.10.2 Local Highway Network

The following section assesses the key elements of the local highway network. The Highway Impact Assessment (2013) identifies the strategic highway network, key junction and allocated employment and residential development allocations over the local LDP period. These are shown in Figure 10 for local context.

Figure 10 Strategic Routes and Junctions in the Vale of Glamorgan⁴²



Pendoylan Corridor

The Pendoylan corridor is predominantly a narrow single carriageway connecting to M4 Junction 34 to the north and to the A48 to the south, as illustrated in a selection of photographs shown in [Appendix D](#). In its northern section, the Pendoylan corridor is a single carriageway with standard width until the priority junction towards Hensol. The road then narrows and becomes a rural road predominantly bounded by hedgerows and woodland areas and is subject to the national speed limit (photograph 1).

The speed limit reduces to 30mph through the village of Pendoylan which is located approximately half way along the route. There is some footway provision throughout the village (photograph 2 and photograph 3). The speed limit rises again to the national speed limit to the south of Pendoylan and reduces to 40mph within approximately 50m of its junction with the A48. The route is narrow in places with difficulties for two vehicles to pass and various passing bays are provided along the route (photograph 4). There are issues along the route of poor visibility at junctions and for vehicles emerging from property drives.

⁴² Highway Impact Assessment (2013)

A geometric assessment of the route has been completed in accordance with DMRB. In order to complete the assessment Ordnance Survey (OS) data was used (it should be noted that OS data has a +/- 2m tolerance). The results of the geometric assessment have been contained as **Appendix E** to this report and demonstrates that almost the entire Pendoylan corridor makes up one departure with only some compliant sections throughout its length, mainly being the first 50m in the south and the last 600m in the north of route section.

Redway Road

Redway Road is a rural route connecting to Clawdd-côch to the north-east and the A48 to the south. The road is a narrow single carriageway bounded by hedgerows and is subject to the national speed limit before reducing to 40mph within approximately 20m of its junction with the A48. Throughout the route there are difficulties in passing and provision of passing bays.

A48 through Bonvilston

The A48 is a single carriageway trunk road. Within the appraisal area, the A48 has good footway provision (shared cycle and pedestrian path) with a few pedestrian crossings and bus stops.

3.10.3 Appraisal Area Junctions

The key junctions in the appraisal area are:

- M4 Junction 34;
- Sycamore Cross Junction - Pendoylan corridor/ A48/ Five Mile Lane; and
- Redway Road/ A48.

M4 Junction 34

Junction 34 is a grade separated junction with slip roads from the mainline carriageway connecting to the A4119 dual carriageway to the north and the single carriageway link to Hensol/ Pendoylan to the south. The junction has two circulatory lanes across the motorway, widening to three lanes to and from the west. The junction is partially signalised, with signals on the westbound off-slip and southbound on the circulatory section. The junction is subject to congestion, notably on the A4119 and on and off of the motorway.

Sycamore Cross Junction

The Capita Symonds Highway Impact Assessment LDP Background Paper (2013) identified that the A48/ Five Mile/ Pendoylan Road junction was forecast to be over capacity by 2026 during the AM and PM peak periods. Since this report junction improvements have been made to introduce traffic signals with right turning lanes, pedestrian crossing facilities and a bus lane on the north side east of the junction. During consultations, issues were highlighted with the junction that the signals may be causing a platooning effect which leads to additional issues of vehicles passing in the Pendoylan corridor to the north. Other consultees however noted that the junction was safer to use since the signals were introduced. The base year 2017 traffic flows at the junction have been extracted from the Transport Assessment for the Five Mile Lane improvement (Parsons Brinckerhoff 2016) as shown in Figure 11.

Redway Road/ A48

The junction of Redway Road with the A48 is a priority cross-roads, with a minor road on the south side leading to Llancarfan. There is a footway on the northern side of the junction.

3.10.4 Personal Injury Accidents

Figure 12 shows available personal injury accident data by severity within the appraisal area and its vicinity, between 2011 and 2015. The map shows a cluster of accidents at M4 Junction 34 with seven accidents, all of which were slight in severity. Ten accidents have been recorded along the A48 between its junction with Redway Road and Pendoylan corridor, seven of which were slight in severity and three of which were serious. A total of five accidents have been recorded along or within close proximity to Pendoylan corridor, four of these accidents were slight in severity and one of which was serious.

Figure 11 Sycamore Cross Junction - Base Year 2017 Turning Flows

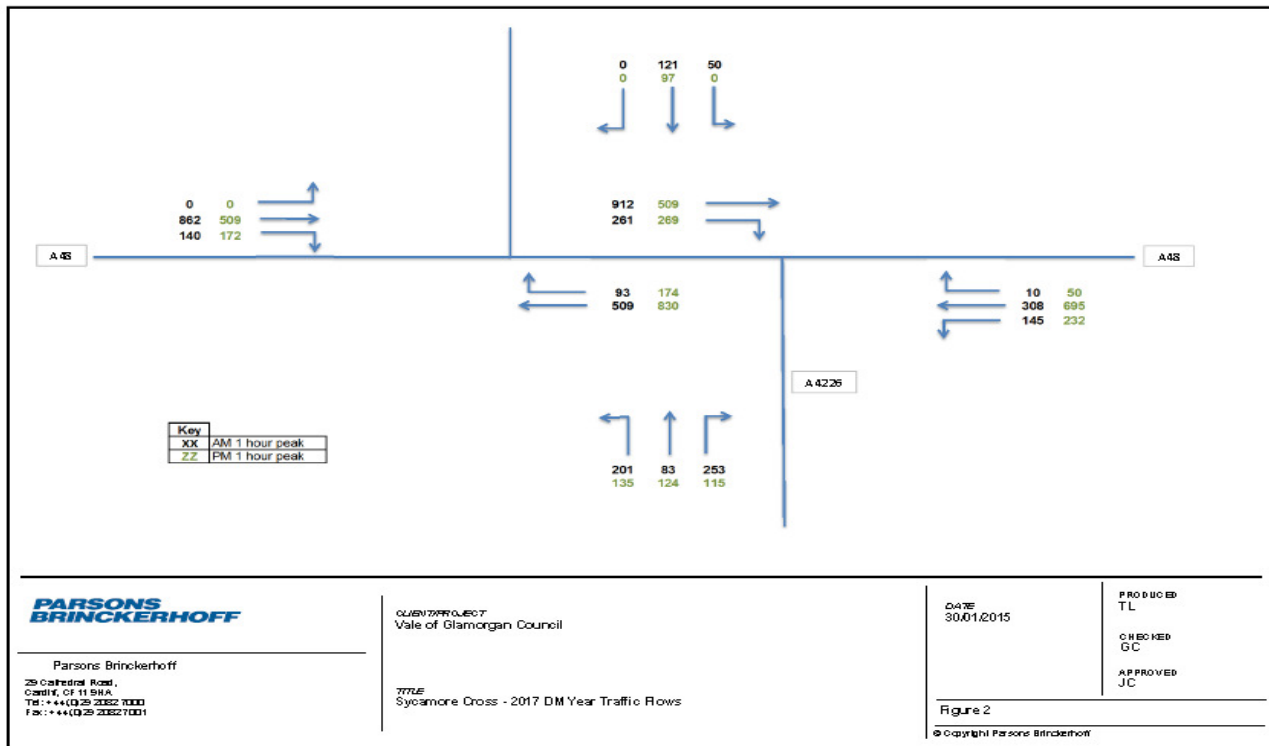
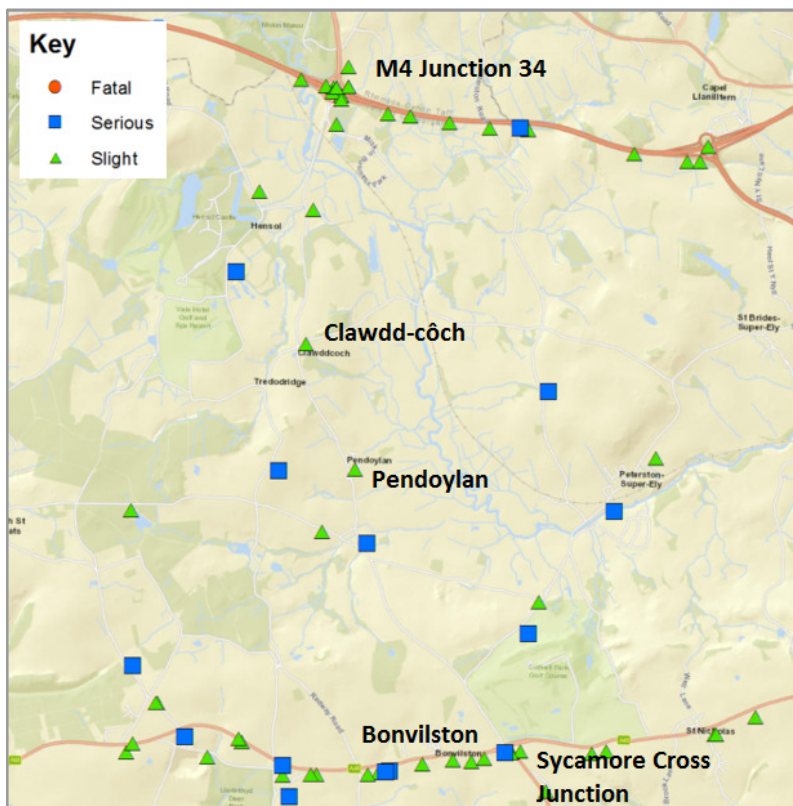


Figure 12 Accidents by Severity within the Appraisal Area (2011-15)⁴³



⁴³ Vale of Glamorgan Council Accident Data

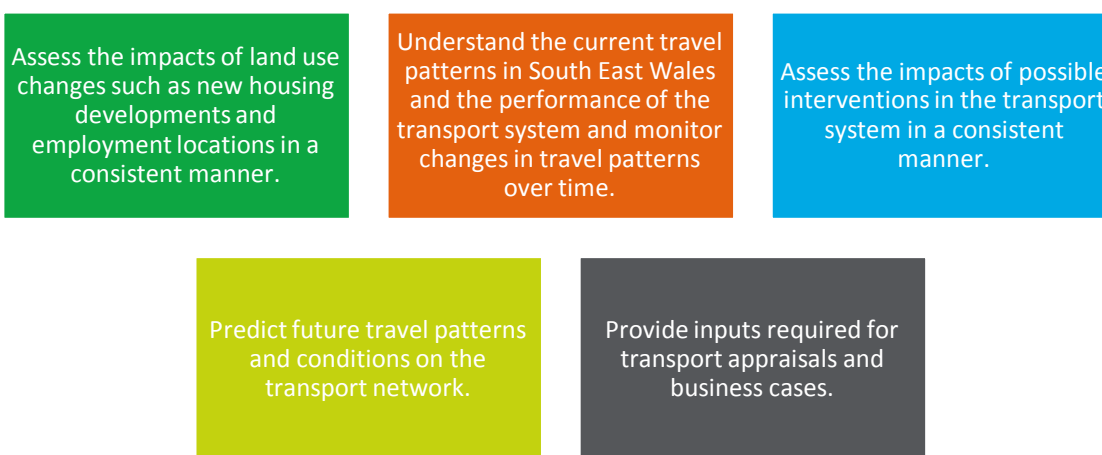
3.10.5 South East Wales Transport Model

Background

To facilitate assessment of the highway route options and quantify the anticipated economic, social and environmental impacts, Mott MacDonald (working with Arup) was commissioned by Transport for Wales to undertake strategic transport modelling for the M4 J34 to A48 link using the South East Wales Transport Model (SEWTM) following a request from Arcadis and working on behalf of Vale of Glamorgan Council. A full technical summary of the commission and output traffic flow plans has been included as [Appendix F](#).

The SEWTM is a multi-modal disaggregate demand model focused on South East Wales, covering the 11 unitary authority areas of Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Rhondda Cynon Taf, Torfaen, and Vale of Glamorgan.

The model comprises separate highway and public transport assignment models linked together with a demand model. The model was commissioned by Welsh Government in 2015 and has been developed by a team led by Mott MacDonald, and including Arup, RAND Europe and David Simmonds Consultancy. The SEWTM has been designed to achieve the following key objectives.



The model represents an average weekday for four time periods: an AM average hour between 07:00 and 09:30; an inter-peak (IP) average hour between 09:30 and 15:30; an average PM hour between 15:30 and 18:00 and an off-peak (OP) average hour between 18:00 and 07:00. The assignment models can also represent peak hours within the AM and PM peak periods. Peak hours are the single hours during which the highest volume of trips are undertaken; between 07:45 and 08:45, and between 16:30 and 17:30. The SEWTM base year is 2015, with forecast years of 2026 and 2036 currently available.

Approach Overview

An overall approach to the strategic modelling, which is proportionate to the scale of the scheme and current development stage, was agreed in advance. The commissioned model subsequently incorporated a single carriageway way, 60mph link from just south of Hensol to the Sycamore Cross junction on the A48. The longest of the two highway alignments was used as a worst case for journey times.

It was assumed that there would be three junctions with local roads on the route and the Sycamore Cross junction will be an improved staggered signalised junction, in line with the current proposals as part of the Five Mile Lane upgrade. The model would specifically encompass running the highway component of SEWTM only and for the 2036 forecast year only, with model outputs used to complete a single year TUBA assessment.

Output

Mott MacDonald/ Arup has issued the following model run outputs:

- GIS shapefiles containing modelled link vehicle flows (actual and demand for AM/ Inter-Peak/ PM) for the 2015 Base, 2036 Do-Minimum and 2036 Do-Something;

- Flow difference plots for AM, Inter-Peak, and PM time periods, comparing the 2036 Do-Minimum and 2036 Do-Something scenarios;
- Full set of TUBA 1.9.9 input and output files for a single year (2036); and
- Highway hour to period factors to assist in forecasting Annual Average Daily Traffic (AADT) flows – AM (2.1977), Inter-Peak (6), PM (2.3768), and Off-Peak (13).

A summary of the output traffic flows for the various scenarios has been included in Table 16.

Table 16 South East Wales Traffic Model – Output Traffic Flows

Link ID	Reference	Direction of Flow	2015 Base			2036 Do-Minimum (DM)			2036 Do-Something (DS)			2015 Base to 2036 DM (% Change)			2036 DM to DS (% Change)		
			AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
1	Pendoylan	Southbound	295	209	283	353	281	342	792	573	772	20%	34%	21%	124%	104%	126%
		Northbound	409	203	303	476	268	389	1234	832	1200	16%	32%	28%	159%	210%	208%
		Two-way	704	412	586	829	549	731	2026	1405	1972	18%	33%	25%	144%	156%	170%
2	M4 west of Junction 34	Eastbound	4045	2196	3184	5215	3099	4433	5037	3049	4360	29%	41%	39%	-3%	-2%	-2%
		Westbound	3268	2309	4131	4507	3306	5255	4522	3349	5270	38%	43%	27%	0%	1%	0%
		Two-way	7313	4505	7315	9722	6405	9688	9559	6398	9630	33%	42%	32%	-2%	0%	-1%
3	M4 east of Junction 34	Eastbound	4777	2771	3774	5813	3818	4989	5940	4000	5145	22%	38%	32%	2%	5%	3%
		Westbound	3686	2676	5105	5020	3783	6169	5292	3867	6295	36%	41%	21%	5%	2%	2%
		Two-way	8463	5447	8879	10833	7601	11158	11232	7867	11440	28%	40%	26%	4%	3%	3%
4	A4119	Southbound	2076	1277	1854	2219	1810	2083	2021	1768	1894	7%	42%	12%	-9%	-2%	-9%
		Northbound	1814	1064	2252	2256	1557	2488	2330	1593	2562	24%	46%	10%	3%	2%	3%
		Two-way	3890	2341	4106	4475	3367	4571	4351	3361	4456	15%	44%	11%	-3%	0%	-3%
5	M4 east of Junction 33	Eastbound	4419	2808	3801	5506	3794	5166	5544	3854	5155	25%	35%	36%	1%	2%	0%
		Westbound	4025	2707	4751	5350	3848	6156	5419	3856	6132	33%	42%	30%	1%	0%	0%
		Two-way	8444	5515	8552	10856	7642	11322	10963	7710	11287	29%	39%	32%	1%	1%	0%
6	A4232 Link Road	Southbound	2972	1813	2541	3729	2614	3468	3651	2513	3472	25%	44%	36%	-2%	-4%	0%
		Northbound	2384	1818	3163	3092	2527	3659	3127	2377	3645	30%	39%	16%	1%	-6%	0%
		Two-way	5356	3631	5704	6821	5141	7127	6778	4890	7117	27%	42%	25%	-1%	-5%	0%
7	A48 east of Sycamore Cross	Eastbound	999	325	623	715	584	1282	701	205	239	-28%	80%	106%	-2%	-65%	-81%
		Westbound	384	310	505	1137	615	840	389	407	992	196%	98%	66%	-66%	-34%	18%
		Two-way	1383	635	1128	1852	1199	2122	1090	612	1231	34%	89%	88%	-41%	-49%	-42%

Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48
 WelTAG Stage Two: Impacts Assessment Report

Link ID	Reference	Direction of Flow	2015 Base			2036 Do-Minimum (DM)			2036 Do-Something (DS)			2015 Base to 2036 DM (% Change)			2036 DM to DS (% Change)		
			AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
8	A48 west of Sycamore Cross	Eastbound	872	458	601	1047	564	673	1362	679	787	20%	23%	12%	30%	20%	17%
		Westbound	553	459	816	737	639	998	552	588	732	33%	39%	22%	-25%	-8%	-27%
		Two-way	1425	917	1417	1784	1203	1671	1914	1267	1519	25%	31%	18%	7%	5%	-9%
9	Five-mile Lane	Eastbound	397	215	398	797	521	1008	823	516	952	101%	142%	153%	3%	-1%	-6%
		Westbound	804	252	666	954	652	911	713	520	544	19%	159%	37%	-25%	-20%	-40%
		Two-way	1201	467	1064	1751	1173	1919	1536	1036	1496	46%	151%	80%	-12%	-12%	-22%

4 Data Source

4.1 Overview

In accordance with the WelTAG guidance this section summarises the data sources used in and to inform this WelTAG Stage One: Strategic Outline Case.

4.2 Data Sources

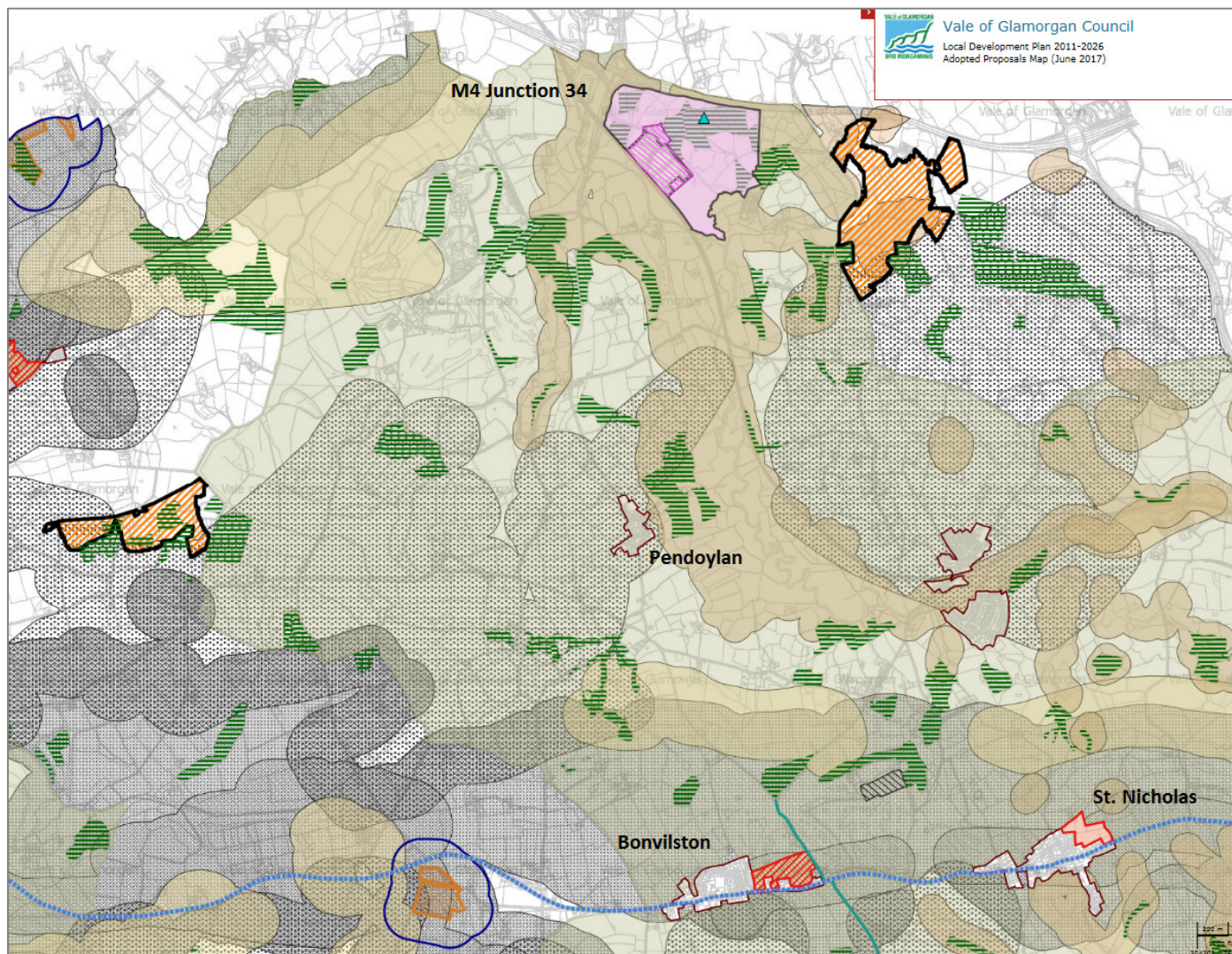
The sources of data used within this Stage One appraisal are as follows:

- AECOM Mid and North Wales – 2011 Journey to Work Analysis (2014)
- Archwilio – Historic Environment Records of Wales (2017) - <https://www.archwilio.org.uk/her/chi1/arch.html?county=Gwynedd&lang=eng>
- Bridgend County Borough Council - LDP 2006-2021 (2011)
- Capita Symonds - Highway Impact Assessment LDP Background Paper (2013)
- Cardiff Capital Region Metro Study (2013)
- Cardiff Council - Cardiff City Region Transport Implementation Plan (2010)
- Cardiff Council - LDP 2006-2026 (adopted 2016)
- Cardiff Council - LTP (2015)
- DEFRA - Air Quality Management Areas - <https://uk-air.defra.gov.uk/aqma/maps>
- DEFRA - Multi-Agency Geographic Information for the Country website (MAGIC) – Magic Application (2017) - <http://magic.defra.gov.uk/MagicMap.aspx>
- Department for Transport – Record of Proceedings (2012)
- Google Maps (2017)
- Historic Wales – Portal for Historic Environmental Information in Wales (2017) - <http://historicwales.gov.uk/>
- Lle Geo-Portal – Catalogue (2017) - <http://lle.gov.wales/catalogue?t=1&lang=en>
- National Assembly Enterprise and Business Committee – International Connectivity through Welsh Ports and Airports, July 2012
- Natural England – Agricultural Land Classification of England and Wales 1985 (ALC009) (2013) - <http://publications.naturalengland.org.uk/publication/6172638548328448>
- Natural Resources Wales' Flood Risk Map Viewer – Long-term flood risk (2017) - <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>
- Network Rail - <http://www.networkrail.co.uk/wp-content/uploads/2016/11/South-Wales-investment-map.pdf>
- National Rail Enquiries - <http://www.nationalrail.co.uk/>
- National Transport Finance Plan (2015) and Evidence Base
- Office for National Statistics - Annual Survey of Hours and Earnings 2014
- Office for National Statistics (2011) (2001) Census
- Office of Road and Rail (2016) - Estimates of Station usage 2015-16
- One Wales: Connecting the Nation – Wales Transport Strategy (2008)
- Rhondda Cynon Taf Council - LDP up to 2021 (2011)
- RowMaps – Maps showing rights of way (2017) - <http://www.rowmaps.com/>

- South East Wales Transport Alliance (Sewta) Rail Strategy (2013) (Jacobs)
- South East Wales Transport Alliance (Sewta) Regional Bus and Community Transport Network Strategy (2014)
- Sustrans - <http://www.sustrans.org.uk/ncn/map>
- Traveline Cymru - <https://www.traveline.cymru/>
- Vale of Glamorgan Council - Accident Data
- Vale of Glamorgan Council - Air Quality Progress Report (2013)
- Vale of Glamorgan Council - Air Quality Progress Report (2016)
- Vale of Glamorgan Council – Adopted LDP 2011-2026 (2017)
- Vale of Glamorgan Council - Designation of Special Landscape Areas (2008)
- Vale of Glamorgan LDP Background Paper - High Impact Assessment, (2013)Welsh Government - Well-being of Future Generations (Wales) Act (2015)
- Vale of Glamorgan Council - Listed Buildings Inventory - https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Listed%20Buildings/Listed_Buildings_Inventory_October_2011.pdf
- Vale of Glamorgan Council - LDP 2011-2026 Sustainable Transport Assessment
- Vale of Glamorgan Council - LDP Proposals Map - <https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP-2013/02-LDP-Proposals-Map-2013.pdf>
- Vale of Glamorgan Council – LSV Tackling Poverty Report - <https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation/WIMD-2014/wimd2014localauthorityanalysis>
- Vale of Glamorgan Council - LTP 2015-30
- Vale of Glamorgan Council - Public Rights of Way Map - <http://myvale.valeofglamorgan.gov.uk/myGlamorgan.aspx?MapSource=ValeOfGlamorgan/AllMaps&StartEasting=309333.460273&StartNorthing=173932.149174&StartZoom=120000&o=1&Layers=rowFOOTPATH,rowBRIDLEWAY,rowRESTRICTEDBYWAY,Walescoastalpath>
- Welsh Assembly Government (2016) Welsh Transport Planning and Appraisal Guidance (WelTAG) (draft version, June 2016)
- Welsh Government (2013) - Active Travel (Wales) Act 2013
- Welsh Government (2015) - Active Travel (Wales) Act 2013 Annual Report 2015
- Welsh Government - Noise Priority Areas (2017) <http://gov.wales/topics/environmentcountryside/epq/noiseandnuisance/environmentalnoise/noisemonitoringmapping/priority-areas/?lang=en>
- Welsh Government - Welsh Index of Multiple Deprivation (2014) - <http://gov.wales/docs/statistics/2015/150812-wimd-2014-summary-revised-en.pdf>

APPENDIX A

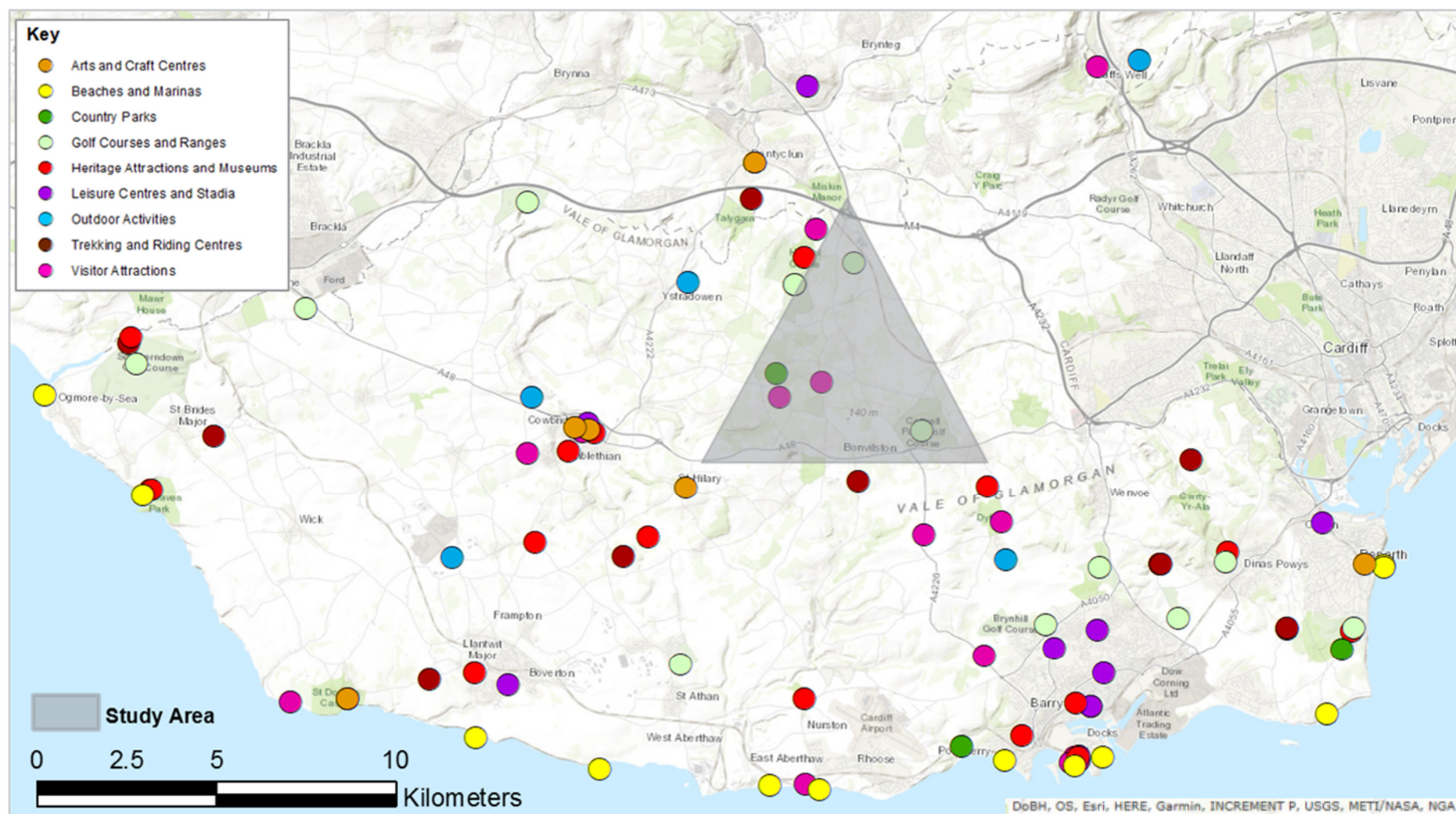
Vale of Glamorgan Local Development Plan Map



Key	
Proposal	Policy / Site Reference
Living	
Housing Allocation	MG 2
Housing Allocation with Infrastructure Provision	MG 2
Strategic Site	MG 3 / MG 10
Residential Settlement Boundary	MD 5
Gypsy and Traveller Site	MG 5
Provision of Education Facilities	MG 6
Provision of Community Facilities	MG 7
Provision of Healthcare Facilities	MG 8
Working	
Employment Allocation	MG 9
Enterprise Zone	MG 10
Retail Hierarchy	MG 12
Managing	
Transport - Walking and Cycling	MG 16 (1 - 5) / SP 7
Transport - National Cycle Network Route 88	MG 16 (1) / SP 7
Transport - Rail	MG 16 (6) / SP 7
Transport - Bus	MG 16 (7 - 12, 20) / SP 7
Transport - Highways	MG 16 (13 - 19) / SP 7
Special Landscape Area	MG 17
Green Wedge	MG 18
Sites of Importance for Nature Conservation	MG 19
Minerals Safeguarding - Limestone Category 1	SP 9, MG 20
Minerals Safeguarding - Limestone Category 2	SP 9, MG 20
Minerals Safeguarding - Sandstone Category 2	SP 9, MG 20
Minerals Safeguarding - Sand & Gravel Category 1	SP 9, MG 20
Minerals Safeguarding - Sand & Gravel Category 2	SP 9, MG 20
Quarry Buffer Zone	SP 9, MG 21
Dormant Mineral Site	SP 9, MG 22
Sand and Gravel Wharf Safeguarding	SP 9 (4)
Sites with known flooding constraints / Flood Consequence Assessments	MD 8
Enjoying	
Glamorgan Heritage Coast	MG 24, SP 10 (4)
Public Open Space	MG 25
Tourism and Leisure Facilities	MG 26, SP 11

APPENDIX B

Cultural Facilities Map



APPENDIX C

Cultural Facilities List

Cultural Facility Type	Facility
Arts and Crafts Centre	St Donats Art Centre, near Llantwit Major
	Coed Hill Rural Artspace, St Hilary
	Ffotogallery at Turner House, Penarth
	Old Wool Barn Art and Craft Centre, Cowbridge
	Giles Gallery
	The Model House
	The Market Theatre, Cowbridge
Beaches and Marinas	Ogmore By Sea
	Dunraven Bay, Southerndown
	Colhuw Beach, Llantwit Major
	Fontygary Bay, Rhoose
	The Knap, Barry
	Whitmore Bay, Barry Island
	Jacksons Bay, Barry Island
	St Mary's Well Bay, Penarth
	Penarth Seafront
	Summerhouse Bay
	The Leys
	Penarth Marina
Country Parks	Porthkerry Country Park, Barry
	Cosmeston Lakes Country Park, Penarth
	Brynna Woods and Llanharan Marsh Nature Reserve
	Hensol Forest
Golf Courses and Ranges	Southerndown Golf Club
	Golf Driving Range, Corntown
	St Mary's Hotel, Golf and Country Club
	Vale of Glamorgan Golf and Country Club, Hensol
	Cottrell Park Golf Club, Bonvilston
	Wenvoe Castle Golf Club
	Brynhill Golf Club, Barry
	St Andrews Major Golf Club, Barry
	Dinas Powys Gold Club
	Glamorganshire Golf Club
	St Athan Golf Club
Heritage Attractions	Ogmore Castle
	Glamorgan Heritage Coast Centre, Southerndown
	St Donats Arts Centre, Llantwit Major

Cultural Facility Type	Facility
	Plas Llanmihangel, Cowbridge
	Cowbridge Museum, Town Hall, Cowbridge
	Beaupre Castle, Cowbridge
	St Lythans and Tinkinswood Burial Chambers, St Nicholas
	Seawatch Centre, Boverton
	Fonmon Castle, Nr Rhoose
	Cosmeston Medieval Village, Penarth
	St Illtud's Church, Llantwit Major
	Aberfan Disaster Memorial Garden
	Barry War Museum
	St Quentin's Castle
	Barry Memorial Hall and Theatre
	Hensol Castle
	Dinas Powys Castle
	Barry Castle
Leisure Centres and Stadia	Barry Leisure Centre
	Barry Sports Centre
	Holm View Recreation Centre, Barry
	Jenner Park Football Stadium
	Cowbridge Leisure Centre
	Llantwit Major Leisure Centre
	Penarth Lesiure Centre
	Welsh Rugby Union and Cardiff City Football Club Training Facilities, Vale Resort
	Llantrisant Leisure Centre
	Colcot Sports Centre
Outdoor Activities	Taskforce Paintball, Cowbridge
	Llandow Motor Sports Centre
	Sevenoaks Fishery
	Dyffryn Springs Trout and Course Fishing
	4x4 Driving School
Trekking and Riding Centres	Dimlands Farm Riding Centre, Llantwit Major
	Penmaen Riding School, St Mary Church
	Liege Manor Farm Equestrian Centre, Bonvilston
	Argae House Stables, St Andrews Major
	Downside Riding Centre, Penarth
	Talgarn Equestrian Centre

Cultural Facility Type	Facility
	Downs-side Riding and Livery Centre
	Ogmore Farm Riding Centre
	St Brides Major Riding and Trekking Centre
	Coles N R Riding School
	Argae House Equestrian Riding Centre
Visitor Attractions	Barry Island Pleasure Park
	Barry Island Tourist Railway
	Quasar Centre, Barry Island
	Adventure Island, Barry Island
	Welsh Hawking Centre, Barry
	Amelia Trust Farm, Whitton Rosser
	Dyffryn Gardens, St Nicholas
	Warren Mill Farm, Pendoylan
	Cowbridge Physic Garden
	Fontygary Holiday & Leisure Park, Rhoose
	Nash Point Lighthouse, Llantwit Major
	Smugglers Cove Adventure Golf
	Hendrewennol Fruit Garden
	Llanerch Vineyard
	Glyndwr Vineyard

APPENDIX D

Pendoylan Corridor Photographs

Photograph 1 – Pendoylan Corridor, south direction through Clawdd-Côch



Photograph 2 – North Pendoylan footway provision, south direction



Photograph 3 – Pendoylan Corridor, bus stop and footways in Pendoylan



Photograph 4 – Pendoylan Corridor – narrow highway with passing bays



APPENDIX E

Geometric Assessment of the Pendoylan Corridor (M4 Junction 34 to the A48 at Sycamore Cross)

Geometric Assessment of the Pendoylan Corridor (M4 Junction 34 to the A48 at Sycamore Cross)

General Characteristics

The existing route is entirely rural with narrow lanes throughout the majority of its length, especially south of Pendoylan. Some passing bays are placed throughout its length but these are not constructed to any specific highway standard. Approximately 95% of the route is surrounded by hedgerow on both sides of the road which is the main reason for reduced visibility throughout.

The alignment assessment has been completed in accordance with guidance stated within the DMRB, TD9/93 and junction splays in accordance with TD42/95.

The width of the road has been carried out against TD27/05 cross section and has been assessed as a single carriageway Rural All-Purpose Road.

Due to its rural nature, a TD9 Chapter 1 design speed calculation has not been undertaken. Based on existing speed limits the design speeds are assumed to be as detailed in Table 1.

Table 1 Assumed Design Speeds

Chainage	Speed Limit	Design Speed
0 – 50m	40mph	70kph
50 – 2750m	60mph	100kph
2750 – 3250m	30mph	60kph
3250 – 6198m	60mph	100kph

Relaxations and departures have been assessed in accordance with TD9 paras 1.24 & 1.26 assuming an all-purpose 'Band B' road with the design speeds above.

Results of Geometric Assessment

Chainage 0m - 50m (40mph)

Chainage 0m to 50m makes up the 40mph zone which stops at the junction with the existing A48 (Sycamore Cross). This section complies with current design guidance and contains no relaxations or departures from DMRB. To the east of the area is the Cottrell Park Golf Resort and to the west lies some fields.

Table 2 Chainage 0m - 50m

Chainage	Junction Type	SSD TD42/05	9m		4.5m		2.4m	
			Left	Right	Left	Right	Left	Right
25m	Access	215	0		69		215	
49m	Access	215		0		94		172

Chainage 50m - 2750m (National Speed Limit)

This section of existing alignment is posted as 60mph. The alignment of this section contains many departures from current design guidance, consisting of vertical and horizontal alignment as well as

departures on the stopping sight distance and width of carriageway. The width, for most of this section is very narrow (around 3m wide) and only allows for single lane driving although there are a number of small widened areas that can be used as passing bays. For the first few hundred meters to the east and west of this section lies the Cottrell Park Golf Resort.

Near chainage 650m there is a junction to the east which leads to Gwern-Y-Steeple. The remainder of the section sits in between existing fields with a number of homes scattered throughout, the homes have direct access onto the road, however visibility splays at these junctions are poor and do not comply with current design guidance (Table 3). The visibility through this section is mostly below standard and this is mainly down to the tight bends, and hedgerow and trees to either side of the road.

Table 3 Chainage 50m-2750m

Chainage	Junction Type	SSD TD42/05	9m		4.5m		2.4m	
			Left	Right	Left	Right	Left	Right
1150m	Access/minor	215m	0m	0m	0m	0m	22m	6m
1350m	Access	215m	0m	0m	27m	0m	110m	9m
1700m	Access/Lane	215m	0m	0m	9m	13m	11m	32m
2050m	Junction	215m	10m	14m	20m	15m	44m	88m
2200m	Access	215m	10m	9m	17m	9m	27m	9m
2250m	Junction	215m	15m	15m	28m	24m	56m	51m
2400m	Junction	215m	24m	13m	40m	111m	59m	130m
2500m	Access	215m	10m	0m	22m	3m	116m	7m
2650m (A)	Access	215m	7m	4m	10m	4m	16m	4m
2650m (B)	Access	215m	2m	3m	4m	3m	6m	3m

Chainage 2750m – 3250m (30mph)

This section of road travels through the small village of Pendoylan. Although this section is limited to 30mph, a number of departures from standard exist. Visibility is restricted for the first 100m although is improved when travelling throughout the village.

South of Pendoylan there is a small housing estate to the west (Heol Ty Mawr) with its own junction. Visibility here is restricted due to the small stone retaining wall and hedge line with visibility well below standard. Further along the section, the west of the road mainly consists of trees and fields. To the east of the section lies Heol St. Cattwg, the Red Lion and Pendoylan Church in Wales Primary School. The area has a number of accesses onto the route although minor visibility splays are below standard, all of which can be seen in Table 4.

Table 4 Chainage 2750m-3250

Chainage	Junction Type	SSD TD42/05	9m		4.5m		2.4m	
			Left	Right	Left	Right	Left	Right
2850m	Junction	90m	5m	2m	9m	3m	19m	5m
2900m	Junction	90m	159m	7m	159m	167m	159m	214m
2950m	Access	90m	N/A	N/A	19m	5m	33m	9m
3050m (A)	Access	90m	52m	10m	52m	49m	52m	63m
3050m (B)	Access	90m	64m	15m	65m	11m	67m	10m
3150m	Access	90m	9m	15m	39m	15m	74m	42m
3200m (A)	Access	90m	N/A	N/A	N/A	N/A	N/A	N/A
3200m (B)	Access	90m	16m	43m	48m	50m	65m	128m
3250m	Access	90m	86m	3m	114m	3m	126m	5m

Chainage 3250m – 5600m (National Speed Limit)

Upon exiting Pendoylan to the north, the speed limit changes to 60mph. As per the previous 60mph section, the alignment consists of many departures although the road width is significantly wider than that of the previous section with the road allowing for 2-way traffic for most of its length. Around chainage 4100m the road enters a hamlet called Clawdd-côch, at this point a cross-roads is approached although the road travels straight through, two junctions to the east and west tie onto the alignment.

To the east is Bethania Presbyterian Church and to the west lies Clawdd-côch Guest House. Visibility at the cross roads is restricted due to the adjacent buildings, hedge line and small retaining wall and therefore not achieving the minimum standards. There are a number of accesses onto the alignment, most of which have below standard visibility splays. Table 5 summarises this information.

Table 5 Chainage 3250m - 5600m

Chainage	Junction Type	SSD TD42/05	9m		4.5m		2.4m	
			Left	Right	Left	Right	Left	Right
3700m	Access	215m	10m	5m	15m	6m	24m	7m
3950m	Access	215m	4m	4m	6m	7m	11m	12m
4100m (A)	Junction	215m	16m	22m	21m	23m	31m	29m
4100m (B)	Junction	215m	21m	18m	26m	32m	34m	113m
4150m (A & B)	Access	215m	15m	N/A	21m	13m	29m	15m

Chainage	Junction Type	SSD TD42/05	9m		4.5m		2.4m	
			Left	Right	Left	Right	Left	Right
4700m	Access	215m	10m	3m	14m	4m	22m	6m
5050m	Access	215m	51m	14m	68m	191m	69m	236m
5350m	Junction	215m	15m	11m	30m	18m	106m	34m
5400m	Junction	215m	82m	51m	69m	51m	44m	51m
5550m	Access	215m	162m	91m	181m	102m	253m	106m

Chainage 5600m – 6198m (National Speed Limit)

This section of road is the section that is mostly compliant with existing standards. The bridge that crosses the existing railway line has solid metal parapets with small footways on both sides. The road surface is in decent condition although the footways are in need of some maintenance along with the parapets. The condition of the soffit and deck cannot be confirmed and further detailed inspection would be required to inform an accurate assessment. There is also a bridge in place which crosses the Ely River, designated as a SSSI. Again, the road surface of the bridge seems to be in good condition with the parapets also acting as a vehicle restraint system with small footways each side. This section of route is surrounded by fields with hedge/ tree line and vehicle restraint barrier present on both sides along most of its length.

Summary

The existing alignment consists of many departures. The departures are made up of a combination of the vertical and horizontal alignment, stopping sight distance and narrow road widths. *Table* below provides a summary of the sections considered above and states how many departures are within each section. It should be noted that due to the horizontal alignment variations in curvature, the departures could be greater, but for ease of reference they have been summarised.

Overtaking is very limited throughout, mainly due to the narrow road widths and is only possible between chainage 5500m and 6100m. There are a number of accesses to local fields, houses and small estates, most of which have below standard visibility splays in both directions. From the assessment completed it can be seen that the entire route makes up almost one departure with some compliant sections throughout, mainly being the first 50m and the last 600m.

Table 6 Assessment Summary

Chainage	Speed Limit	Average Road Width	No of Relaxations	No of Junctions/Accesses	No of Departures
0m – 50m	40mph	6.3m	2	2	0
50m – 2750m	60mph	5.4m	0	11	7
2750m – 3250m	30mph	6.8m	0	9	2
3250m – 5600m	60mph	7.9m	0	11	6
5600m – 6198m	60mph	12.2m	0	0	0

APPENDIX F

South East Wales Traffic Model (SEWTM) – M4 J34 to A48 Link WeITAG
Stage 2 Technical Note & Traffic Flow Output Plans

Project:	SEWTM – M4 J34 to A48 Link WeITAG Stage 2		
Prepared by:	S Bukowski (Arup) / G Bate	Date:	23 March 2018
Approved by:	P Chase	To:	Arcadis
Subject:	SEWTM Modelling Approach		

1 Introduction

1.1 Purpose

Mott MacDonald (working with Arup) has been commissioned by Transport for Wales to undertake strategic transport modelling for the M4 J34 to A48 Link using the South East Wales Transport Model (SEWTM), following a request from Arcadis working on behalf of Vale of Glamorgan Council. Strategic modelling is required to support a WeITAG Stage 2 study for the scheme.

This Technical Note has been prepared to summarise the modelling approach adopted for the study, including validation checks, network coding assumptions, and outputs delivered. It is expected that this Note will be included as an appendix to the WeITAG stage report.

1.2 South East Wales Transport Model (SEWTM)

SEWTM is a multi-modal disaggregate demand model focused on South East Wales, covering the eleven unitary authority areas of Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Rhondda Cynon Taf, Torfaen, and Vale of Glamorgan. The model comprises separate highway and public transport assignment models linked together with a demand model. The model was commissioned by Welsh Government in 2015 and has been developed by a team led by Mott MacDonald, and including Arup, RAND Europe, and David Simmonds Consultancy.

The SEWTM has been designed to:

- Understand the current travel patterns in South East Wales and the performance of the transport system;
- Monitor changes in travel patterns over time;
- Predict future travel patterns and conditions on the transport network;
- Assess the impacts of possible interventions in the transport system in a consistent manner;
- Assess the impacts of land use changes such as new housing developments and employment locations in a consistent manner; and
- Provide inputs required for transport appraisals and business cases.

The model represents an average weekday for four time periods: an AM average hour between 0700 and 0930, an inter-peak (IP) average hour between 0930 and 1530, an average PM hour between 1530 and 1800 and an off-peak (OP) average hour between 1800 and 0700. The assignment models can also represent peak hours within the AM and PM peak periods. Peak hours are the single hours during which the

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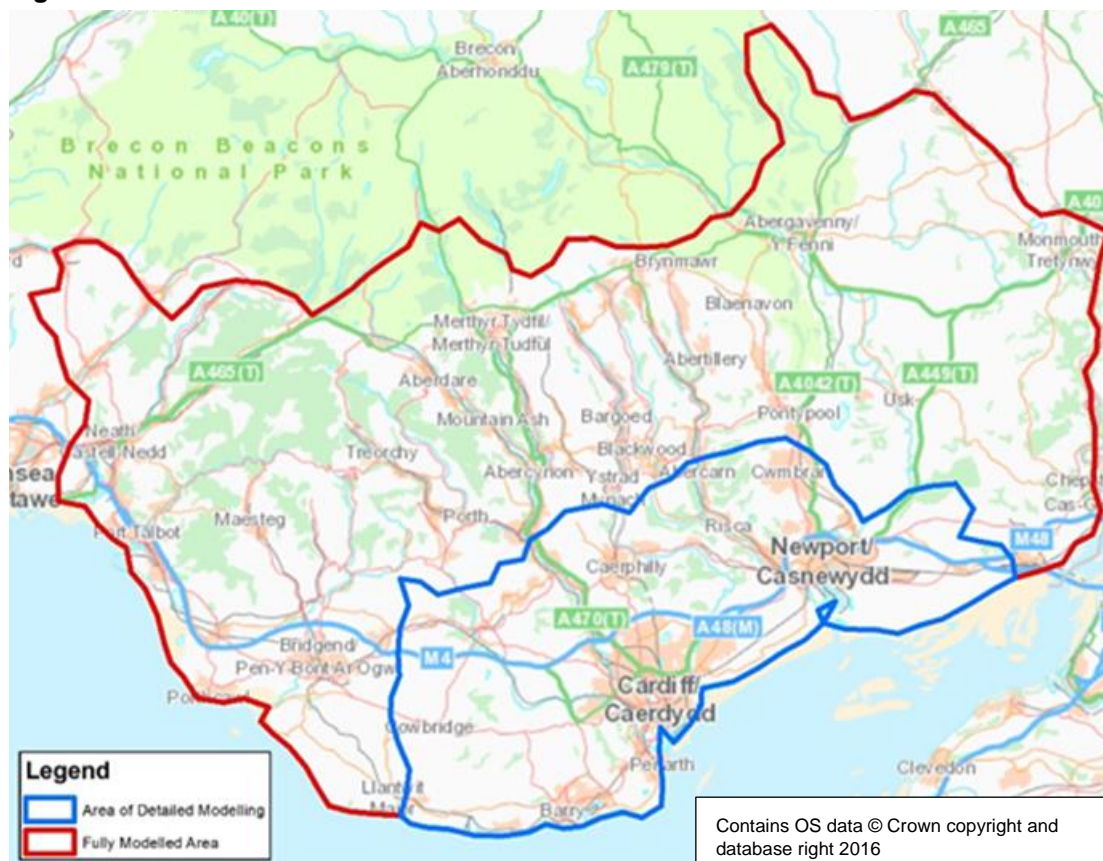
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

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highest volume of trips are undertaken; between 0745 and 0845, and between 1630 and 1730. The SEWTM base year is 2015, with forecast years of 2026 and 2036 currently available.

SEWTM geographical coverage is shown in Figure 1. The M4 J34 to A48 Link, as well as the wider area in which the greatest transport impacts are likely to be felt, is within the Area of Detailed Modelling. This is the area of the transport model within which significant impacts of interventions are more certain. Within this area the model represents all trips (demand), model zones are small and highly disaggregated, the transport network is detailed, and junction modelling is included.

Figure 1: SEWTM modelled area



Source: Mott MacDonald

1.3 Approach Overview

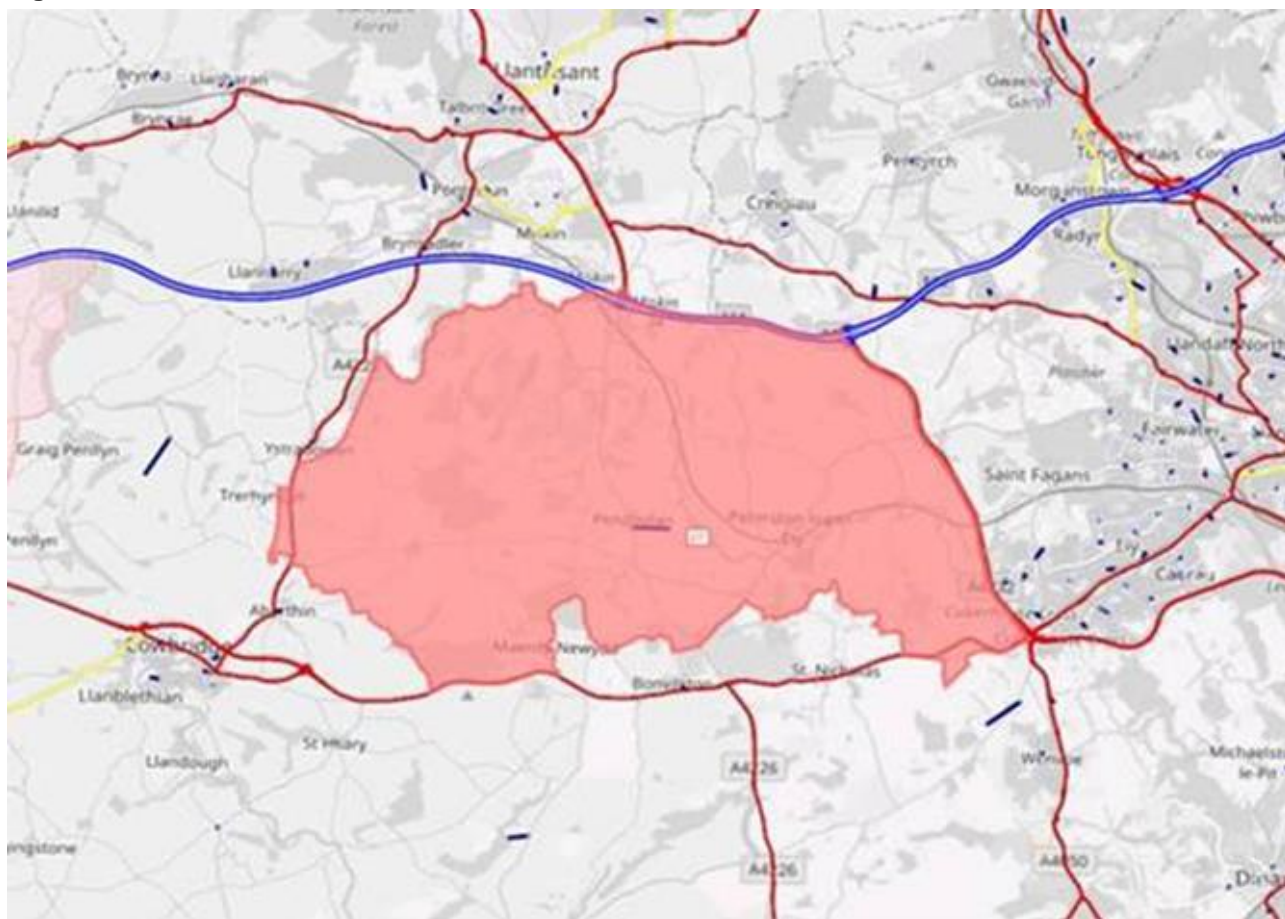
An overall approach to the strategic modelling, which is proportionate to the scale of the scheme and current development stage, was agreed with Arcadis in advance:

- Running the highway component of SEWTM only; and
- 2036 forecast year only, with model outputs used to complete a single year TUBA assessment.

The zoning structure within the scheme area has been reviewed. Model zone 27 (highlighted in Figure 2) is the main zone in the study area. All villages local to the scheme and the Renishaw factory are included within this zone.

The zone boundaries are based on the LSOA (Lower Layer Super Output Area) in this area and the zone is connected to the highway network near to Pendoylan village. Having such a large zone could have an impact on the local assignment of trips within this area of the model. However, given the rural nature of the zone, the level of trip generation is relatively low (compared to the rest of the model area) and therefore the zone size is unlikely to have a significant impact on the results of this high-level analysis of the proposed scheme. However, this is an area that could be developed further in any future modelling work for the scheme.

Figure 2: Extent of Model Zone 27



Source: Arup / Mott MacDonald

Within SEWTM, all lower rank, non-strategic routes are modelled as fixed low speed links. In this case the existing road between M4 J34 and A48 was modelled as such in the Base and Do-Minimum scenarios. Considering the existing characteristics of this road and sections with a single track/passing places specifically, this approach was deemed as appropriate in the development phase of the model.

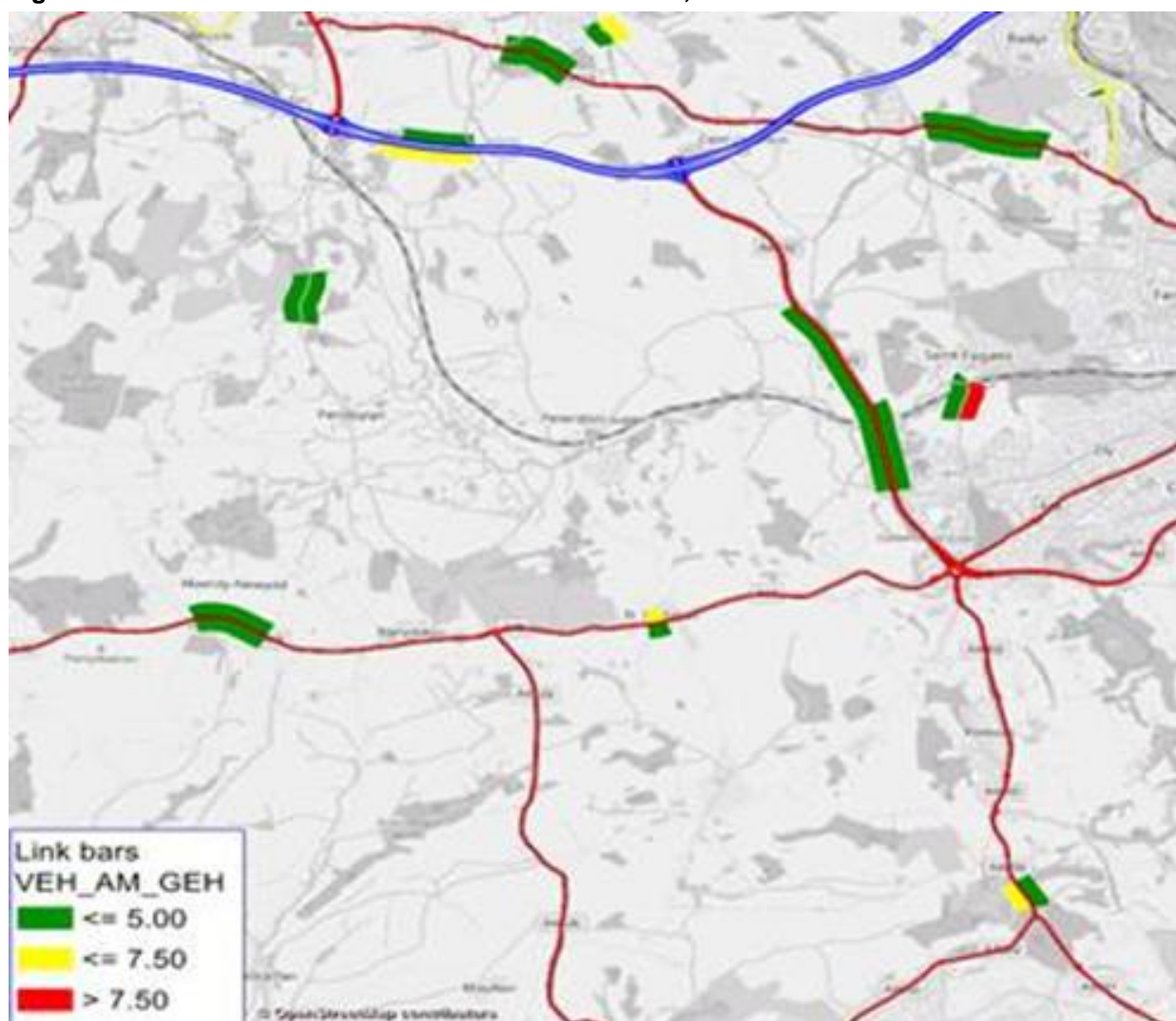
3 Highway Validation

A review of 2015 base year highway model performance in the study area has been undertaken. The review indicated that the model presented a good level of validation in terms of screenlines and link flow volumes on most validation points in the area around the scheme. This includes the existing road section adjacent to the scheme and the A48 west of the scheme. Link validation results for all time periods, based on the standard GEH statistic, are shown in Figure 3, Figure 4 and Figure 5.

The link flow volumes on the A48 to the east of the scheme did not validate quite as well and are slightly underestimated in the base year.

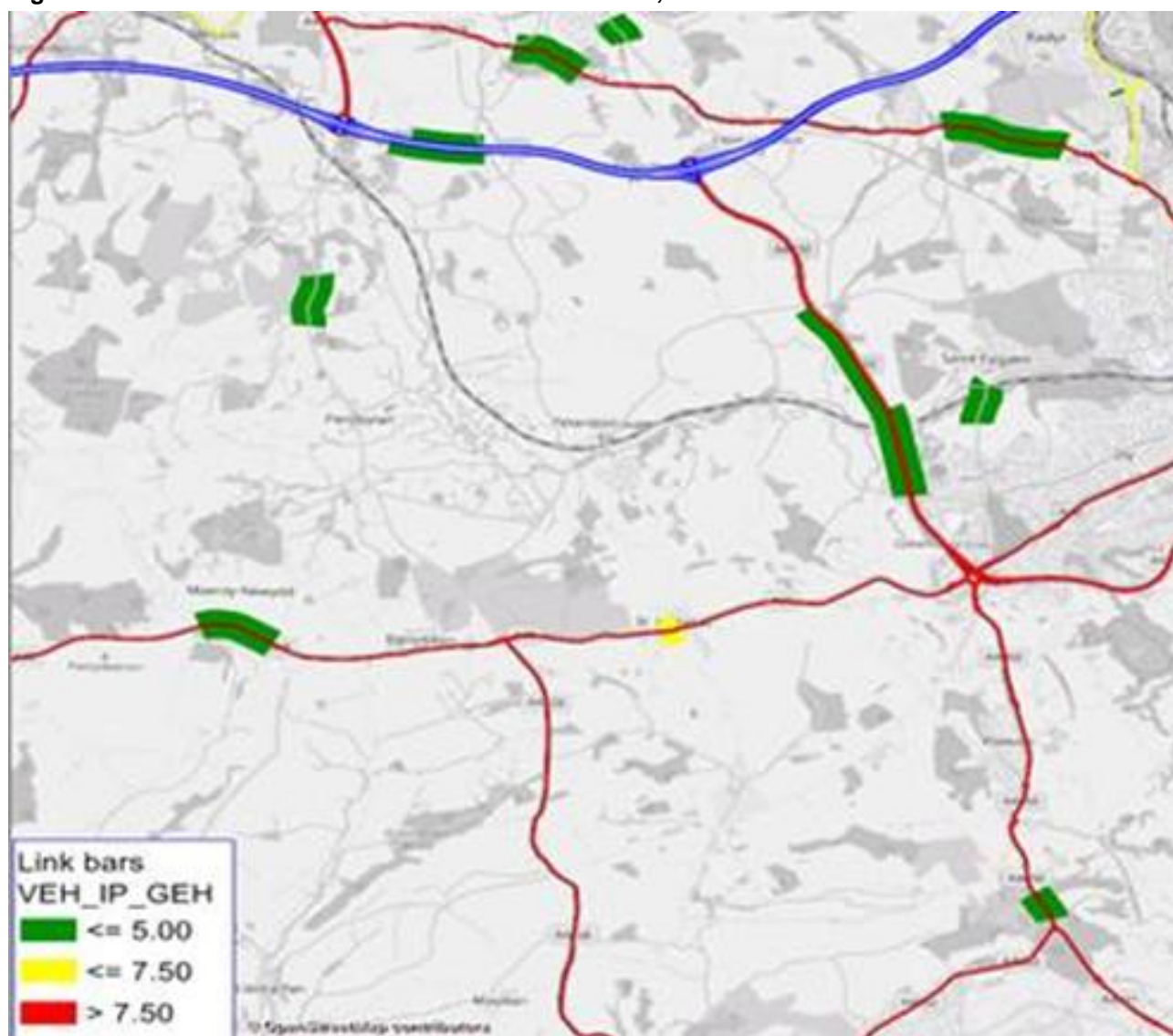
The model journey times were analysed along strategic routes. Routes in proximity of the proposed scheme (A48, A4232 and M4) display a good level of validation across all time periods.

Figure 3: Base Year Model Link Validation – All Vehicles, AM 2015



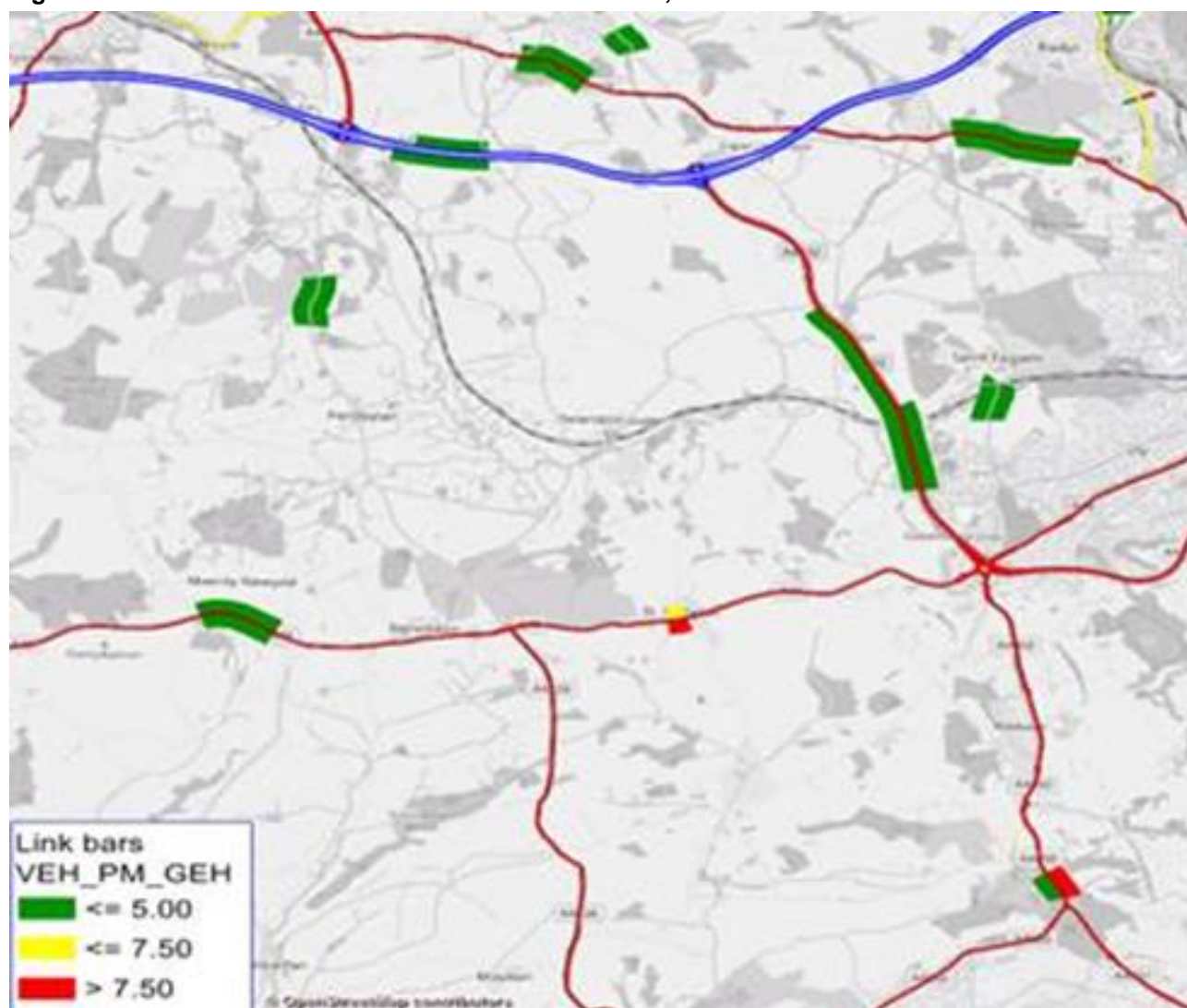
Source: Arup / Mott MacDonald

Figure 4: Base Year Model Link Validation – All Vehicles, Inter-Peak 2015



Source: Arup / Mott MacDonald

Figure 5: Base Year Model Link Validation – All Vehicles, PM 2015



Source: Arup / Mott MacDonald

4 Do-Minimum Networks

The 2036 Do-Minimum highway networks in SEWTM already include the following schemes:

- Five Mile Lane Scheme, involving a range of improvements to the A4226 between Sycamore Cross and Weycock Cross;
- A465 Dualling between Gilwern and Dowlais Top; and
- M4 Junction 32 improvements, including a new dedicated left turn lane from the M4 westbound.

Additionally, the following schemes and amendments have now been included as part of Do-Minimum network updates:

- Eastern Bay Link Stage 1 between the Butetown Tunnel and Ocean Way; and
- Revised A4226 Five Mile Lane coding, to incorporate the latest information outlined in the Five Mile Lane Transport Assessment, provided by Arcadis. Changes were made to the road characteristics and junction control settings including new signal phasing and timings.

5 Do-Something Networks

The 2036 Do-Something networks consist of the revised Do-Minimum network with the additional coding of the M4 J34 to A48 link road. The following assumptions are made in terms of modelling the proposed scheme:

- Single carriageway link classification and speed-flow curve (60mph/100km design speed);
- The section of the scheme road 450 metres north of the A48 Sycamore Cross junction is coded as suburban single carriageway link classification and speed-flow curve (40mph/64km design speed);
- No adjustments were made to the coding of Sycamore Cross junction signals to account for the new scheme road section; and
- Due to the size of zones (and zone loading points) in the proximity of the scheme road, no intermediate junctions were coded along the scheme link.

6 Outputs

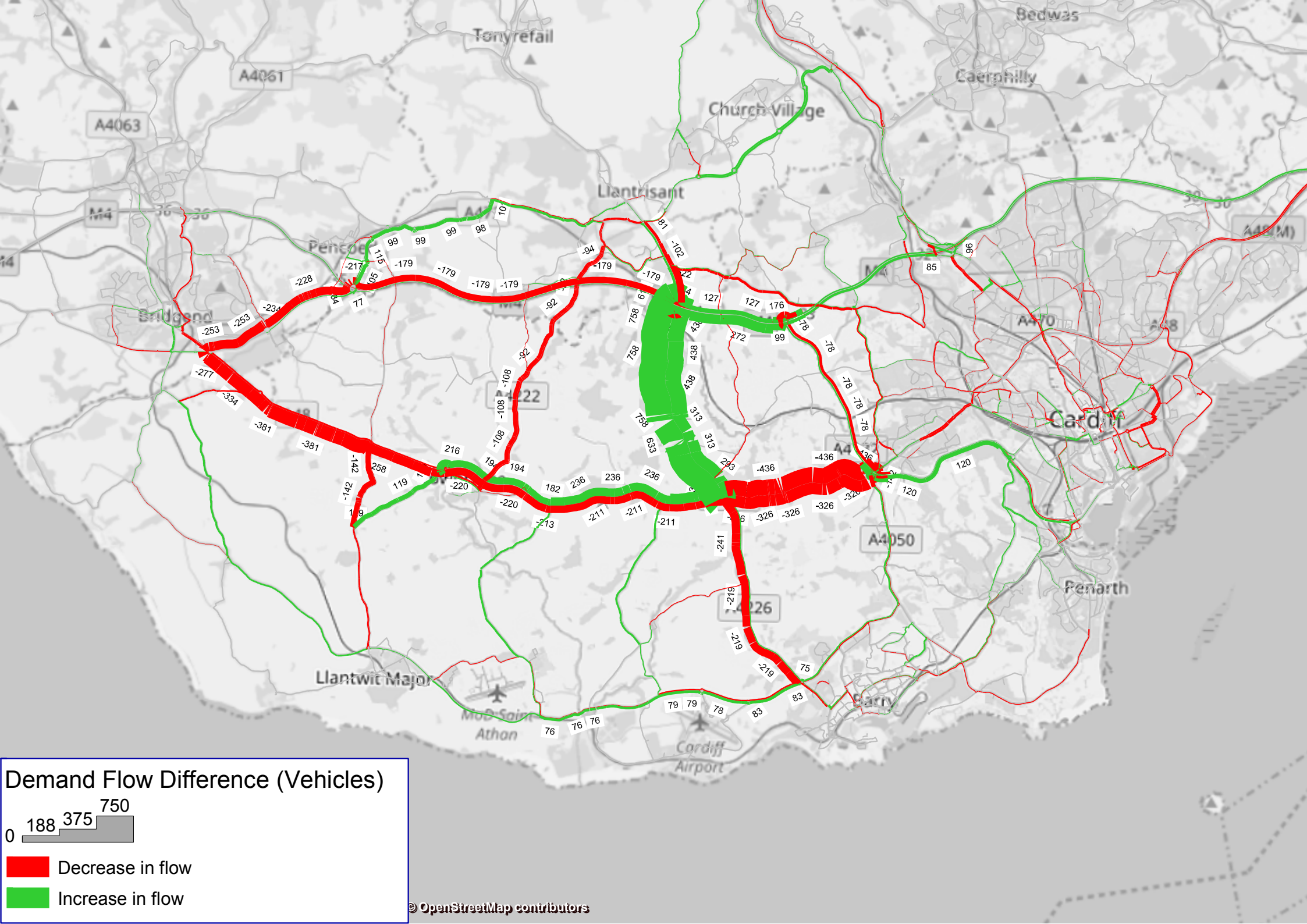
Mott MacDonald / Arup has issued the following information and model run outputs:

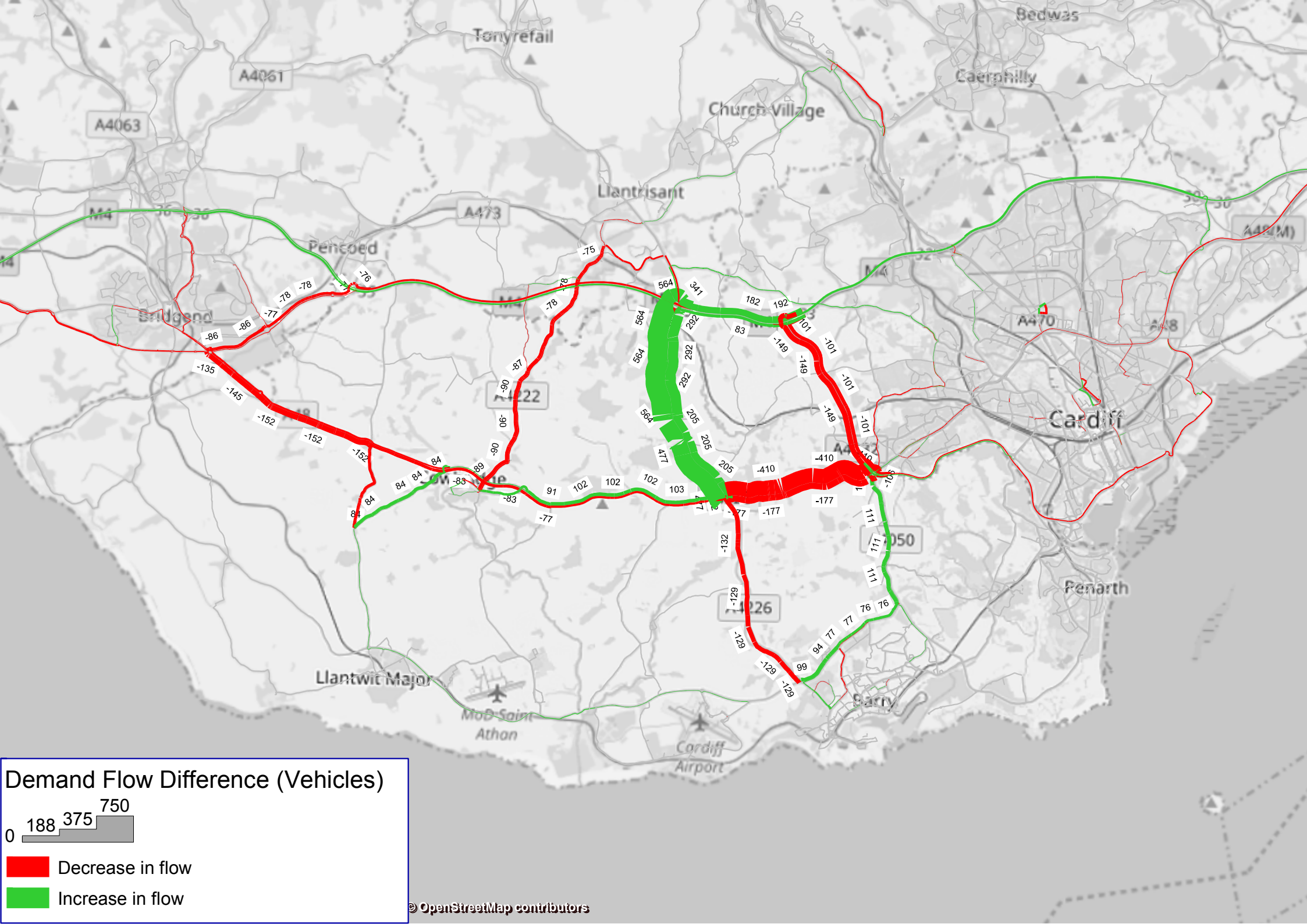
- GIS shapefiles containing modelled link vehicle flows (actual and demand for AM / Inter-Peak / PM) for:
 - 2015 Base
 - 2036 Do-Minimum
 - 2036 Do-Something
- Flow difference plots for AM, Inter-Peak, and PM time periods, comparing the 2036 Do-Minimum and 2036 Do-Something scenarios;
- Spreadsheet containing additional attributes describing model links characteristics;
- Full set of TUBA 1.9.9 input and output files for a single year (2036); and
- Highway hour to period factors to assist in forecasting Annual Average Daily Traffic (AADT) flows – AM (2.1977), Inter-Peak (6), PM (2.3768), and Off-Peak (13).

7 Considerations for WeITAG Stage 3

Future development work on the M4 J34 to A48 Link scheme, potentially as part of a WeITAG Stage 3 assessment, should consider the following options to refine the modelling:

- Additional journey time data could be collected and used for validation along the existing road between M4 J34 and the A48;
- Disaggregation of model zones local to the scheme road section, with the aim of helping to improve model validation on the A48 to the east of the scheme;
- Refining coding of the existing road in the Do-Minimum, considering the link speed and replicating the performance of the road, which on some sections is single track with passing places;
- Junction / signal optimisation at Sycamore Cross (A48) and M4 J34;
- Use of a cordoned version of SEWTM to remove the impacts of any model noise in the economic appraisal.





Demand Flow Difference (Vehicles)

0 188 375 750

Decrease in flow

Increase in flow

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A decorative graphic consisting of three thin orange lines. One line is horizontal, extending across the width of the page. Two other lines are diagonal, starting from the bottom left and extending towards the top right, intersecting the horizontal line.