Agenda Item: 9

Meeting of:	**Cabinet**
Date of Meeting:	**Monday, 05 October 2020**
Relevant Scrutiny Committee:	Environment and Regeneration
Report Title:	Vale of Glamorgan Gateway Station WelTAG Stage Two Outline Business Case
Purpose of Report:	To update Cabinet on progress with the Vale of Glamorgan Gateway Station WelTAG Stage Two Outline Business Case and make recommendations for the next steps to be considered.
Report Owner:	Cabinet Member for Neighbourhood Services and Transport
Responsible Officer:	Miles Punter - Director of Environment and Housing
Elected Member and Officer Consultation:	Cabinet Member for Neighbourhood Services and Transport Cabinet Member for Regeneration and Planning Operational Manager Engineering Accountant Environment and Housing Services Operational Manager Finance Head of Regeneration and Planning Legal Services (Committee Reports)
Policy Framework:	This report is a matter for Executive decision by Cabinet

Executive Summary:

This Report provides Cabinet with an update on progress of the Vale of Glamorgan Gateway Station WelTAG Stage Two Outline Business study (Appendix A refers).

The draft WelTAG Stage Two Outline Business Case has been completed by Arcadis and assessed the do-minimum scenario plus four options for a station located near to M4 Junction 34 encompassing:

Location 1 - Land South East of the Renishaw Development

Location 2 - Land South of the Railway between the Railway and River Ely

Location 3 - Situated on Marsh/ Wet Woodland West of the Extant Renishaw Development

Location 4 - Existing Renishaw Car Park Site.

On the basis of the WelTAG Stage Two study and the potential socio-economic, cultural and environmental benefits identified in this outline business case, it is considered that the Vale of

Glamorgan Gateway Station (Location 4) has merit in being taken forward for further consideration as part of an updated WelTAG Stage Two appraisal encompassing a full value for money assessment. Whilst Location 4 has been identified as the preferred location option, it is advised that the study considers the potential for an alternate location, primarily due to extant constraints that could adversely impact on implementation.

Following completion of the Stage Two appraisal, the report subsequently makes the following recommendations:

Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.

Submission of GRIP Stage 1-2/ Transport for Wales Stage A (see Appendix B) to be brought in line with GRIP Product Deliverables, including the potential for an additional solution to be developed (as an alternative).

Submission of GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection.

The scope of the GRIP product deliverables should be developed to encompass the following key activities where applicable:

Stakeholder engagement and consensus to determine likelihood of external factors.

Additional Demand Forecasting (dependent on external factors), route origin/ destination reviews, including additional detail on traffic impact within the Vale of Glamorgan road network.

Detailed timetable analysis, including the impact on freight services and resilience/ redundancy review in the rail network.

A timetable for ecological surveys required and likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).

Option cost estimation.

Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).

Recommendations

1. That progress made on the Vale of Glamorgan Gateway Station WelTAG Stage Two Outline Business Case (Appendix A) relating to proposals for a new railway station in the Vale of Glamorgan located near to the M4 Junction 34 is noted.
2. That this matter is referred to Scrutiny Committee (Environment and Regeneration) for consideration.
3. That, subject to consideration by Scrutiny Committee (Environment and Regeneration), the progression of the full WelTAG Stage Two study and accompanying GRIP Transport for Wales Stage A and B studies for the Vale of Glamorgan Gateway Station is endorsed.

Reasons for Recommendations

1. To update members on progress made on the scheme.
2. To allow this report to be scrutinised.
3. To support progression of the study to full WelTAG Stage Two, in principle, funded by Welsh Government.

1. Background

1.1 Arcadis Consulting (UK) Limited (Arcadis) was commissioned by the 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 2017) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals.

1.2 The WelTAG Stage One report was previously prepared by Arcadis and considered the problems, opportunities and constraints, established objectives and appraised a long list of options and as a result three options were recommended to be taken forward for WelTAG Stage Two appraisal against the do-minimum, namely:

- Option B M4 Junction 34 to A48 Highway Route East of Pendoylan
- Option C M4 Junction 34 to A48 Highway Route West of Pendoylan
- Option G Vale of Glamorgan Gateway Station (formerly Parkway Station) with Park and Ride facility and bus integration near to the M4 Junction 34

1.3 The WelTAG Stage One recommendations were considered at by the project Review Group, the Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee and Vale of Glamorgan Council Cabinet and endorsed with accompanying recommendations (as detailed within the WelTAG documentation).

1.4 A first WelTAG Stage Two report was prepared by Arcadis and presented to the project Review Group on 2nd October 2018. Following consideration of the report's output, several recommendations were agreed by the Review Group for completion at Stage Two including a programme of early stage environmental surveys and investigations, more detailed development of the highway link concept designs and completion of Vale of Glamorgan Gateway Station GRIP Stage 1 and GRIP Stage 2 studies. The proposals for additional Stage Two assessment (referred to as Stage Two Plus) were considered and agreed by the Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee and Vale of Glamorgan Council Cabinet over several meetings.

1.5 Following further consideration of the selected options at WelTAG Stage Two, it was recognised that proposals for a Vale of Glamorgan Gateway Station present regional, strategic and sustainable transport opportunities that could be better recognised and scrutinised separately from the highways proposals, whilst also allowing a number of rail sub-options to be developed and independently WelTAG assessed. In addition, the rail and highway options under consideration retain separate management and control processes, which inherently influence next steps and programming for ongoing WelTAG assessment. In agreement with Welsh Government, a decision has therefore been made by the Vale of Glamorgan Council to separate assessment of the Vale of Glamorgan Gateway Station option from the M4 Junction 34 to A48 highway link options.

1.6 This Cabinet report therefore specifically relates to the WelTAG Stage Two Outline Business Case report for the development, proportionate appraisal and evaluation of the options for a VALE OF GLAMORGAN GATEWAY STATION with Park and Ride facility and bus integration near to M4 Junction 34 (Appendix A refers). It has been undertaken with the involvement of key stakeholders.

1.7 For the WelTAG Stage Two study, the do-minimum (with no new railway station) and four potential location options have been considered. The location options have been informed by the GRIP Stage 1-2 Feasibility Report Transport for Wales Stage A (Appendix B refers).

- Do-Minimum - The Do-Minimum scenario assumes that there is no step change in investment beyond the current programmes and commitments.

- Location 1 - Land South East of the Renishaw Development.

- Location 2 - Land South of the Railway between the Railway and River Ely.

- Location 3 - Situated on Marshland and Woodland West of Renishaw.

- Location 4 - Existing Renishaw Car Park (the Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw. This

proposal would need to be negotiated and agreed with the landowners, Renishaw).

1.8 The supporting WelTAG Stage Two GRIP Stage 1-2 Feasibility Report Transport for Wales Stage A (Appendix B) has subsequently been reported to the project Review Group on 9th January 2020 and these considerations have been taken into account in this report. The Review Group brought together key stakeholders to oversee the studies and included representatives of the Cardiff Capital Region and the neighbouring authorities.

2. Key Issues for Consideration

2.1 The WelTAG Stage Two Outline Business Case study (Appendix A) has taken forward and appraised each of the five options in relation to the Five Case Business Model: the strategic, transport, management, financial and commercial case.

2.2 The WelTAG Stage One report is accompanied by the Impact Assessment Report (IAR). Its purpose is to provide a permanent record of the appraisal work on the proposed transport intervention and contains the detailed evidence behind the summary of information provided to decision makers in the Stage reports. The IAR remains a live document for updating throughout the process.

2.3 The problems have been identified as follows:

Ref	PROBLEMS
1	Poor highway infrastructure between M4 Junction 34 and the A48 leading to poor access for local communities and businesses.
2	Poor sustainable access to Cardiff Airport and strategic destinations.
3	High use of the private car for local and regional trips (e.g. journeys to work).
4	Existing congestion issues at M4 Junction 34 and on the A48 which are likely to worsen with the committed developments in the area.
5	Poor infrastructure and local connectivity by walking and cycling.
6	Environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution.
7	Accessibility for HGVs.
8	Adverse road safety conditions along existing routes non-compliant to current DMRB highway standards.

2.4 The objectives were set for the study in order to address the problems, opportunities and constraints as set out below. These were accompanied by details of what success would look like and how it would be measured:

Ref	OBJECTIVES
1	Enhance connectivity to Cardiff Airport and strategic employment sites in the region.
2	Increase transport options for strategic access and access to and from local communities.
3	Improve network resilience and road safety on the M4, A48 and A4232 corridors and other connecting roads.
4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area.
5	Minimise impacts on communities and support social inclusion and health and well-being.

2.5 The objectives have been verified to determine how they contribute to resolving problems of the study area, the Well-being of Future Generations Act Well-being Goals, the Wales Transport Strategy outcomes and the Welsh Government's Strategic Priorities, as set out in the Wales Transport Strategy.

2.6 For the Strategic Case, the options have been assessed in terms of how each would tackle the identified problems, to what extent it meets the objectives, including contributing to local, regional and national well-being objectives, as well as key risks, adverse impacts, constraints and dependencies. The Well-Being goals have been assessed using the framework provided, as guidance to supplement WelTAG. The impacts of the do-minimum scenario are also set out compared to the Base Year situation. The assessment identifies that the four location options perform similarly in terms of their contribution to tackling the problems, objectives and well-being goals. A new station would positively contribute towards

- Addressing problems, including congestion on the strategic road network and access to strategic employment opportunities.

- Meeting objectives, making a strong contribution to increasing transport options for strategic access and access to and from local communities and supporting health and wellbeing.

- The well-being goals, particularly a prosperous Wales and cohesive communities.

2.7 However, the development of a station could bring environmental impacts such as loss of habitats and impacts on heritage assets. It may also lead to increased traffic issues on the local road network to and from the station.

2.8 Regarding the Transport Case, the four Vale of Glamorgan Gateway Station location options have been tested alongside the do-minimum option. The aim of the Transport Case is to explain the expected impacts of the project, how the project will contribute to the well-being goals and whether a project will provide

value for public money. The social, cultural, environmental and economic costs and benefits of each option are considered.

2.9 The Transport Case assessment demonstrates that the four proposed locations for the railway station perform similarly in terms of the social, cultural and economic assessment with broadly positive impacts identified. The key differences are retained as part of the environmental assessment and with specific regard to the impact on landscape, historic environment, biodiversity and water environment where adverse impacts are anticipated. The land and property appraisal included as part of the economic assessment also demonstrates differences in scoring between all four location options.

2.10 In addition, the WelTAG Stage Two report has set out the anticipated financial, commercial and management cases all of which will require further consultation with key stakeholders as the WelTAG assessment evolves into the next stages of appraisal.

2.11 On the basis of the WelTAG Stage Two study and the potential socio-economic, cultural and environmental benefits identified in the outline business case, it is considered that the Vale of Glamorgan Gateway Station (Location 4) has merit in being taken forward for further consideration as part of an updated WelTAG Stage Two appraisal encompassing a full value for money assessment. Whilst Location 4 has been identified as the preferred location option, it is advised that the study considers the potential for an alternate location, primarily due to extant constraints that could adversely impact on implementation.

2.12 It should also be noted that the WelTAG Stage Two study has not been able to provide an economic appraisal and assessment of value for money, as the feasibility work has been at GRIP Stage 1-2 and the transport appraisal has provided high level demand forecasts. These areas of work require further development prior to moving to a Stage Three WelTAG appraisal, likely to encompass the completion of a GRIP Stage 3 Transport for Wales Stage B Option Development and Selection study.

2.13 Following completion of the Stage Two appraisal, the report subsequently makes the following recommendations:

- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.

- Submission of GRIP Stage 1-2/ Transport for Wales Stage A to be brought in line with GRIP Product Deliverables, including the potential for an additional solution to be developed (as an alternative).

- Submission of GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection.

- The scope of the GRIP product deliverables should be developed to encompass the following key activities where applicable:
- Stakeholder engagement and consensus to determine likelihood of external factors.

- Additional Demand Forecasting (dependent on external factors), route origin/ destination reviews, including additional detail on traffic impact within the Vale of Glamorgan road network.

- Detailed timetable analysis, including the impact on freight services and resilience/ redundancy review in the rail network.

- A timetable for ecological surveys required and likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).

- Option cost estimation.

- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).

3. How do proposals evidence the Five Ways of Working and contribute to our Well-being Objectives?

3.1 The introduction of the WelTAG report sets out an overview of how the approach and proposals of the appraisal evidence the Five Ways of Working and support the seven Well-being goals set out in the Future Generations of Wales Act 2015. The WelTAG guidance states it is required 'to ensure the needs of future generations are considered and understand how well they help public bodies to meet the well-being objectives and maximise their contribution to each of the seven goals'. Consideration should be given to long-term challenges, trends, opportunities, as well as integration, collaboration, involvement and preventing problems from occurring or getting worse.

Long Term

3.2 The Impact Assessment Report which accompanies each stage of the WelTAG process provides the evidence of both current and future problems, trends and opportunities to inform consideration of the long-term perspective and the development of options.

3.3 Improvements are needed to address the congestion and road safety issues associated with the M4 corridor and key connections and the subsequent

impacts on the economy, access to education, jobs and services, health and the environment (notably air quality and noise impacts).

3.4 Current traffic congestion and connectivity issues will be exacerbated in the future with traffic growth as well as new developments in the M4 corridor. The options considered in the WelTAG Stage One report offer long term solutions to address the existing issues by providing a park and ride facility and new station to reduce the length of road-based journeys and maximise use of rail.

Prevention

3.5 The options under consideration offer the opportunity to prevent as far as possible the future problems and trends from occurring, through the enhancement of alternative travel modes (primarily rail but also buses and active travel). Moreover, the Commercial, Financial and Management Cases in this Strategic Outline Case report seek to identify costs and deliverability risks to aid decision making and prevent long term liabilities for public money by considering all of the issues at the outset

Integration

3.6 The options under consideration involve the integration of active travel, rail and bus modes to provide a transport interchange, with good access from the strategic highway network. The WelTAG study has been undertaken in an integrated manner to consider and take account of other schemes and proposals through discussion with stakeholders as well as integration with adjacent studies such as the M4 Junction 32 to Junction 35 WelTAG Stage Two Study and emerging proposals from the North West Cardiff Corridor Study (WelTAG Stage One).

Collaboration

3.7 In undertaking the WelTAG Stage Two study, there has been collaboration between departments within the local authority, with Welsh Government and Transport for Wales, between stakeholders and between Arcadis and other consultants working on adjacent projects influencing the study area issues and solutions.

Involvement

3.8 A full public consultation as well as stakeholder workshops were undertaken as part of the M4 Junction 34 to A48 WelTAG Stage Two study.

3.9 The GRIP Stage 1-2 Feasibility Report Transport for Wales Stage A (Appendix B refers) has been reported to the project's Review Group which brings together key stakeholders to oversee the studies. Further stages of WelTAG would involve full public consultation in due course.

Well-being Goals

3.10 The objectives have been developed through consideration of the Well-being goals and this is presented in the Strategic Case Section. The Strategic Case also considers how each of the options meets the Well-being goals. Together this seeks to ensure that achieving the Well-being goals are at the centre of the setting of objectives for the study and the emerging interventions

4. Resources and Legal Considerations

Financial

4.1 The study has been financed by Welsh Government Capital Trust Grant funding.

4.2 The WelTAG Stage Two Plus value to date (including consideration of the Vale of Glamorgan Gateway Station and two highway link options between M4 Junction 34 and the A48) the amount paid up to 31/08/2020 is £261,153.06.

Employment

4.3 Consultants Arcadis have been commissioned to undertake the technical work on this Project because the resource and some of the technical skills required to do so are not available within Council.

Legal (Including Equalities)

4.4 The appraisal of options has been undertaken in accordance with Welsh Government's latest version of WelTAG (December 2017) including advise on the appraisal in relation to the Well-being goals set out in the Well-being of the Future Generations (Wales) Act 2015.

4.5 The Vale of Glamorgan Local Development Plan (2017) was adopted by the Council on the 28th June 2017, which sets out the vision, objectives, strategy and policies for managing development in the Vale of Glamorgan. It also seeks to identify the infrastructure that will be required to meet anticipated growth in the Vale of Glamorgan area up to 2026. The LDP states that priority will be given to schemes that improve highway safety, accessibility, public transport, walking and cycling. The LDP's of the neighbouring Authorities of Bridgend, Cardiff and Rhondda Cynon Taff have also been noted.

4.6 The Vale of Glamorgan Local Transport Plan (2015) acknowledges 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.

4.7 The provision of a well organised transport network helps to increase mobility and accessibility.

5. Background Papers

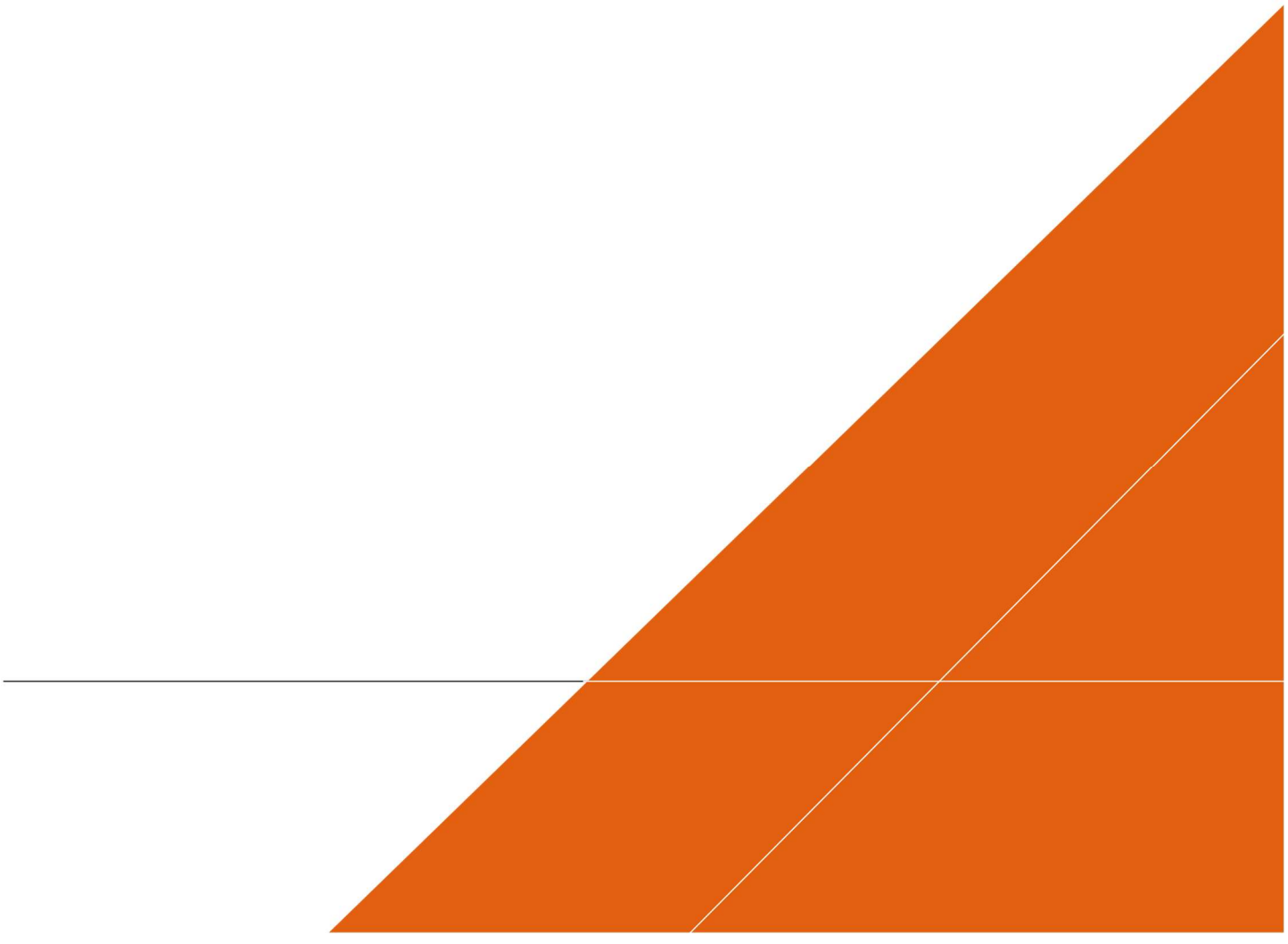
https://www.valeofglamorgan.gov.uk/en/living/Roads/Transport-Studies/M4-Junction-34-to-A48-Transport-Improvements.aspx

ARCADIS Design & Consultancy for natural and built assets

VALE OF GLAMORGAN GATEWAY STATION

WelTAG Stage Two Plus | Outline Business Case

SEPTEMBER 2020



Vale of Glamorgan Gateway Station

WelTAG Stage Two Plus | Outline Business Case

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Report No	10028657-ARC-XX-XX-RP-TP-0003
Date	SEPTEMBER 2020

VERSION CONTROL

Version	Date	Author	Changes
P01	16/03/2020	MF	Confidential draft for review
P02	30/06/2020	MF	Updated following client comments
P03	09/09/2020	MF	Updated following client comments

This report dated 09 September 2020 has been prepared for the Vale of Glamorgan Council (the "Client") in accordance with the terms and conditions of appointment dated 20 December 2018 (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.

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Executive Summary

Introduction

Purpose of the Study

Arcadis Consulting (UK) Limited was commissioned by the 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 2017) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals. This WelTAG Stage Two Plus report presents the development, proportionate appraisal and evaluation of options for a Vale of Glamorgan Gateway Station with Park and Ride facility and bus integration near to the M4 Junction 34.

Context

The WelTAG Stage One report was prepared by Arcadis and considered the problems, opportunities and constraints, established objectives and appraised a long list of options and as a result three options were recommended to be taken forward for WelTAG Stage Two appraisal against the do-minimum, namely:

- Option B | M4 Junction 34 to A48 Highway Route East of Pendoylan
- Option C | M4 Junction 34 to A48 Highway Route West of Pendoylan
- Option G | Vale of Glamorgan Gateway Station (formerly Parkway Station) with Park and Ride facility and bus integration near to the M4 Junction 34

A first WelTAG Stage Two report was prepared by Arcadis and presented to the project Review Group on 2nd October 2018. Following consideration of the report's output, several recommendations were agreed by the Review Group for completion at Stage Two including a programme of early stage environmental surveys and investigations, more detailed development of the highway link concept designs and completion of Vale of Glamorgan Gateway Station GRIP Stage 1-2 study. The proposals for additional Stage Two assessment (referred to as Stage Two Plus) were considered and agreed by the Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee and Vale of Glamorgan Council Cabinet over several meetings.

Following further consideration of the selected options, it was recognised that proposals for a Vale of Glamorgan Gateway Station present regional, strategic and sustainable transport opportunities that could be better recognised and scrutinised in their own right, whilst also allowing a number of rail sub-options to be developed and independently assessed. In addition, the rail and highway options under consideration would involve separate management and control processes, which inherently influence next steps and programming for ongoing WelTAG assessment. In agreement with Welsh Government, a decision was made by the Vale of Glamorgan Council to separate assessment of the Vale of Glamorgan Gateway Station option from the M4 Junction 34 to A48 highway link options.

The scope for the Vale of Glamorgan Gateway Station study has been developed through close consultation with Vale of Glamorgan Council and key stakeholders including the adjacent local authorities, Cardiff Capital City Region, the Welsh Government and Transport for Wales to ensure that the role of strategic public transport and active travel options in addressing the problems of regional connectivity is fully considered. This has considered:

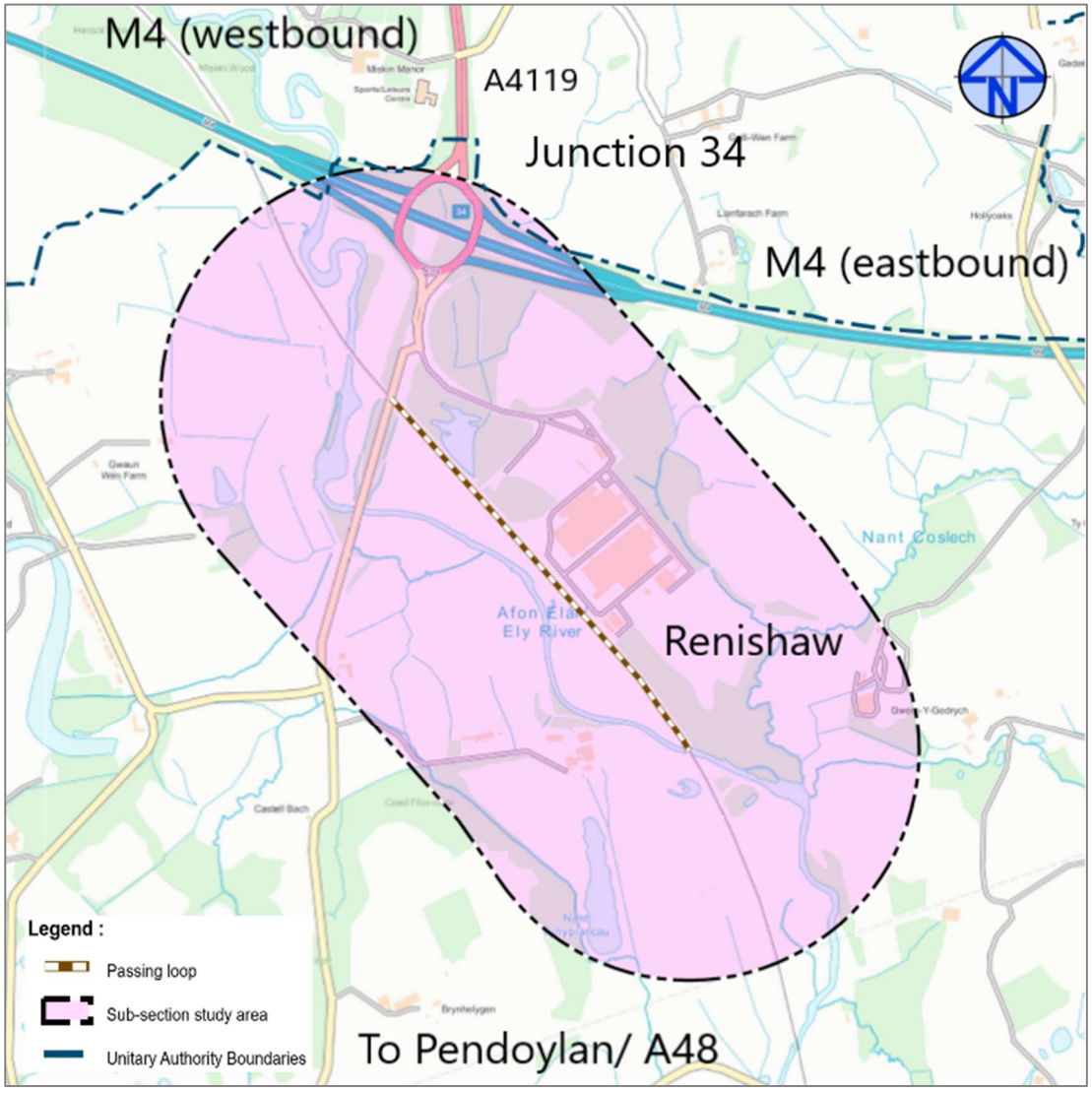
- A Vale of Glamorgan Gateway Station with Park and Ride facilities located near M4 Junction 34.
- A minimum of 500 car parking spaces with the ability to extend to 1,000 car parking spaces.
- Provision of a station interchange access/ approach road.
- Platform length to meet aspirations to accommodate all rolling stock including Great Western Railway (GWR) Intercity (10 cars). For this study, 300m length platforms have been considered.
- Station buildings including entrance, canopy, waiting room/ shelter to meet the requirements of the Disability Discrimination Act (DDA).

- Provision of a footbridge with lifts for improved accessibility and in compliance with Department for Transport standards.
- Provision of facilities for sustainable travel such as cycle parking/ lockers and bus services.
- Station to be designed in accordance of Department for Transport Accessible Railway Stations Design Standards.
- Ensuring the well-being goals of the Well-being of Future Generations (Wales) Act 2015 are considered throughout the process.

WelTAG Stage Two Plus – Study Area

The study area for the appraisal is defined in the following image and encompasses a 500m boundary surrounding the existing 4-track Miskin Passing Loops on the South Wales Main Line (encompassing land south of the M4 Junction 34 and adjacent to the Pendoylan road). The station would be situated adjacent to the Miskin Passing Loops approximately 15 kms west of Cardiff Central and 17.5 kms east of Bridgend Railway Station.

Image 1 WelTAG Stage Two Plus | Vale of Glamorgan Gateway Station Appraisal Area[1]



[1] Contains OS data © Crown Copyright OS Open Map – Local 2019

Covid-19 | Assessment Impact

As a result of the Covid-19 outbreak in 2020, all key areas of the WelTAG assessment and appraisal including the case for change and socio-economic, cultural and environmental considerations are anticipated to be affected to a greater or lesser extent beyond expected conditions. At the time of this report, the future medium to longer-term implications of Covid-19 at a local, regional and national level remain extensively unknown and this study has not therefore made any assumptions as to the impacts on these scenarios. However, it is anticipated that future work completed with regard to this appraisal and associated studies will increasingly need to consider the implications of the pandemic as information, trends and impacts become more widely known and accepted. This WelTAG Stage Two Plus assessment therefore remains an assessment based on pre Covid-19 conditions and forecasts and for the purposes of the WelTAG appraisal should be viewed with this in mind.

Strategic Case

Overview

The Strategic Case addresses the need for change, providing an evidence-based description of the current situation, describes the likely funding situation if no action is taken and presents the reasons why an intervention is required. The strategic case includes analysis of the factors leading to the problem and the development of possible solutions, establishes objectives and provides a narrative as to how each of the solutions is intended to change the situation.

Evidence Base

The development of the strategic case has been evidence based, drawing on currently available data and is presented within the accompanying Impact Assessment Report (10028657-ARC-XX-XX-RP-TP-0002). The key sources of information have come from the following:

- Studies and Strategy Documents | Transport Data including the South East Wales Transport Model, traffic counts, accident data and existing transport provision.
- Development Proposals | Vale of Glamorgan Council Local Development Plan.
- Environmental Constraints | Heritage, ecology, landscape, water and geotechnical.
- Social, Economic and Cultural | Data on demographics, facilities, tourism and the economy

Involvement of Stakeholders and Public Consultation

The strategy has been to involve the stakeholders throughout the WelTAG stages, with key stakeholders also represented on the Review Group. The public have been consulted at both Stages One and Two to gain feedback on issues, objectives and options. The WelTAG reports have also been taken through the political process, involving presentation to Cabinet and Scrutiny Committee of the Vale of Glamorgan Council.

The Case for Change

The overarching ‘Case for Change’ is set out in the Peter Brett Associates (PBA) report contained in the accompanying Impacts Assessment Report. The strategic study area includes the ten local authorities within the Cardiff Capital Region (Cardiff, Monmouthshire, Torfaen, Blaenau Gwent, Newport, Caerphilly, the Vale of Glamorgan, Merthyr Tydfil, Rhondda Cynon Taf and Bridgend), as well as three of the four members of the Swansea Bay City Region (Swansea, Neath Port Talbot and Carmarthenshire).

The ‘Case for Change’ is made predominantly on the basis of realising the strategic development and employment opportunities associated with the Cardiff Airport – St Athan EZ, which will offer economic development benefits for South Wales as a whole but also on improving connectivity in the Cardiff Capital Region.

Taken together, consultation and desk-based analysis has demonstrated that the current transport connectivity of the Vale of Glamorgan, is sub-optimal in terms of journey times, journey time reliability, public transport coverage and the routeing of strategic traffic.

The socio-economic baselining of the study area has clearly highlighted the multitude of problems currently being experienced in the Cardiff Capital Region and Swansea Bay City Region. These include low levels of

productivity and business competitiveness, limited inward investment, high rates of economic inactivity & unemployment and concentrated areas of multiple deprivation. Improved transport connectivity is vital to enable these issues to be tackled.

Moreover, with a once in a generation programme of capital investment in transport infrastructure in the Capital Region and connecting Wales with England underway, there is an opportunity for the areas to the west of Cardiff to better access a wider range of employment and business opportunities. However, this improved connectivity also presents a risk, in that by failing to address the transport problems in the Vale of Glamorgan, the economic gravity of the area could shift to the east, with potential for economic leakage to England.

There are a number of opportunities for Cardiff International Airport to better position itself as the gateway to Wales, particularly in terms of the long-haul market. The presence of a well-connected international airport is generally seen to be positive in promoting economic development and inward investment. However, the current surface access to the airport has been widely cited as a constraint which, if not addressed, could continue to limit the route development potential of the airport.

Finally, within the Vale of Glamorgan itself, the current transport infrastructure is considered to be having a negative impact on the area, particularly in terms of congestion and journey time reliability. The transport issues are considered to be having a negative impact on business performance, the attractiveness of the Vale of Glamorgan as a place to live, work and do business and, in the longer-term, land-use aspirations within the Vale of Glamorgan – these same adverse impacts can also be aligned with the wider study area, whereby investment in transport infrastructure is considered an essential mechanism towards sustainable economic development throughout the region.

In short, improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.

WelTAG Stage Two Plus Option Development

As part of this WelTAG Stage Two Plus appraisal, reference should be made to the accompanying GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A (10028657-ARC-00-XX-RP-ZZ-00001) completed by Arcadis that details option development and appraisal of the Vale of Glamorgan Gateway Station proposals. A summary of key information has been provided within the WelTAG Stage Two Plus to outline development of the following options for appraisal:

- **Do-Minimum |** The Do-Minimum scenario assumes that there is no step change in investment beyond the current programmes and commitments.
- **Location 1 |** Land South East of the Extant Renishaw Development (10028657-ARC-00-XX-DR-CE-00001).
- **Location 2 |** Land South of the Railway between the Railway and River Ely (10028657-ARC-00-XX-DR-CE-00002).
- **Location 3 |** Situated on Marshland and Woodland West of Renishaw (10028657-ARC-00-XX-DR-CE-00003).
- **Location 4** | Existing Renishaw Car Park (the Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw. This proposal would need to be negotiated and agreed with the landowners, Renishaw) (10028657-ARC-00-XX-DR-CE-00004).

Passenger Rail Demand Forecasting

In order to inform the requirements for a new railway station, the GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A carried out demand forecasting for a Vale of Glamorgan Gateway Station using the Transport for Wales managed South East Wales Transport Model (SEWTM) and based on the following four 2026 scenarios:

- **Scenario 1 |** Do-Minimum Core
- **Scenario 2 |** Do-Something Core with Vale of Glamorgan Gateway Station

- **Scenario 3 |** Do-Minimum with Renishaw Development[2]
- **Scenario 4 |** Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development

A summary of the forecast rail passenger numbers for each scenario in 2026 has been provided in the following table for the Vale of Glamorgan Gateway Station, as well as for existing stations west of the M4 Junction 34. The results show that the new station is forecast to attract 133,969 individual trips per year by 2026 if the Renishaw development does not take place. If the Renishaw development is completed, demand for the station is shown to significantly decrease to 40,153 trips as a result of capacity constraints at key junctions on the local highway network. The model predicts that the existing highways and M4 Junction 34 would be over utilised/ highly congested in the future year with the Renishaw development taking place, which would supress demand for the station. An additional forecast was undertaken to demonstrate that if the local congestion problems were mitigated (with regard to Scenario 4), the forecast demand for the station would significantly increase from 40,153 passengers to 216,982.

The GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A further outlines that the Vale of Glamorgan Gateway Station is forecast to generate 60,245 and 172,391 new rail trips for Scenario 2 and 4 respectively, the latter assuming local congestion problems are mitigated. In the absence of highway mitigation, minus 4,438 [-4,438] rail trips are forecast under Scenario 4.

Railway Station	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Vale of Glamorgan Gateway Station	0	133,969	0	40,153 (216,982 if congestion issues mitigated)
Pontyclun Station	257,588	241,522	256,828	254,184
Llanharan Station	146,552	134,556	144,359	135,317
Pencoed Station	201,053	182,472	196,083	183,904
Bridgend Station	1,677,875	1,650,795	1,665,429	1,644,703

The station demand data can be highly skewed from factors outside the control and remit of this project. It will require local and regional consideration to determine the full demand analysis at the next stage of WelTAG appraisal

Rail Service Provision and Timetable Opportunities

For the purposes of the WelTAG appraisal and accompanying GRIP Stage 1-2/ Transport for Wales Stage A feasibility study, it is assumed that all passing Transport for Wales services would call at the new Vale of Glamorgan Gateway Station. This results in a service frequency of approximately three trains per hour in each direction encompassing the Ebbw Vale to Maesteg service, the Carmarthen/ Milford Haven to Manchester Piccadilly services, and the Swansea to Cardiff Central service.

An initial timetable study has been undertaken, looking at all Transport for Wales services stopping at the Vale of Glamorgan Gateway Station. For the purposes of the timetable study, other TOCs have not been including due to the uncertainty and additional requirements that would need to be considered. The study has considered assessed the immediate impact of the new station between Cardiff Central and Bridgend. As with any new station, additional time will be required within the timetable to accommodate the stop. Time can

[2] See Chapter 2 – Strategic Case for details of the proposed Renishaw Development (planning application reference 2014/00228/EAO)

add up to a few minutes **estimated to be at least four minutes** to take account of the train slowing down, dwelling and then accelerating back up to normal speeds.

Following completion of this first phase analysis, it would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds. Network Rail has also confirmed that the sidings offer additional redundancy which aids performance and have often been used for broken down trains.

A further timetable study will be required once operational assumptions are defined with key stakeholders, and whilst several key timetable issues have been highlighted at this early stage of the analysis, more detailed engagement with both Network Rail and Transport for Wales will be taken forward to confirm all viable opportunities available for the proposed development.

Appraisal of Options

Consideration of the various options against the problems, objectives, well-being goals identifies that the four location options perform similarly in terms of their contribution to tackling the problems, objectives and well-being goals. A new station would positively contribute towards:

- Addressing problems, including congestion on the strategic road network and access to strategic employment opportunities.
- Meeting objectives, making a strong contribution to increasing transport options for strategic access and access to and from local communities and supporting health and wellbeing; and
- The well-being goals, particularly a prosperous Wales and cohesive communities.

With regard to the regional economy, transport connectivity has been identified as critical towards boosting productivity and prosperity. Whilst Cardiff Capital Region is embracing the Metro as one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through the implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of low productivity. The aspiration towards enhanced connectivity to support economic, social and environmental considerations is also recognised as part of wider national, regional and local policy and legislation with a common vision towards increased reliance on sustainable forms of transport including public transport, walking and cycling.

Whilst it is noted that the development of a station could bring environmental impacts such as loss of habitats and impacts on heritage assets and may lead to increased traffic issues on the local road network, it is anticipated that such impacts could be effectively mitigated over the longer term as the benefits of a new railway station are realised.

Transport Case

The aim of the transport case is to explain the expected impacts of the project, how the project will contribute to the well-being goals and whether a project will provide value for public money. The social, cultural, environmental and economic costs and benefits of each option are considered. The transport case presents the approach and assessment of impacts of each option under the headings of social, cultural, environmental and economic impacts and an evidence-based assessment of the following:

- What the impacts will be?
- The scale of those impacts.
- Where will they occur?
- Who/ what will experience them?

The four proposed locations for the railway station perform similarly in terms of the social, cultural and economic assessment. The opportunities derived from a new railway station at Junction 34 of the M4 could especially realise positive change with regard to social impacts with enhanced security, access to employment and access to services observed. The potential for enhanced journey quality is considered, whilst access to cultural facilities and wider economic impacts are of particular benefit for the cultural and

economic assessment respectively. Economic benefits to journey time changes and reliability, transport costs and accidents are also identified.

The key differences are retained as part of the environmental assessment and with specific regard to landscape, historic environment, biodiversity and water environment where adverse impacts are anticipated, although Location 4 generally demonstrates the least adverse impacts. However, it is anticipated that effective measures explored at the next stage of assessment could, to a large extent, reduce the environmental impacts. The land/ property and capital costs included as part of the economic assessment also demonstrate differences in scoring between all four location options with each site retained specific characteristics – **a full economic/ value for money appraisal** will need to be completed as part of a next stage of work.

Financial, Commercial and Management Cases

The final sections of the WelTAG Stage Two Plus report consider the financial, commercial and management cases. In summary:

- The Financial Case *'presents information on whether an option is affordable in the first place and long-term financial viability. It covers both capital and annual revenue requirements over the life cycle of the project and the implications of these for the balance sheet, income and expenditure accounts of public sector organisations.'*
- The commercial case covers *'whether it is going to prove possible to procure the scheme and then to continue with it in the future.'* The case considers the level and type of involvement from the private sector, as well as potential effects on the on-going viability of the option/ scheme. **Implementation of the commercial case would be subject to detailed discussion with Vale of Glamorgan Council, Welsh Government, Transport for Wales, Network Rail and the Department for Transport.**
- The management case considers the delivery arrangements for the project and how the project is going to be managed through its lifetime. The management case shows the project is achievable and identifies the different arrangements put in place to deliver the project. At this stage of the appraisal it would be assumed that Vale of Glamorgan working with Transport for Wales, Network Rail and Welsh Government would be responsible for the delivery of a Vale of Glamorgan Gateway Station. This would be subject to confirmation and needs to align with the programme for the Wales & Borders franchise for the south east Wales Metro proposals. The management and delivery of the scheme would likely follow the Transport for Wales Plan of Works and Network Rail GRIP process encompassing scheme initiation & feasibility, option selection, design development, construction and project close out. The development of a new railway station would subsequently be anticipated to be progressed in close consultation with integral stakeholders, as well as through public consultation.

Conclusions and Recommendations

This WelTAG Stage Two Plus report has developed and appraised options to determine the requirements and feasibility of opening a new railway station in the Vale of Glamorgan located near to the M4 Junction 34. Consideration has been given towards how the options would address the study objectives and thereby counter the problems identified, whilst contributing to the goals of the Well-being of Future Generations (Wales) Act 2015, together with Welsh Government strategies and outcomes. The report represents an Outline Business Case for which an appraisal of the social, environmental, cultural and economic impacts has been undertaken. At the end of WelTAG Stage Two, the guidance sets out that the report should:

- Determine whether there are any transport options that can address the issues identified, contributes positively to the well-being goals and objectives, and can be delivered within technical and financial constraints.
- Select a preferred option to be taken forward to Stage Three.
- Agree the methods to be used to provide additional evidence where required for Stage Three.
- Identify any legislative requirements that need to be met during Stage Three.
- Document the decisions of the WelTAG Stage Two Review Group, and the basis for these decisions.

Preferred Transport Option

The outline business case has considered the do-minimum situation and identified the relative changes from the do-something options in comparison. Without an intervention, local and strategic transport conditions are anticipated to worsen throughout the region, with forecast increases in traffic adversely impacting the performance of the transport network.

The provision of a Vale of Glamorgan Gateway Station has the subsequent potential to bring substantial sustainable travel benefits at a regional scale, particularly focussed on the M4 corridor and communities throughout south east Wales, and whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives (such as the Gateway Station) could further help address the issue of existing low levels of productivity.

Connectivity is seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Supporting development of a prosperous, sustainable economy, as well as enhanced accessibility to social facilities and services, is an approach promoted by national, regional and local policy with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling. And where there is opportunity to enhance the transport network interconnecting southwards within the Vale of Glamorgan (outside the scope of this study), then this would offer additional local and regional benefits for residents and businesses.

Following completion of the WelTAG Stage Two Plus study and GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A of the four location options, Location 4 (Existing Renishaw Car Park) is considered the most feasible solution. The option does have constraints relating to third party land ownership and agreements as the station would be positioned predominantly on an existing car park owned by Renishaw.

However, whilst further consultation would be required with Renishaw, initial talks have been constructive and indicated they are open to a potential multi-storey car park solution to facilitate the station's development. The potential wider benefits for the proposed Renishaw development could be substantial following the implementation of a railway station. Such benefits could be realised with regard to commercial land/ property value and sustainable accessibility with all parts of the proposed development within reasonable walking distance of all four station location options.

Renishaw do retain privately funded proposals to develop land surrounding Location 4 under application reference 2014/00228/EAO. Having already secured outline planning permission, their proposals are ahead in terms of planning and equivalent RIBA design stages. The integration of proposals would need to be agreed in advance as the Renishaw development is likely to be implemented ahead of any potential station development.

Several constraints were identified across all location options including the requirement for further detailed timetable analysis to establish how operational services will be timed-based on future rail timetables. An initial timetable study has concluded that it would not appear possible to include station calls at the new railway station without significant amendment of the timetable, as the additional required time cannot be absorbed by the current planning margins and turn rounds. The new station is likely to add at least four minutes to those services stopping at the station. The Miskin goods loops also provide additional resilience and redundancy for the railway, which may be affected by their utilisation for the new station. Route enhancements will be considered to mitigate this impact, although would be subject to separate analysis and consultation with Network Rail as the infrastructure owner and would inevitably import additional infrastructure cost for the project.

Given the forecast growth on the M4 and around Junction 34 (including the proposed Renishaw development), there is potential for significant traffic congestion to occur on the strategic highway network within the vicinity of a proposed railway station, principally at M4 Junction 34. In this scenario, the 2026 demand forecasting exercise identified a significant reduction in passenger demand from 133,969 users (establishing 60,245 new passenger trips) to 40,153 users, although this does rise extensively to 216,982 users (establishing 172,391 new passenger rail trips) should appropriate highway mitigation be implemented. This is because highway congestion is forecast in the transport model to suppress demand for the station. All

demand forecast scenarios are subject to the assumptions implemented and the potential to stop London bound services could considerably increase demand beyond the existing forecast figures.

Wider consideration has already been given to addressing existing issues of congestion at the M4 Junction 34. A Welsh Government commissioned study (A470/ M4 WelTAG Stage 2; Draft 1; Arup; 10th July 2019) was tasked with identifying measures to tackle road-based congestion at the most severely congested locations on the M4 and A470 trunk roads (M4 Junction 32 to Junction 35 and A470 Coryton – Merthyr Tydfil). The brief was also extended to cover integration of public transport initiatives (heavy rail/ Metro), and to cover the A4232 and M4 between Junction 33 and Junction 32. The report concluded that an M4 Junction 34 Interchange option (signalisation and gyratory widening, with or without a new M4 Junction 34 to A48 link) was one of several key recommendations for progression to WelTAG Stage Three (Full Business Case) – a proposal that is anticipated to address existing congestion issues, whilst also establishing the capacity needed to support future local and regional development. In addition, the report concluded that a new railway station at Miskin (M4 Junction 34) be recommended for further consideration as part of separate studies.

Ownership of the new railway station and its facilities will need to be decided, determining whether Transport for Wales will own and operate the station or by default Network Rail will own the station and infrastructure with the Vale of Glamorgan Council owning and operating the car park. The management case will need to be developed through close consultation with key stakeholders.

It is notable that the accompanying GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A does not rule out the possibility of other nearby locations should the opportunity arise at GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection. This includes the potential to explore opportunities to the west of the current study area, on land south of the M4, together with parking situated to the south of the River Ely. The WelTAG process retains a robust framework from which to take forward and evolve station options for final option selection as part of a GRIP Stage 3/ Transport for Wales Stage B study incorporating enhanced consultation with key stakeholders including local authorities, Welsh Government, Transport for Wales Rail Services and Network Rail, together with other interested parties, especially given the potential national importance of this station.

Updated demand forecasting would be advised at the next stage of assessment with increased consideration and agreement given to the likely factors and variables that may affect the scheme. This could include assumptions not identified or incorporated as part of the GRIP Stage 1-2 | Transport for Wales Stage B demand forecasting exercise.

As the station will impact on Network Rail infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From an engineering perspective, the scheme is considered feasible based on existing information available for this study, although further development of design options will evolve the business case, including further clarity regarding the funding mechanisms that could be available to facilitate development.

With regard to ongoing development of the station design, the WelTAG report has identified two design parameters encompassing minimum and future proofed options. The minimum design would be a Category F unstaffed station with two platforms approximately 130m long connected by a footbridge with lifts, waiting shelters and parking provision for up to 500 spaces. A future proofed station would be staffed, have two sheltered/ canopied platforms approximately 300m long connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1,000 vehicles. **The preferred design option at this stage and as confirmed by the Vale of Glamorgan Council is for a Category D (future proofed) station as opposed to the minimum Category F option.**

Proposals for a new station require further, more detailed technical feasibility work as part of a GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection appraisal encompassing an economic value for money exercise. A significant timetable study will be required to review all the services that travel through the area as the typical stop is likely to add at least four minutes to the existing timetables, although it is positive that the principle of a new station in the Miskin area is incorporated into the new rail franchise. There were some comments made by stakeholders that it would be appropriate to retain the option of a bus Park and Ride at Junction 34. This might be best considered as part of ongoing discussions surrounding the Vale of Glamorgan Gateway Station.

Limitations

This WelTAG Stage Two Plus study has not been able to provide an economic appraisal and assessment of value for money, as the feasibility work has been at GRIP Stage 1-2 (without detailed costs) and the transport appraisal has provided high level demand forecasts. These areas of work as part of a GRIP 3 Study and prior to moving to a Stage Three WelTAG appraisal.

Recommendations

On the basis of this WelTAG Stage Two Plus study and the potential strategic socio-economic, cultural and environmental benefits identified in this outline business case, it is considered that the **Vale of Glamorgan Gateway Station (Location 4)** has merit in being taken forward for further consideration as part of an updated WelTAG Stage Two appraisal encompassing a full value for money assessment. Whilst Location 4 has been identified as the preferred location option, it is advised that the study considers the potential for an alternate location, primarily due to extant constraints that could adversely impact on implementation.

The WelTAG Stage Two consultation has provided an opportunity for the public to feedback on the Vale of Glamorgan Gateway Station option. A decision on whether to go forward with further investigations of options is a matter for the Review Group and Vale of Glamorgan Council to make based on the appraisal set out in this report and the consultation responses. As set out in the guidance, the Stage Three WelTAG study purpose *'is to make a full and detailed assessment of the preferred option to inform a decision as to whether or not to proceed to implementation.'* It should therefore be noted that until such time as a Review Group and the local authority has considered the outcomes of a Stage Three study, and the statutory planning processes have taken place, no decision would be made to deliver a scheme.

Overall, the Vale of Glamorgan Gateway Station appears to have large potential. The new station will be in close proximity to a motorway junction, giving it a strategic location close to existing and potential areas of development and population. Accessibility to and from the station would be enhanced with the potential for a new or enhanced road infrastructure between the M4 Junction 34 and A48 (which is now subject to a separate WelTAG process), as well as the potential for M4 Junction 34 enhancements noted with that could alleviate congestion.

The station will offer quick direct trains into Cardiff Central with a journey time of just 10 minutes. The scheme is likely to be of regional importance, due to the location and potential of significant benefits to the South Wales area and will need general consensus from local authorities and Welsh Government.

Next Steps

The recommended next steps are as follows:

- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.
- Submission of GRIP Stage 1-2/ Transport for Wales Stage A to be brought in line with GRIP Product Deliverables, including the potential for an additional solution to be developed (as an alternative).
- Submission of GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection.
- The scope of the GRIP product deliverables should be developed to encompass the following key activities where applicable:
    - Stakeholder engagement and consensus to determine likelihood of external factors.
    - Additional Demand Forecasting (dependent on external factors), route origin/ destination reviews, including additional detail on traffic impact within the Vale of Glamorgan road network.
    - Detailed timetable analysis, including the impact on freight services and resilience/ redundancy review in the rail network.
    - A timetable for ecological surveys required and likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).

- Option cost estimation.
- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA

1 Introduction

1.1 Purpose of the Study

1.1.1 Arcadis Consulting (UK) Limited has been commissioned by the 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 2017[3]) including advice on the appraisal in relation to the Future Generations of Wales (2015) Act Well-being Goals[4].

1.1.2 This WelTAG Stage Two Plus report presents the development, proportionate appraisal and evaluation of options for a Vale of Glamorgan Gateway Station with Park and Ride facility and bus integration near to M4 Junction 34. It has been undertaken with the involvement of key stakeholders and in conjunction with the Vale of Glamorgan Council. The detailed evidence, data and analysis underlying the statements made in this report are provided in the accompanying Impacts Assessment Report.

1.2 WelTAG Stage One Report | Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48

1.2.1 The WelTAG Stage One report was prepared by Arcadis and considered the problems, opportunities and constraints, established objectives and appraised a long list of options and as a result three options were recommended to be taken forward for WelTAG Stage Two appraisal against the do-minimum, namely:

- Option B | M4 Junction 34 to A48 Highway Route East of Pendoylan
- Option C | M4 Junction 34 to A48 Highway Route West of Pendoylan
- Option G | Vale of Glamorgan Gateway Station (formerly Parkway Station) with Park and Ride facility and bus integration near to the M4 Junction 34

1.2.2 The WelTAG Stage One recommendations were considered by the project Review Group on 27th November 2017 and referred to the Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee on 30th November 2017[5], whereby the recommendations of the report were endorsed.

1.3 WelTAG Stage Two Report | Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48

1.3.1 A first WelTAG Stage Two report was prepared by Arcadis and presented to the project Review Group on 2nd October 2018. Following consideration of the report's output, several recommendations were agreed by the Review Group for completion at Stage Two including a programme of early stage environmental surveys and investigations, more detailed development of the highway link concept designs and completion of Vale of Glamorgan Gateway Station GRIP Stage 1 and GRIP Stage 2 studies. The proposals for additional Stage Two assessment (referred to as Stage Two Plus) were considered and agreed by the Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee and Vale of Glamorgan Council Cabinet over several meetings.

1.3.2 The Vale of Glamorgan Council Cabinet meeting held on 4th April 2019 resolved:

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[3] https://beta.gov.wales/sites/default/files/publications/2017-12/welsh-transport-appraisal-guidance.pdf

[4] https://beta.gov.wales/sites/default/files/publications/2017-12/WelTAG-2017-supplementary-guidance-the-well-being-of-future-generations-wales-act-2015.pdf

[5] http://www.valeofglamorgan.gov.uk/en/our_council/Council-Structure/minutes,_agendas_and_reports/minutes/Scrutiny-ER/2017/17-11-30.aspx

- (1) T H A T the progress made on the WelTAG studies relating to improving the transport network corridor from the M4 Junction 34 to the A48 be noted.
- (2) T H A T this matter be referred to Environment and Regeneration Scrutiny Committee for consideration.
- (3) T H A T, subject to consideration by the Environment and Regeneration Scrutiny Committee the progression of the WelTAG studies for the M4 Junction 34 to the A48 to WelTAG Stage Three be endorsed, subject to the Welsh Government Capital Transport Grant funding applied for being made available.

1.3.3 The Vale of Glamorgan Council Environment and Regeneration Scrutiny Committee meeting held on 25th June 2019 recommended:

- (1) T H A T Cabinet give consideration to an additional option of improving the existing infrastructure without the need for a new road.
- (2) T H A T an additional report on the Stage Two Plus process should be reported back to the Committee.
- (3) T H A T a letter be sent to the Welsh Government Minister in light of the Welsh Government declaration of a climate emergency, requesting the Welsh Government to outline its vision and how the impact on the environment would be minimised.
- (4) T H A T Cabinet be requested to consider the impact on future generations and the environment should a new road be approved.

1.3.4 The Vale of Glamorgan Council Cabinet meeting held on 29th July 2019 resolved:

- (1) T H A T in relation to recommendation (1) of the Environment and Regeneration Scrutiny Committee meeting 25th June, it be noted that the Welsh Government has included an additional option of improving the existing infrastructure without the need for a new road on the Stage Two Plus process.
- (2) T H A T in relation to recommendation (4) of Environment and Regeneration Scrutiny Committee meeting 25th June, it be noted that this will be covered in the Stage Two Plus process.

1.4 WelTAG Stage Two Plus Report | Vale of Glamorgan Gateway Station

1.4.1 Following further consideration of the selected options, it was recognised that proposals for a Vale of Glamorgan Gateway Station present regional, strategic and sustainable transport opportunities that could be better recognised and scrutinised in isolation from the highways proposals, whilst also allowing a number of rail sub-options to be developed and independently WelTAG assessed. In addition, the rail and highway options under consideration retain separate management and control processes, which inherently influence next steps and programming for ongoing WelTAG assessment. In agreement with Welsh Government, a decision has therefore been made by the Vale of Glamorgan Council to separate assessment of the Vale of Glamorgan Gateway Station option from the M4 Junction 34 to A48 highway link options.

1.4.2 The scope for the Vale of Glamorgan Gateway Station study has been developed through close consultation with Vale of Glamorgan Council and key stakeholders including Welsh Government and Transport for Wales to ensure that the role of strategic public transport and active travel options in addressing the problems of regional connectivity is fully considered. Specifically, the following scope has been agreed:

- A Vale of Glamorgan Gateway Station with Park and Ride facilities located near M4 Junction 34.
- A minimum of 500 car parking spaces with the ability to extend to 1,000 car parking spaces.
- Provision of a station interchange access/ approach road.

- Platform length to meet aspirations to accommodate all rolling stock including Great Western Railway (GWR) Intercity (10 cars). For this study, 300m length platforms have been considered.
- Station buildings including entrance, canopy, waiting room/ shelter to meet the requirements of the Disability Discrimination Act (DDA).
- Provision of a footbridge with lifts for improved accessibility and in compliance with Department for Transport standards.
- Provision of facilities for sustainable travel such as cycle parking/ lockers and bus services.
- Station to be designed in accordance of Department for Transport Accessible Railway Stations Design Standards.
- Ensuring the well-being goals of the Well-being of Future Generations (Wales) Act 2015 are considered throughout the process.

1.4.3 Reference should be made to the following documents that support this WelTAG Stage Two Plus Outline Business Case:

- GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A (10028657-ARC-00-XX-RP-ZZ-00001) | Appendix A
- Vale of Glamorgan Gateway Station | WelTAG Stage Two Plus Outline Business Case | Impacts Assessment Report (10028657-ARC-XX-XX-RP-TP-0002)
- Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48 | WelTAG Stage Two | Consultation Report (10013270-ARC-XX-XX-RP-TP-0003)

1.5 Wider Context

WelTAG Stage Two | Outline Business Case

1.5.1 The WelTAG guidance states that the purpose of the Stage Two Outline Business Case is to *'examine in greater detail the short list of options for tackling the problem under consideration*.' During Stage Two, the appraisal team needs to consider how the proposed solution will lead to the desired outcomes, maximising contribution to objectives and well-being goals and use this understanding to refine the design of the options and identify key dependencies and constraints. At the end of the stage, the report should provide the Review Group with the evidence required to select a preferred option to take forward for Stage Three.

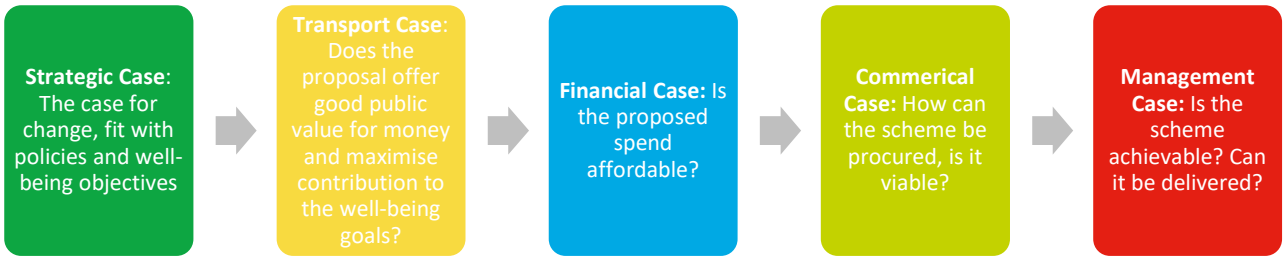
1.5.2 The guidance identifies that at the end of WelTAG Stage Two *'the strategic and transport cases must be virtually complete, and more information provided on the delivery, commercial and financial cases for the shortlisted options.'* The assessment is required to provide stakeholders and decision makers with sufficient information and understanding of the problems and potential solutions to commit further resources to taking forward options to the next stage of appraisal.

1.5.3 As such, the WelTAG Stage Two Outline Business Case report:

- Sets out any changes that have occurred in the transport system and wider context since WelTAG Stage One (and in this case, since the Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48 WelTAG Stage Two study).
- Describes the process of developing the shortlisted options to a more developed solution for assessment.
- Describes how each option would meet the objectives set out in WelTAG Stage One.
- Presents a Five Case Assessment for each option with a separate presentation of the strategic, transport, management, financial and commercial case for each option and the contribution towards the well-being goals.

- Determines whether there are any transport options that can address the issues identified, contributes positively to the well-being goals and objectives and can be delivered within technical and financial constraints.
- Selects a preferred option to be taken forward to Stage Three and establishes the methods to be used for further evidence and work to meet legislative requirements.
- Documents the decisions of the WelTAG Stage Two Review Group and the basis for these decisions.

1.5.4 This report follows the structure of the Five Case Model used by the Welsh Government:



1.5.5 For the key areas affecting decision making it provides a quantitative appraisal, and some areas of appraisal are largely qualitative. The guidance identifies that at the end of WelTAG Stage Two *'the strategic and transport cases must be virtually complete, and more information provided on the delivery, commercial and financial cases for the shortlisted options*.' The report provides stakeholders and decision makers with sufficient information and understanding of the problems and potential solutions to commit further resources to taking forward options to Stage Three. In accordance with the WelTAG guidance the significance and scale of the impacts throughout the assessment has been appraised using a seven-point scale, as presented in Table 1.

Table 1 WelTAG Seven-Point Assessment Scale

Large beneficial	*Moderate beneficial*	*Slight beneficial*	*Neutral*	*Slight adverse*	*Moderate adverse*	*Large adverse*
+++	++	+	0	-	--	---

1.6 Appraisal Area | Vale of Glamorgan Gateway Station

1.6.1 The WelTAG Stage One study originally focussed on a local appraisal area representing approximately 24 sq.km. defined by M4 Junction 34 to the north, and in a triangle approximately 7.3km from either side of the A48 Sycamore Cross junction – this is shown as Figure 1. In addition, the strategic study area was also defined as part of the early WelTAG process and includes the ten local authorities within the Cardiff Capital Region, as well as three of the four members of the Swansea Bay City Region – reference to this is included within the case for change (see Figure 4).

1.6.2 The location of the proposed station had not been fixed prior to the original WelTAG Stage Two M4 Junction 34 to A48 public consultation as at that time the appraisal was subject to further feasibility assessment. The assumed location was anticipated to be situated within the broad corridor defined by Miskin to the north west and east of Pendoylan village to the south, as shown in Figure 2.

1.6.3 The original study areas remain the foundation from which the overarching WelTAG assessment has developed, with data analysis documented within the corresponding Impact Assessment Reports but has been further defined in Figure 3 to encompass a 500m boundary surrounding the existing 4-track Miskin Passing Loops on the South Wales Main Line (encompassing land south of the M4 Junction 34 and adjacent to the Pendoylan road). The station would be situated adjacent to the Miskin Passing Loops approximately 15 kms west of Cardiff Central and 17.5 kms east of Bridgend Railway Station.

Figure 1 WelTAG Stage One Local Appraisal Area[6]

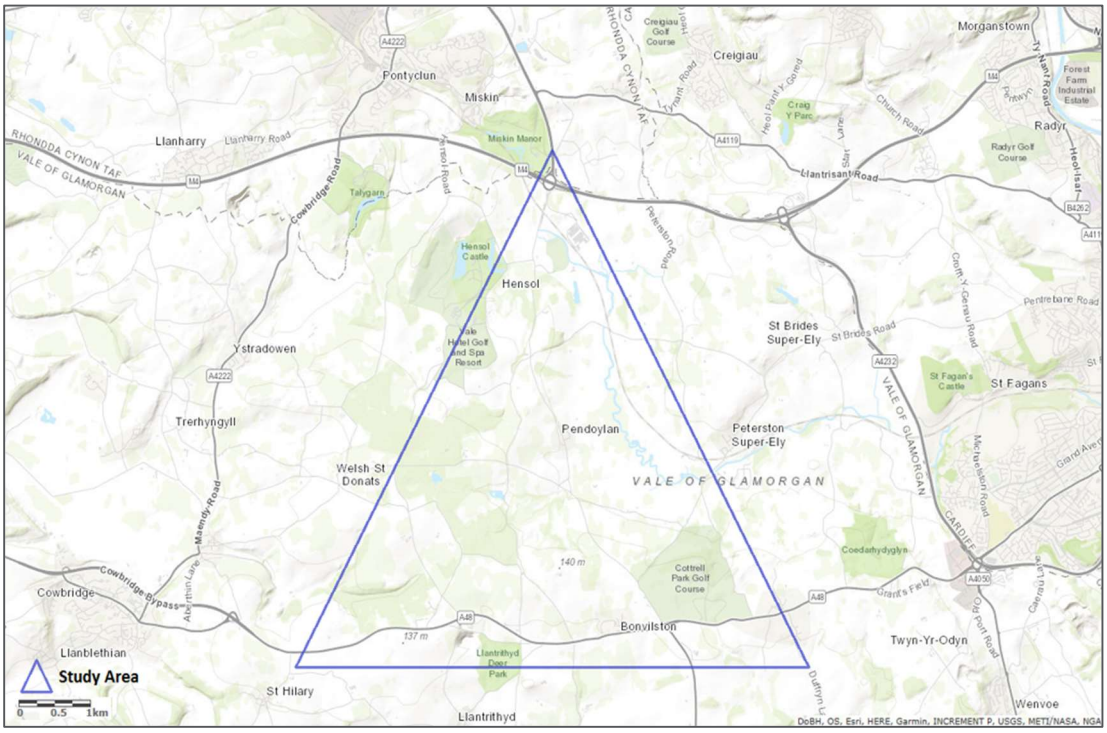
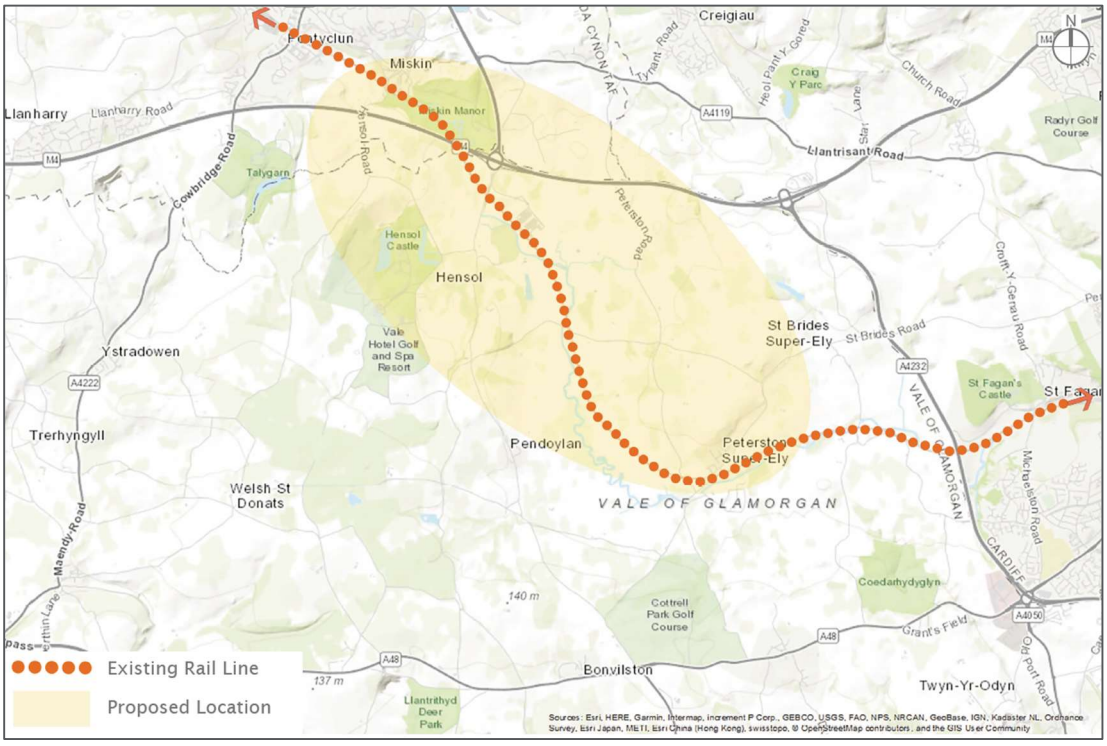
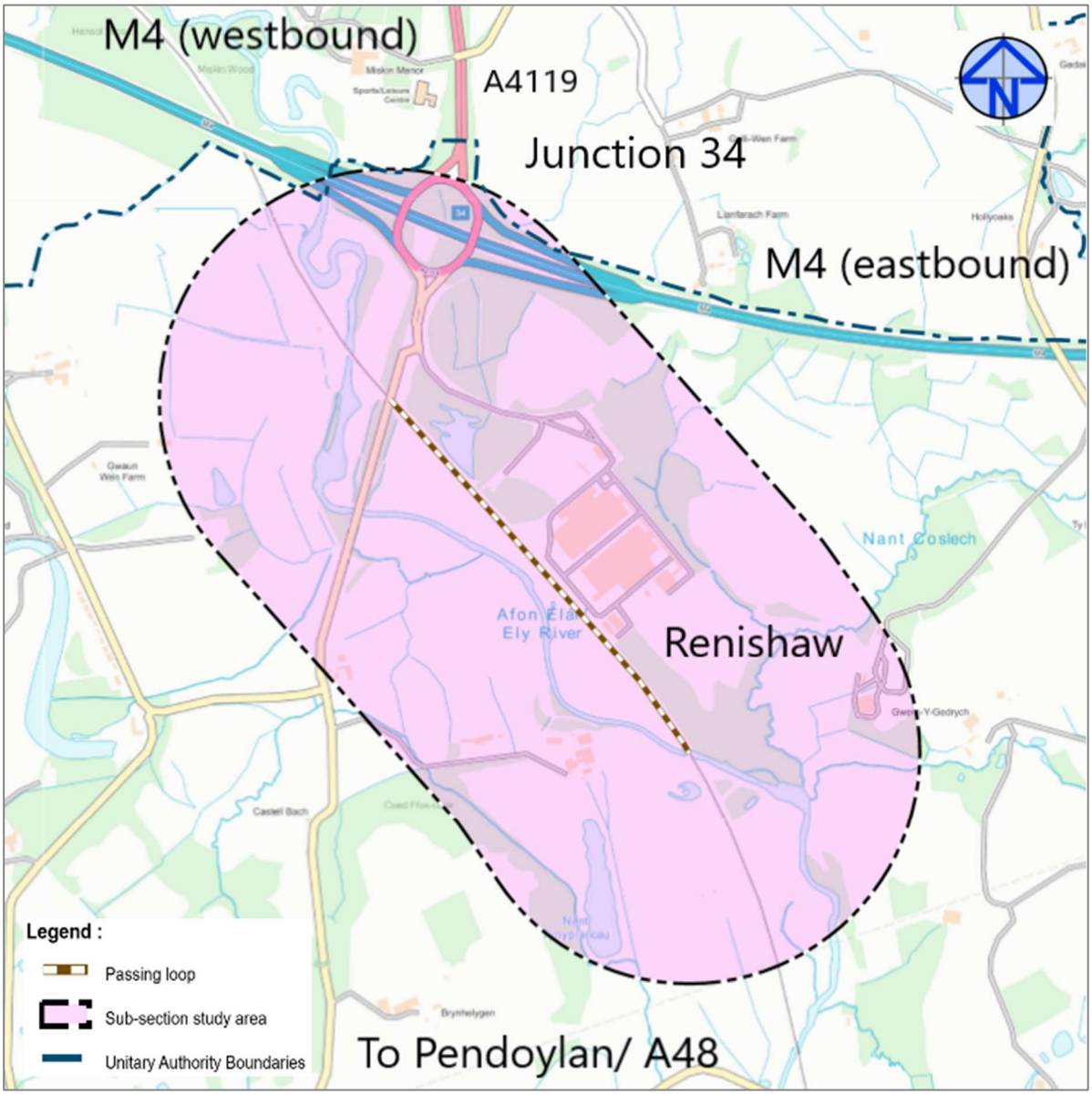


Figure 2 WelTAG Stage Two Public Consultation | Station Appraisal Area



[6] Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordinance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Figure 3 WelTAG Stage Two Plus | Vale of Glamorgan Gateway Station Appraisal Area[7]



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

Five Ways of Working

1.7.1 This section provides an overview of how the approach and proposals set out in this report evidence the Five Ways of Working and support the seven Well-being goals set out in the Future Generations of Wales Act 2015. As set out in detail in the Impact Assessment Report, the latest WelTAG guidance has been developed in such a way to ensure that public funds are invested to maximise contribution to the well-being of Wales. The onus is specifically focused upon the delivery of sustainable development, of which will in turn contribute to the achievement of the well-being goals.

1.7.2 The WelTAG guidance states it is required *'to ensure the needs of future generations are considered and understand how well they help public bodies to meet the well-being objectives and maximise*

[7] Contains OS data © Crown Copyright OS Open Map – Local 2019

their contribution to each of the seven goals.' Consideration should be given to long-term challenges, trends, opportunities, as well as integration, collaboration, involvement and preventing problems from occurring or getting worse.

Long Term

1.7.3 The Impact Assessment Report which accompanies each stage of the WelTAG process provides the evidence of both current and future problems, trends and opportunities to inform consideration of the long-term perspective and the development of options.

1.7.4 Improvements are needed to address the congestion and road safety issues associated with the M4 corridor and key connections and the subsequent impacts on the economy, access to education, jobs and services, health and the environment (notably air quality and noise impacts).

1.7.5 Current traffic congestion and connectivity issues will be exacerbated in the future with traffic growth as well as new developments in the M4 corridor. The options considered in the WelTAG Stage One report offer long term solutions to address the existing issues by providing a park and ride facility and new station to reduce the length of road-based journeys and maximise use of rail.

Prevention

1.7.6 The options under consideration offer the opportunity to prevent as far as possible the future problems and trends from occurring, through the enhancement of alternative travel modes (primarily rail but also buses and active travel).

1.7.7 Moreover, the commercial, financial and management cases in this Outline Business Case report seek to identify costs and deliverability risks to aid decision making and prevent long term liabilities for public money by considering all of the issues at the outset.

Integration

1.7.8 The options under consideration involve the integration of active travel, rail and bus modes to provide a transport interchange, with good access from the strategic highway network. The WelTAG study has been undertaken in an integrated manner to consider and take account of other schemes and proposals through discussion with stakeholders as well as integration with adjacent studies such as the M4 Junction 32 to Junction 35 WelTAG Stage Two Study and emerging proposals from the North West Cardiff Corridor Study (WelTAG Stage One).

Collaboration

1.7.9 In undertaking the WelTAG Stage Two study, there has been collaboration between departments within the local authority, with Welsh Government and Transport for Wales, between stakeholders and between Arcadis and other consultants working on adjacent projects influencing the study area issues and solutions.

Involvement

1.7.10 A full public consultation as well as stakeholder workshops were undertaken as part of the M4 Junction 34 to A48 WelTAG Stage Two study (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48 | WelTAG Stage Two | Consultation Report 10013270-ARC-XX-XX-RP-TP-0003).

1.7.11 The GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A has been reported to the project's Review Group which brings together key stakeholders to oversee the studies. Further stages of WelTAG would involve full public consultation in due course.

Well-being Goals

1.7.12 The objectives have been developed through consideration of the Well-being goals and this is presented in the strategic case section. The strategic case also considers how each of the options meets the Well-being goals. Together this seeks to ensure that achieving the Well-being goals are at the centre of the setting of objectives for the study and the emerging interventions.

1.8 Welsh Government and Vale of Glamorgan Council Climate Emergency Declarations | 2019

1.8.1 An important development since completion of the first WelTAG Stage Two report in October 2018 has been Welsh Government's climate emergency declaration in 2019 stating its commitment towards *'achieving a carbon neutral public sector by 2030 and to coordinating action to help other areas of the economy to make a decisive shift away from fossil fuels, involving academia, industry and the third sector.'* Shortly before this declaration was announced, the Welsh Government released *Prosperity for All: A Low Carbon Wales*, which sets out 100 policies and proposals to meet the 2020 carbon emissions targets. The plan for 2021-26 is in the process of being prepared.

1.8.2 Moreover, the Vale of Glamorgan Council also announced a climate emergency in 2019 outlining a commitment to deliver its well-being goals as set out in the Corporate Plan *Strong Communities with a Bright Future* and the well-being of Future Generations Act, and the progress of initiatives in support of the existing Carbon Management Plan. The Council further recognises that a reduction in carbon emissions can also deliver benefits in terms of new jobs, economic savings and market opportunities. The Council therefore resolves to:

- Join with Welsh Government and other councils across the UK in declaring a global climate emergency in response to the findings of the IPCC report.
- Reduce its own carbon emissions to net zero before the Welsh Government target of 2030 and support the implementation of the Welsh Government's new Low Carbon Delivery Plan, to help achieve the Welsh Government's ambition for the public sector in Wales to be carbon neutral.
- Make representations to the Welsh and UK Governments, as appropriate, to provide the necessary powers, resources and technical support to local authorities in Wales to help them successfully meet the 2030 target.
- Continue to work with partners across the region to develop and implement best practice methods that can deliver carbon reductions and help limit global warming.

1.8.3 The climate emergency is a key influence on the direction of development and infrastructure provision for Wales, as well as an integral component towards shaping future transport schemes as the balance and inter-relationship between sustainable transport initiatives and highway network enhancement is carefully considered. The WelTAG process and the framework provided by the well-being of Future Generations (Wales) Act 2015, enables the climate emergency considerations to be highlighted in the appraisal (as part of the strategic and transport case) and will subsequently provide an important context for this WelTAG appraisal, to be considered in the decision making process. Further details regarding *Prosperity for All: A Low Carbon Wales* are included within the accompanying Impacts Assessment Report.

1.9 Covid-19 | Assessment Impact

1.9.1 As a result of the Covid-19 outbreak in 2020, all key areas of the WelTAG assessment and appraisal including the case for change and socio-economic, cultural and environmental considerations are anticipated to be affected to a greater or lesser extent beyond expected conditions. At the time of this report, the future medium to longer-term implications of Covid-19 at a local, regional and national level remain extensively unknown and this study has not therefore made any assumptions as to the impacts on these scenarios. However, it is anticipated that future work completed with regard to this appraisal and associated studies will increasingly need to consider the implications of the pandemic as information, trends and impacts become more widely known and accepted. This WelTAG Stage Two Plus assessment therefore remains an assessment based on pre Covid-19 conditions and forecasts and for the purposes of the WelTAG appraisal should be viewed with this in mind.

1.10 Report Structure

1.10.1 In accordance with the WelTAG guidance the structure of this report is as follows:

- Chapter 2 | Strategic Case

- Chapter 3 | Transport Case
- Chapter 4 | Financial Case
- Chapter 5 | Commercial Case
- Chapter 6 | Management Case
- Chapter 7 | Conclusions and Recommendations

2 Strategic Case

2.1 Overview

2.1.1 The strategic case addresses the need for change, providing an evidence-based description of the current situation, describes the likely funding situation if no action is taken and presents the reasons why an intervention is required. The strategic case includes analysis of the factors leading to the problem and the development of possible solutions, establishes objectives and provides a narrative as to how each of the solutions is intended to change the situation.

2.2 Evidence Base

2.2.1 The development of the strategic case has been evidence based, drawing on currently available data and is presented within the accompanying Impact Assessment Report (10028657-ARC-XX-XX-RP-TP-0002). The key sources of information have come from the following:

- **Studies and Strategy Documents |** Transport Data including the South East Wales Transport Model, traffic counts, accident data and existing transport provision.
- **Development Proposals |** Vale of Glamorgan Council Local Development Plan.
- **Environmental Constraints |** Heritage, ecology, landscape, water and geotechnical.
- **Social, Economic and Cultural |** Data on demographics, facilities, tourism and the economy.

2.3 Involvement of Stakeholders

2.3.1 There were a wide range of key stakeholders involved in the Review Group for the Stage Two report (finalised October 2018), who were in summary:

- The communities of Pendoylan, St Nicholas with Bonvilston and Peterston-Super-Ely who directly experience the existing issues of traffic through the lanes and will also be most affected by transport proposals.
- Businesses in the appraisal area and its vicinity, including Renishaw's, Vale Resort Hotel, Welsh Rugby Union as well as local agricultural, tourism, leisure, and other small businesses.
- The Vale of Glamorgan Council and the neighbouring authorities of Rhondda Cynon Taf, Cardiff and Bridgend.
- Transport network providers including Cardiff Airport, Network Rail, Welsh Government and Transport for Wales.
- Transport operators including Cardiff Bus and New Adventure Travel.
- Road haulage businesses represented by the Road Haulage Association.
- The wider business community of the affected local authorities

2.3.2 This Stage Two Plus report has involved ongoing discussions with departments of the Vale of Glamorgan Council and with Natural Resources Wales (NRW) especially regarding hydrological modelling. These discussions have informed refinements to the concept design of options and the methodology for appraisal.

Stakeholder Engagement Process

2.3.3 The strategy has been to involve the stakeholders throughout the WelTAG stages, with key stakeholders also represented on the Review Group. The WelTAG reports have also been taken through the political process, involving presentation to Cabinet and the Environment and Regeneration Scrutiny Committee of the Vale of Glamorgan Council. It is intended that there will be further consultation at the next stage of WelTAG appraisal to inform decision making.

Review Group

2.3.4 Early development of the Vale of Glamorgan Gateway Station (formerly Parkway Station) option (plus highway options) has been subject to a series of Review Group meetings as part of the original WelTAG Stage One and Stage Two studies completed. These meetings are referenced as follows:

- WelTAG Stage One Strategic Outline Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th November 2017.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 16th January 2018.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th March 2018.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 2nd October 2018.

2.3.5 The GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A has subsequently been reported to the project Review Group on 9th January 2020 and these considerations have been taken into account in this report. The Review Group brought together key stakeholders to oversee the studies and included representatives of the Cardiff Capital Region and the neighbouring authorities.

Collaboration with Neighbouring Authorities

2.3.6 During the WelTAG Stage One and Two studies, collaboration has taken place with the neighbouring authorities on their development and transport plans, as well as with Welsh Government and their consultants, with respect to an emerging Masterplan for Cardiff Airport and St Athan and the strategic case for improved connections and other consultants' with respect to the WelTAG Stage Two study of the M4 Junctions 32-35 and the early stages of the Stage One study for North West Cardiff.

2.4 Consultation

2.4.1 Following the preparation of the original draft WelTAG Stage Two report (10013270-ARC-XX-XX-RP-TP-0001; Version D01; March 2018), consultation took place with stakeholders and the public on Junction 34 railway station option between April to July 2018, including three days of public exhibition where members of the study team and Vale of Glamorgan Council officers were available to discuss the study with attendees. The responses received to the consultation from the various sources (online, paper survey forms and written emails and letters) were provided to Arcadis.

2.4.2 These responses were analysed and a Consultation Report (10013270-ARC-XX-XX-RP-TP-0003; Version D01; September 2018) was prepared. In summary:

- The Consultation Report identified that there was significant engagement in the consultation process by stakeholders and the public, with 444 people attending events and a high number of responses received within the consultation period.
- There was broad support for a new railway station near to the M4 Junction 34 with 62% of respondents outlining that they either strongly agree (41%) or agree (21%) with the proposal. 'Improved Transport Journey' (234 respondents), 'Reduced Impact on Community' (159 respondents) and 'Environmental Impacts' (96 respondents) were identified as key reasons behind respondents outlining their support for the rail option.
- Other reasons given for supporting the railway station option included a reduction in the number of car trips and associated traffic, as well as to reduce the impact of new developments on the local network, a positive impact on the local community including improved public transport for locals, a reduction in air pollution and to open up new opportunities for development.

2.4.3 It should be noted that the output of this WelTAG Stage Two report has not been presented for public consideration, although further stages of WelTAG would involve full public consultation in due course.

2.5 The Case for Change

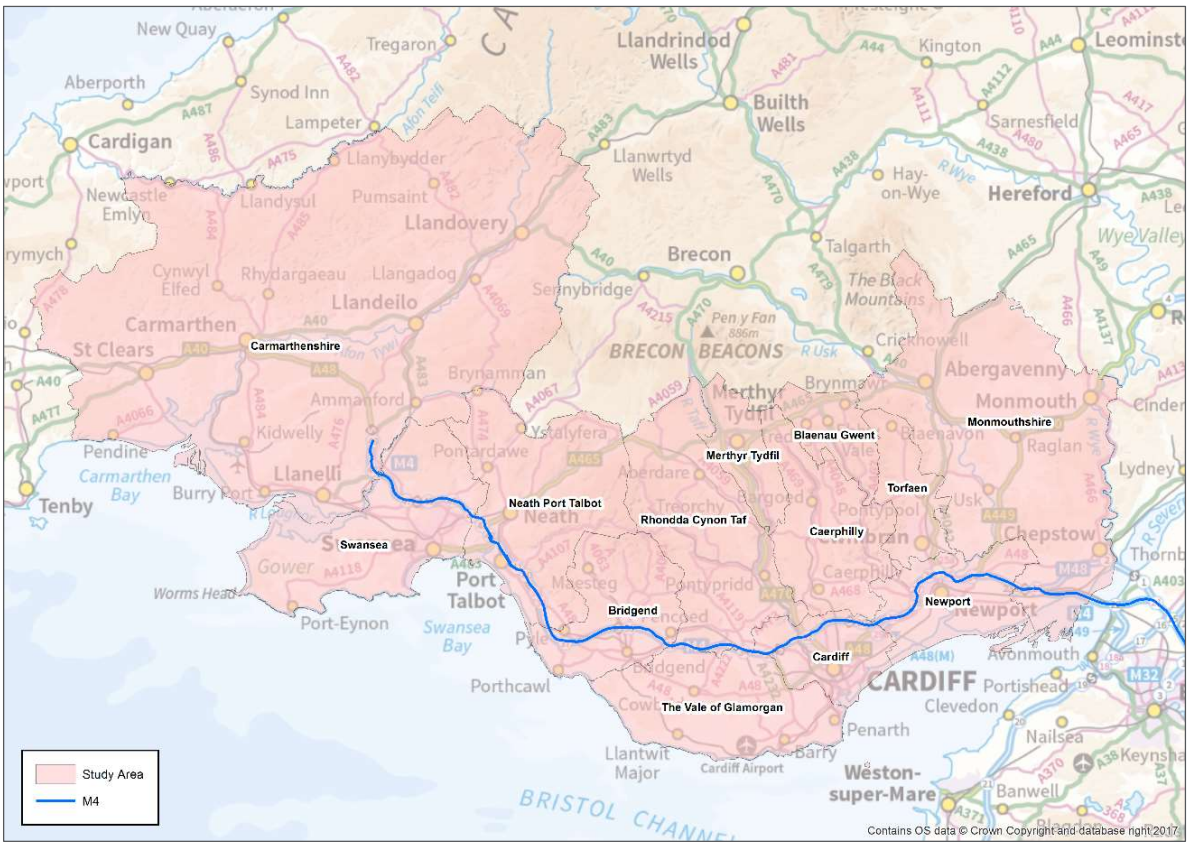
Strategic Issues and Opportunities

2.5.1 The overarching 'Case for Change' is set out in the Peter Brett Associates (PBA) report contained in the accompanying Impacts Assessment Report. This forms a fundamental aspect of the strategic case. This is summarised and updated as below.

Strategic Study Area

2.5.2 The strategic study area as outlined in Figure 4 includes the ten local authorities within the Cardiff Capital Region (Cardiff, Monmouthshire, Torfaen, Blaenau Gwent, Newport, Caerphilly, the Vale of Glamorgan, Merthyr Tydfil, Rhondda Cynon Taf and Bridgend) as well as three of the four members of the Swansea Bay City Region (Swansea, Neath Port Talbot and Carmarthenshire).

Figure 4 Strategic Study Area



Why is the case for improving connectivity to the Vale of Glamorgan being considered?

2.5.3 There are significant regional/ national and local drivers for improving connectivity to and from the Vale of Glamorgan. From a national and regional perspective:

- The emergence of the Cardiff Airport – St Athan Enterprise Zone (EZ) in the Vale of Glamorgan presents a strategically important economic development and employment opportunity for South Wales as a whole. The EZ is considered a leading UK aerospace, manufacturing and engineering location, catering for the aerospace, defence, automobile, manufacturing and engineering sectors.

  It is anticipated that this development will create 4,000 new jobs, with further indirect and induced employment across South Wales. Key examples of recent job creation include the Aston Martin

Lagonda Production & Technology Centre located in St. Athan which commenced operations in late 2019 and which is seeking to employ up to 750 new jobs[8]. In addition, Britishvolt, which plans to produce batteries for electric vehicles, has announced St. Athan as the preferred site location for a new 'gigaplant' in June 2020. Whilst the final decision is subject to confirmation, the development alone is forecast to generate between 3,500 to 4,000 jobs, excluding jobs that would be created in the supply chain[9].

- As part of the development of the Cardiff Capital Region and corresponding City Deal, there is a need to improve transport connectivity across South East Wales, safeguarding and promoting employment and investment and attracting and retaining population.
- It is envisaged that judicious and targeted investment will ensure that the Capital Region remains attractive and competitive.
- Through an arms-length company, Welsh Government owns and operates Cardiff International Airport. Surface access to the airport has frequently been cited as a problem and there is a desire within Welsh Government to consider options for improving connectivity to and from the airport.

2.5.4 From a **local** perspective:

- In partnership with neighbouring Rhondda Cynon Taf County Borough Council, the Vale of Glamorgan Council is pursuing a sub-regional development strategy intended to ensure that the area offers an appropriate and future-proofed balance of employment, commercial and residential opportunities. The current transport infrastructure is considered to be a constraint in realising these aspirations.
- The transport links, across all modes, connecting the Vale of Glamorgan with Cardiff and the wider Capital Region are experiencing significant congestion, which is considered by the Council to be acting as a major constraint on the area in terms of attracting investment and realising development planning opportunities, whilst it is also seen to detract from resident and visitor amenity.

What is the policy fit?

2.5.5 The proposal for a new railway station located Junction 34 of the M4 establishes an exciting opportunity to align with policy objectives at the local, regional and national levels.

2.5.6 The Case for Change report identifies that the principle of improving connections to and from the Vale of Glamorgan aligns well with national, regional and local transport, planning and socio-economic policies, in particular outlining that the EZ has been identified as a strategic opportunity area, with the overall policy framework providing guidance as to how the potential of such developments can be realised.

2.5.7 The policies and proposed delivery programmes and schemes that are relevant to this study are presented in Section 2 of the Case for Change Report and in more detail in the Impacts Assessment Report, the latter of which presents a full and updated analysis of key policies and legislation relevant to this study. A selection of headline national and regional policies demonstrating clear alignment with the proposed railway station is included as follows.

National Policy

2.5.8 The **Wales Transport Strategy (WTS)** sets out the Welsh Government's aim to improve transport (whilst recognising that the new WTS is under preparation). The WTS focused 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.

[8] https://www.astonmartinlagonda.com/about-us/locations/st-athan

[9] https://www.bbc.co.uk/news/uk-wales-53016649

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

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

2.5.9 Improvements to the connectivity of the Vale of Glamorgan would make an enabling contribution to the 'Themes' of **Prosperity for All | The National Strategy**. Enhancing access to a potentially major employment growth area and promoting development at the sub-regional level would support the emergence of regionally significant business and employment opportunities in the Vale of Glamorgan, which would be of benefit to communities across South Wales.

2.5.10 **Prosperity for All** is underpinned by an **Economic Action Plan (EAP)**, which sets out a vision for 'inclusive growth, built on strong foundations, supercharged industries of the future and productive regions.' Within the EAP, there is a commitment to both:

- A new regionally focussed model of economic development, which will promote regional interests and issues in Welsh Government. In the context of this study, this can be thought of as the Cardiff Capital Region, of which the Vale of Glamorgan is part.
- A five-year programme of transport capital funding, linking to mandated regional land-use and planning decisions. Whilst this commitment remains at the strategic stage, it is possible that the EZ would be considered within the context of 'mandated regional land-use.'

2.5.11 **Prosperity for All – A Low Carbon Wales** outlines Welsh Government's commitment to tackling climate change. The plan identifies that transport in Wales is dominated by the use of the private car, contributing to problems such as air quality issues, congestion and a significant proportion of Wales' CO2 emissions. To encourage a shift away from use of the private car, a range of proposals and supporting policies are highlighted, including increasing travel by rail and bus, reduce transport emissions, and working to achieve a modal shift from car dependency to sustainable forms of transport.

2.5.12 The proposal to enhance connectivity to and from the Vale of Glamorgan is also well grounded within the emerging **National Development Framework** (draft November 2019). The Vale of Glamorgan forms part of a National Growth Area and Cardiff Airport provides an International Connection. The draft National Development Framework identifies the importance of Cardiff Airport; of sustainable travel options for strategic developments and of connectivity and growth around Cardiff. The Draft NDF also seeks to address inequalities in the South East Wales region and seeks an integrated, connected region. It is noted that the South East region has traditionally had a high degree of integration, with the relationship between the cities, the Valleys and adjoining rural areas shaping the roles and functions of settlements in the region. The opportunity to build on these relationships and re-establish them where they have weakened, will allow issues that are difficult to address at the local level, to be considered collectively at the regional level.

Local and Regional Policy

2.5.13 The **Cardiff Capital Region – Industrial and Economic Plan** is a 20-year plan setting out an ambitious and long-term vision to boost productivity and accelerate economic and inclusive growth in the region. A key part of the plan is establishing infrastructure that is fit for the future, both digital and physical. The region seeks to implement infrastructure that connects the region effectively by road, rail and air and notes the continuance to work closely with the UK and Welsh Governments to further develop, enhance and implement the transport network to improve links within the region, reduce congestion and connect people as one of several key initiatives to achieve this goal. Key features noted within the plan include:

- *'The Plan advocates global connectivity through investment in best in class transport systems, housing, digital infrastructure, and employable skills in order to fulfil its objectives of job creation, improved productivity and the leveraging of evergreen investment.'*

- *'Alongside the South Wales Metro, which is the "back bone" for the Plan, targets have been set to create 25,000 new jobs, achieve 5% increase in GVA, and leverage £4bn of additional investment in CCR.'*
- The plan aims to support a number of different sectors throughout the region, including (although not limited to) FinTech, Cyber Security Analytics, Creative Economy and Transport Engineering – automotive, trains and aircraft, for example.

2.5.14 Moreover, Network Rail's **Route Strategic Plan (2019)** and **Delivery Plan for the Wales and Western region (2019 – 2024 Control Period 6)** outline wider planned route enhancement proposals for the railway network to support policy objectives, In addition, a report undertaken for Welsh Government '**The Rail Network in Wales – The Case for Investment' (2018)** identifies that there is a *'positive and compelling case for major rail investment that addresses both the Welsh Government's economic ambitions and [Wales'] broader environmental and well-being objectives.'*

2.5.15 With regard to the South Wales Main Line, there is a vision to support inclusive and balanced economic growth in Wales and south west England by providing faster and more frequent services through investment in the Great Western rail corridor. It is proposed that this is achieve through implementation of a range of key objectives including the improvement of Park and Ride provision for accessing the South Wales Main Line and reducing reliance on the M4 corridor.

2.5.16 The regional employment opportunity presented by the EZ has the potential to contribute to the Welsh Government **Our Valleys, Our Future Delivery Plan**, particularly in terms of creating good quality jobs and furnishing residents with the skills to do them. However, facilitating this desired outcome will require both transport infrastructure and services which connect the Valleys labour market to employment opportunities in the Vale of Glamorgan, and regionally throughout south and west Wales.

2.5.17 The emerging Strategic Development Plans are likely to support the development of key sites within the Vale of Glamorgan, including the EZ. This would provide a firm policy basis for supporting accessibility improvements to these sites.

2.5.18 A Growth Strategy for the Swansea Bay City Region recognises the need for improved connectivity between the City Region, the rest of Wales, the UK more generally and internationally. Good connections to and from strategic employment and the Airport will also support connectivity for the Swansea Bay City Region to opportunities and international connections.

Land-Use Development Baseline

2.5.19 The PBA report notes that the declaration of an EZ in the Vale of Glamorgan has facilitated a strategically important and high value economic development and employment site within the area. 78% of the total employment land allocation for the Vale of Glamorgan falls within the EZ and it is anticipated that the site will create 4,000 direct jobs. Notably, if the current plans come to fruition this may be a conservative estimate of job creation. The EZ therefore represents a development of strategic importance for the Cardiff Capital Region and South Wales as a whole.

2.5.20 Ensuring that the EZ and the wider Vale of Glamorgan maximises its development and regional economic potential (particularly in terms of the sub-region being developed in partnership with Rhondda Cynon Taf County Borough Council) will require the provision of a safe and efficient transport network capable of meeting the needs of employees, business visitors and freight.

2.5.21 **With regard to the strategic land-use development issue, it is worth noting that the Inspector's Report on the Vale of Glamorgan Local Development Plan (LDP) suggests that without intervention in the relatively short-term, transport infrastructure may start to place a longer-term constraint on land-use aspirations within the Vale of Glamorgan, negatively affecting the economy of the County.**

2.5.22 Whilst the PBA report is predominantly focussed on the case for improving connectivity to the Vale of Glamorgan, there is also a specific case for considering infrastructure improvements which would support the development of regional (combining the development potential of the Vale of Glamorgan with strategic sites/ opportunities throughout the study area) and sub-regional economy (combining

the development potential of the Vale of Glamorgan with strategic sites/ opportunities within Rhondda Cynon Taf, for example – the Rhondda Gateway and Llanilid on the M4).

2.5.23 Both Rhondda Cynon Taf County Borough Council and Cardiff Council have subsequently outlined extensive development proposals as part of their adopted LDPs, which in addition to the growth of employment, retail and other associated community uses, encompasses extensive residential development in the Rhondda Cynon Taf Southern Strategy Area (three strategic sites encompassing circa 3,250 to 3,550 dwellings) and north west Cardiff (three strategic sites encompassing circa 7,650 dwellings).

2.5.24 The transport infrastructure and services in their current form are likely to act as a constraint on the anticipated development of these residential opportunities, as well as the Vale of Glamorgan EZ and wider regional employment proposals. In contrast, the effective and sustainable realisation of these sites would assist in addressing an identified market failure in respect of the provision of Grade A commercial property within the Capital Region and would assist in ensuring the Region as a whole retains enhanced accessibility and is competitive against other areas of the UK.

Socio-Economic Baseline

2.5.25 A comprehensive socio-economic baselining exercise by PBA has identified two key points in relation to the socio-economic profile of the study area:

- There is strong evidence of the existence of a 'two-speed economy' with a broadly affluent rural hinterland and coastal zone encircling the Valleys, which suffer high levels of multiple deprivation (including high levels of economic inactivity and unemployment). The imbalance within the regional economy is negative for the study area as a whole.
- There is an evidenced issue with productivity/ competitiveness within the study area as a whole and within constituent local authorities.

2.5.26 Participation (i.e. high levels of economic activity and employment) and productivity are considered to be the building blocks of a strong economy. Whilst there are variances across the study area, there is a clearly evidenced problem in respect of both of these growth factors when the area is considered as a single entity.

2.5.27 At the strategic level, the rationale for improving transport connections to and from the Vale of Glamorgan is based on supporting strategic economic and land-use development within the Vale of Glamorgan, most notably in the context of the EZ. It is anticipated that by improving connectivity (the outcome), there will be a positive impact in terms increased Gross Value Added (GVA), reduced unemployment, and higher household incomes, for example (the impacts).

2.5.28 It is also important to note the economic position of the study area is not static. Improvements to transport connectivity (e.g. improvements to the South Wales Main Line, removal of the tolls on the Severn Bridges) and other infrastructure investments within the study area could disadvantage both the Cardiff Capital Region and Swansea Bay City Region if other areas of the UK, and in particular the south west of England, are deemed to be more competitive. Whilst the Metro will assist in supporting the economic competitiveness of South Wales, the threat of a loss of economic activity is a real one.

2.5.29 It is in this context that the EZ, and indeed the wider sub-regional opportunity, can be considered so important. The EZ, amongst other developments, presents a regionally significant economic growth opportunity, potentially generating a range of employment opportunities across different occupational categories, both directly and in terms of indirect and induced employment. Of critical importance is the potential creation of jobs in manufacturing (skilled and unskilled) which would be well suited to parts of the study area with high concentrations of residents in these occupational categories.

2.5.30 Effective transport connectivity between the Vale of Glamorgan and the rest of the study area is however likely to be essential in ensuring the EZ is competitive in matching jobs with the labour market and facilitating business-to-business interactions, as well as establishing connectivity from across the City Region to key destinations, employment sites and services within and beyond the study area, depending on the level of service provision implemented – a vision that could effectively

be realised through delivery of a new railway station at Junction 34 of the M4, inclusive of a Park and Ride facility.

Transport Connectivity Baseline

2.5.31 The land-use development and socio-economic 'cases' set out above from the PBA report clearly highlight the scale of the EZ and its socio-economic importance to South Wales. However, the current transport connectivity of the Vale of Glamorgan is considered to be a constraint in the development of the EZ sites and thus the benefits associated with it. Specifically:

- Whilst the M4 provides high quality strategic access points to the Vale of Glamorgan, the local road network within the Vale is generally of a single carriageway standard and suffers significant congestion around the primary 'gateway' of Culverhouse Cross. Accessibility analysis shows that the need to route via Junction 33 of the M4 and the busy Culverhouse Cross does have a negative impact on both journey length and reliability.
- The most direct route from the M4 to the EZ is via Junction 34 of the M4. However, the connecting road is of a poor quality with lengthy single-track sections and poor visibility. The Junction 34 option has become a rat run for those travelling to the Vale of Glamorgan from the west, with negative implications for communities along the route, including Pendoylan village.
- Whilst there is a reasonable public transport network connecting Cardiff City Centre with the Airport (and, to a much lesser extent, St Athan), connections from elsewhere in the Capital Region and areas to the west are limited, infrequent and generally require interchange. It is notable that those currently working in the EZ area generally travel to work by car.
- Public transport journey times to the Vale of Glamorgan generally and the EZ specifically are well in excess of those by car.
- Freight access to and from the Vale of Glamorgan is sub-optimal, with issues associated with journey time reliability, routeing through broadly residential areas and a circuitous route to West Wales. The area around Cardiff Airport has a high proportion of freight intensive industries, whilst the focus of the EZ on aerospace and manufacturing means that there is likely to be significant growth in freight movements from the Vale of Glamorgan in the medium-term. The provision of appropriate freight routes to the M4 is a key consideration of any future improvements to Vale of Glamorgan connectivity.

2.5.32 Moreover, the accessibility analysis undertaken found that relatively modest reductions in journey times to/ from the Vale of Glamorgan would significantly increase the labour market and business-to-business catchment of the EZ.

2.5.33 Whilst the EZ presents a regionally significant opportunity, the labour market catchment of the site is limited by the current transport infrastructure and services. If this issue is not resolved, it may have longer term implications for firms currently located in the Vale of Glamorgan and in terms of the business location decisions of prospective investors. The limited labour market catchment of the EZ currently is compounded by comparatively poor business-to-business accessibility. This may have an impact on business location/ investment decisions and would also weaken the agglomeration benefits associated with the development of an aerospace cluster in the Vale.

2.5.34 Similar infrastructure limitations are applicable for travel to wider employment sites throughout the study area, with 69% of commuters within South East Wales travelling to and from their place of work by car. The importance of connectivity in supporting socio-economic development throughout the region has already been recognised by Welsh Government and supporting stakeholders as part of aspirations to implement the Cardiff Capital Region Metro.

2.5.35 Measures designed to enhance regional connectivity in addition to those already identified within the Metro programme have the potential to further enhance accessibility within the study area, as well the potential for cross-border interconnectivity to broaden employment opportunities and access to key facilities and services.

The Future of Cardiff International Airport

2.5.36 Whilst the aspiration to improve the connectivity of the Vale of Glamorgan is predominantly focussed on unlocking the land-use development and employment potential of the EZ, any such improvement would clearly be beneficial for Cardiff International Airport. Indeed, the desk-based analysis and consultation demonstrated that the current surface accessibility of the airport is acting as a key constraint on route development, frequency and ultimately passenger numbers.

2.5.37 To support Cardiff airport's vision to be a pioneering airport business, a Masterplan has been completed in accordance with UK Government Aviation Policy Framework 2013 to outline growth plans for the next 20-year period towards becoming a key gateway to the United Kingdom. The economic significant of Cardiff Airport is highlighted, *'…both as an international gateway and as a major driver within the Welsh Economy, supporting 1,800 aviation-related jobs at the Airport as well as directly and indirectly supporting a further 2,675 jobs across the wider area.'*

2.5.38 The Masterplan subsequently recognises a number of drivers and opportunities for change including connectivity and accessibility, customer experience, technology, culture and identity, environment and sustainability, and business and economy. In addition to recognising Cardiff airport and its associated Enterprise Zones as a strategic opportunity area, it also describes the importance of the airport towards supporting Cardiff Capital Region achieving its priorities to achieve regionally and nationally significant economic growth and to attract employment opportunities and skills to the region.

2.5.39 The Masterplan's commentary in surface access include existing and opportunities for future transport links including M4 Junction 34 to A48 link road, Five Mile Lane improvements (since completed), Great Western mainline improvements, South Wales Main Line improvements, South Wales Metro development, rail frequency enhancements and express bus connectivity.

Why invest in improved transport connectivity?

2.5.40 **As explained above, improvements in transport connectivity to and from the Vale of Glamorgan would assist in improving the connectivity of the City Region with job opportunities in the EZ as well as better connect jobs to labour and businesses to other businesses within the strategic study area, including to and from Cardiff.**

Conclusions | The Case for Change

2.5.41 The 'Case for Change' is on the basis of realising the strategic development and employment opportunities associated with the Cardiff Airport – St Athan EZ as well as improving connectivity in the Cardiff Capital Region.

2.5.42 Taken together, consultation and desk-based analysis has demonstrated that the current transport connectivity of the Vale of Glamorgan, is sub-optimal in terms of journey times, journey time reliability, public transport coverage and the routeing of strategic traffic.

2.5.43 The socio-economic baselining of the study area has clearly highlighted the multitude of problems currently being experienced in the Cardiff Capital Region and Swansea Bay City Region. These include low levels of productivity and business competitiveness, limited inward investment, high rates of economic inactivity & unemployment and concentrated areas of multiple deprivation. Improved transport connectivity is vital to enable these issues to be tackled.

2.5.44 Moreover, with a once in a generation programme of capital investment in transport infrastructure in the Capital Region and connecting Wales with England underway, there is an opportunity for the areas to the west of Cardiff to better access a wider range of employment and business opportunities. However, this improved connectivity also presents a risk, in that by failing to address the transport problems in the Vale of Glamorgan, the economic gravity of the area could shift to the east, with potential for economic leakage to England.

2.5.45 There are a number of opportunities for Cardiff International Airport to better position itself as the gateway to Wales, particularly in terms of the long-haul market. The presence of a well-connected international airport is generally seen to be positive in promoting economic development and inward

investment. However, the current surface access to the airport has been widely cited as a constraint which, if not addressed, could continue to limit the route development potential of the airport.

2.5.46 Finally, within the Vale of Glamorgan itself, the current transport infrastructure is considered to be having a negative impact on the area, particularly in terms of congestion and journey time reliability. The transport issues are considered to be having a negative impact on business performance, the attractiveness of the Vale of Glamorgan as a place to live, work and do business and, in the longer-term, land-use aspirations within the Vale of Glamorgan – these same adverse impacts can also be aligned with the wider study area, whereby investment in transport infrastructure is considered an essential mechanism towards sustainable economic development throughout the region.

2.5.47 **In short, improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.**

2.6 Local Appraisal Area Issues and Opportunities

2.6.1 Alongside the strategic case for change, the analysis for this WelTAG study report has focussed on the specific issues within the local appraisal area. This reiterates that the highway network through and near to the Pendoylan corridor between M4 Junction 34 and the A48 is extensively poor, comprising narrow lanes with limited passing opportunities, restricted speed as a result of adverse route alignments, and is predominantly non-compliant to current Design Manual for Roads and Bridges (DMRB) standards.

2.6.2 Sustainable transport options are also restricted with no immediate access to local and regional rail services or robust provision for cycling, and although local bus services do operate through Pendoylan village, services are subject to the constraints of the road network and delay. There is a high reliance on car travel to access services and employment with limited public transport options. Traffic congestion and resilience issues evident throughout the region are particularly affecting the M4 corridor and the A48/ A4232 at Culverhouse Cross during peak commuting hours. There is high car dependency within the local area with 92% of those living within the study area. As a result of congestion, and when incidents arise on the M4, the Pendoylan corridor also functions as a ‘rat-run’.

2.7 Summary of Problems and Opportunities

2.7.1 The identified issues that require addressing are summarised below, which have been identified through the Case for Change report, reference to previous feasibility reports and policy, and consultation with stakeholders and members of the public as part of the Stage One and Stage Two WelTAG studies. The identified problems are as presented in Table 2.

Table 2 Identified Problems

Reference	Heading
P01	Poor highway infrastructure between M4 Junction 34 and the A48 leading to poor access for local communities and businesses.
P02	Poor sustainable access to Cardiff Airport and strategic destinations.
P03	High use of the private car for local and regional trips (e.g. journeys to work).
P04	Existing congestion issues at M4 Junction 34 and on the A48 which are likely to worsen with the committed developments in the area.
P05	Poor infrastructure and local connectivity by walking and cycling.
P06	Environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution.

Reference	Heading
P07	Accessibility for HGVs.
P08	Adverse road safety conditions along existing routes non-compliant to current DMRB highway standards.

2.7.2 The opportunities of the study area have been identified to assist in ensuring that the identified objectives and options are realistic as well as maximise opportunities and consider the context of the study area. Following feedback from the stakeholder workshop and public consultation in WelTAG Stage One and Stage Two, the opportunities have been identified as illustrated in Table 3.

Table 3 Identified Opportunities

Reference	Opportunity
O1	Improved connections to link the airport to Strategic Opportunity Areas (SOAs) e.g. Llantrisant and other regional centres.
O2	National significance of Cardiff Airport.
O3	Growth of Cardiff Airport and investment in St. Athan EZ infrastructure.
O4	Five Mile Lane upgrade will significantly improve access between the A48 and Cardiff Airport.
O5	Potential to create connections between M4 Junction 34 and A48 to continue Five Mile Lane route.
O6	Northernmost 500m section of route near M4 Junction 34 of good standard with existing bridges over the River Ely which is a Site of Special Scientific Interest (SSSI) and mainline railway.
O7	Proposed improvement at Bonvilston end of route, connecting to Sycamore Cross.
O8	Potential for Park and Ride and bus and cycle connections.

2.8 Objectives

Identification of Objectives

2.8.1 The objectives for the intervention have been derived from general and transport-specific objectives as set by the Welsh Government and through considering the national well-being goals as set out in the Future Generations of Wales (2015) Act. The Impacts Assessment Report sets out how stakeholders have informed the development of the objectives and how the proposed objectives positively contribute to Welsh Government policy and well-being.

2.8.2 The final objectives for the intervention are as outlined in Table 4. This includes an overview of what success would look like and how this can be measured in the WelTAG Stage Two Plus assessment. These objectives apply to all of the identified problems and opportunities of the study area, rather than specifically for the railway station.

Table 4 Final Proposed Objectives

Ref	Objective	What will success look like?	How will success be measured?
1	Enhance connectivity to Cardiff Airport and strategic employment sites in the region.	Reduced and more reliable journey times between strategic network and Cardiff Airport and St Athan.	Forecast journey times.
2	Increase transport options for strategic access and access to and from local communities.	Increased use of sustainable travel modes by residents of local communities.	Length of walking and cycling links provided or improved. Bus journey times.
3	Improve network resilience and road safety on the M4, A48 and A4232 corridors and other connecting roads.	Reduced accidents and delay on adjacent strategic routes.	Journey times, accident rates per vehicle kilometre.
4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area.	Transport network is improved with at least neutral impact on historic, built and natural assets.	Number of historic assets, area of ecological features, area of flood zone affected.
5	Minimise impacts on communities and support social inclusion and health and well-being.	Transport network is improved with at least neutral impact on social and cultural facilities, businesses and residential properties.	Number of properties affected, length of walking and cycling links provided.

Verification of Objectives

2.8.3 The objectives have been verified to determine how they contribute to:

- Resolving problems of the study area.
- The Well-being of Future Generations Act Well-being Goals.
- Wales Transport Strategy outcomes.
- The Welsh Government's Strategic Priorities as set out in the Wales Transport Strategy.

2.8.4 Table 5 illustrates the extent to which the objectives address the identified transport problems.

2.8.5 The appraisal demonstrates that each of the identified problems are directly addressed by at least one objective.

Table 5 Relationship of Objectives to Problems

Objectives	Potential Problems							
	P01	P02	P03	P04	P05	P06	P07	P08
1	+++	+++	++	++	++	++	++	++
2	0	+++	+++	++	++	++	0	+

Objectives	Potential Problems							
	P01	P02	P03	P04	P05	P06	P07	P08
3	+++	++	++	++	++	++	++	+++
4	0	++	++	0	+	+++	0	0
5	+	++	+	+	++	++	+	+

2.8.6 The WelTAG guidance states that 'when using WelTAG it is essential to comply with the duties set out in the Well-being of Future Generations (Wales) Act 2015. They are to follow the sustainable development principle through following the five ways of working and set well-being objectives that maximise contribution to the seven well-being goals.' Table 6 shows a positive relationship between the objectives and the seven well-being goals.

Table 6 Relationship of Objectives to Well-being Goals

Well-being of Future Generations (Wales) Act Outcomes		Objectives				
		1	2	3	4	5
Seven Well-being Goals	A prosperous Wales	+++	+++	++	++	++
	A resilient Wales	+	+	+++	++	+
	A healthier Wales	++	++	+	+	+++
	A more equal Wales	+	++	+	+	+
	A Wales of cohesive communities	++	++	+	+	+
	A Wales of vibrant culture and Welsh language	0	0	0	++	+
	A globally responsible Wales	+	+	+	+++	+

2.8.7 In addition, the objectives have been assessed against the Wales Transport Strategy outcomes as outlined in Table 7. A positive relationship has been identified.

Table 7 Objectives Relating to the WTS Outcomes

Wales Transport Strategy Outcomes		Objectives				
		1	2	3	4	5
Social	Improve access to healthcare	+	++	+	0	++
	Improves access to education, training and lifelong learning	+	++	+	0	++
	Improving access to shopping and leisure facilities	+	++	+	0	++
	Encourage healthy lifestyles	+	++	0	+	++
	Improve the actual and perceived safety of travel	+	++	+++	0	++

Wales Transport Strategy Outcomes		Objectives				
		1	2	3	4	5
Economic	Improve access to employment opportunities	+++	++	+	0	++
	Improve connectivity within Wales and internationally	+++	++	++	0	+
	Improve the efficient, reliable and sustainable movement of people	++	+++	+	+	++
	Improve access to visitor attractions	+	+	+	0	++
Environmental	Increase the use of more sustainable materials	0	0	0	0	+
	Reduce the contribution of transport to greenhouse gas emissions	+	+++	+	++	++
	Adapt to the impacts of climate change	+	+++	+	++	++
	Reduce the contribution of transport to air pollution and other harmful emissions	+	+++	+	++	++
	Improve the impact of transport on the local environment	+	+++	+	++	+
	Improve the impact of transport on our heritage	+	++	0	++	+
	Improve the impact of transport on biodiversity	+	++	0	++	+

2.8.8 In addition, Table 8 shows a positive relationship between the objectives and the Strategic Priorities as set out in the Wales Transport Strategy.

Table 8 Objectives Relating to the Strategic Priorities

Strategic Priorities	Objectives				
	1	2	3	4	5
Reducing greenhouse gas emissions and other environmental impacts from transport	+	++	+	+++	++
Integrating local transport	+	++	+	0	++
Improving access between key settlements and sites	+++	++	+++	0	++
Enhancing international connectivity	+++	++	+	0	+
Increasing safety and security	+	++	+++	+	+

2.9 WelTAG Stage Two Plus Option Development

Background

2.9.1 This section identifies the process undertaken to develop the Vale of Glamorgan Gateway Station options and provides an overview of the options. As part of this WelTAG Stage Two Plus appraisal, reference should be made to the accompanying GRIP Stage 1-2 Feasibility Report | Transport for

Wales Stage A (10028657-ARC-00-XX-RP-ZZ-00001) completed by Arcadis that details option development and appraisal of the Vale of Glamorgan Gateway Station proposals. A summary of key information has been provided herewith to support the WelTAG Stage Two Plus assessment.

2.9.2 The Vale of Glamorgan Gateway Station is a proposal for a new transport interchange development located near Junction 34 of the M4, close to Miskin and Hensol. The South Wales Main Line has two running tracks and at this location features the Miskin Loops, which provide two additional tracks (four tracks in total). The purpose of the loops is for freight trains to wait while faster passenger services overtake. At this stage it is assumed that the railway station in the vicinity of M4 Junction 34 will be served by all Transport for Wales rail services passing this location, with longer term ambitions for main line Swansea to London Paddington services to also call at the station.

Rail Passenger Demand Forecasting

2.9.3 In order to inform the requirements for a new station at this location, the GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A carried out demand forecasting for a Vale of Glamorgan Gateway Station using the Transport for Wales managed South East Wales Transport Model (SEWTM). Arcadis has liaised with Transport for Wales on commissioning the model runs to ensure the outputs provided are applicable in future appraisal work should the project progress to a next stage appraisal.

2.9.4 The SEWTM has been run on the following four 2026 scenarios:

- **Scenario 1 |** Do-Minimum Core
- **Scenario 2 |** Do-Something Core with Vale of Glamorgan Gateway Station
- **Scenario 3 |** Do-Minimum with Renishaw Development
- **Scenario 4 |** Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development

2.9.5 **Note |** The Renishaw Development encompasses a privately funded proposal to develop land allocated in the adopted Vale of Glamorgan Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha encompassing B1, B2 and B8 land uses to meet strategic and local employment needs. The LDP site is situated south east of M4 Junction 34 adjacent to the extant Renishaw factory. Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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.

2.9.6 A summary of the forecast rail passenger numbers for each scenario in 2026 has been provided in Table 9 for the Vale of Glamorgan Gateway Station, as well as for existing stations west of M4 Junction 34. The results show that the new station is forecast to attract 133,969 individual trips per year by 2026 if the Renishaw development does not take place. If the Renishaw development is completed, demand for the station is shown to significantly decrease to 40,153 trips as a result of capacity constraints at key junctions on the local highway network.

2.9.7 The model predicts that the existing highways and M4 Junction 34 would be over utilised/ highly congested in the future year with the Renishaw development taking place, which would supress demand for the station. An additional forecast was undertaken to demonstrate that if the local congestion problems were mitigated (with regard to Scenario 4), the forecast demand for the station would significantly increase from 40,153 passengers to 216,982.

Table 9 SEWTM 2026 Rail Passenger Demand Forecast

Railway Station	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Vale of Glamorgan Gateway Station	0	133,969	0	40,153 (216,982 if congestion issues mitigated)
Pontyclun Station	257,588	241,522	256,828	254,184
Llanharan Station	146,552	134,556	144,359	135,317
Pencoed Station	201,053	182,472	196,083	183,904
Bridgend Station	1,677,875	1,650,795	1,665,429	1,644,703

2.9.8 The GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A further outlines that the Vale of Glamorgan Gateway Station is forecast to generate 60,245 and 172,391 new rail trips for Scenario 2 and 4 respectively, the latter assuming local congestion problems are mitigated. In the absence of highway mitigation, minus 4,438 [-4,438] rail trips are forecast under Scenario 4. The station demand data can be highly skewed from factors outside the control and remit of this project. It will require local and regional consideration to determine the full demand analysis and in summary, the station demand is highly likely to be affected by the following key factors:

- Renishaw development of the strategic employment area.
- M4 Junction 34 capacity issues.
- M4 and A4232 congestion to the west of M4 Junction 34, which will influence decisions to use the Park and Ride.
- Existing constraints on the local connection through Pendoylan to the A48.
- Whether or not proposals for an improved link from M4 Junction 34 to the A48 are taken forward.
- Growth of Cardiff Airport and strategic employment in the wider area together with bus connections from the station.
- Event parking for Cardiff, if the station hosts turn back facilities for event shuttle services and availability of overflow car parks.
- London Rail Services (Great Western Railway/ Grand Union Trains).
- Cardiff City Vehicle Policy (e.g. congestion zones, vehicle ban).
- Emerging proposals at M4 Junction 33 and the Cardiff north western corridor.
- Cardiff Metro development proposals.

Station Categorisation

2.9.9 Stations are categorised in accordance with Department for Transport ratings as shown in Table 10.

Table 10 Station Category Classification

Category	Description	Trips per Annum
A	National Hub	Over 2 million

Category	Description	Trips per Annum
B	Regional Interchange	Over 2 million
C	Important Feeder	0.5 to 2 million
D	Medium Staffed	0.25-0.5 million
E	Small Staffed	Under 0.25 million
F	Small unstaffed.	Under 0.25 million

2.9.10 Overall, the demand forecasting indicates that the station usage in 2026 should be classified as Category F (less than 250,000 trips). However, the aspiration of the project and the Vale of Glamorgan Council is to achieve the patronage that would require a Category D (medium staffed) station. The factors noted that are likely to affect patronage mean that providing for a Category D station is likely to be appropriate to future proof the station and enable it to meet potentially higher demand in the future.

2.9.11 For the purposes of this appraisal, a minimum 'do something' design would encompass a Category F station proposal, whilst a Category D station would provide a future proofed option capable of accommodating greater demand. There is opportunity for an initial station to be constructed to a smaller footprint and then upgraded depending on actual demand, although any recommendation to phase development would be subject to further, more detailed assessment.

2.9.12 **Following discussions with stakeholders, the preferred design parameter at this stage and as confirmed by the Vale of Glamorgan Council is for a Category D station which is future proofed, as opposed to a minimum Category F station.**

2.9.13 The station would interchange with regional and local bus services, including services between the M4 Junction 34/ A48 corridor and Cardiff Airport and St Athan. There would also be active travel connections to the north of the M4 and parking provision for the station.

Options for Appraisal

2.9.14 For the WelTAG Stage Two Plus study, the do-minimum (with no new railway station) and four potential location options have been considered for the railway station. The location options have been informed by the GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A and as outlined in Figure 5.

- **Do-Minimum |** The Do-Minimum scenario assumes that there is no step change in investment beyond the current programmes and commitments.
- **Location 1 |** Land South East of the Extant Renishaw Development (10028657-ARC-00-XX-DR-CE-00001).
- **Location 2 |** Land South of the Railway between the Railway and River Ely (10028657-ARC-00-XX-DR-CE-00002).
- **Location 3 |** Situated on Marshland and Woodland West of Renishaw (10028657-ARC-00-XX-DR-CE-00003).
- **Location 4** | Existing Renishaw Car Park (the Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw. This proposal would need to be negotiated and agreed with the landowners, Renishaw) (10028657-ARC-00-XX-DR-CE-00004).

Figure 5 Vale of Glamorgan Gateway Station Location Options

2.10 Station Requirements

Platforms

2.10.1 It is assumed that the station would retain two platforms located within the cess adjacent to the goods loops. The size, number and location of platform entrances influence passenger distribution clearance times. Factors such as this have to be considered and integrated with station capacity assessment, safety and accessibility as below:

- **Length |** Dictated by the rolling stock that will be stopping at the station. 300m is assumed for this study.
- **Width |** The minimum recommended width is 3m.
- **Columns |** Columns and other obstructions should be at least 2m clear of the platform edge.
- **Headroom |** At least 2.5m to structures and platform signs for a width if up to 2m from the platform edge over the entire length. At least 2.3m for distances greater than 2m from the platform edge.
- **Yellow Line |** The yellow line is used by the Train Operating Company (TOC) to manage crowding and safe dispatch of trains. At least 1.5m is needed from the platform edge where trains are passing at more than 100mph. Where the train speed is greater than 45mph or the 1.5m is likely to lead to overcrowding on the platform, the distance could be reduced subject to mitigation. The TOC should be consulted whilst defining the width of this zone.
- **Platform Canopy |** The platform canopy should be located adjacent to the platform access and egress point and cover the entire platform length if possible. Ideally the platform canopy will be linked to the footbridge canopy to ensure there is no gap. The material of canopy structure will be based upon the structure size, with timber recommended for small spans and a steel portal system for large span roofs.

  To prevent rain flooding and leaking, the canopy will be inclined away from the track with a drainage system and drainpipe provided within or adjacent to the canopy supporting column. A Category F station would be uncovered with no canopy although the platform would need to retain waiting shelters.

Station Buildings

2.10.2 For a Category D station, the building entrance needs to have an appropriate size, number, and spacing to provide free and safe access to all passengers as well as the emergency evacuation arrangements. Entrance doors should not open outwards into the flow of passengers and alcoves should be avoided. The station entrance canopy should be designed to draw customers towards the station entrance and provide shelters for people waiting to meet others.

2.10.3 It is considered that the canopy design will be integrated with the station building, and stairs with handrails will be provided for passengers to access to platform level. A lift within the station building would give access to both platform level and footbridge level. A Category F (unstaffed) station would typically not have a station building.

Station Facilities

2.10.4 A Category D (staffed) station would typically encompass the following:

- The number of staffed ticket offices and ticket vending machines would need to be assessed by the TOC in order to meet the requirement of station customer capacity.
- A passenger waiting room will be provided in the station building or otherwise a sheltered waiting room will be available on each platform.
- Help Points and information displays will be provided in the waiting room, station building and on platforms.
- CCTV is required for safety and security purposes for the coverage of all station public areas.
- Lighting on the platform and in the building will be evenly distributed with the lux level to comply with relevant standards.
- Male and female toilets are recommended at this station and if toilets are provided, a minimum of one unisex toilet will be accessible for disabled people.
- Other station facilities such as a coffee shop, vending machines, cash machines, newspaper & magazine distribution racks, advertising areas and WIFI will be considered following consultation with the client and TOC. Smart Station sensors will also be explored, to manage station usage and provide live data to relevant stakeholders.
- The positioning of booking offices, ticket machines, information screens and retail outlets will be considered to avoid congestion and blockage.

2.10.5 A Category F (unstaffed) station would typically encompass the following:

- Ticket vending machine
- Help Points
- Information displays
- Station lighting
- CCTV

2.10.6 Transport for Wales have committed to using renewable energy sources to power facilities and to aid this, local renewable energy production will be considered at the next stage of appraisal, but this is dependent on land availability. The scheme could potentially benefit from additional funding for renewable energy, as well as be considered as a trial or exemplar station. The station will consider sustainability, but for greater acknowledgement, the scheme could be progressed under CEEQUAL, which is an evidence-based sustainability assessment, rating and award scheme.

Station Footbridge

2.10.7 To gain access between the platforms, a footbridge will be required to span the four-track railway. The footbridge must be compliant to the requirements of NR/L3/CIV/020. Network Rail are currently

developing a new standard footbridge design although a bespoke footbridge design may be required due to the longer span requirements of approximately 25m.

2.10.8 It is expected that the footbridge would comprise a single span with stairs and lifts either side for better accessibility. The bridge soffit will need to be designed high enough to accommodate the potential for future electrification of the lines. It is anticipated that the main span, stairs and ramps will be fully enclosed with suitable lighting and CCTV to ensure a safe and secure environment is established.

2.10.9 The final design of the footbridge is likely to be determined by using passenger flow analysis, principally with regard to the recommended widths. A Category D station is likely to be a covered footbridge whilst a Category F station is likely to be an open footbridge.

Station Approach Road and Access

2.10.10 A new station approach road would be provided (where applicable to specific options) to connect the existing highway to the station car park. It would be a single carriageway with designated public transport drop-off and pick-up zones close to the station. To reduce any congestion due to possible traffic overflow and vehicle manoeuvres, a vehicle turning circle would be provided at the end of station approach road.

2.10.11 The Vale of Glamorgan Gateway Station will require a passengers set-down and pick-up area alongside provision for taxis and buses. The landing area will be level and firm with a ramp fitted (where applicable) with lowest practicable gradient. Rail replacement buses and coaches would need to be accommodated in case of railway services being unavailable. Shuttle-link or other bus/ coach services to link to Cardiff Airport, the Vale Resort or to Cardiff venues for example will be explored at the next stage of appraisal and will require space to implement supporting infrastructure. An interchange facility with regional or local bus services would also be provided and a designated area at the front of the station established for emergency vehicles.

Vehicle Parking Facilities

2.10.12 An overview of nearby stations as shown in Table 11 identifies the number of spaces and existing charges. There are also other strategic Park and Ride facilities under consideration, as outlined in Table 12.

Table 11 Nearby Station Parking Facilities[10]

Station	Total parking spaces	Access for all spaces	Charges
Cardiff Central	426	20	£12.50 for 1 day
Pontyclun	<30 To be confirmed	To be confirmed	Free
Llanharan	42	2	Free
Pencoed	0	0	Not Applicable
Bridgend	108	5	£7 for 1 day

[10] https://www.nationalrail.co.uk/

*Table 12 Planned Park & Ride Developments (*values estimated from media sources)*

Nearby Schemes under Development	Number of Spaces
M4 Junction 33 Park & Ride (Bus Interchange)	1,000
Cardiff Parkway Station	2,000

2.10.13 The remit set by the Vale of Glamorgan Council is to subsequently provide a minimum of 500 vehicle parking spaces at the Vale of Glamorgan Gateway Station, although there is opportunity for the station to be designed with a minimum of 500 spaces with additional land ringfenced to expand/ overflow to 1,000 spaces when required. The parking facilities should have a minimum of 10% bays for electric vehicle charging (50 spaces). Options will consider future proofing a higher percentage of bays to accommodate future demand as by 2035, only electric vehicles may be produced, and the overall design life of the facilities is 120 years[11].

2.10.14 In addition to car charging, taxis and bus charging infrastructure will also be considered. Access for all spaces should be provided within 50m of the station entrance, wherever practical. For 500 or more spaces, it is recommended that 24 spaces are designed for access for all passenger purposes.

2.10.15 The following provision will also be considered:

- Long and short stay public parking (both long and short stay) – consider design opportunities to retain flexibility for future expansion (e.g. modular construction methodology).
- Motorcycle and cycle parking.
- In all cases where the layout of the car park affects access by emergency service vehicles, the access for such vehicles shall comply with the Building Regulations.
- It is anticipated that parking management measures would be implemented to control use of parking and charges and for entitlement within the Station Access Agreement.
- Permit/ contract/ preferential parking (for example, for Transport for Wales Rail Services staff, business passengers and car hire franchise).
- Parcel collection point parking.
- Station management/ visitor parking.
- Station mobility buggy parking.
- Station contractor/ maintenance parking.
- Train crew parking (including out-of-hours access).
- Other TOC operational parking (e.g. station staff).
- Other Transport for Wales Rail Services parking (e.g. operational staff).
- British Transport Police parking (including its use for emergency response vehicles and for accessing custody suites).
- Other tenancy parking (e.g. for train catering and postal/ parcel operations).
- Retail parking for station retail/ catering outlet staff.
- Lineside maintenance vehicles.

[11] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

2.10.16 Adequate lighting levels would be required in accordance with *RIS-7700-INS: Railway Industry Standard for Lighting at Stations*. It is important that lighting does not interfere in any way with the operational railway and any light overspill to adjoining neighbours be minimised. This would include consideration of any ecological impacts in this location such as impacts on bats. Consideration of energy efficient lighting will be taken forward as part of the design process.

2.10.17 CCTV will be required to cover the car park, including pay stations and entrances/ exit barriers. The CCTV design will take into account national and industry standards and guidelines such as *NR/L2/TEL/30135: Technical requirements for security CCTV Systems on Network Rail Infrastructure* and *NR/GN/TEL/50017: CCTV for Stations – Functional, Technical, Operational Requirements*. The function and system performance would be determined following consultation with the Local Authority and British Transport Police.

2.10.18 The cost of parking will need to be carefully considered. It is noted that nearby stations provide free parking such as Pontyclun and Llanharan and is likely to be a large factor for users. Rail passengers will be required to pay for tickets for rail/ bus services. Future design activities will need to carry out option selection and design of car parking facilities, number of spaces and layouts.

2.10.19 It is anticipated that there will be demand for car share spaces to facilitate latent demand already observed within the vicinity of the M4 Junction 34. Car park pricing would need to be set to ensure that this does not reduce availability of parking for station users.

Access for All

2.10.20 The proposed station will be accessible to all people and designed in accordance with the Department for Transport *Accessible Railway Stations* design standards. Key stakeholders including Network Rail and Transport for Wales Rail Services will be consulted as part of the design process to help ensure the suitability of provision.

2.10.21 Designated disabled person's parking spaces together with setting-down and pick-up points will be located on firm and level ground, as close as feasible to the accessible entrance. Pedestrian areas shall be designed clear of obstacles to allow for unobstructed accessibility. The suggested footway width for wheelchair ramps is up to 1620mm and 4040mm plus manoeuvring space.

2.10.22 Where there is a station building, lifts will be provided to facilitate accessibility between ground level and the station platforms. Ramps shall be installed where lifts are not practicable and retain the lowest practical gradient of no more than 1:20. No series of ramps to a building should rise more than 2m. For a Category D station, a minimum width of 2m between handrails is recommended.

2.10.23 Retail and catering facilities will be accessible to all passengers. Ticket sales points including manual ticket sales counters, information desks, customer assistance points and ticket vending machines will be provided along the obstacle-free route, a minimum of one desk and one machine should be at a lower level to provide improved access. A minimum of one desk will be fitted with an induction loop system for hearing assistance.

2.10.24 Bi-lingual information signs will be installed where applicable to provide safety information, safety instructions, train timetables, warnings, and access information. The text and symbols of the signs needs to be clear, consistent and unambiguous. Tactile signs will be provided where visually impacted people need them to be able to identify and use facilities at the station. Clear announcements of important information will be given as they are particularly valuable for blind and partially sighted passengers.

Retail (Station) Telecommunications

2.10.25 The station will require station telecommunications encompassing IT infrastructure, networking, CCTV, ticket machines, help points, specialised telecoms systems and loudspeakers. The requirements will be designed to Network Rail standards with design input primarily agreed between the infrastructure owner and Transport for Wales Rail Services.

Sustainable Travel Requirements

2.10.26 The Welsh Government has a clear priority on increasing levels of walking and cycling in Wales to realise the many benefits that travelling actively brings, for individuals and for society. The Active Travel (Wales) Act 2013 places an onus on local authorities to provide active travel networks and forming good active travel connections to a new station would be essential. The benefits of sustainable travel are to increase the nation's health, reduce greenhouse gas emissions, create an integrated community and support sustainable economic growth. Walking includes the use of wheelchairs and mobility scooters while cycling includes the use of electric bikes but not motorcycles.

2.10.27 The Vale of Glamorgan Council also have a clear and aspirational vision towards increasing opportunities for sustainable travel, with the Council's Local Transport Plan (2015 – 2030) seeking to secure better conditions for pedestrians, cyclists and public transport users and to encourage a modal shift away from the single occupancy car. In addition, the Local Development Plan will favour 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). Priority will be given to schemes that improve highway safety and accessibility, public transport, walking and cycling, whilst 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.

2.10.28 Approximately 45% of passenger journeys by rail in Wales access railway stations on foot, whereas just 2.7% arrive by cycle. The Vale of Glamorgan Gateway Station will provide transport interchange facilities for cyclists and pedestrians to enable easy and safe access by the implementation of key design principles. It is however recognised that the station is not located close to existing communities and therefore the level of walking and cycling to the station may be low.

2.10.29 The new station will have dedicated active travel provision/ access, although no local provision is currently available. Nearby land is proposed to be developed and the route could connect into other new developments. There would be potential to have a dedicated active travel route over the M4 to interconnect with nearby towns/ villages and future developments. The active travel network beyond the station development is not yet defined but will be considered as part of the next stages of assessment.

Cycle Facilities

2.10.30 The provision of secure cycle parking at stations must meet the needs of a range of different users, including those employed at the interchange, short term visitors and longer-term users. Cycle parking will be located as close as possible to the main station access point. The quantity of cycle parking will need to be assessed to ensure demand is met including spare capacity to allow for growth in cycling.

2.10.31 The Vale of Glamorgan Gateway Station is anticipated to be a key strategic commuting station and cycle parking to accommodate 5% of passengers is recommended[12]. The increasing trend towards to electric bikes will be considered including the provision of charging points to support and encourage their use.

2.10.32 The cycle parking layout will be large enough to accommodate the dimensions of a typical adult size bicycle[13]. Parking will be located on level ground and clear from obstruction of other users, particularly those with visual or mobility difficulties. Cycle parking types that suit public transport interchanges are Sheffield stands, two-tier stands or lockers/ cages.

2.10.33 Lighting, CCTV and the provision of specific equipment such as lockers or secure cycle storage compounds will be considered. Secure cycle parking facilities with hire, repair and retail facilities can be encouraged, with local authorities working in partnership with relevant organisations and

[12] Green and Hall (2009), Better Rail Stations – An Independent Review. London: Department for Transport

[13] Active Travel (Wales) Act 2013

operating companies. Clear bi-lingual signage for route guidance, location and direction will be provided to cover the station area.

2.10.34 To encourage cycling to the station, maintenance facilities or assistance such as pumps, tools, electric bike charging points and cycle services shops will be considered. Consideration will also be given to a Park and Cycle initiative allowing users to park and complete their journey by cycling.

Electrical and Plant (E&P)

2.10.35 The South Wales Main Line within the vicinity of the proposed Vale of Glamorgan Gateway Station location has recently been re-signalled as part of the Cardiff Area Signalling Renewals (CASR) scheme and it is therefore assumed that the signalling power system is compliant with BS7671. Points Heating will have been provided for the four point-ends. A Points Heating Control Cubicle (PHCC) and a Distribution Network Operator (DNO) should have been located in the vicinity of these points, although a site survey will be required to confirm existing equipment. Trackside electrical requirements are assumed to be limited to:

- Points heating following track changes.
- Minor signalling power changes to reflect the track and signalling changes.
- Junction lighting (where required) following track changes.

2.10.36 The following non-trackside station elements will also need to be provided as these are expected to require a segregated TOC supply:

- Ticket machine power supplies.
- Station building lighting to encompass ticket office, concourse, waiting room and toilets.
- Station telecoms to include help points, CCTV, CIS & specialised telecoms systems.
- Retail unit supplies.
- Lift supplies.
- Footbridge lighting.
- Platform lighting.

2.10.37 Street/ parking power requirements will encompass:

- Carpark charging points.
- Street lighting.
- Ticket machine and barrier power supplies (where applicable).
- Telecoms power supplies (to include CCTV) will also have an electrical requirement. The car park ownership (and so DNO ownership) has not yet been determined.

Lineside Signalling | Changes Required

2.10.38 The signalling in this area is considered generally suitable for accommodating platforms on the outside of the loop lines. The areas that will need changes are the installation of car stop boards to be placed relevant to the length of rolling stock that will be using this station. Care will have to be taken to ensure that stopping trains in the Up Miskin Loop do not activate the Pontsarn Automatic Half Barrier Crossing (AHBC). The new platforms will require to be shown on the Visual Display Unit (VDU) displays at the South Wales Control Centre (SWCC).

2.10.39 Although this is a minor change, this will be a long lead item to ensure the software updates required. Any changes to timetable and services will require level crossing assessments to be carried out along the section of route affected. Future signal sighting activities need to be undertaken to assess the impact of the new station infrastructure including the proposed footbridge, lift shafts and platform canopies for example.

2.11 Rail Service Provision and Timetable Opportunities

Rail Service Provision

2.11.1 For the purposes of the WelTAG appraisal and accompanying GRIP Stage 1-2/ Transport for Wales Stage A feasibility study, it is assumed that all passing Transport for Wales services would call at the new Vale of Glamorgan Gateway Station. This results in a service frequency of approximately three trains per hour in each direction encompassing the Ebbw Vale to Maesteg service, the Carmarthen/ Milford Haven to Manchester Piccadilly services, and the Swansea to Cardiff Central service.

Timetable Opportunities

2.11.2 An initial timetable study has been undertaken, looking at all Transport for Wales services stopping at the Vale of Glamorgan Gateway Station. For the purposes of the timetable study, other TOCs have not been including due to the uncertainty and additional requirements that would need to be considered. The study has assessed the immediate impact of the new station between Cardiff Central and Bridgend. As with any new station, additional time will be required within the timetable to accommodate the stop. Time can add up to a few minutes **estimated to be at least four minutes** to take account of the train slowing down, dwelling and then accelerating back up to normal speeds. The study has indicated some important issues, including the following:

- Maesteg services currently have a very tight turnround at Maesteg and on occasion arrive from other single line sections (e.g. Ebbw Vale). Adding an additional call will require these services to be retimed.
- Presentation at crossing points on single line sections may change, which would require retiming to other services (e.g. Ebbw Vale or Milford Haven).
- Presentation times at Cardiff Central will likely need to be amended. This may have significant implications for the long-distance services that may need to be re-timed (heading to Manchester or Milford Haven, for example).
- Presentation and turnround times at Swansea will be affected. This could impact the station working margins which will result in further re-timings.
- Some freight services that currently utilise the Miskin Loop would need to be re-timed. This will be exacerbated on days of the week when freight provision increases.
- Reduced redundancy – Sidings offer additional redundancy for freight, main and local services.

2.11.3 The level of impact with regards to re-timing existing services, depends upon the confirmation of operational assumptions. Examples of these would be the likely Sectional Running Times for calling at the station, the required dwell time and potential line speed improvements on the Miskin Loop. Reducing the additional time required to call at the station will mitigate the impact on the existing timetable as would providing higher speed switches into, out of and within the loop, currently rated at 15mph. Grand Union Trains has indicated that 15mph is an issue that would need to be addressed. Timetable activities as part of this scheme will not consider introducing non-stops at existing stations.

2.11.4 It would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds. Network Rail has also confirmed that the sidings offer additional redundancy which aids performance and have often been used for broken down trains. Additional reviews will have to consider other suitable locations to offer this redundancy. An alternative location for the station could also be considered as the goods loops offer both advantages and disadvantages.

2.11.5 The timetable study is included with the GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A (10028657-ARC-00-XX-RP-ZZ-00001). A further timetable study will be required once operational assumptions are defined with key stakeholders. Whilst several key timetable issues have been highlighted at this early stage of the analysis, more detailed engagement with both Network Rail and Transport for Wales will be taken forward to confirm all viable opportunities available for the proposed development.

2.12 Environmental Constraints

2.12.1 The key environmental constraints and how the design and location of the Vale of Glamorgan Gateway Station seeks to address them are summarised in Table 13. Further details are provided in the WelTAG Stage Two Plus Vale of Glamorgan Gateway Station Impact Assessment Report (10028657-ARC-XX-XX-RP-TP-0002).

Table 13 Vale of Glamorgan Gateway Station | Constraints

Constraint	Description
River Ely Floodplain	The Natural Resources Long Term Flood Risk Map shows that land between the rail track and the River Ely is designated as Flood Zones 2 and 3. Flood Zone 2 shows the extent of a flood from rivers or from the sea with up to a 0.1% (1 in 1,000) chance of happening in any given year and contains areas recorded to have flooded in the past. Flood Zone 3 shows the extent of a flood from rivers with a 1% (1 in 100) chance or greater of happening in any given year or the extent of a flood from the sea with a 0.5% (1 in 200) chance or greater of happening in any given year. In addition to the Long-Term Flood Risk Map, the Welsh Government produce a Development Advice Map (DAM) which is for land use planning purposes and should be used alongside the Welsh Government's Technical Advice Note 15: Development and Flood Risk (TAN15)[14]. The DAM shows that the majority of the land in the study area is designated as Zone C2 (areas of the floodplain without significant defence infrastructure) and Zone B (areas that have flooded in the past evidenced by sedimentary deposits). Parts of the study area designated as Zone A are considered to be at little or no risk of fluvial or tidal/coastal flooding.
Water Courses	Nant Criafol, Nant Coselch and other unnamed water courses are located within the study are. The watercourses are located south of the M4, and north east of the rail track. Ordinary Watercourse Consent could potentially be required.
Ecology and Nature Conservation	The railway track crosses the Ely Valley Site of Special Scientific Interest (SSSI) and there are seven Sites of Interest for Nature Conservation (SINC) within the study area. Six groups of Tree Preservation Orders (TPOs) are present within the study area One area of Ancient Semi-Natural Woodland (ASNW) and one Restored Ancient Woodland Site (RAWS) are present within the study area. There are also a number of priority habitats (woodland, marshy grassland, and ponds) and the potential presence of protected and priority species within the study area. The desk study returned records of a number of protected and priority species including three floral species (e.g. *Parmotrema perlatum* (a lichen)), 17 terrestrial and aquatic invertebrate species (e.g. golden-ringed dragonfly *Cordulegaster boltonii*, short-winged cone-head *Conocephalus dorsalis*), numerous bird species (e.g. fieldfare *Turdus pilaris*, spotted flycatcher *Muscicapa striata*, starling *Sturnus vulgaris*), five bat species (e.g. common pipistrelle *Pipistrellus pipstrellus*, otter (*Lutra lutra*) and dormice (*Muscardinus avellanrius*) within the 2km search area. The habitats present in the study area are considered to have the potential to support otters, bats (foraging and roosting), dormice, badgers, nesting birds, great crested newts *Triturus cristatus* and reptiles.
Ancient Woodland	One area of Ancient Semi-Natural Woodland (ASNW) and one Restored Ancient Woodland Site (RAWS) are present within 500m of the proposed passing loop. 73 ancient woodland sites, including ASNWs, RAWS and Plantation on Ancient Woodland Site (PAWS), are present within the 2km search area.

[14] Welsh Assembly Government, 2004. Planning Policy Wales, Technical Advice Note 15: Development and Flood Risk

Constraint	Description
Heritage	There is one statutory designation within the study area, the scheduled monument of Felin Isaf Castle Mound (reference number GM370). This is located immediately north of the railway line and west of Renishaw Factory, in a partially wooded area bordered to the north by the factory car park. The scheduled monument comprises the remains of a medieval motte (mound) and surrounding ditch. It is of national importance for its potential to enhance knowledge of medieval defensive practices and is well preserved with significant archaeological potential. There are four non-designated heritage assets recorded by GGAT HER within the study area. To the north of the railway line and south east of M4 junction 34 is the site of a pond recorded on the 1st edition Ordnance Survey (OS) map (04389s), it is unclear whether the pond is still extant. To the south east of this, also to the north of the railway, is the earthwork remains of another pond recorded on the 1st edition OS map (04318s). Further south east and immediately adjacent to the north of the railway line and south west of Renishaw Factory is the route of a former watercourse recorded on the 1st edition OS map (04388.0s). In the south of the study area, to the west of the railway line is an earthwork of a semi-circular ditch (01480s), which was rejected as a moated site and is thought to be a possible orchard ditch. These four non-designated assets are of local importance as they illustrate the historic landscape and past agricultural use of the landscape in this area. To the north west of M4 junction 34 is the grade II registered park and garden at Miskin Manor, which comprises a landscape park, Victorian and Edwardian pleasure grounds and a walled kitchen garden. The park and garden are of regional/ national importance. The essential setting of the park and garden is located to the west and north of the park, adjacent to the M4 and A4119 respectively and outside the study area.
Landscape	The study area falls within the Ely Valley and Ridge Slopes Valley Special Landscape Area (SLA). The key ecological constraints to the proposed development in the study area are: • River Ely SSSI south of the railway; appropriate construction buffers would need to be implemented to the SSSI boundary and riverbank. Any works within the SSSI boundary would need assent from Natural Resources Wales and a method statement to protect designated features agreed. • Pre-construction checks for otters Lutra within 30m of the riverbank should be undertaken. Pollution prevention guidelines to protect water quality of surface and ground waters would need to be followed during construction and lighting mitigation to retain the river as a dark corridor put in place. • SINCs and TPOs north of the railway: works should avoid or minimise impacts to these areas to avoid damaging priority habitats (woodland, marshy grassland, ponds). If works in the SINCs cannot be avoided a detailed botanical survey would be required to identify the plant communities within the SINC and design appropriate mitigation measures to ensure no net loss of biodiversity. Construction would need to follow sensitive vegetation clearance and habitat translocation, or compensatory planting may be required to provide an area of habitat of the same or greater area.
Public Rights of Way	There are two Public Rights of Way (PRoW) located south of the River Ely and one to the east of the Renishaw Factory: P2/38/1 P2/18/2 P6/9/1

Constraint	Description
Timetable and Feasibility Constraints	The availability of suitable capacity on the South Wales Main Line to accommodate additional rail services, and impact on existing stations and services (e.g. Pontyclun).

2.13 Scheme Risks

2.13.1 The key risks associated with the proposed railway station are summarised in Table 14. Risks specific to each of the development locations have been captured as part of the strategic appraisal of options.

Table 14 Vale of Glamorgan Gateway Railway Station | Scheme Risks

Risk	Description
Land Acquisition	Location 1, Location 3 and Location 4 are situated on land that retains extant outline planning permission granted under application reference 2014/00228/EAO (dated 30 Jul 2015) for privately funded development by Renishaw comprising class B1, B2 and 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. Negotiation and agreement with Renishaw would be required to facilitate rail development at these locations. **Note |** Whilst agreement with Renishaw represents a key item to address, the potential wider benefits for the proposed Renishaw development could be substantial following the implementation of a railway station. Such benefits could be realised with regard to commercial land/ property value and sustainable accessibility with all parts of the proposed development within reasonable walking distance of all four station location options.
Topographic Survey Data	Topographic survey data is OS contours at 5m intervals and is accurate to +/- 2m which could affect earthworks and accuracy of design.
Ecology	Local wildlife and TPOs in the area could be affected or damaged by implementation of a new railway station and associated works.
Heritage	Unknown archaeology could be encountered during detailed design phases and construction.
Flooding and Water Courses	Some sites are located in the floodplain of the River Ely and water courses are located within the study area.
Rail Infrastructure	Further investigative/ feasibility work is required to consider the impact on extant rail infrastructure including signalling, permanent way, telecommunications and E&P. The cost and programme implications would depend on the extent of mitigation works required.
Highway Capacity | M4 Junction 34	The demand forecasting exercise has identified the potential for significant highway capacity issues arising at the M4 Junction 34 junction, assuming implementation of the proposed Renishaw development (2014/00228/EAO; approval dated 30 Jul 2015).

2.14 Appraisal of Options

2.14.1 At this stage in the WelTAG process, the options have been assessed in terms of how each would tackle the identified problems, to what extent it meets the objectives, including contributing to local, regional and national well-being objectives, as well as key risks, adverse impacts, constraints and dependencies. The appraisal of objectives is described using the WelTAG seven-point assessment scale as set out in Table 1. The Well-Being goals have been assessed using the framework provided, as guidance to supplement WelTAG[15]. For the strategic case, the impacts of the do-minimum scenario are also set out compared to the Base Year situation. This enables an understanding of what will happen if only limited investment is made in the transport connections and provides a basis for comparing the performance of the do-something options.

2.14.2 **Given the broad similarities between the four location options, differences within the tables have been highlighted in bold text to outline key information, especially with regard to the risks, constraints and adverse impacts of each option.**

- Table 15 | Do-Minimum Strategic Option Appraisal
- Table 16 | Location 1 Land South East of the Extant Renishaw Development
- Table 17 | Location 2 Land South of the Railway between the Railway and River Ely
- Table 18 | Location 3 Situated on Marshland and Woodland West of Renishaw
- Table 19 | Location 4 Existing Renishaw Car Park

Table 15 Do-Minimum Strategic Option Appraisal

Do-Minimum	
Description	Assume continued delivery of transport enhancements via the Local Transport Plan and utilising existing sources of funding but assumes no step change in the level of funding or delivery of any major transport enhancements within the study area (assumes current levels of investment). Assumes the continuation of local bus services and community transport at a similar level as present utilising funding at similar levels to existing. Assumes continued work by local authorities and stakeholders to deliver improvements to the transport network, with the overall aim of addressing the identified problems and the outcomes of the relevant transport policies. This includes the implementation of existing Network Rail, Transport for Wales and Welsh Government strategic funding programmes to enhance the rail network within and near to the defined study area.
How it tackles the problems	The Do-Minimum scenario offers no viable alternative to use of the car exacerbating existing congestion issues on the local highway network, which are likely to worsen with planned committed development in the area (both within and external to the Vale of Glamorgan). High use of the private car for local and regional trips (e.g. journeys to work) is therefore likely to remain as a key problem, including environmental issues associated with high use of the car (adverse greenhouse emissions and noise pollution). Limited available funding (both capital and revenue) and resources are unlikely to make a step difference in overcoming the identified problems. The Do-Minimum Scenario 1 and Do-Minimum Scenario 3 (with Renishaw development) assessed as part of the SEWTM appraisal (which assumes no Vale of Glamorgan Gateway Station) has identified a neutral (zero growth) to negative (-20,369 user rail trips) rail user growth respectively.

[15] https://futuregenerations.wales/wp-content/uploads/2018/11/FGCW-Framework.pdf

Do-Minimum			
How it Contributes to Well-Being Goals		A prosperous Wales	0
		A resilient Wales	0
		A healthier Wales	0
		A more equal Wales	0
		A Wales of cohesive communities	0
		A Wales of vibrant culture and Welsh language	0
		A globally responsible Wales	0
Objectives | Review	**Overall**	Overall, the do-minimum scenario is considered to have an adverse effect at meeting the objectives as no step change in transport provision will be established, over and above that already planned for the rail network. It subsequently assumes that background increases in population and traffic growth exceed investment provision to mitigate increasing impacts and pressure on the existing transport network. It should be noted that policies and programmes are in place to facilitate improved transport/ rail services throughout the region, although the specific allocation of funding means that beneficial enhancements to the defined study area are currently difficult to achieve. A negative impact on the environment is forecast as the traffic levels between Junction 34 and the A48 would continue to increase, as well as those on the strategic network. The well-being of local communities in the local appraisal area would be anticipated to deteriorate, in the absence of schemes able to promote enhanced health and well-being and mitigate the adverse impact of increased traffic impacts.	
Objectives | Scoring	**O1**	Enhance connectivity to Cardiff Airport and strategic employment sites in the region.	0
	O2	Increase transport options for strategic access and access to and from local communities.	0
	O3	Improve network resilience and road safety on the M4, A48 and A4232 corridors and other connecting roads.	–
	O4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area.	–
	O5	Minimise impacts on communities and support social inclusion and health and well-being.	–
Key Risks		Potential reductions in available funding and resources leading to poor investment in public transport and local highway infrastructure. Do-minimum option will mean that connectivity to residential areas, strategic economic centres and key services/ facilities (including Cardiff Airport) remains a key issue, and not being seen to tackle existing issues or support local and regional development aspirations.	

Do-Minimum	
Adverse Impacts	The anticipated increase in annual traffic volumes (general background traffic growth plus local LDP development) is anticipated to have a significant adverse impact on the environment compared to the existing situation. Potential for a deterioration in highway safety on routes between M4 Junction 34 and A48, as well as on the strategic network, most notably through Pendoylan with potential for local increases in traffic flow. Potential for increased congestion on the alternative routes to strategic employment sites including the A4232 and A48 and potential for adverse development of socio-economic opportunities with restrained accessibility to sustainable travel opportunities. Deterioration of the quality of environment and journey times on the Pendoylan corridor as well as the strategic road network (M4, A4232 and A48) encompassing increase journey time delay, environmental issues, and anticipated worsening of highway junction capacity.
Constraints	The do-minimum is considered to be relatively unconstrained although any restriction with regard to the availability of funding and resources could jeopardise standard maintenance/ enhancement proposals.
Dependencies	The implementation of the Five Mile Lane improvement is anticipated to have impacted on transport in the study area. The growth of the Airport, strategic employment sites and other development (including residential) in the sub-region is related to the level of impacts, as well as the transport issues in the do-minimum, potentially constraining growth.

Table 16 Location 1 | Land South East of the Extant Renishaw Development

Location 1 | Land South East of the Extant Renishaw Development	
Description	**The option encompasses the implementation of a Vale of Glamorgan Gateway Station located south east of the Renishaw factory, north of the South Wales Main Line.** Specific deliverables would be subject to GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection but would be anticipated to encompass a station building with ticket office, waiting areas, café and toilet facilities, **a 1,151 space Park and Ride facility with bus integration**, covered cycle parking facilities, two 300-metre length platforms, a footbridge with lifts connecting between the platforms, as well as support staff situated on-site. **A new approach road would interconnect the railway station to an existing unclassified road interconnecting with M4 Junction 34 that presently provides access to the Renishaw factory.** It would be assumed that a new railway station at this location would provide frequent rail service east towards Cardiff and west towards Swansea, with the large Park and Ride facility allowing for robust integration for passengers. It is anticipated that any such facility would provide an integrated bus service between the railway station and strategic employment sites and Cardiff Airport, as well as other regional employment centres. **Reference general arrangement drawing 10028657-ARC-00-XX-DR-CE-00001.**

Location 1 | Land South East of the Extant Renishaw Development			
How it tackles the problems		This option has the potential to tackle the following problems – P02 / P03 / P04 / P06: • A Vale of Glamorgan Gateway Station with bus integration has the potential to make travel by non-car means an attractive option, reducing dependency on the private car. This may have regional benefits, notably for rail service access to and from the A4119/ Rhondda Valley area, as well as from the M4 corridor. • The option has the potential to positively support improved sustainable accessibility to and from Cardiff Airport as well as other strategic destinations that are regional and outside of Wales. • The option has the potential to help mitigate existing congestion issues on the strategic road network by encouraging trips to be made by more sustainable means. • The potential to remove car trips from the regional highway network is anticipated to help mitigate adverse environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution. However, there could be additional traffic on the local road network to the south on routes from the A48, exacerbating existing issues. Research completed by Cardiff Capital Region has identified a 0.6% reduction in GVA per job filled for the region between 2014 to 2016 and neutral growth for the Vale of Glamorgan, with Cardiff Capital Region also scoring lowly on the 2019 UK Competitiveness ranking (UKCI). Connectivity is subsequently seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of existing low levels of productivity. Supporting development of a prosperous, sustainable economy (as well as enhanced accessibility to social facilities and services) is further promoted by national, regional and local policy (see Impacts Assessment Report), including that promoted by the Vale of Glamorgan Council and Welsh Government, with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling.	
How it Contributes to Well-Being Goals		A prosperous Wales	++
		A resilient Wales	-
		A healthier Wales	+
		A more equal Wales	+
		A Wales of cohesive communities	++
		A Wales of vibrant culture and Welsh language	0
		A globally responsible Wales	0
	O1	A Vale of Glamorgan Gateway Station provides an opportunity to contribute towards enhanced sustainable connectivity within, to and from the region. If	

Location 1 | Land South East of the Extant Renishaw Development			
Objectives | Review		developed in combination with bus services to and from the strategic employment sites, there is potential for modal shift to public transport.	
	O2	The option would help promote sustainable access with the potential to reduce both local and strategic car-based trip distances. There may be changes in traffic patterns to access the station which would need to be investigated.	
	O3	Enhancing options for travel by sustainable modes of transport is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network subsequently has the potential to improve highway network resilience and road safety particularly on the M4 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station.	
	O4	There are flood risk and biodiversity constraints along the rail corridor which might mean adverse impacts from a station facility. The potential for the option to reduce the number of car-based trips could however retain a long-term positive impact on the effects of climate change, with a reduction in associated vehicle emissions as well as reductions in noise pollution.	
	O5	A Vale of Glamorgan Gateway Station has the potential to proactively enhance social inclusion throughout the region by expanding transport options and affording improved sustainable accessibility.	
Objectives | Scoring	**O1**	Enhance connectivity to Cardiff Airport and strategic employment sites in the region	+
	O2	Increase transport options for strategic access and access to and from local communities	+++
	O3	Improve network resilience and road safety on the M4 and A4232 corridors and other connecting roads	+
	O4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area	-
	O5	Minimise impacts on communities and support social inclusion and health and well-being	++
Key Risks		Delivery would be in the medium to long term, given the rail industry and planning requirements, likely funding constraints in current programmes and development work required to take the option forward. There are considerable pressures on funding for the Metro network. There would be a need to demonstrate robust regional/ national value against other large-scale transport schemes and City Deal proposals. Constructability and operational impacts of a new railway station on the South Wales Main Line. There would be a need for further feasibility work to be undertaken. There is a risk that a new station brings disbenefits to other communities through changes in timetabling and journey times. Suitable land availability and land acquisitions (time and cost). Environmental considerations (time and cost).	

Location 1 | Land South East of the Extant Renishaw Development	
	South platform is far from existing signalling and may need repeater.
Adverse Impacts	**The station site is furthest site away from M4 Junction 34 and would require the longest approach road out of the four locations. Furthest distance for buses and cyclists.** **Access is likely to lead to loss of parts of a SINC: Land South West of Llanfarach Farm SINC consisting of UK BAP Priority Habitat of lowland mixed deciduous woodland, wet woodland and ponds.** **Loss of potential priority habitats (woodland and marshy grassland) – habitat translocation and/or mitigation planting would be required. Further botanical survey work would be required to ascertain value of grassland.** **Habitats present may support protected and priority species including dormouse, bats, badger, breeding birds, great crested newts (breeding and terrestrial), reptiles and is likely to be of conservation value for terrestrial invertebrates.** **Land is known to have flooded in the past (Zone B designation in the DAM).** **Potential for currently unknown archelogy, of unknown value, to be present. Further survey and assessment required.** **Significant tree loss.** **Long walking distance for passengers as platform entrance at end of platform.**
Constraints	The availability of suitable capacity on the South Wales Main Line to accommodate additional rail services, and impact on existing stations and services (e.g. Pontyclun). Availability of funding and resources. The option does not address the constrained road network between the proposed station and the A48. **The GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A (10028657-ARC-00-XX-RP-ZZ-00001) accompanying this WelTAG appraisal has considered Location 1 and dismissed the option on the basis that Renishaw has been granted outline planning permission (reference 2014/00228/EAO) for proposed commercial development at this site location. Moreover, a reserved matters application (appearance, scale, layout, access and landscaping) for the first phase of development relating to Zones A, W, Y and Z providing 33,909 sqm of employment floorspace (Use Class B1, B2 and B8) and associated works was registered in December 2019 and is under consideration.**
Dependencies	Welsh Government/ Transport for Wales priorities and committed expenditure. Local authority delivery programmes. Development of new highway infrastructure to realise the full potential for any proposed bus Park and Ride scheme integrating with the Vale of Glamorgan Gateway Station by establishing robust journey times and reliability. Investment and 'buy-in' from rail industry/ train operator. Ability to acquire all land required to facilitate the option.

Table 17 Location 2 | Land South of the Railway between the Railway and River Ely

Location 2 | Land South of the Railway between the Railway and River Ely	
Description	**The option encompasses the implementation of a Vale of Glamorgan Gateway Station located south of the South Wales Main Line, between the railway and River Ely.** Specific deliverables would be subject to GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection but would be anticipated to encompass a station building with ticket office, waiting areas, café and toilet facilities, **a 727 space Park and Ride facility with bus integration**, covered cycle parking facilities, two 300-metre length platforms, a footbridge with lifts connecting between the platforms, as well as support staff situated on-site. **Access to the Park and Ride facility would be via a new junction off the Pendoylan road.** It would be assumed that a new railway station at this location would provide frequent rail service east towards Cardiff and west towards Swansea, with the large Park and Ride facility allowing for robust integration for passengers. It is anticipated that any such facility would provide an integrated bus service between the railway station and strategic employment sites and Cardiff Airport, as well as other regional employment centres. **Reference general arrangement drawing 10028657-ARC-00-XX-DR-CE-00002.**
How it tackles the problems	This option has the potential to tackle the following problems – P02 / P03 / P04 / P06: • A Vale of Glamorgan Gateway Station with bus integration has the potential to make travel by non-car means an attractive option, reducing dependency on the private car. This may have regional benefits, notably for rail service access to and from the A4119/ Rhondda Valley area, as well as from the M4 corridor. • The option has the potential to positively support improved sustainable accessibility to and from Cardiff Airport as well as other strategic destinations that are regional and outside of Wales. • The option has the potential to help mitigate existing congestion issues on the strategic road network by encouraging trips to be made by more sustainable means. • The potential to remove car trips from the local and regional highway network is anticipated to help mitigate adverse environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution. However, there could be additional traffic on the local road network to the south on routes from the A48, exacerbating existing issues. Research completed by Cardiff Capital Region has identified a 0.6% reduction in GVA per job filled for the region between 2014 to 2016 and neutral growth for the Vale of Glamorgan, with Cardiff Capital Region also scoring lowly on the 2019 UK Competitiveness ranking (UKCI). Connectivity is subsequently seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of existing low levels of productivity. Supporting development of a prosperous, sustainable economy (as well as enhanced accessibility to social facilities and services) is further promoted by

Location 2 | Land South of the Railway between the Railway and River Ely			
		national, regional and local policy (see Impacts Assessment Report), including that promoted by the Vale of Glamorgan Council and Welsh Government, with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling.	
How it Contributes to Well-Being Goals		A prosperous Wales	++
		A resilient Wales	-
		A healthier Wales	+
		A more equal Wales	+
		A Wales of cohesive communities	++
		A Wales of vibrant culture and Welsh language	0
		A globally responsible Wales	0
Objectives | Review	**O1**	A Vale of Glamorgan Gateway Station provides an opportunity to contribute towards enhanced sustainable connectivity within, to and from the region. If developed in combination with bus services to and from the strategic employment sites, there is potential for modal shift to public transport.	
	O2	The option would help promote sustainable access with the potential to reduce both local and strategic car-based trip distances. There may be changes in traffic patterns to access the station which would need to be investigated.	
	O3	Enhancing options for travel by sustainable modes of transport is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network subsequently has the potential to improve highway network resilience and road safety particularly on the M4 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station.	
	O4	There are flood risk and biodiversity constraints along the rail corridor which might mean adverse impacts from a station facility. The potential for the option to reduce the number of car-based trips could however retain a long-term positive impact on the effects of climate change, with a reduction in associated vehicle emissions as well as reductions in noise pollution.	
	O5	A Vale of Glamorgan Gateway Station has the potential to proactively enhance social inclusion throughout the region by expanding transport options and affording improved sustainable accessibility.	
Objectives | Scoring	**O1**	Enhance connectivity to Cardiff Airport and strategic employment sites in the region	+
	O2	Increase transport options for strategic access and access to and from local communities	+++
	O3	Improve network resilience and road safety on the M4 and A4232 corridors and other connecting roads	+

Location 2 | Land South of the Railway between the Railway and River Ely			
	O4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area	-
	O5	Minimise impacts on communities and support social inclusion and health and well-being	++
Key Risks		Delivery would be in the medium to long term, given the rail industry and planning requirements, likely funding constraints in current programmes and development work required to take the option forward. There are considerable pressures on funding for the Metro network. There would be a need to demonstrate robust regional/ national value against other large-scale transport schemes and City Deal proposals. Constructability and operational impacts of a new railway station on the South Wales Main Line. There would be a need for further feasibility work to be undertaken. There is a risk that a new station brings disbenefits to other communities through changes in timetabling and journey times. Suitable land availability and land acquisitions (time and cost). **Environmental considerations (time and cost), including the presence of multiple watercourses, flood plain and position adjacent to a SSSI.**	
Adverse Impacts		**The station would require a new access junction off the Pendoylan road with the potential to establish traffic congestion on the local highway network.** **Access will lead to the loss of a small area of potential priority habitat (broadleaved plantation woodland). Habitat translocation and/or mitigation planting would be required.** **Connecting habitat along the railway would be lost.** **A construction buffer of 10-20m to the River Ely SSSI would need to be in place to protect the river and its wildlife from pollution, lighting and disturbance (noise/people).** **Habitats present may support protected and priority species including dormouse (woodland only, some of which may be retained), bats, otter, badgers, great crested newts (breeding and terrestrial) and breeding birds.** **Located in the floodplain of the River Ely. Development would need to ensure there is no increase to third party flood risk and ensure that the flood risk onsite is suitable for the type of development proposed. Given the constrained nature of this location, offsite mitigation is likely to be required.** **This is the second closest option to the scheduled monument (circa 20m), likely to cause change to the setting and impact to significance. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.** **Area visible from the adjacent local highway network establishing an adverse landscape impact.**	
Constraints		The availability of suitable capacity on the South Wales Main Line to accommodate additional rail services, and impact on existing stations and services (e.g. Pontyclun).	

Location 2 | Land South of the Railway between the Railway and River Ely	
	Availability of funding and resources. The option does not address the constrained road network between the proposed station and the A48.
Dependencies	Welsh Government/ Transport for Wales priorities and committed expenditure. Local authority delivery programmes. Development of new highway infrastructure to realise the full potential for any proposed bus Park and Ride scheme integrating with a Vale of Glamorgan Gateway Station by establishing robust journey times and reliability. Investment and 'buy-in' from rail industry/ train operator. Ability to acquire all land required to facilitate the option.

Table 18 Location 3 | Situated on Marshland and Woodland West of Renishaw

Location 3 | Situated on Marshland and Woodland West of Renishaw	
Description	**The option encompasses the implementation of a Vale of Glamorgan Gateway Station located north of the South Wales Main Line and north west of the existing Renishaw factory.** Specific deliverables would be subject to GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection but would be anticipated to encompass a station building with ticket office, waiting areas, café and toilet facilities, **a 918 space Park and Ride facility with bus integration**, covered cycle parking facilities, two 300-metre length platforms, a footbridge with lifts connecting between the platforms, as well as support staff situated on-site. **A new junction access would interconnect the car park to the existing unclassified road interconnecting with M4 Junction 34 that presently provides access to the Renishaw factory.** It would be assumed that a new railway station at this location would provide frequent rail service east towards Cardiff and west towards Swansea, with the large Park and Ride facility allowing for robust integration for passengers. It is anticipated that any such facility would provide an integrated bus service between the railway station and strategic employment sites and Cardiff Airport, as well as other regional employment centres. **Reference general arrangement drawing 10028657-ARC-00-XX-DR-CE-00003.**
How it tackles the problems	This option has the potential to tackle the following problems – P02 / P03 / P04 / P06: • A Vale of Glamorgan Gateway Station with bus integration has the potential to make travel by non-car means an attractive option, reducing dependency on the private car. This may have regional benefits, notably for rail service access to and from the A4119/ Rhondda Valley area, as well as from the A48 corridor in the Vale of Glamorgan. • The option has the potential to positively support improved sustainable accessibility to and from Cardiff Airport as well as other strategic destinations that are regional and outside of Wales. • The option has the potential to help mitigate existing congestion issues on the strategic road network by encouraging trips to be made by more sustainable means.

Location 3 | Situated on Marshland and Woodland West of Renishaw			
		• The potential to remove car trips from the local and regional highway network is anticipated to help mitigate adverse environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution. However, there could be additional traffic on the local road network to the south on routes from the A48, exacerbating existing issues. Research completed by Cardiff Capital Region has identified a 0.6% reduction in GVA per job filled for the region between 2014 to 2016 and neutral growth for the Vale of Glamorgan, with Cardiff Capital Region also scoring lowly on the 2019 UK Competitiveness ranking (UKCI). Connectivity is subsequently seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of existing low levels of productivity. Supporting development of a prosperous, sustainable economy (as well as enhanced accessibility to social facilities and services) is further promoted by national, regional and local policy (see Impacts Assessment Report), including that promoted by the Vale of Glamorgan Council and Welsh Government, with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling.	
How it Contributes to Well-Being Goals		A prosperous Wales	++
		A resilient Wales	-
		A healthier Wales	+
		A more equal Wales	+
		A Wales of cohesive communities	++
		A Wales of vibrant culture and Welsh language	0
		A globally responsible Wales	0
Objectives | Review	**O1**	A Vale of Glamorgan Gateway Station provides an opportunity to contribute towards enhanced sustainable connectivity within, to and from the region. If developed in combination with bus services to and from the strategic employment sites, there is potential for modal shift to public transport.	
	O2	The option would help promote sustainable access with the potential to reduce both local and strategic car-based trip distances. There may be changes in traffic patterns to access the station which would need to be investigated.	
	O3	Enhancing options for travel by sustainable modes of transport is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network subsequently has the potential to improve highway network resilience and road safety particularly on the M4 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station.	

Location 3 | Situated on Marshland and Woodland West of Renishaw			
	O4	There are flood risk and biodiversity constraints along the rail corridor which might mean adverse impacts from a station facility. The potential for the option to reduce the number of car-based trips could however retain a long-term positive impact on the effects of climate change, with a reduction in associated vehicle emissions as well as reductions in noise pollution.	
	O5	A Vale of Glamorgan Gateway Station has the potential to proactively enhance social inclusion throughout the region by expanding transport options and affording improved sustainable accessibility.	
Objectives | Scoring	**O1**	Enhance connectivity to Cardiff Airport and strategic employment sites in the region	+
	O2	Increase transport options for strategic access and access to and from local communities	+++
	O3	Improve network resilience and road safety on the M4, A48 and A4232 corridors and other connecting roads	+
	O4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area	-
	O5	Minimise impacts on communities and support social inclusion and health and well-being	++
Key Risks		Delivery would be in the medium to long term, given the rail industry and planning requirements, likely funding constraints in current programmes and development work required to take the option forward. There are considerable pressures on funding for the Metro network. There would be a need to demonstrate robust regional/ national value against other large-scale transport schemes and City Deal proposals. Constructability and operational impacts of a new railway station on the South Wales Main Line. There would be a need for further feasibility work to be undertaken. There is a risk that a new station brings disbenefits to other communities through changes in timetabling and journey times. Suitable land availability and land acquisitions (time and cost). **Environmental considerations (time and cost), including the presence of woodland and TPOs.** **The area is heavily vegetated and situated on woodland with priority habitat.** **There is a waterbody located in the area, but no further information is available at this stage.** **Signal sighting would be required. May require additional signals at platform ends.** **Goods loops has a speed limit of 15mph.**	
Adverse Impacts		**Extensive land preparation required and works damaging to the local environment and biodiversity.**	

Location 3 | Situated on Marshland and Woodland West of Renishaw	
	Loss of a SINC (Land South West of Llanfarach Farm SINC) consisting of UK BAP Priority Habitat – lowland mixed deciduous woodland, wet woodland, and ponds. Habitat translocation and/ or mitigation planting would be required, which is likely to require additional land purchase requirements. **Loss of connectivity of woodland habitat along and across the railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development.** **Construction buffer to woodland and SINC immediately to the north would need to be in place.** **Habitats present may support protected and priority species including dormouse, bats, badgers, breeding birds and great crested newts (possibly breeding and terrestrial phase).** **Quite close (c. 100m) to the scheduled monument, possibility of change to setting and impact to significance. This is likely to be minor if intervening woodland is retained.** **Historic landscape feature of a pond is present within the site. Removal of this would impact coherence of locally important historic landscape.** **Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.** **Complete or partial loss of a TPO. Extensive woodland loss.** **Extensive land preparation required and works damaging to the local environment. Size of building may be restricted to allow for additional car parking spaces.**
Constraints	The availability of suitable capacity on the South Wales Main Line to accommodate additional rail services, and impact on existing stations and services (e.g. Pontyclun). Availability of funding and resources. The option does not address the constrained road network between the proposed station and the A48.
Dependencies	Welsh Government/ Transport for Wales priorities and committed expenditure. Local authority delivery programmes. Development of new highway infrastructure to realise the full potential for any proposed bus Park and Ride scheme integrating with a Vale of Glamorgan Gateway Station by establishing robust journey times and reliability. Investment and 'buy-in' from rail industry/ train operator. Ability to acquire all land required to facilitate the option.

Table 19 Location 4 | Existing Renishaw Car Park

Location 4 | Existing Renishaw Car Park	
Description	**The option encompasses the implementation of a Vale of Glamorgan Gateway Station north west of the Renishaw factory site encompassing the existing Renishaw car park.** Specific deliverables would be subject to GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection but

Location 4 | Existing Renishaw Car Park	
	would be anticipated to encompass a station building with ticket office, waiting areas, café and toilet facilities, **a 724 space Park and Ride facility with bus integration**, covered cycle parking facilities, two 300-metre length platforms, a footbridge with lifts connecting between the platforms, as well as support staff situated on-site. **A new junction access would interconnect the car park to the existing unclassified road interconnecting with M4 Junction 34 that presently provides access to the Renishaw factory.** It would be assumed that a new railway station at this location would provide frequent rail service east towards Cardiff and west towards Swansea, with the large Park and Ride facility allowing for robust integration for passengers. It is anticipated that any such facility would provide an integrated bus service between the railway station and strategic employment sites and Cardiff Airport, as well as other regional employment centres. **Reference general arrangement drawing 10028657-ARC-00-XX-DR-CE-00004.**
How it tackles the problems	This option has the potential to tackle the following problems – P02 / P03 / P04 / P06: • A Vale of Glamorgan Gateway Station with bus integration has the potential to make travel by non-car means an attractive option, reducing dependency on the private car. This may have regional benefits, notably for rail service access to and from the A4119/ Rhondda Valley area, as well as from the A48 corridor in the Vale of Glamorgan. • The option has the potential to positively support improved sustainable accessibility to and from Cardiff Airport as well as other strategic destinations that are regional and outside of Wales. • The option has the potential to help mitigate existing congestion issues on the strategic road network by encouraging trips to be made by more sustainable means. • The potential to remove car trips from the local and regional highway network is anticipated to help mitigate adverse environmental issues associated with high use of the car, including adverse greenhouse emissions and noise pollution. Research completed by Cardiff Capital Region has identified a 0.6% reduction in GVA per job filled for the region between 2014 to 2016 and neutral growth for the Vale of Glamorgan, with Cardiff Capital Region also scoring lowly on the 2019 UK Competitiveness ranking (UKCI). Connectivity is subsequently seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of existing low levels of productivity. Supporting development of a prosperous, sustainable economy (as well as enhanced accessibility to social facilities and services) is further promoted by national, regional and local policy (see Impacts Assessment Report), including that promoted by the Vale of Glamorgan Council and Welsh Government, with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling.

Location 4 | Existing Renishaw Car Park			
How it Contributes to Well-Being Goals		A prosperous Wales	++
		A resilient Wales	-
		A healthier Wales	+
		A more equal Wales	+
		A Wales of cohesive communities	++
		A Wales of vibrant culture and Welsh language	0
		A globally responsible Wales	0
Objectives | Review	**O1**	A Vale of Glamorgan Gateway Station provides an opportunity to contribute towards enhanced sustainable connectivity within, to and from the region. If developed in combination with bus services to and from the strategic employment sites, there is potential for modal shift to public transport.	
	O2	The option would help promote sustainable access with the potential to reduce both local and strategic car-based trip distances. There may be changes in traffic patterns to access the station which would need to be investigated.	
	O3	Enhancing options for travel by sustainable modes of transport is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network subsequently has the potential to improve highway network resilience and road safety particularly on the M4 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station.	
	O4	There are flood risk and biodiversity constraints along the rail corridor which might mean adverse impacts from a station facility. The potential for the option to reduce the number of car-based trips could however retain a long-term positive impact on the effects of climate change, with a reduction in associated vehicle emissions as well as reductions in noise pollution.	
	O5	A Vale of Glamorgan Gateway Station has the potential to proactively enhance social inclusion throughout the region by expanding transport options and affording improved sustainable accessibility.	
Objectives | Scoring	**O1**	Enhance connectivity to Cardiff Airport and strategic employment sites in the region	+
	O2	Increase transport options for strategic access and access to and from local communities	+++
	O3	Improve network resilience and road safety on the M4, A48 and A4232 corridors and other connecting roads	+
	O4	Protect and enhance the historic, built and natural environment including the landscape and settlement character of the study area	-

Location 4 | Existing Renishaw Car Park			
	O5	Minimise impacts on communities and support social inclusion and health and well-being	++
Key Risks		Delivery would be in the medium to long term, given the rail industry and planning requirements, likely funding constraints in current programmes and development work required to take the option forward. There are considerable pressures on funding for the Metro network. There would be a need to demonstrate robust regional/ national value against other large-scale transport schemes and City Deal proposals. Constructability and operational impacts of a new railway station on the South Wales Main Line. There would be a need for further feasibility work to be undertaken. There is a risk that a new station brings disbenefits to other communities through changes in timetabling and journey times. Suitable land availability and land acquisitions (time and cost). **Environmental considerations (time and cost), including the presence of woodland and TPOs.** **Signal sighting required. Potential for signal repeaters.**	
Adverse Impacts		**The car park would be located/ developed near scheduled monuments and areas of archaeological interest.** **Passenger demand forecasting has predicted congestion issues, assuming highway mitigation is not implemented on the local highway network.** **Semi-natural broadleaved woodland between hardstanding and railway track. Loss of potential priority habitat (woodland). Habitat translocation and/or mitigation planting would be required, which may require land for offset planting depending on the scheme footprint.** **Loss of connectivity of woodland habitat along railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development.** **Construction buffer to woodland and SINC immediately to the north would need to be in place.** **Habitats present may support protected and priority species, in particular dormouse, bats, badgers, breeding bird and great crested newts (terrestrial phase only).** **Closest option to the scheduled monument (circa 15m), likely to cause change to land setting and impact to significance. There is also potential to impact associated archaeological remains outside scheduled area that may be of equivalent national importance. Proximity to scheduled monument poses risk to granting of permission for development in this location.** **Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.**	
Constraints		**The site has planning permission granted for an alternative Renishaw development. Agreements required to use land.** **Small area known to have flooded in the past (Zone B designation in the DAM).**	

Location 4 | Existing Renishaw Car Park	
	The availability of suitable capacity on the South Wales Main Line to accommodate additional rail services, and impact on existing stations and services (e.g. Pontyclun). Availability of funding and resources. The option does not address the constrained road network between the proposed station and the A48.
Dependencies	Welsh Government/ Transport for Wales priorities and committed expenditure. Local authority delivery programmes. Development of new highway infrastructure to realise the full potential for any proposed bus Park and Ride scheme integrating with a Vale of Glamorgan Gateway Station by establishing robust journey times and reliability. Investment and 'buy-in' from rail industry/ train operator. Ability to acquire all land required to facilitate the option.

2.15 Overview

2.15.1 Consideration of the various options against the problems, objectives, well-being goals identifies that the four location options perform similarly in terms of their contribution to tackling the problems, objectives and well-being goals. A new station would positively contribute towards:

- Addressing problems, including congestion on the strategic road network and access to strategic employment opportunities.
- Meeting objectives, making a strong contribution to increasing transport options for strategic access and access to and from local communities and supporting health and wellbeing.
- The well-being goals, particularly a prosperous Wales and cohesive communities.

2.15.2 With regard to the regional economy, transport connectivity has been identified as critical towards supporting enhanced productivity and prosperity. Whilst Cardiff Capital Region is embracing the Metro as one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through the implementation of additional flagship initiatives, such as the Gateway Station, could further help address the issue of low productivity. The aspiration towards enhanced connectivity to support economic, social and environmental considerations is also recognised as part of wider national, regional and local policy and legislation with a common vision towards increased reliance on sustainable forms of transport including public transport, walking and cycling.

2.15.3 Whilst it is noted that the development of a station could bring environmental impacts such as loss of habitats and impacts on heritage assets and may lead to increased traffic issues on the local road network, it is anticipated that such impacts could be effectively mitigated over the longer term as the benefits of a new railway station are realised.

3 Transport Case

3.1 Overview

3.1.1 The aim of the transport case is to explain the expected impacts of the project, how the project will contribute to the well-being goals and whether a project will provide value for public money. The social, cultural, environmental and economic costs and benefits of each option are considered. The transport case presents the approach and assessment of impacts of each option under the headings of social, cultural, environmental and economic impacts and an evidence-based assessment of the following:

- What the impacts will be?
- The scale of those impacts.
- Where will they occur?
- Who/ what will experience them?

3.1.2 The four Vale of Glamorgan Gateway Station location options have been tested alongside the do-minimum option.

3.2 Approach to Impact Assessment

3.2.1 Where possible, other impacts have been quantified. At this stage social, cultural and environmental impacts have been assessed through measurement of receptors likely to be affected, but this is prior to technical surveys being undertaken and a full Environmental Impact Assessment (EIA), which will need to be progressed at Stage Three.

3.2.2 The impacts considered and the means of assessment for each is summarised below.

Social Impacts

3.2.3 The social impacts have been assessed with reference to the guidance in WebTAG Unit A4.12, with corresponding worksheets included within the Impacts Assessment Report. The assessment is qualitative. The topics covered are physical activity, security, severance, journey quality, option and non-use values, accessibility and personal affordability.

Cultural Impacts

3.2.4 The Future Generations of Wales (2015) Act 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*.' For this assessment, the cultural assessment is a qualitative commentary on any impacts on cultural assets and the Welsh language. Cultural assets considered include arts and cultural centres, visitor attractions, sports facilities and cultural heritage.

Environmental Impacts

3.2.5 The environmental impacts appraisal for this WelTAG Stage Two Plus report is based on WebTAG Unit A3.12 (Impacts Assessment Report). The topics covered are noise, air quality, greenhouse gases, landscape, townscape, historic environment, biodiversity and water environment. At this stage, most of the appraisal has been undertaken using desk top analysis. For landscape and visual impacts and biodiversity, site visits by professionals to identify key issues and constraints. The Impacts Assessment Report sets out the environmental data utilised to inform the appraisal.

Economic Impacts

3.2.6 A quantitative economic appraisal of the new station in accordance with WebTAG Unit A5.3 has not been undertaken at this stage. A qualitative appraisal has been given, drawing on the likely impacts and the demand forecasting.

3.3 Option Impact Assessment

3.3.1 The assessment of impacts for each of the options is provided within Appendix B with a summary of results outlined within Table 20. Each assessment is in comparison to the do-minimum in 2026 (the year for which the demand forecasting was available from SEWTM). The WelTAG seven-point assessment scale, as set out in Table 1, has been used to present the scale of the impact.

Table 20 Impact Assessment Summary

Impact	Do-Minimum	Location 1	Location 2	Location 3	Location 4
Social					
Physical Activity	0	+	+	+	+
Journey Quality	0	++	++	++	++
Accidents	-	+	+	+	+
Security	0	++	++	++	++
Access to Employment	-	++	++	++	++
Access to Services	-	++	++	++	++
Affordability	-	+	+	+	+
Severance	-	+	+	+	+
Option and Non-Use Values	-	+++	+++	+++	+++
Cultural					
Cultural Facilities	0	++	++	++	++
Welsh Language	0	+	+	+	+
Environmental					
Noise	0	-	-	-	-
Air Quality	-	+	+	+	+
Greenhouse Gases	-	+	+	+	+
Landscape	0	-	--	-	0
Townscape	0	0	0	0	0
Historic Environment	0	0	-	-	-
Biodiversity	0	--	--	--	-
Water Environment	-	-	---	-	-
Residential Amenity	0	0	0	0	0

Impact	Do-Minimum	Location 1	Location 2	Location 3	Location 4
Economic					
Journey Time Changes	-	+	+	+	+
Journey Time Reliability Changes	-	+	+	+	+
Transport Costs	-	+	+	+	+
Accidents	-	+	+	+	+
Wider Economic Impacts	-	++	++	++	++
Land and Property	0	---	-	---	-
Capital Costs	0	---	---	---	---
Revenue Costs	0	-	-	-	-

3.4 Transport Case Summary

3.4.1 The four proposed locations for the railway station perform similarly in terms of the social, cultural and economic assessment. The opportunities derived from a new railway station at Junction 34 of the M4 could especially realise positive change with regard to social impacts with enhanced security, access to employment and access to services observed. The potential for enhanced journey quality is considered, whilst access to cultural facilities and wider economic impacts are of particular benefit for the cultural and economic assessment respectively. Economic benefits to journey time changes and reliability, transport costs and accidents are also identified.

3.4.2 The key differences are specific to the aspects of the environmental appraisal and with specific regard to landscape, historic environment, biodiversity and water environment where adverse impacts are anticipated, although Location 4 generally demonstrates the least adverse impacts. However, it is anticipated that effective measures explored at the next stage of assessment could, to a large extent, reduce the environmental impacts. The land/ property and capital costs included as part of the economic assessment also demonstrate differences in scoring between all four location options with each site retained specific characteristics – a full economic/ value for money appraisal will need to be completed as part of a next stage of work.

4 Financial Case

4.1 Overview

4.1.1 The financial case *'presents information on whether an option is affordable in the first place and long-term financial viability. It covers both capital and annual revenue requirements over the life cycle of the project and the implications of these for the balance sheet, income and expenditure accounts of public sector organisations.'*

4.2 Option Costs

4.2.1 The capital (including Bill of Quantity items) and lifetime costs of developing a Vale of Glamorgan Gateway Station are not known at this stage and will be subject to development at GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection. The costs would arise from the start of Stage Three WelTAG up to and including delivery of the scheme. Costs beyond the scheme delivery would relate to ongoing maintenance and monitoring. The maintenance costs are dependent on the design characteristics of the proposed station. For the purposes of this report, a new Category D station cost with interchange facilities is typically **£25 million**, although consideration of detailed option costs would be subject to GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection.

4.3 Funding and Accounting Implications

4.3.1 It is assumed that funding for a Vale of Glamorgan Gateway Station is likely to be required as part of the Metro development, using funding via City Deal/ Transport for Wales/ Welsh Government. There are also anticipated to be contributions from the TOC through the franchise arrangements, given that the potential new station was included in the franchise tender process, as well as other private contributions from developers through Section 106 agreements. Ongoing revenue costs (as well as any income from car parking revenue, for example) would typically fall on the TOC. The potential for funding opportunities via the Department for Transport will also be explored.

4.4 Financial Case Assessment

4.4.1 At this stage of the assessment, the financial case is considered broadly similar across all four location options as summarised in Table 21. Capital costs for development will be influenced by key factors including third party land purchase costs and the requirement for environmental mitigation that will be considered in greater detail as part of the next stages of assessment. The report has also highlighted the location options retain with the proposed Renishaw development and that whilst there is potential to integrate the railway station development with the future plans for the wider LDP/ Renishaw site, further detailed consultation would be required with Renishaw to explore how potential benefits would be realised.

Table 21 Financial Case Assessment

Option	Lifetime Costs of the Project		Source of Funding	Accounting Implications	
Location 1 Location 2 Location 3 Location 4	---	The assumed total costs of developing a new railway station are high and for the purposes of this exercise are estimated and circa £25m. It is anticipated that high costs associated with delivering new rail services could be accommodated by wider regional investment. Revenue	Network Rail (capital) Welsh Government / Metro (capital and revenue) Local transport fund (capital)	Capital	Welsh Government Cardiff Capital Region City Deal Transport for Wales Rail Services in their capacity the TOC (dependent on franchise arrangements)

Option	Lifetime Costs of the Project	Source of Funding	Accounting Implications	
	implications are likely to exist throughout the lifetime of the project with any increases in services. Capital costs to purchase buses would be at the commencement of the project, but there would be continued revenue costs to maintain the vehicles and purchase replacement vehicles over time. Public and/ or private revenue implications are likely to exist throughout the lifetime of the project.	Transport for Wales Rail Services in their capacity as the TOC Cardiff Capital Region City Deal Private investment (other than TOC)		Private investment (other than TOC)
			Revenue	Welsh Government
			Revenue	Local Authorities via the Regional Transport Services Grant and Bus Services Support Grant from Welsh Government Welsh Government

5 Commercial Case

5.1 Overview

5.1.1 The commercial case covers *'whether it is going to prove possible to procure the scheme and then to continue with it in the future.'* The case considers the level and type of involvement from the private sector, as well as potential effects on the on-going viability of the option/ scheme. **Implementation of the commercial case would be subject to detailed discussion with Vale of Glamorgan Council, Welsh Government, Transport for Wales, Network Rail and the Department for Transport.**

5.2 Procurement Strategy

Outline Business Case

5.2.1 The WelTAG Stage Two Plus outline business case would need to be refined. An economic impact assessment should be undertaken encompassing a value for money appraisal of capital and lifetime costs. The scope of the supporting GRIP | Transport for Wales Stage product deliverables would be subject to agreement with key stakeholders, although it is assumed that a GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection study is completed to consider a preferred option. At this stage it is anticipated that the Vale of Glamorgan Council would procure the WelTAG and rail studies via competitive tender or framework, however the proposed procurement strategy is subject to confirmation.

Full Business Case

5.2.2 A WelTAG Stage Three study would need to be commissioned to progress development of the full business case for the preferred option. The scope of the GRIP | Transport for Wales Stage product deliverables would be subject to agreement with key stakeholders, although it is assumed that an initial GRIP Stage 4/ Transport for Wales Stage C Single Option Development study would be required to support the WelTAG appraisal. It is anticipated that the GRIP report would include the completion of environmental and topographical surveys to support development of the design together with ground investigation analysis. At this stage it is anticipated that the Vale of Glamorgan Council would procure the WelTAG and rail studies via competitive tender or framework, however the proposed procurement strategy is subject to confirmation.

Scheme Implementation

5.2.3 A consultant, contractor or a combination of both would be required to take the project forward through the statutory process, detailed design, construction and post-implementation. The different procurement options available for this stage are as outlined below:

- **Early Contractor Involvement (ECI) |** Under ECI, the Contractor is appointed under a two-stage Engineering and Construction Contract before the final scheme design has been fully developed and priced. This procurement method has its advantages where the construction of the project is complex.
- **Design and Build (D&B) |** Under a D&B Contract, the Employer employs a consultant under a Professional Services Contract who takes the project through the design and statutory process. A Contractor with Consultant is then procured to carry out the detailed design and construction of the works. This procurement method is more suited to the simpler projects where an ECI contractor wouldn't have much to bring the early stages of the design process.

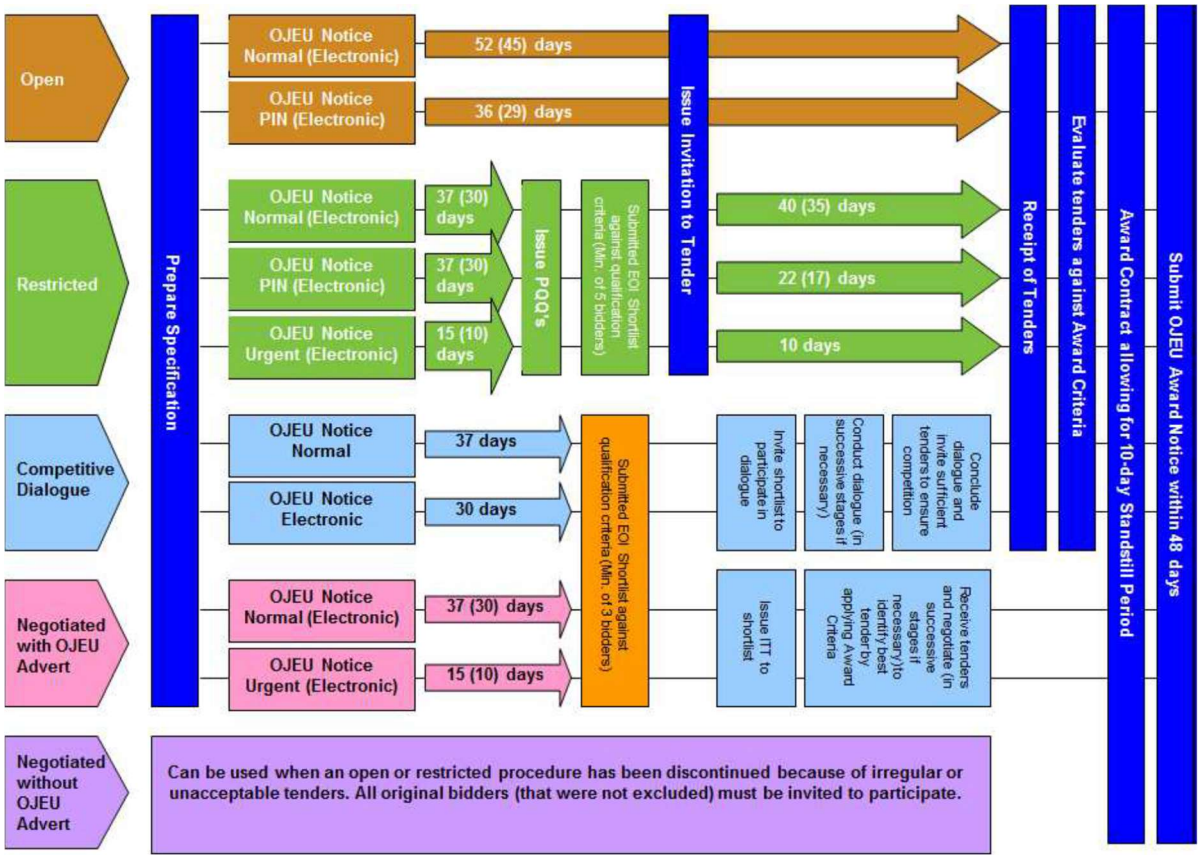
5.2.4 It is assumed that funding for a Vale of Glamorgan Gateway Station is likely to be required as part of the Metro development using funding via City Deal/ Welsh Government. There may also be opportunities for funding from Transport for Wales Rail Services (in their capacity as the TOC), the Department for Transport, as well as the potential for private contributions from developers through Section 106 agreements. Ongoing revenue costs (as well as any income from car parking revenue for example) would typically fall on the TOC.

5.2.5 The process of implementation and post-implementation would also need to be captured through formal completion of WelTAG stages four and five respectively. The principal aims of Stage Four and Five is to subsequently record what happens so that lessons can be learnt. They may lead to alterations to the current scheme and will form valuable evidence for use in future WelTAG appraisals. The procurement strategy of these two stages would be subject to confirmation

5.3 Procurement Process

5.3.1 Given the estimated contract value, an OJEU Prior Information Notice (PIN) would need to be published, giving potential bidders notification of the proposed contract. The PIN will detail the scope of works along with the cost estimate of the scheme. The procurement strategy adopted would follow the OJEU Restricted process as set out in Figure 6. This would mean that potential bidders for the work would need to complete and submit a Pre-Qualification Questionnaire (PQQ).

Figure 6 OJEU Process[16]



5.3.2 Bidders who successfully complete the PQQ process would then be invited to tender for the works in accordance with the procurement method, whether an ECI or ED contract. Subject to the outcome of the statutory procedures and the performance of the Contractor, the contract also provides a procedure for the Contractor to undertake the detailed design and construction of the works.

5.4 Suppliers

5.4.1 Within the OJEU Notice, the Employer can stipulate where the consultant/ contractor should operate. In addition to this the Employer can insert additional clauses into the contract which stipulates that the employed contractor/ consultant should make use of local resources/ materials/ suppliers where possible. A percentage of overall costs may also be inserted into the contract which ensures the

[16] Source: http://www.hacw.nhs.uk/our-services/procurement/ojeu-tenders/

employed contractor/ consultant complies with the relevant clauses and uses all local resources/ materials/ suppliers.

5.5 Contract Length

5.5.1 Within the Contract Notice, the duration of the chosen contract is estimated by providing an estimated start and end date. Subject to agreement with Welsh Government and Transport for Wales, it is anticipated that the contract would be structured around key stages relating to the Transport for Wales Plan of Works and Network Rail GRIP (Governance for Railway Investment Projects) process. These processes have been developed to manage and control capital investment projects by minimising and mitigating the risks associated with delivering such projects. Within each stage, an agreed set of products is delivered. Depending on the procurement method chosen, the following key stages are likely to apply, as outlined in Table 22.

Table 22 Transport for Wales and Network Rail Key Infrastructure Capital Stages

Transport for Wales Plan of Work					
Stage C Preliminary Design	Stage D Statutory Process	Stage E Detailed Design	Stage F Construct, Commission & Handover	Stage G Closeout	
GRIP 4 Single Option Development		GRIP 5 Detailed Design	GRIP 6 Construct, Test & Commission	GRIP 7 Scheme Handback	GRIP 8 Project Close Out
Network Rail GRIP Process					

5.6 Allocation of Risk

5.6.1 The allocation of risk would need to be covered in a project risk register following risk workshops conducted throughout the project design stage and further in the construction stage. Allocation of risk would also be specified in the chosen contracts, utilising contract conditions and any additional clauses required by the Employer.

5.7 Payment Mechanisms

5.7.1 The chosen contract will stipulate what the payment mechanisms/ arrangements are for each stage. However, the employer may make amendments to these payment processes to suit their requirements. Any amendments will be detailed in the relevant contract documents. If a Target Cost contract is utilised a pain/ gain mechanism would need to be developed identifying the necessary share. Therefore, any over-spend or under-spend is shared between the Employer and Consultant/ Contractor in accordance with these share ranges.

5.8 Whole Life Costs

5.8.1 There would be on-going revenue support required, although the extent of each is currently unknown.

6 Management Case

6.1 Overview

6.1.1 The management case considers the delivery arrangements for the project and how the project is going to be managed through its lifetime. The management case shows the project is achievable and identifies the different arrangements put in place to deliver the project.

6.1.2 At this stage of the appraisal it would be assumed that Vale of Glamorgan working with Transport for Wales, Network Rail and Welsh Government would be responsible for the delivery of a Vale of Glamorgan Gateway Station. This would be subject to confirmation.

6.1.3 The management and delivery of the scheme would likely follow the Transport for Wales Plan of Works and Network Rail GRIP process encompassing scheme initiation & feasibility, option selection, design development, construction and project close out. The development of a new railway station would subsequently be anticipated to be progressed in close consultation with integral stakeholders, as well as through public consultation.

6.2 Vale of Glamorgan Gateway Station

Project Plan

6.2.1 How the project is to be delivered is to be determined at WelTAG Stage Three.

Legal Requirements

6.2.2 Design and construction of the project will be undertaken with due consideration of the following key items:

- Construction (Design and Management) Regulations 2015.
- Equality Act 2010.
- Active Travel (Wales) Act 2013.
- The Wellbeing and Future Generations (Wales) Act 2015.
- Wales Act 2017 and Welsh Language Standards (Welsh Ministers, County and County Borough Councils, and National Park Authorities) Regulations 2015.
- The project should also conform to all EU and UK Environmental Legislation.

6.3 Governance

Organisational Structure

6.3.1 Depending on the type of procurement method used for further design and construction, the anticipated core parties involved in the delivery of the project would be:

- **The Employer |** To be confirmed (subject to discussion between the Vale of Glamorgan Council, Welsh Government and Transport for Wales Rail Services).
- **The Employer's Agent |** To be confirmed (acting as the Employer's representative, providing financial, project management, contract and technical advice throughout the project).

Design and Build Contract

- **Contractor |** Commissioned to undertake detailed design, construction and aftercare of the project.
- **Designers |** Commissioned to carry out the preliminary environmental and engineering design for the preferred route, as well as undertake all activities necessary for the publication of orders and procure the Contractor.

Early Contractor Involvement (ECI) Contract

- **ECI Contractor |** Commissioned to develop the outline design, prepare the necessary statutory orders and EIA documentation, publish draft Orders, progress the project through the statutory process, including Public Inquiry if required and, if successful, then to undertake the detailed design, construction and aftercare of the project.
- **ECI Contractor's Designers |** Employed by the ECI Contractor to carry out the preliminary environmental and engineering design, as well as undertake all activities necessary to complete the detailed design.

Project Reporting

6.3.2 It is anticipated that the project would be managed following the principles of the Transport for Wales Plan of Work and GRIP project management processes. The key stages of the project will form the stage boundaries and will require Project Board approval. The Employer is subject to confirmation, although would likely include individuals and departments identified by the Project Engineer and Project Director for the delivery of the project.

6.3.3 Interaction with the Employer, unless otherwise agreed, will be made through the Project Director or the Project Engineer as identified within the contract documents (once the procurement route has been determined). Progress meetings should be held at monthly intervals with the Designer/ Contractor/ Employers Agent and Employer. Quarterly Financial Review meetings should also be utilised to discuss financial matters and to ensure the project stays on track, within budget and to agreed timescales.

Communication and Stakeholder Management

6.3.4 To ensure the management of stakeholders and communication on the project is managed correctly, a Communications Plan should be drafted which identifies how all communications between project team members and external parties will be managed. All parties adhering to the Communications Plan should ensure that the needs of the Employer are met, and the project is delivered successfully.

Monitoring and Evaluation

6.3.5 Some of the monitoring that would be required to be undertaken during the life of the project are outlined below:

- Environmental aftercare
- Health and Safety File
- Safety audits following completion of design and then construction works

6.3.6 WelTAG includes the requirement for a detailed monitoring and evaluation plan to be drawn up at Stage Three. This plan would describe what evidence would be used in the project's evaluation report and how it will be collected. Evidence is required on the actual inputs used when implementing the scheme and during its on-going operation, what was actually delivered, the impacts experienced, to what extent the intervention met its objectives and how they were achieved.

Risk Management

6.3.7 Risk will be managed on the project in accordance with the procedures set out in GRIP | Transport for Wales Plan of Works. A risk workshop should be conducted early in the WelTAG Stage Three and GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection studies. A risk register should then be developed and reviewed and updated (where required) as a minimum every three months throughout the project's life.

7 Conclusions and Recommendations

7.1 Introduction

7.1.1 This WelTAG Stage Two Plus report has developed and appraised options to determine the requirements and feasibility of opening a new railway station in the Vale of Glamorgan located near to the M4 Junction 34. Consideration has been given towards how the options would address the study objectives and thereby counter the problems identified, whilst contributing to the goals of the Well-being of Future Generations (Wales) Act 2015, together with Welsh Government strategies and outcomes. The report represents an Outline Business Case for which an appraisal of the social, environmental, cultural and economic impacts has been undertaken.

7.1.2 At the end of WelTAG Stage Two, the guidance sets out that the report should:

- Determine whether there are any transport options that can address the issues identified, contributes positively to the well-being goals and objectives, and can be delivered within technical and financial constraints.
- Select a preferred option to be taken forward to Stage Three.
- Agree the methods to be used to provide additional evidence where required for Stage Three.
- Identify any legislative requirements that need to be met during Stage Three.
- Document the decisions of the WelTAG Stage Two Review Group, and the basis for these decisions.

7.2 Preferred Transport Option

7.2.1 The outline business case has considered the do-minimum situation and identified the relative changes from the do-something options in comparison. Without an intervention, local and strategic transport conditions are anticipated to worsen throughout the region, with forecast increases in traffic adversely impacting the performance of the transport network.

7.2.2 The provision of a Vale of Glamorgan Gateway Station has the subsequent potential to bring substantial sustainable travel benefits at a regional scale, particularly focussed on the M4 corridor and communities throughout south east Wales, and whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives (such as the Gateway Station) could further help address the issue of existing low levels of productivity.

7.2.3 Connectivity is seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Supporting development of a prosperous, sustainable economy, as well as enhanced accessibility to social facilities and services, is an approach promoted by national, regional and local policy with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling. And where there is opportunity to enhance the transport network interconnecting southwards within the Vale of Glamorgan (outside the scope of this study), then this would offer additional local and regional benefits for residents and businesses.

7.2.4 Following completion of the WelTAG Stage Two Plus study and GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A of the four location options, Location 4 (Existing Renishaw Car Park) is considered the most feasible solution. The option does have constraints relating to third party land ownership and agreements as the station would be positioned predominantly on an existing car park owned by Renishaw.

7.2.5 However, whilst further consultation would be required with Renishaw, initial talks have been constructive and indicated they are open to a potential multi-storey car park solution to facilitate the station's development. The potential wider benefits for the proposed Renishaw development could be substantial following the implementation of a railway station. Such benefits could be realised with regard to commercial land/ property value and sustainable accessibility with all parts of the proposed development within reasonable walking distance of all four station location options.

7.2.6 Renishaw do retain privately funded proposals to develop land surrounding Location 4 under application reference 2014/00228/EAO. Having already secured outline planning permission, their proposals are ahead in terms of planning and equivalent RIBA design stages. The integration of proposals would need to be agreed in advance as the Renishaw development is likely to be implemented ahead of any potential station development.

7.2.7 Several constraints were identified across all location options including the requirement for further detailed timetable analysis to establish how operational services will be timed-based on future rail timetables. An initial timetable study has concluded that it would not appear possible to include station calls at the new railway station without significant amendment of the timetable, as the additional required time cannot be absorbed by the current planning margins and turn rounds. The new station is likely to add at least four minutes to those services stopping at the station. The Miskin goods loops also provide additional resilience and redundancy for the railway, which may be affected by their utilisation for the new station. Route enhancements will be considered to mitigate this impact, although would be subject to separate analysis and consultation with Network Rail as the infrastructure owner and would inevitably import additional infrastructure cost for the project.

7.2.8 Given the forecast growth on the M4 and around Junction 34 (including the proposed Renishaw development), there is potential for significant traffic congestion to occur on the strategic highway network within the vicinity of a proposed railway station, principally at M4 Junction 34. In this scenario, the 2026 demand forecasting exercise identified a significant reduction in passenger demand from 133,969 users (establishing 60,245 new passenger trips) to 40,153 users, although this does rise extensively to 216,982 users (establishing 172,391 new passenger rail trips) should appropriate highway mitigation be implemented. This is because highway congestion is forecast in the transport model to suppress demand for the station. All demand forecast scenarios are subject to the assumptions implemented and the potential to stop London bound services could considerably increase demand beyond the existing forecast figures.

7.2.9 Wider consideration has already been given to addressing existing issues of congestion at the M4 Junction 34. A Welsh Government commissioned study (A470/ M4 WelTAG Stage 2; Draft 1; Arup; 10th July 2019) was tasked with identifying measures to tackle road-based congestion at the most severely congested locations on the M4 and A470 trunk roads (M4 Junction 32 to Junction 35 and A470 Coryton – Merthyr Tydfil). The brief was also extended to cover integration of public transport initiatives (heavy rail/ Metro), and to cover the A4232 and M4 between Junction 33 and Junction 32. The report concluded that an M4 Junction 34 Interchange option (signalisation and gyratory widening, with or without a new M4 Junction 34 to A48 link) was one of several key recommendations for progression to WelTAG Stage Three (Full Business Case) – a proposal that is anticipated to address existing congestion issues, whilst also establishing the capacity needed to support future local and regional development. In addition, the report concluded that a new railway station at Miskin (M4 Junction 34) be recommended for further consideration as part of separate studies.

7.2.10 Ownership of the new railway station and its facilities will need to be decided, determining whether Transport for Wales will own and operate the station or by default Network Rail will own the station and infrastructure with the Vale of Glamorgan Council owning and operating the car park. The management case will need to be developed through close consultation with key stakeholders.

7.2.11 It is notable that the accompanying GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A does not rule out the possibility of other nearby locations should the opportunity arise at GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection. This includes the potential to explore opportunities to the west of the current study area, on land south of the M4, together with parking situated to the south of the River Ely. The WelTAG process retains a robust framework from which to take forward and evolve station options for final option selection as part of a GRIP Stage 3/ Transport for Wales Stage B study incorporating enhanced consultation with key stakeholders including local authorities, Welsh Government, Transport for Wales Rail Services and Network Rail, together with other interested parties, especially given the potential national importance of this station.

7.2.12 Updated demand forecasting would be advised at the next stage of assessment with increased consideration and agreement given to the likely factors and variables that may affect the scheme. This could include assumptions not identified or incorporated as part of the GRIP Stage 1-2 | Transport for Wales Stage B demand forecasting exercise.

7.2.13 As the station will impact on Network Rail infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From an engineering perspective, the scheme is considered feasible based on existing information available for this study, although further development of design options will evolve the business case, including further clarity regarding the funding mechanisms that could be available to facilitate development.

7.2.14 With regard to ongoing development of the station design, the WelTAG report has identified two design parameters encompassing minimum and future proofed options. The minimum design would be a Category F unstaffed station with two platforms approximately 130m long connected by a footbridge with lifts, waiting shelters and parking provision for up to 500 spaces. A future proofed station would be staffed, have two sheltered/ canopied platforms approximately 300m long connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1,000 vehicles. **The preferred design option at this stage and as confirmed by the Vale of Glamorgan Council is for a Category D (future proofed) station as opposed to the minimum Category F option.**

7.2.15 Proposals for a new station require further, more detailed technical feasibility work as part of a GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection appraisal encompassing an economic value for money exercise. A significant timetable study will be required to review all the services that travel through the area as the typical stop is likely to add at least four minutes to the existing timetables, although it is positive that the principle of a new station in the Miskin area is incorporated into the new rail franchise. There were some comments made by stakeholders that it would be appropriate to retain the option of a bus Park and Ride at Junction 34. This might be best considered as part of ongoing discussions surrounding the Vale of Glamorgan Gateway Station.

7.3 Limitations

7.3.1 This WelTAG Stage Two Plus study has not been able to provide an economic appraisal and assessment of value for money, as the feasibility work has been at GRIP Stage 1-2 (without detailed costs) and the transport appraisal has provided high level demand forecasts. These areas of work as part of a GRIP 3 Study and prior to moving to a Stage Three WelTAG appraisal.

7.4 Recommendations

7.4.1 On the basis of this WelTAG Stage Two Plus study and the potential strategic socio-economic, cultural and environmental benefits identified in this outline business case, it is considered that the **Vale of Glamorgan Gateway Station (Location 4)** has merit in being taken forward for further consideration as part of an updated WelTAG Stage Two appraisal encompassing a full value for money assessment. Whilst Location 4 has been identified as the preferred location option, it is advised that the study considers the potential for an alternate location, primarily due to extant constraints that could adversely impact on implementation.

7.4.2 The WelTAG Stage Two consultation has provided an opportunity for the public to feedback on the Vale of Glamorgan Gateway Station option. A decision on whether to go forward with further investigations of options is a matter for the Review Group and Vale of Glamorgan Council to make based on the appraisal set out in this report and the consultation responses. As set out in the guidance, the Stage Three WelTAG study purpose *'is to make a full and detailed assessment of the preferred option to inform a decision as to whether or not to proceed to implementation.'* It should therefore be noted that until such time as a Review Group and the local authority has considered the outcomes of a Stage Three study, and the statutory planning processes have taken place, no decision would be made to deliver a scheme.

7.4.3 Overall, the Vale of Glamorgan Gateway Station appears to have large potential. The new station will be in close proximity to a motorway junction, giving it a strategic location close to existing and

potential areas of development and population. Accessibility to and from the station would be enhanced with the potential for a new or enhanced road infrastructure between the M4 Junction 34 and A48 (which is now subject to a separate WelTAG process), as well as the potential for M4 Junction 34 enhancements noted with that could alleviate congestion.

7.4.4 The station will offer quick direct trains into Cardiff Central with a journey time of just 10 minutes. The scheme is likely to be of regional importance, due to the location and potential of significant benefits to the South Wales area and will need general consensus from local authorities and Welsh Government.

7.5 Next Steps

7.5.1 The recommended next steps are as follows:

- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.
- Submission of GRIP Stage 1-2/ Transport for Wales Stage A to be brought in line with GRIP Product Deliverables, including the potential for an additional solution to be developed (as an alternative).
- Submission of GRIP Stage 3/ Transport for Wales Stage B Option Development and Selection.
- The scope of the GRIP product deliverables should be developed to encompass the following key activities where applicable:
  - Stakeholder engagement and consensus to determine likelihood of external factors.
  - Additional Demand Forecasting (dependent on external factors), route origin/ destination reviews, including additional detail on traffic impact within the Vale of Glamorgan road network.
  - Detailed timetable analysis, including the impact on freight services and resilience/ redundancy review in the rail network.
  - A timetable for ecological surveys required and likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).
  - Option cost estimation.
  - Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).

Glossary of Terms and Acronyms

AADT	Annual Average Daily Traffic
AEPMR	Annual Environmental Performance and Monitoring Report
AMCB	Analysis of Monetarised Costs and Benefits
BCR	Benefit Cost Ratio
CAA	Civil Aviation Authority
CCTV	Closed Circuit Television
COBALT	COst and Benefit to Accidents – Light Touch
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
D&B	Design & Build
EAP	Economic Action Plan
ECI	Early Contractor Involvement
ED	Employers Design
EIA	Environmental Impact Assessment
EU	European Union
EZ	Enterprise Zone
FCA	Flood Consequence Assessment
GRIP	Guide to Rail Investment Process
GVA	Gross Value Added
HCD	Highways Construction Detail
HGV	Heavy Goods Vehicle
KPH	Kilometres per Hour
KS	Key Stage
LDP	Local Development Plan
LTN	Local Transport Note
MPH	Miles per Hour
NO2	Nitrogen Dioxide
NRW	Natural Resources Wales
NPV	Net Present Value
NRSWA	New Roads and Street Works Act 1991 (and amendments)
NTEM	National Trip End Model
OB	Optimism Bias
OJEU	Official Journal of the European Union
OS	Ordinance Survey
PA	Public Accounts

PBA	Peter Brett Associates
PIN	Prior Information Notice
PQQ	Pre-Qualification Questionnaire
PRINCE2	PRojects IN Controlled Environments
PRoW	Public Right of Way
PVB	Present Value of Benefits
RCT	Rhondda Cynon Taf
RRRAP	Road Restraints Risk Assessment Process
SEWTM	South East Wales Transport Model
SINC	Site of Nature Conservation
SOA	Strategic Opportunity Areas
SSSI	Site of Special Scientific Interest
TEE	Transport Economic Efficiency
UK	United Kingdom
VOG	Vale of Glamorgan
WebTAG	Web-based Transport Analysis Guidance
WelTAG	Welsh Transport Appraisal Guidance
WFD	Water Framework Directive
WTS	Wales Transport Strategy

Appendix A

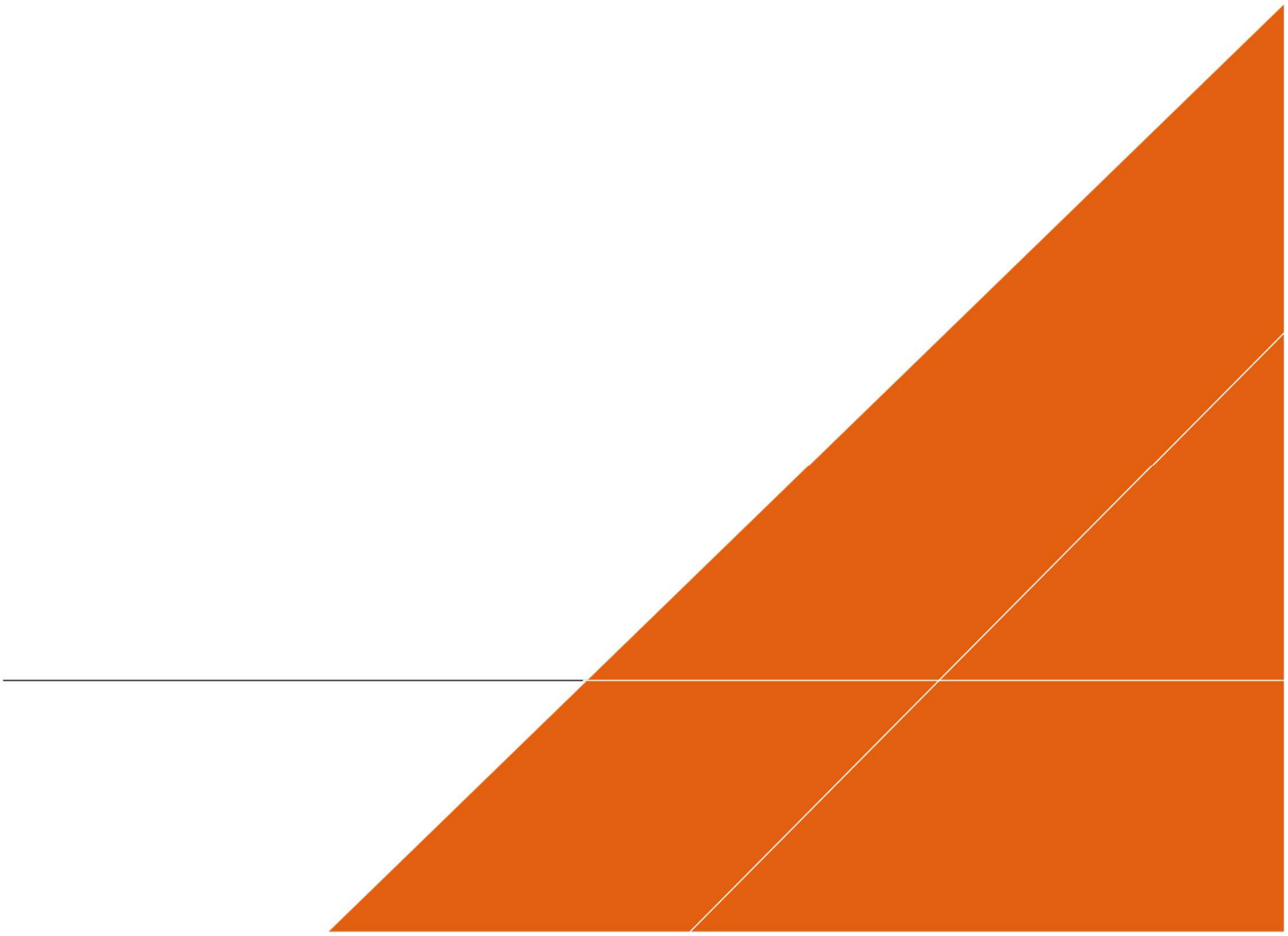
Vale of Glamorgan Gateway Station | GRIP Stage 1-2 Feasibility Report | Transport for Wales Stage A

ARCADIS Design & Consultancy for natural and built assets

VALE OF GLAMORGAN GATEWAY STATION

GRIP 1-2 Feasibility Report
TfW Stage A

SEPTEMBER 2020



Vale of Glamorgan Gateway Station

GRIP 1-2 Feasibility Report | TfW Stage A

Author	JO
Checker	MF
Approver	JH
Report No	10028657-ARC-00-XX-RP-ZZ-00001
Date	SEPTEMBER 2020

VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
P01	06/12/2019	ZS Assistant Engineer	JO Design Manager	JL Technical Director	First issue for comment
P02	17/12/2019	DH Senior Engineer	JO Design Manager	JO Design Manager	Updated following client comments
P03	28/02/2020	JO Design Manager	JH Senior Technical Director	JH Senior Technical Director	Updated following Review Group comments
P04	09/09/2020	JO Design Manager	MF Principal Transport Consultant	JH Senior Technical Director	Updated following client comments

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Abbreviations

AHBC	Automatic Half Barrier Crossing
AoD	Above Ordnance Datum
AQMA	Air Quality Management Area
BSA	Basic Service Agreement
BAPA	Basic Asset Protection Agreement
CASR	Cardiff Area Signalling Renewal
CCTV	Close Circuit Television
DAM	Welsh Government's Development Advice Map
DNO	Distribution Network Operator
DfT	Department for Transport
ELR	Engineers Line Reference
FRAP	Flood Risk Activity Permit
FCA	Flood Consequences Assessment
FoC	Freight Operating Company
GGAT HER	Glamorgan Gwent Archaeological Trust Historic Environment Record
GRIP	Governance of Railway Investment Projects
GWR	Great Western Railway
HABD	Hot Axle Box Detector
NR	Network Rail
NRW	National Resources Wales
MAGIC	Multi-Agency Geographic Information for the Countryside
OS	Ordnance Survey
OWC	Ordinary Watercourse Consents
PHCC	Points Heating Control Cubicle
PRoW	Public Right of Way
RIBA	Royal Institute of British Architects
ROGS	The Railway and Other Guided Transport Systems (Safety Regulations)
S&C	Switches and crossings
SAC	Special Areas of Conservation
SEWBReC	South-East Wales Biodiversity Records Centre
SEWTM	South East Wales Transport Model
SLA	Special Landscape Area
SINC	Site of Interest for Nature Conservation
SSSI	Site of Special Scientific Interest
SWCC	South Wales Control Centre
SWM2	South Wales Mainline 2
TAN	Welsh Government's Technical Advice Note
TfW	Transport for Wales
TOC	Train Operating Company
TPO	Tree Preservation Order(s)
TSI	Technical Specifications for Interoperability
TVM	Ticket Vending Machine
VDU	Visual Display Unit
WG	Welsh Government

TfW Plan of Works Comparison Table

	Initiate		Choose Options	Design			Build	Close	
TfW Plan of Works	**Stage A** Output Requirements and Options		**Stage B** Options Development and Selection	**Stage C** Preliminary Design	**Stage D** Statutory Process	**Stage E** Detailed Design	**Stage F** Construction, Commission and handover	**Stage G** Close Out	
Network Rail GRIP	**GRIP 1** Output Definition	**GRIP 2** Feasibility	**GRIP 3** Option Selection	**GRIP 4** Single Option development		**GRIP 5** Detailed Design	**GRIP 6** Construction, Test and Commission	**GRIP 7** Scheme Hand back	**GRIP 8** Close out
WelTAG	**Stage 1** Strategic Case		**Stage 2** Outline Business Case	**Stage 3** Full Business Case			**Stage 4** Implementation		**Stage 5** Post-Implementation
Highways-Infrastructure	**Stage A** Output Definition		**Stage B** Design Development	**Stage C** Preliminary Design (Pre-planning) Stage 1 Road Safety Audit	**Stage D** *Developed Design & Assessment , DAS, Planning Application*	**Stage E** Detailed Design Highway-Drainage Approvals (S278/ S104), Stage 2 RSA	**Stage F** Construction, and handover (Stage 3 Road Safety Audit)	**Stage G** Close Out	

Executive Summary

The Vale of Glamorgan Gateway Station is a proposal for a new transport interchange/ parkway development located near Junction 34 of the M4, close to Miskin and Hensol. The South Wales Mainline has two running tracks (ELR SWM2 179m 27ch) and at this location features the 'Miskin Loops', which provide two additional tracks (four tracks in total). The purpose of the loops is for freight trains to wait while faster passenger services overtake.

The aim of this Study was to review the suitability of the Miskin Loops for the new railway station and develop a GRIP 1-2/ TfW Stage A report to determine requirements and feasibility. The provision of a Vale of Glamorgan Gateway Station has the subsequent potential to bring substantial sustainable travel benefits at a regional scale, particularly focussed on the M4 corridor and communities throughout south east Wales, and whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives (such as the Gateway Station) could further help address the issue of existing low levels of productivity.

Connectivity is seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Supporting development of a prosperous, sustainable economy, as well as enhanced accessibility to social facilities and services, is an approach promoted by national, regional and local policy with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling. And where there is opportunity to enhance the transport network interconnecting southwards within the Vale of Glamorgan (outside the scope of this study), then this would offer additional local and regional benefits for residents and businesses.

To support the appraisal, an initial demand forecasting exercise has been completed with a Vale of Glamorgan Gateway Station forecast to generate up to circa 172,000 new rail trips per annum, assuming local M4 Junction 34 congestion problems are mitigated. The total demand (new plus existing from other stations) indicates up to circa 217,000 trips per annum, based on the assumptions of the forecast and local TfW services only. If London bound services were also to stop at the railway station the demand would considerably increase. A number of external factors have been identified that may also affect the potential demand for the station and it will require local and regional consideration to determine the full demand analysis at the next stage of WelTAG appraisal.

An initial timetable study has concluded that significant amendment of the timetable would be required to facilitate station calls at the new station, as the additional required time cannot be absorbed by the current planning margins and turn rounds. The new station is likely to add at least four minutes to those services that would stop at the station. The goods loops also provide additional resilience and redundancy for the railway, which may be affected by utilisation of them for the new station. A further timetable study will be required once operational assumptions are defined with key stakeholders. Whilst several key timetable issues have been highlighted at this early stage of the analysis, more detailed engagement with both Network Rail and TfW will be taken forward to confirm all viable opportunities available for the proposed station.

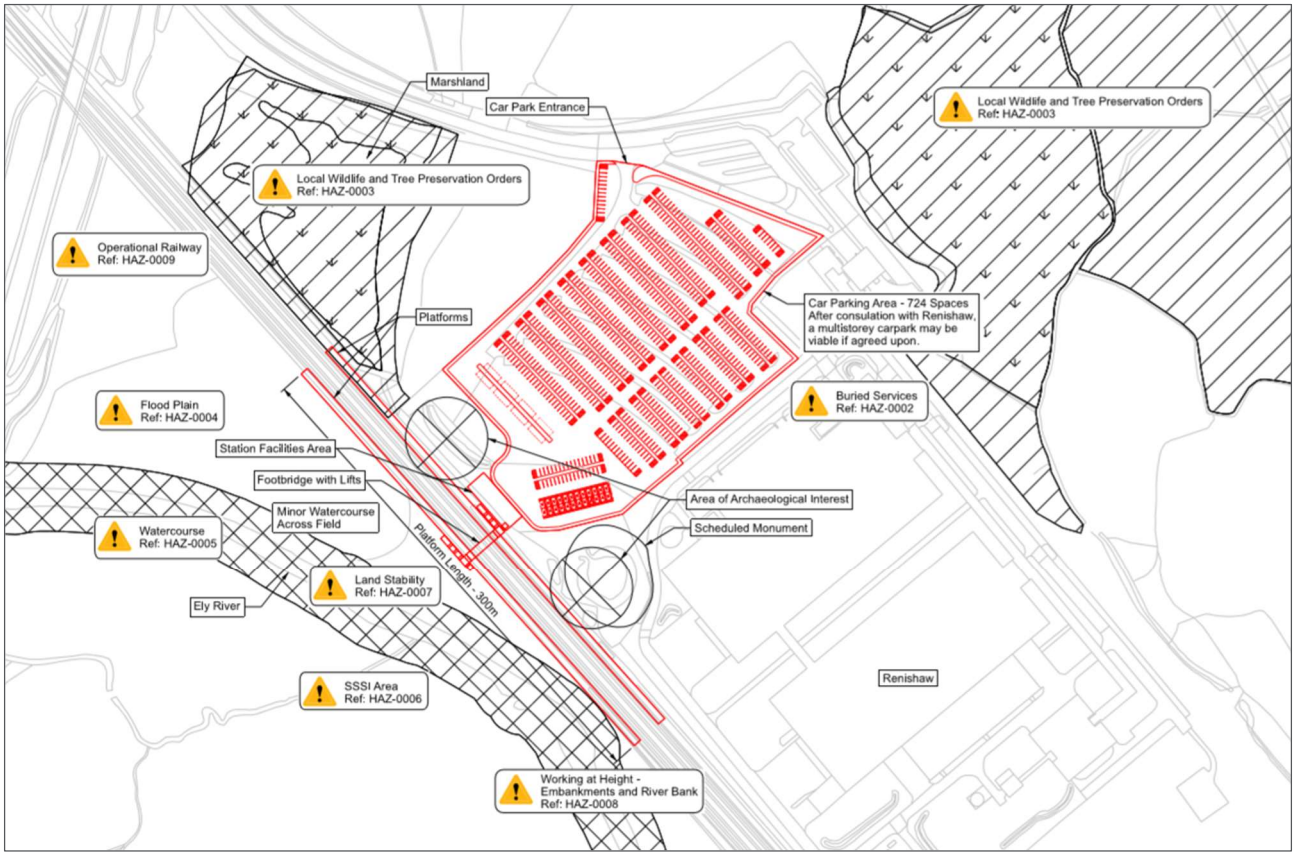
The Vale of Glamorgan Gateway Station has two main design options, a minimum and a desired. The minimum station would be unstaffed, have two platforms each approximately 130m long, connected by a footbridge with lifts, waiting shelters and car parking for up to 500 spaces. A desired/ future proofed station would be staffed, have two sheltered/ canopied platforms approximately 300m long, connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1,000 vehicles.

Ownership of the new railway station and its facilities will need to be decided, determining whether TfW will own and operate the station or by default Network Rail will own the station and infrastructure, with the Vale of Glamorgan Council owning and operating the car park. The management case will need to be developed through close consultation with key stakeholders.

Four locations along the Miskin Loops have been assessed with Location 4 considered the most feasible solution reviewed, which proposes a multi-storey car park on the existing Renishaw staff car park. Whilst further consultation would be required with Renishaw, initial talks have been constructive and indicated they are open to a potential multi-storey car park solution to facilitate the station's development. The potential wider benefits for the proposed Renishaw development could be substantial following the implementation of

a railway station. Such benefits could be realised with regard to commercial land/ property value and sustainable accessibility with all parts of the proposed development within reasonable walking distance of all four station location options.

Vale of Glamorgan Gateway Station | Feasibility General Arrangement Location 4



Renishaw do retain privately funded proposals to develop land surrounding Location 4 under application reference 2014/00228/EAO. Having already secured outline planning permission, their proposals are ahead in terms of planning and equivalent RIBA design stages. The integration of proposals would need to be agreed in advance as the Renishaw development is likely to be implemented ahead of any potential station development.

As the station will impact on Network Rail infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From an engineering perspective, the scheme is considered feasible based on existing information available for this study, although further development of design options will evolve the business case, including further clarity regarding the funding mechanisms that could be available to facilitate development.

Proposals for a new station require further, more detailed technical feasibility work as part of a GRIP Stage 3/ TfW Stage B Option Development and Selection appraisal encompassing an economic value for money exercise. A significant timetable study will be required to review all the services that travel through the area, although it is positive that the principle of a new station in the Miskin area is incorporated into the new rail franchise. There were some comments made by stakeholders that it would be appropriate to retain the option of a bus Park and Ride at Junction 34. This might be best considered as part of ongoing discussions surrounding the Vale of Glamorgan Gateway Station.

In summary, the Vale of Glamorgan Gateway Station has large potential. The new station will be in close proximity to a key motorway junction giving it a strategic location close to existing and potential areas of population. With the potential for new strategic road infrastructure/ enhancements (subject to separate WelTAG appraisals) in addition to existing provision, the station could be extremely well connected to the Vale of Glamorgan, Rhonda Cynon Taff and the M4 corridor. The station will offer quick direct trains into

Cardiff city centre with a journey time of just 10 minutes. The scheme is likely to be of regional importance due to the location and potential for significant benefits to the South Wales area and will need general consensus from local authorities and Welsh Government.

The recommended next steps are as follows:

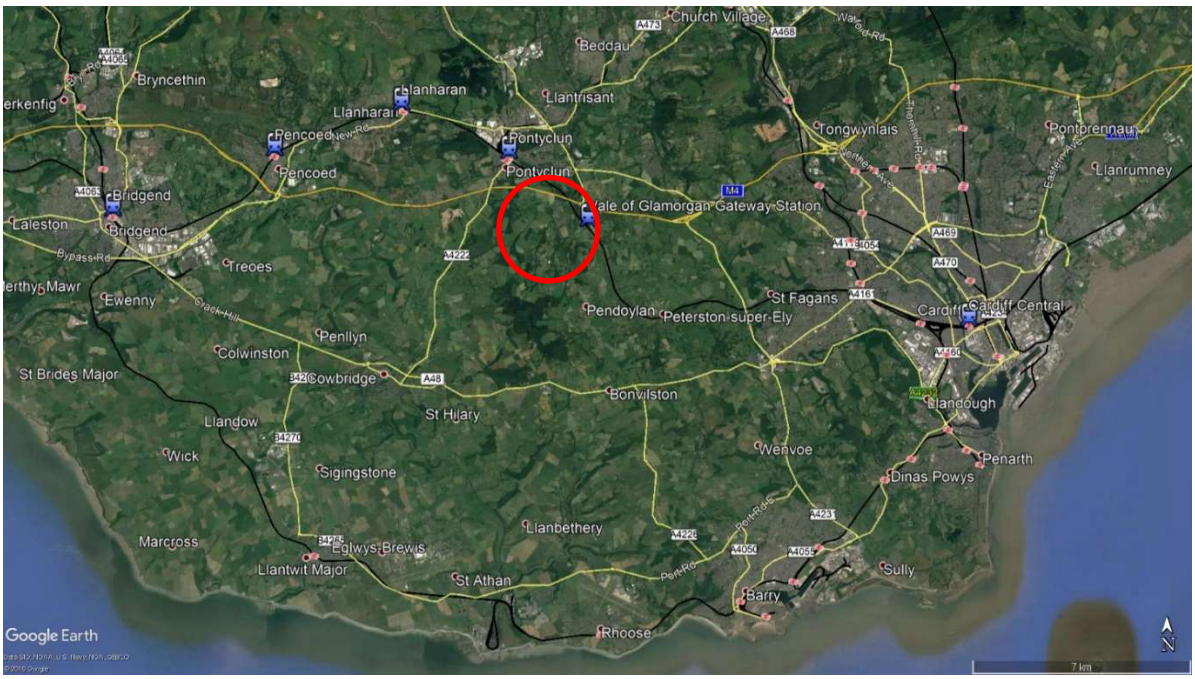
- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.
- Consideration given to an additional solution to be developed (as an alternative option, with potentially fewer constraints).
- Stakeholder engagement and general consensus, to determine likelihood of external factors.
- Additional demand forecasting (dependent on external factors) route origin/ destination reviews including additional detail on traffic impact within the Vale of Glamorgan road network.
- Detailed timetable analysis, including Goods/ Freight Services, and resilience/ redundancy review in the rail network.
- Cost estimation.
- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).
- Network Rail Governance for Railway Investment Projects (GRIP) Product Deliverables.
- Submission of GRIP 1-2/ TfW Stage A to be brought in line with GRIP Product Deliverables.
- GRIP 3/ Stage B – Option Development and Selection.

1 Introduction

1.1 Overview

1.1.1 The Vale of Glamorgan Gateway Station is a proposal for a new transport interchange to be located near Junction 34 of the M4, near Hensol. The railway station would be strategically located near to the M4 and A4119 corridors to be easily accessible for commuters and leisure travel to destinations on the rail network including Cardiff and Bridgend. Moreover, if separate proposals for an improved highway link to the A48 are taken forward, it could also have bus services from the station to Cardiff Airport, the Enterprise Zone and other strategic employment opportunities.

Figure 1 Location Plan

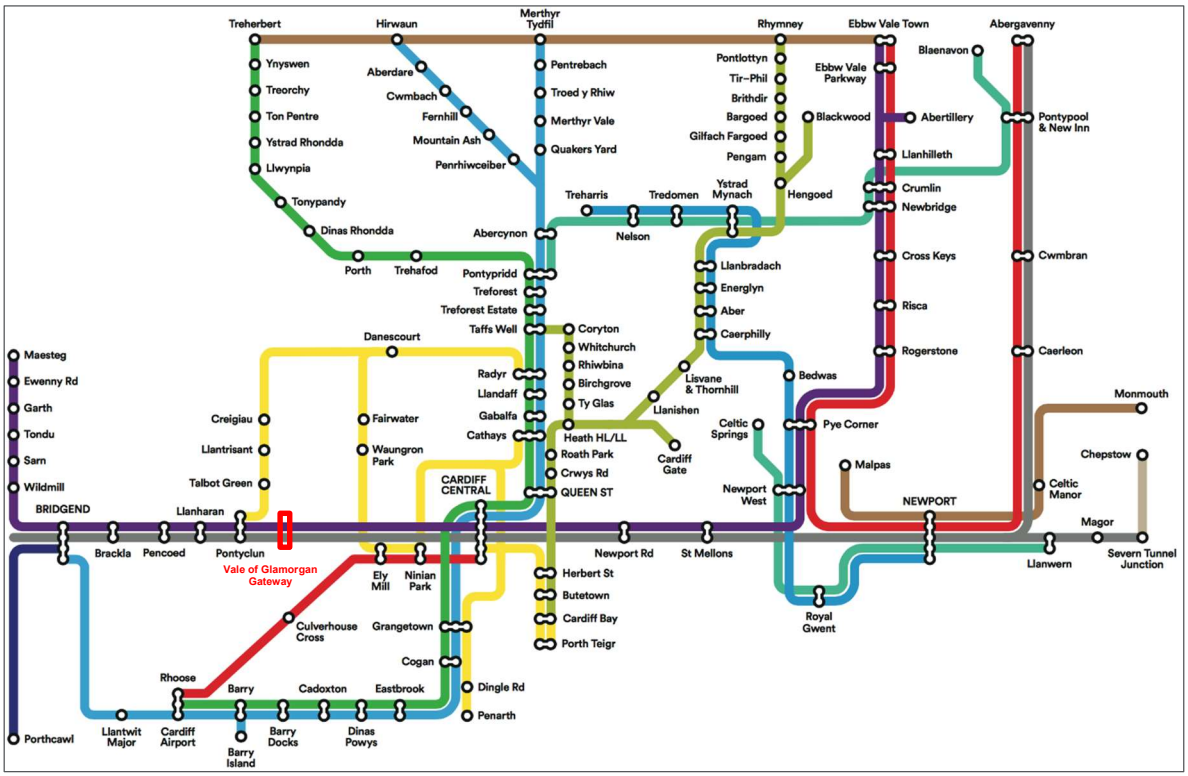


1.1.2 The railway station will offer direct trains into Cardiff, with an expected journey time of 10 minutes. The new station would be located on the South Wales Mainline (SWM2), approximately 9 miles away from Cardiff Central, and 11 miles from Bridgend Station. Figure 2 shows the location of the station on the rail network.

Table 1 Location Information

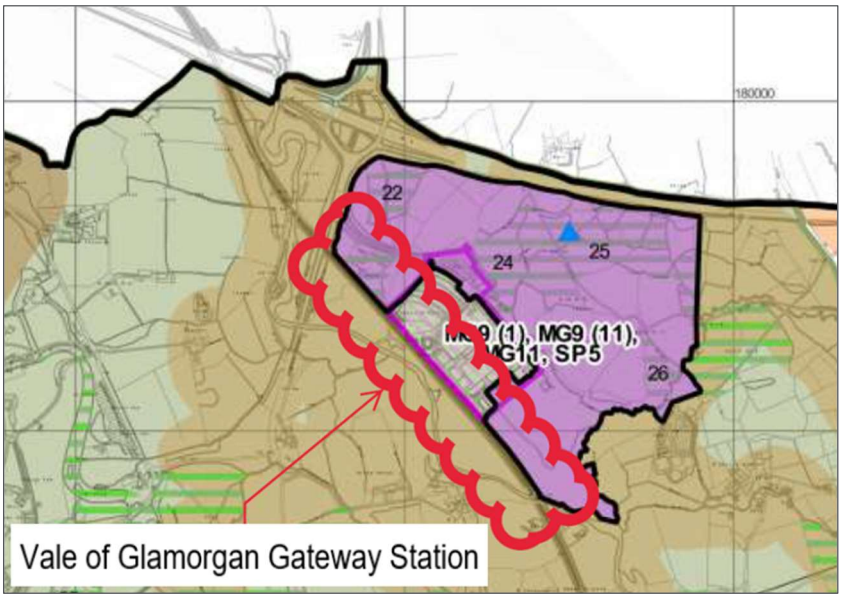
Feature	Location
Google maps approximate location	https://google/maps/vmzFAYJx3QW685r97
Engineers Line Reference (ELR) (Distances from route origin, Paddington Station)	Between SWM2 178 miles 1614 yards and 179 miles 1348 yards
M4	Junction 34
National Grid Reference	ST059792

Figure 2 South Wales Metro Map



1.1.3 The area identified for the railway station (as shown in Figure 3) is allocated in the adopted Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha of land for B1, B2 and B8 uses to meet strategic and local employment needs. It is situated adjacent to the Renishaw Factory. The area was identified as appropriate for the railway station given the proximity to a four track section of the railway, which would enable trains stopped at the station to be passed by through trains on the Great Western Mainline, together with good accessibility from Junction 34 of the M4 and the development land as set out above.

Figure 3 Adopted Vale of Glamorgan Local Development Plan (2011-2026)



1.2 Scheme Definition & Scope

1.2.1 The scheme definition and scope has been arrived at through consultation with Vale of Glamorgan Council and key stakeholders (Welsh Government and TfW) as follows:

- A new Vale of Glamorgan Gateway Station with park and ride facilities located off Junction 34 of the M4.
- A minimum of 500 car parking spaces with the ability to extend to 1,000 car parking spaces.
- Provision of a station interchange access/ approach road.
- Platform Length to meet aspirations to accommodate all rolling stock including GWR Intercity (10 cars) (For this Study, 300m of platform has been provided).
- Station buildings including entrance, canopy, waiting room/ shelter to meet the requirements of Disability Discrimination Act (DDA).
- Provision of a footbridge with lifts for better accessibility and in compliance with DfT standards.
- Provision of facilities for sustainable travel such as cycle parking/ lockers and bus services.
- Ultra-Low Emission Vehicle (ULEV) infrastructure including opportunity for renewable energy and Digital.
- Station to be designed in accordance with DfT Accessible Railway Stations Design Standards[1].
- Ensuring the well-being goals of the Well-being of Future Generations (Wales) Act 2015 are considered throughout the process.

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

1.3.1 The Well-being of Future Generations (Wales) Act (Welsh Government, 2015) strives to improve the social, economic, environmental and cultural well-being of Wales. The Vision is that *'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 deliver a joined-up approach. The well-being goals to represent what the long-term economic, social and environmental well-being of Wales are shown in Table 2 and the five ways of working as set out within the Act are shown in Figure 4.

Table 2 Well-being of Future Generations (Wales) Act – Well-being Goals

Goal	Description of the Goal
A prosperous Wales	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
A resilient Wales	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

[1] https://www.gov.uk/government/publications/accessible-railway-stations-design-standards

Goal	Description of the Goal
A healthier Wales	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
A more equal Wales	A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio-economic background and circumstances).
A Wales of cohesive communities	Attractive, viable, safe and well-connected communities.
A Wales of vibrant culture and thriving Welsh language	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.
A globally responsible Wales	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

Figure 4 Well-being of Future Generations (Wales) Act – Five Ways of Working[2]

Five Ways of Working

1.3.2 This section provides an overview of how the approach and proposals set out in this report evidence the Five Ways of Working and support the Well-being goals set out in the Future Generations of Wales Act 2015. The WelTAG guidance (which can be considered similarly applicable for the GRIP 1-2 Study) states it is required *'to ensure the needs of future generations are considered and understand how well they help public bodies to meet the well-being objectives and maximise their*

[2] http://futuregenerations.wales/about-us/future-generations-act/

contribution to each of the seven goals.' Consideration should be given to long-term challenges, trends, opportunities, as well as integration, collaboration, involvement and preventing problems from occurring or getting worse.

Long Term

1.3.3 The Impacts Assessment Report (IAR) which accompanies the Stage Two Outline Case Report for the M4 Junction 34 to A48 Study provides the evidence of both current and future problems, trends and opportunities in the study area[3] to inform consideration of the long-term perspective and the development of options.

1.3.4 Improvements are needed to address the congestion and road safety issues associated with the M4 corridor and key connections to the A48 and the subsequent impacts on the economy, access to education, jobs and services, health and the environment.

1.3.5 Current traffic congestion and connectivity issues will be exacerbated in the future with traffic growth. The development of a new Gateway Station close to the M4 offers a substantial long-term solution by encouraging sustainable travel and reducing road-based journey lengths.

Prevention

1.3.6 The rail station under consideration offers the opportunity to prevent as far as possible the future problems and trends from occurring, through a substantial enhancement in public transport.

1.3.7 Moreover, this GRIP 1-2 report seeks to identify the potential deliverability risks to aid decision making and prevent long term liabilities for public money by considering all of the issues at the outset.

Integration

1.3.8 The rail station options under consideration involve the integration of active travel, rail and bus modes together with the highway network. The study has been undertaken in an integrated manner to consider and take account of other schemes and proposals through discussion with stakeholders as well as integration with adjacent studies.

Collaboration

1.3.9 In undertaking the study, there has been collaboration between departments within the local authority, with Welsh Government and TfW, between stakeholders and between Arcadis and other consultants working on adjacent projects influencing the study area issues and solutions.

Involvement

1.3.10 The WelTAG Stage Two study which led to further consideration of the railway station proposal involved stakeholder workshops and consultation with the public. A good level of response was received through the engagement process and strong support for a new station.

1.3.11 Early development of the Vale of Glamorgan Gateway Station (formerly Parkway Station) option (plus highway options) has been subject to a series of Review Group meetings as part of the original WelTAG Stage One and Stage Two studies completed. These meetings are referenced as follows:

- WelTAG Stage One Strategic Outline Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th November 2017.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 16th January 2018.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th March 2018.

[3] https://www.valeofglamorgan.gov.uk/Documents/Our%20Council/consultation/J34-to-A48/WelTAG-Stage-Two-M4-A48-Impacts-Assessment-Report-D03.pdf

- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 2nd October 2018.

1.3.12 The GRIP Stage 1-2 Feasibility Report/ TfW Stage A has subsequently been reported to the project Review Group on 9th January 2020 and these considerations have been taken into account in this report. The Review Group brought together key stakeholders to oversee the studies and included representatives of the Cardiff Capital Region and the neighbouring authorities.

Well-being Goals

1.3.13 The contribution of a new railway station to well-being goals will be further considered in a subsequent Outline Business Case report for the scheme.

1.4 Report Structure

1.4.1 The remainder of the report comprises the following sections:

- Chapter 2 – Environmental Constraints
- Chapter 3 – Demand Forecasting
- Chapter 4 – Initial Timetable Review
- Chapter 5 – Station Requirements
- Chapter 6 – Site Location Feasibility Review
- Chapter 7 – Summary

2 Environmental Constraints

2.1 Introduction

2.1.1 A desk-based study to identify the environmental considerations has been undertaken to inform the feasibility study. This has been based on mapping associated with the Local Development Plan (LDP) (2017) and has been informed by web-based searches using the following sources:

- Multi-Agency Geographic Information for the Countryside website (MAGIC).
- Historic Wales – Portal for historic environment information in Wales.
- Lle Geo-Portal.
- Cadw - Historic Landscapes.
- Glamorgan Gwent Archaeological Trust Historic Environment Record (GGAT HER).
- Natural Resources Wales' Flood Risk Map Viewer.
- Extrium Wales Noise and Air Quality Viewer.
- Air Quality Management Areas Interactive Map.
- Vale of Glamorgan GIS datasets.

2.1.2 Most of the study area currently comprises agricultural land dissected centrally by the existing Railway. The River Ely meanders through the land to the west of the railway while an industrial site (Renishaw) occupies approximately half of the study area located to the east of the railway. The environmental constraints from the above data sources are presented in the Environmental Constraints Plan (Appendix A).

2.2 Ecology and Nature Conservation

2.2.1 The ecological features of importance to the proposed scheme have been presented in relation to the following two categories:

- The **study area** which refers to a 500m radius buffer around the proposed passing loop.
- The **2km search area** which refers to a 2km radius buffer around the proposed passing loop.

2.2.2 A desk study was undertaken in order to identify any existing ecological information relating to the study area and the 2km search area. The Multi-Agency Geographic Information for the Countryside (MAGIC) website[4] was used to search for statutory designated nature conservation sites within the 2km search area; the search area was extended to 10km for Special Areas of Conservation (SACs) designated for bats.

2.2.3 The South-East Wales Biodiversity Records Centre (SEWBReC) was consulted in February 2019 to request records of local nature conservation sites and of protected/ notable habitats and species within the 2km search area. This included a request for records of Priority Habitats and Priority Species, as listed within Section 7 of the Environment (Wales) Act 2016[5].

2.2.4 The Natural Resources Wales (NRW) Ancient Woodland Inventory Map[6] was reviewed in February 2019 in order to identify areas of ancient woodland, including Ancient Semi-Natural Woodland (ASNW), Restored Ancient Woodland Sites (RAWS) and Plantation on Ancient Woodland Sites (PAWS), within the 2km search area.

[4] MAGIC, 2014: Magic Interactive Mapping Application. Available from http://www.magic.gov.uk/MagicMap.aspx [Accessed online in January 2019].

[5] The Environment Wales Act (2016). Her Majesty's Stationery Office

[6] Natural Resources Wales, 2011. Ancient Woodland Inventory 2011 Data Set. Available from http://lle.gov.wales/map#m=-4.83334,51.90838,14&b=europa&l=60 [Accessed Online in January 2019].

2.2.5 The Vale of Glamorgan GIS data set was searched for Tree Preservation Orders (TPOs) within the 2km search area.

2.2.6 An extended Phase 1 habitat survey was undertaken by Arcadis Ecologists in July 2019. Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types, but there was no attempt to compile exhaustive species lists. Habitats were assessed for their potential to support protected/ notable species of fauna and observation was made of any incidental signs of protected/ notable species. Where access was restricted or refused by landowners, habitats were assessed using a combination of viewing from public footpaths or public roads and supported by aerial imagery. It must be noted that certain features may not have been visible (e.g. ponds in the corners of fields overtopped by trees) and areas which could not be surveyed have been identified and presented on the Phase 1 Habitat Survey Plan in Appendix B.

2.2.7 A number of important ecological features have been identified within the study area, presented in the Ecological Constraints Plan (Appendix C). The railway track crosses the Ely Valley Site of Special Scientific Interest (SSSI) and there are seven Sites of Interest for Nature Conservation (SINC) within the study area. Six groups of Tree Preservation Orders (TPOs) are present within the study area. One area of Ancient Semi-Natural Woodland (ASNW) and one Restored Ancient Woodland Site (RAWS) are present within the study area. There are also a number of priority habitats (woodland, marshy grassland, and ponds) and the potential presence of protected and priority species within the study area.

2.2.8 A total of two SSSIs, 35 SINCs, 96 TPOs and 73 ancient woodland sites, including ASNWs, RAWS and Plantation on Ancient Woodland Site (PAWS), are present within the 2km search area. The locations of the SSSIs, SINCs, TPOs and ancient woodland sites are presented in the Ecological Constraints Plan (Appendix C).

2.2.9 The desk study returned records of a number of protected and priority species including three floral species (e.g. *Parmotrema perlatum* (a lichen)), 17 terrestrial and aquatic invertebrate species (e.g. golden-ringed dragonfly *Cordulegaster boltonii*, short-winged cone-head *Conocephalus dorsalis*), numerous bird species (e.g. fieldfare *Turdus pilaris*, spotted flycatcher *Muscicapa striata*, starling *Sturnus vulgaris*), five bat species (e.g. common pipistrelle *Pipistrellus pipstrellus*, otter (*Lutra lutra*) and dormice (*Muscardinus avellanrius*) within the 2km search area.

2.2.10 The Phase 1 Habitat Survey recorded a range of habitats within the study area, summarised in the Phase 1 Habitat Survey Plan and Target Notes in Appendix B.

2.2.11 The dominant habitat type was improved grassland with large sections of semi-improved neutral grassland, marshy grassland and broadleaved woodland (both plantation and semi-natural). Smaller sections of amenity grassland, scattered trees, scrub, tall ruderal, running water, standing water, intact hedges, invasive non-native species and buildings were also recorded within the study area.

2.2.12 The key ecological constraints to the proposed development in the study area are:

- **River Ely SSSI south of the railway –** appropriate construction buffers would need to be implemented to the SSSI boundary and riverbank. Any works within the SSSI boundary would need assent from Natural Resources Wales and a method statement to protect designated features agreed. Pre-construction checks for otters Lutra within 30m of the riverbank should be undertaken. Pollution prevention guidelines to protect water quality of surface and ground waters would need to be followed during construction and lighting mitigation to retain the river as a dark corridor put in place.
- **SINCs and TPOs north of the railway –** works should avoid or minimise impacts to these areas to avoid damaging priority habitats (woodland, marshy grassland, ponds). If works in the SINCs cannot be avoided a detailed botanical survey would be required to identify the plant communities within the SINC and design appropriate mitigation measures to ensure no net loss of biodiversity. Construction would need to follow sensitive vegetation clearance and habitat translocation, or compensatory planting may be required to provide an area of habitat of the same or greater area.

- **Potential for protected species –** the habitats present are considered to have the potential to support otters, bats (foraging and roosting), dormice, badgers, nesting birds, great crested newts Triturus cristatus and reptiles.

2.2.13 Surveys are recommended to assess habitats in more detail, and surveys for protected species would be required to inform planning for the proposed development. At this stage it is anticipated that the following surveys would be required, but the scope would vary between options and would need to be agreed in consultation with the Vale of Glamorgan Council Ecologist and Natural Resources Wales (NRW):

- Extended Phase 1 habitat survey of areas which have not yet been accessed.
- Phase 2 botanical surveys.
- Terrestrial & aquatic invertebrate surveys.
- Environmental DNA survey and Habitat Suitability Index assessment for great crested newts in waterbodies within 250m of proposals.
- Breeding bird and barn owl surveys.
- Bat roost (trees and buildings) and activity surveys.
- Water vole and otter surveys.
- Dormouse surveys (nest tube and nut search).
- Badger surveys.
- Fish survey (may be needed if there are direct impacts to the River Ely).

2.3 Heritage

2.3.1 A desk-based review of heritage assets located within the study area has been undertaken using data on designated heritage assets obtained from the Lle Geo-Portal website, which provides data from Cadw, and non-designated heritage assets from the GGAT HER.

2.3.2 There is one statutory designation within the study area, the scheduled monument of Felin Isaf Castle Mound (reference number GM370). This is located immediately north of the railway line and west of Renishaw Factory, in a partially wooded area bordered to the north by the factory car park. The scheduled monument comprises the remains of a medieval motte (mound) and surrounding ditch. It is of national importance for its potential to enhance knowledge of medieval defensive practices and is well preserved with significant archaeological potential.

2.3.3 There are four non-designated heritage assets recorded by GGAT HER within the study area. To the north of the railway line and south east of M4 junction 34 is the site of a pond recorded on the 1st edition Ordnance Survey (OS) map (04389s), it is unclear whether the pond is still extant. To the south east of this, also to the north of the railway, is the earthwork remains of another pond recorded on the 1st edition OS map (04318s). Further south east and immediately adjacent to the north of the railway line and south west of Renishaw Factory is the route of a former watercourse recorded on the 1st edition OS map (04388.0s). In the south of the study area, to the west of the railway line is an earthwork of a semi-circular ditch (01480s), which was rejected as a moated site and is thought to be a possible orchard ditch. These four non-designated assets are of local importance as they illustrate the historic landscape and past agricultural use of the landscape in this area.

2.3.4 To the north west of M4 junction 34 is the grade II registered park and garden at Miskin Manor, which comprises a landscape park, Victorian and Edwardian pleasure grounds and a walled kitchen garden. The park and garden are of regional/ national importance. The essential setting of the park and garden is located to the west and north of the park, adjacent to the M4 and A4119 respectively and outside the study area.

2.4 Landscape

2.4.1 The study area (with the exception of the area north of the M4 motorway) falls within the Ely Valley & Ridge Slopes Valley 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.

2.4.2 The Ely Valley & Ridge Slopes Valley SLA is designated for its predominantly lowland rolling landscape with the Ely River valley running through it from north to south-east. The majority of the lowland valley floor is flood plain. The area is very flat with a sense of openness and contains the meandering River Ely towards its centre with a rectilinear pattern of drainage ditches running into the river. The highest point is approximately 55m Above Ordnance Datum (AOD) in the north towards Llanerch Farm. The landcover is dominated by a mosaic field pattern of pastures bounded by hedgerows.

2.4.3 Some fields are very small and narrow and overall, the field size is no more than medium size. Settlement is sparse with only a few scattered farms within the study area. There is riparian vegetation which defines the path of the River Ely and there are areas of severely fragmented woodland. The M4 is located to the north of the study area and the Cardiff to Bridgend railway line runs along the valley floor.

2.4.4 To the north-west, the landscape is one of lowland valleys and hills, forming the upper reaches of various tributaries that flow into the Thaw and Ely valleys. The study area has high scenic, but low habitat value, the landscape includes semi-natural broadleaf woodland, improved grassland, arable and amenity grassland[7].

2.4.5 The extensive woodland around the station site north of the railway line is a key landscape feature although is not designated as ancient woodland. It screens the site from the M4 and provides integration into the surrounding landscape.

2.5 Noise and Air Quality

2.5.1 There are no Air Quality Management Areas (AQMAs) or Noise Planning Priority Areas located within 2km of the study area.

2.6 Public Rights of Way

2.6.1 There are four Public Rights of Way (PRoW) located within the study area (Environmental Constraints Plan Appendix C). These are found to the south west of the River Ely.

2.7 Ground Conditions

2.7.1 A high-level desk-based review of publicly available information has been undertaken to inform this feasibility report.

Topography

2.7.2 Ground levels across the study area range from approximately +28m to +32m Above Ordnance Datum (AOD), with the land to the west of the existing railway line being lower than the east.

Historical Land Use

2.7.3 A review of historical Ordnance Survey maps available on the Old Maps Website[8] has been completed. The available maps (dated 1877 through to 1992) indicates that the study area has remained agricultural land since the first available published map. The railway was shown present on the first available published map (1877). The sewage works, located approximately 300m west of the

[7] LDP Special Landscape Areas Integration with Adjoining Authorities Update 2013 - https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP-2013/37_LDP_Special_Landscape_Areas_Integration_with_Adjoining_Authorities_Update_2013.pdf

[8] Old Maps Website 2019 - https://www.old-maps.co.uk

study area is first shown on the 1942 map while the M4 motorway, located approximately 300m north of the study area, is first shown on the 1974 map. The industrial site present to the east of the railway is first shown on the 1992 map.

Radon

2.7.4 The Public Health England website[9] indicates the study area is in an area where 3 to 5% of properties are at or exceed the Radon Action Level.

Geology

2.7.5 The 1:50,000 scale British Geological Survey (BGS) Geological Map (Sheet No. 262) for Bridgend indicates most of the study area is underlain by Superficial Deposits of Alluvium (comprising clay, silt, sand and gravel). The area northeast of the railway line is shown to be underlain by Glacial Till. The map further indicates that the solid geology underlying the study area is the Llanishen Conglomerate (comprising Conglomerate interbedded with Sandstone). A fault, trending northeast to southwest, is located approximately 500m west of the study area and coincides with the axis of the Ely Valley.

Mining

2.7.6 The study area is not located within a Coal Mining Reporting Area. There is no evidence of historical mines or quarries located in the study area on the available historical maps.

Unexploded Ordnance

2.7.7 The Zetica Risk Map[10] indicates the study area is located in an area designated as having 'Low' (15 bombs per 1000 acres or less) risk of Unexploded ordnance (UXO).

Ground Conditions | BGS Boreholes

2.7.8 The BGS Geoindex Onshore website[11] indicates that there are four exploratory holes located within the study area.

Table 3 Summary of Ground Conditions from Available Exploratory Holes

Top Depth (m bgl)	Base Depth to (m bgl)	Thickness (m)	Stratum Name	Typical Stratum Description
GL	0.30	0.30	Topsoil	Soft to firm brown sandy CLAY.
0.30	1.50-5.10	1.20-4.80	Alluvium (Cohesive)	Soft sandy CLAY
1.50-5.10	5.10 – 10.00	3.00-8.10	Alluvium (Granular)	SAND or GRAVEL with boulders.
5.10-10.00	7.60->11.2	>2.4 (base not proven)	Glacial Deposits (Cohesive)	Stiff to hard sandy CLAY, locally with boulders.

2.7.9 The ground conditions recorded in the available exploratory holes are in general similar to that shown on the geological mapping. No groundwater data is presented on the available exploratory hole records. Noting that the site is located adjacent to the River Ely and that there are many areas

[9] UK maps of radon 2019 - https://www.ukradon.org/information/ukmaps

[10] Zetica Risk Map 2019 - https://zeticauxo.com/downloads-and-resources/risk-maps/

[11] British Geological Survey – Geoindex Onshore 2019 - http://mapapps2.bgs.ac.uk/geoindex/home.html

of standing water visible on the available aerial imagery it is likely that groundwater is present at shallow depth beneath the ground surface and at a similar level to the River Ely.

Potential Geotechnical and Geo-Environmental Constraints

2.7.10 The following potential constraints have been identified from the desk-based review:

- The land within the study area is mainly agricultural and has not been subject to historical development except the existing railway and industrial site (i.e. Renishaw). Though mainly agricultural, the existing railway and industrial site may have impacted the land quality. The M4 located to the north (and upstream) of the study area may also have impacted land quality.
- Ground conditions at the site comprise Alluvium and Glacial Till. The upper Alluvium comprises soft clay which extends to depths of approximately 5m below existing ground level. This material is likely to provide low bearing capacity and may pose a long-term settlement risk to proposed foundations.
- Groundwater within the study area is likely to be shallow (circa 1-2m below existing ground level).

2.7.11 It is recommended that a detailed geotechnical and geo-environmental desk study, followed by appropriate intrusive ground investigation and assessment is undertaken early in the design of the proposed station to identify any further ground related constraints and provide a suitable basis for design.

2.8 Flood Risk

2.8.1 According to the NRW Long Term Flood Risk Map[12] (Figure 5), the River Ely is designated as a Main River. Works in, over, under or within 8m of the top of bank of a Main River or flood defence, and within a floodplain, require an application to NRW for a Flood Risk Activity Permit (FRAP). Ordinary Watercourse Consents (OWCs) may be required for works on watercourses that are not Main Rivers. The Lead Local Flood Authority would need to be contacted for information and advice on OWCs.

2.8.2 The NRW Long Term Flood Risk Map[6] (Figure 5) shows that land between the rail track and the River Ely is designated as Flood Zones 2 and 3. Flood Zone 2 shows the extent of a flood from rivers or from the sea with up to a 0.1% (1 in 1000) chance of happening in any given year and contains areas recorded to have flooded in the past. Flood Zone 3 shows the extent of a flood from rivers with a 1% (1 in 100) chance or greater of happening in any given year or the extent of a flood from the sea with a 0.5% (1 in 200) chance or greater of happening in any given year.

2.8.3 In addition to the Long-Term Flood Risk Map, the Welsh Government produce a Development Advice Map (DAM) which is for land use planning purposes and should be used alongside the Welsh Government's Technical Advice Note 15: Development and Flood Risk (TAN15)[13]. The DAM (Figure 6) shows that the majority of the land in the study area is designated as Zone C2 (areas of the floodplain without significant defence infrastructure) and Zone B (areas that have flooded in the past evidenced by sedimentary deposits). Parts of the study area designated as Zone A are considered to be at little or no risk of fluvial or tidal/ coastal flooding.

2.8.4 Given that parts of the study area are designated as Zones B and C2 (defined by the extent of NRW Flood Zone 2), the plans for the station should be informed by a detailed Flood Consequences Assessment (FCA) in accordance with TAN15. An FCA is required to show that development would be safe from flooding over its lifetime and does not cause any detriment to flood risk on third party lands. Potential flood risk management measures may include earthworks to create flood free development platforms or flood protection bunds, offset by provision of compensation for any loss of floodplain storage volume. A hydraulic model of the River Ely and its floodplain that includes the

[12] NRW, 2019. Long Term Flood Risk Map. Available from https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en [Accessed online February 2019].

[13] Welsh Assembly Government, 2004. Planning Policy Wales, Technical Advice Note 15: Development and Flood Risk

Gateway Station site is currently being developed by Arcadis, in consultation with NRW. This model will generate robust flood risk data to inform a detailed FCA for the proposed development, and could be used to explore flood risk management measures to demonstrate that the future development would be free from flooding over its lifetime and would not increase flood risk to third party lands, in accordance with the requirements of TAN15.

Table 4 Watercourses within the Study Area

Watercourses	Description and Location	Consents/ Permits potentially required	Advisory timescale
River Ely	The River Ely flows south easterly across the centre of the study area, south west of the rail track. The River Ely is crossed by the rail track at NGR: ST 06397 78798	Flood Risk Activity Permits (FRAPs) may be required	Can take 2 months for a decision
Nant Criafol, Nant Coslech and other unnamed ordinary watercourses	The ordinary watercourses are located south of the M4 and are primarily located north east of the rail track and Miskin Business Park	Ordinary Watercourse Consent (OWC)	

Figure 5 NRW Long Term Flood Risk Map

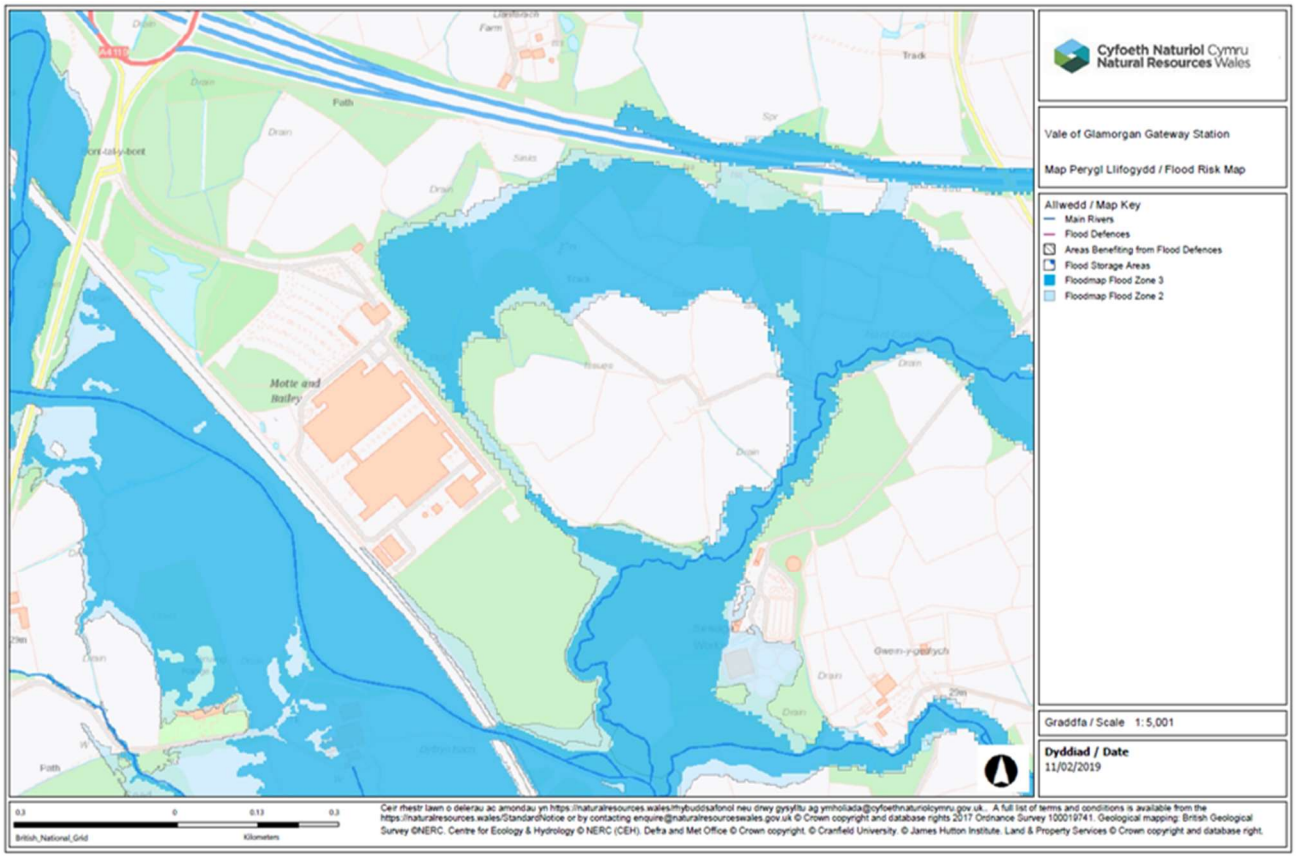
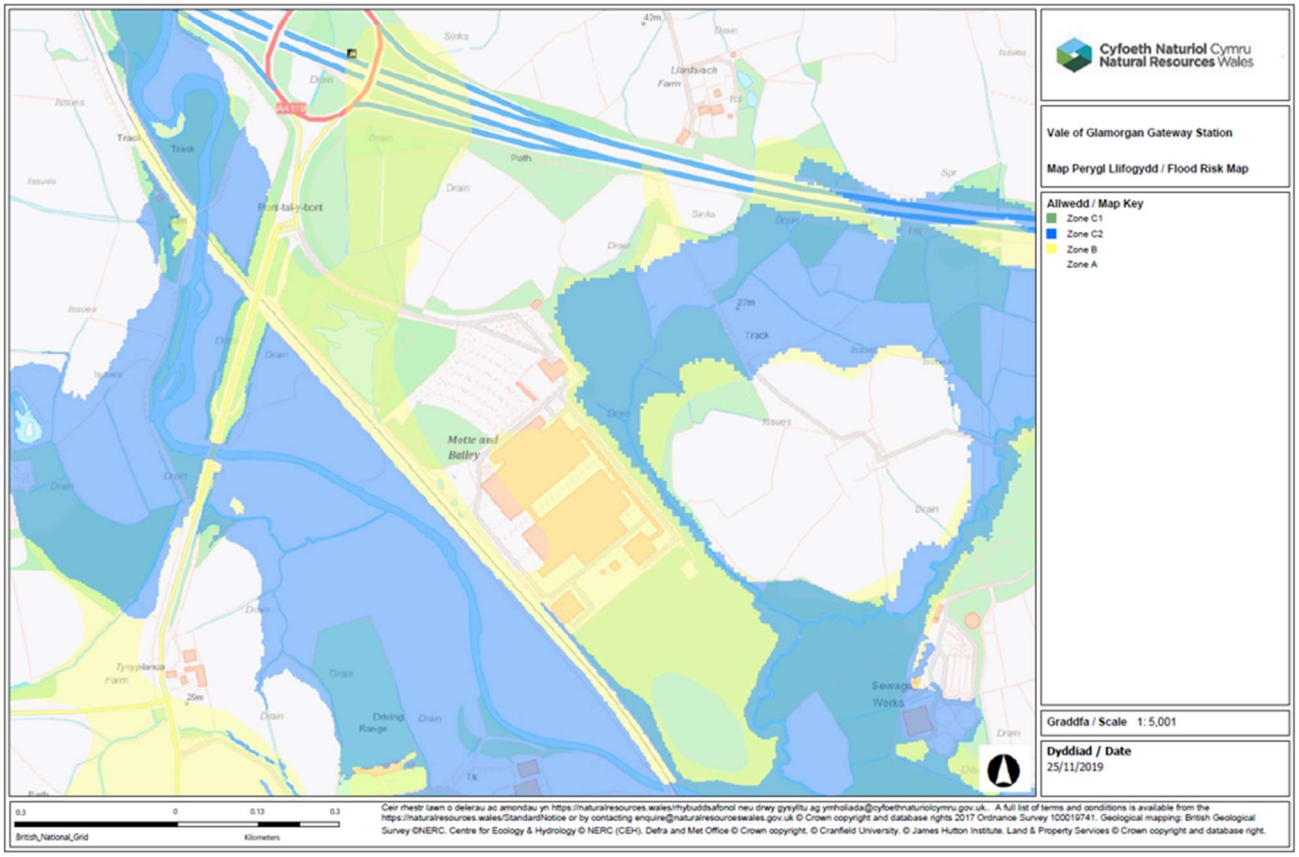


Figure 6 Development Advice Map



3 Demand Forecasting

3.1.1 The Welsh Government and TfW have developed the South East Wales Transport Model (SEWTM). SEWTM is a multi-modal model covering the South East Wales network in detail. The use of the model allows consideration of highway and public transport interventions together and evaluates the interaction between the schemes, allowing for a forecast for future demand.

3.1.2 The new Gateway Station has been tested using SEWTM as an independent option, as well as a combined option with the proposed Renishaw Development (i.e. implementation of the employment allocation). The model is managed by TfW and Arcadis has liaised with TfW on commissioning the model runs, and to ensure the outputs provided are applicable in future appraisal work as the project develops.

3.1.3 The SEWTM has been run on four 2026 scenarios:

- Scenario 1: Do-Minimum Core
- Scenario 2: Do-Something Core
- Scenario 3: Do-Minimum with Renishaw Development
- Scenario 4: Do-Something with Renishaw Development

Table 5 Do-Minimum (DM) Core Demographic (Scenario 1)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added (unused in this scenario)
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (does not include adjacent site development)

Table 6 Do-Something (DS) Core Demographic (Scenario 2)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added Highway access from southern (unclassified) arm at M4 Junction 34 All passing TfW services (i.e. those on the Ebbw Vale to Maesteg Line) to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (does not include adjacent site development)

Table 7 Do-Minimum (DM) Alternative Demographic (Scenario 3)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added (unused in this scenario)
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (includes adjacent site development)

Table 8 Do-Something (DS) Alternative Demographic (Scenario 4)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added Highway access from southern (unclassified) arm at M4 Junction 34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (includes adjacent site development)

3.1.4 Table 9 summarises the forecast number of passengers in 2026 per annum under each scenario at the proposed station, as well as the existing stations in the vicinity.

Table 9 SEWTM 2026 Forecast

Station	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Vale of Glamorgan Gateway Station	0	133,969	0	40,153 (216,982, if congestion issues mitigated)
Pontyclun	257,588	241,522	256,828	254,184
Llanharan	146,552	134,556	144,359	135,317
Pencoed	201,053	182,472	196,083	183,904
Bridgend	1,677,875	1,650,795	1,665,429	1,644,703

3.1.5 The new station is forecast to attract 133,969 individual trips per year by 2026 if the Renishaw development does not take place on the adjacent land. If the development does occur, then demand for the station is shown to decrease by 70% comparing Scenario 4 to 2. This anomaly is due to the capacity of the highway network infrastructure.

3.1.6 The model predicts that the existing highways and motorway junction would be over utilised/ highly congested in the future year with the development taking place, which would supress demand for the station. An additional forecast was undertaken to demonstrate that if the local congestion problems were mitigated, the expected demand for the station is 216,982, with it decreasing by 82% between scenarios 4b and 4a if congestion is not addressed.

Table 10 New Demand Forecast

Scenario	Demand	New demand generated
Scenario 1	0	0
Scenario 2	133,969	60,245
Scenario 3	0	-20,369
Scenario 4a	40,153	-4,438
Scenario 4 b (with congestion mitigation)	216,982	172,391

3.1.7 As shown above in Table 10, the new station generates new demand, for scenario 2 and 4b with congestion mitigation. The new demand generated for those scenario's is 60,245 and 172,391 of new trips by rail. It can be seen that a large proportion of new trips are related to the adjacent strategic employment development. In perspective, that is equivalent to up to 60 thousand and 172 thousand trips by car (assuming single occupancy) making potentially shorter or no journey by road per year. The new Renishaw development is shown to have a negative effect on car usage on the road network without any congestion mitigation, both without and with the new Vale of Glamorgan Gateway Station.

3.1.8 Overall, demand forecasting indicates that the station usage in 2026 (133,969, 40,153 and 216,982 trips) should be classified as category F (under 250,000).

3.1.9 The station demand data can be highly skewed from factors outside the control and remit of this project. It will require local and regional consideration to determine the full demand analysis.

3.1.10 The station demand is highly likely to be affected by:

- Renishaw Development of the strategic employment area.
- M4 Junction 34 capacity issues.
- M4 and A4232 congestion to the west of Junction 34, which will influence decisions to use the park and ride.
- Existing constraints on the local connection through Pendoylan to the A48.
- Whether or not proposals for an improved link from Junction 34 to the A48 goes forward.
- Growth of Cardiff Airport and strategic employment in the wider area and bus connections from the station.
- Event parking for Cardiff, if the station hosts turn back facilities for event shuttle services and availability of overflow car parks.
- London Rail Services (Great Western Railway, Grand Union Trains).

- Cardiff City Vehicle Policy (i.e. congestion zones, vehicle ban).
- Emerging proposals at J33 and the Cardiff north western corridor.
- Cardiff Metro.

3.1.11 The initial assumption is that most demand will come from commuters on the M4 who usually drive into Cardiff. Local community councils have raised concern that the station may also possibly increase private car journeys on rural roads from within the Vale of Glamorgan to the station. During the next stage of design and preparation of a business case, additional transport modelling will be required to establish modal change as a result of the new station and take into account route origins and destination, to review local journeys within the Vale of Glamorgan and the impact on the local road infrastructure.

3.1.12 Comparison with nearby stations indicates that the development could possibly achieve a category D classification (medium staffed facility), which is the ambition of the scheme. With the factors listed above, and potential upgrades to local road infrastructure, the demand may well increase beyond forecasted levels and planning for a future with increased role of the station would seem appropriate given the uncertainties in forecasting.

3.1.13 Concerns have been raised by the project stakeholders regarding existing capacity issues on TfW rail services. Many services within the area appear to have overcrowding. There may be a possibility that existing rail services stopping at a new station will not be able to accommodate the new additional passengers. TfW have committed to introducing new rolling stock, with higher capacities and more frequent services across the network. TfW have been contacted to determine existing capacity numbers against future capacity numbers, but at present a response is awaited.

3.1.14 The demand forecasting technical note is included as Appendix D.

4 Initial Timetable Review

4.1.1 An initial timetable study has been undertaken, looking at all TfW services stopping at the Gateway Station. For the purpose of the timetable study, other TOCs have not been included due to the uncertainty and additional requirement. The study has considered the immediate impact of the new station between Cardiff Central and Bridgend. As with any new station, additional time will be required within the timetable to accommodate the stop, time can add up to a few minutes, estimated to be at least four minutes, to take account of the train slowing down, dwelling and then accelerating back up to normal speeds. The study has indicated some key issues including the following:

- Maesteg services currently have a very tight turnround at Maesteg and sometimes come from other single line sections (e.g. Ebbw Vale). Adding an additional call will require these services to be retimed
- Presentation at crossing points on single line sections may change, which would require retiming to other services (e.g. Ebbw Vale or Milford Haven)
- Presentation times at Cardiff Central will likely need to be amended. This may have significant implications for the long-distance services that may need to be re-timed (heading to Manchester or Milford Haven for example)
- Presentation and turnround times at Swansea will be affected. This could impact the station working margins which will result in further re-timings
- Some freight services that currently utilise the Miskin loop would need to be re-timed. This will be exacerbated on days of the week when the freight provision increases.
- Reduced redundancy – Sidings offer additional redundancy for freight, main and local services.

4.1.2 The level of impact, with regards to re-timing existing services, depends upon the confirmation of operational assumptions. Examples of these would be the likely Sectional Running Times for calling at the station, required dwell time, potential line speed improvements on the Miskin loop. Reducing the additional time required to call at the station will mitigate the impact on the existing timetable as would providing higher speed switches into, out of and within the loop, currently rated at 15mph. Grand Union Trains has indicated that 15mph is an issue that would need to be addressed. Timetable activities as part of this scheme will not consider introducing non-stops at existing stations.

4.1.3 It would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds. Network Rail has also confirmed that the sidings offer additional redundancy which aids performance and have often been used for broken down trains. Additional reviews will have to consider other suitable locations to offer this redundancy. An alternative location for the station could also be considered as the goods loops offer both advantages and disadvantages.

4.1.4 A further timetable study will be required once operational assumptions are confirmed/ more defined. Appendix E contains the initial timetable study.

5 Station Requirements

5.1 Introduction

5.1.1 Stations are categorised in accordance with Department for Transport (DfT) ratings as shown in Table 11 below.

Table 11 Station Categories

Category	Description	Trips per annum
A	National Hub	Over 2 million
B	Regional Interchange	Over 2 million
C	Important Feeder	0.5 to 2 million
D	Medium Staffed	0.25-0.5 million
E	Small Staffed	Under 0.25 million
F	Small unstaffed.	Under 0.25 million

5.1.2 The demand forecasting has rated the station as a category F, with up to 0.216 million trips per annum by 2026. The aspiration of the project and the Vale of Glamorgan Council is to achieve the patronage that would require a category D station. As set out in Section 3, the various factors involved in forecasting mean that providing for a category D station is likely to be appropriate to future proof the station and enable it to meet potentially higher demand in future.

5.1.3 In general, two scheme ideas of ‘do something’ and ‘future proofed’ has been considered to represent the category F and category D respectively. The do something scheme has the proposed Vale of Glamorgan Gateway Station, the highway access from the southern (unclassified) arm at M4 Junction 34, all passing TfW services to call and a 500-space P&R at the station. The future proofed scheme also includes the development of local employment area, upgrades to local road infrastructure, event parking and shuttle services to Cardiff, Cardiff City Vehicle Policy (i.e. congestion zones, vehicle ban), London Rail Services and provision of 500 – 1000 parking spaces.

5.1.4 For the purpose of this study, a category D station will have more facilities, and have a higher land usage. Therefore, for future proofing the station, a larger station footprint suitable for a category D station has subsequently been used throughout the study. In reality, the station could initially be constructed to a smaller footprint and then upgraded/ expanded depending on actual demand, as long as land for the expansion is safeguarded for development.

5.1.5 The scheme is anticipated to lead to some switch of patronage from other stations in the locality which may have the advantage of reducing congestion in those villages/ towns, where station car parks are over utilised and railway users often park on nearby residential streets.

5.2 Rolling Stock

5.2.1 The type of rolling stock that would be expected to utilise the station determines the length of platform required for the new station. Rolling stock information is provided in Table 12.

Table 12 Rolling Stock Information

Type	Class 170	CAF Civity	Stadler FLIRT DEMU	Class 800 5-car	Class 800 9-car
Routes	Cardiff to Maesteg/ Swansea/ west Wales local services	Manchester to West Wales long distance services	Cardiff to Maesteg/ Swansea local services	West Wales to London Paddington	West Wales to London Paddington
Max no. of vehicles (typical service)	3	5	4 (plus 1 power vehicle)	2x5	1x9
Length of vehicles (m)(approx.)	23.5	24	21 (power vehicle 16)	26	26
Normal train length (approx.)	70	120	100	260	234

5.2.2 The Rail Safety and Standards Board (RSSB) standardRIS-7016-INS[14] states that '*the usable length of platforms shall be long enough to accommodate the longest train formation regularly booked to stop at a platform, with allowances for inaccurate stopping and operational (including train control) requirements.'*

5.2.3 There are a number of decisions to be made which will dictate the length of the platforms depending on which Train Operating Companies (TOCs) use the station.

5.2.4 For TfW services, 120m plus allowances is required. For Great Western Railway 260m plus allowances is required. A new TOC with plans to operate in south Wales, Grand Union Trains, would likely require similar lengths as GWR.

5.2.5 For the purpose of developing this scheme, 300m has been allocated for the full platform length, as this will take up the largest land usage and thus provides a robust approach to considering the feasibility of the station. This value will need to be assessed at a later GRIP stage in regard to Technical Specifications for Interoperability (TSIs) and The Railway and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

5.3 Platforms

5.3.1 The Vale of Glamorgan Gateway Station is anticipated to feature two platforms, located on the cess next to the goods loops. The size, number and location of platform entrances influence passenger distribution clearance times. Factors such as this have to be considered and integrated with station capacity assessment, safety and accessibility as below:

- Length – Dictated by the rolling stock that will be stopping at the station. For this study 300m is assumed as established in Section 5.2.

[14] Rail Industry Standard RIS-7016-INS 'Interface between Station Platforms, Track, Trains and Buffer Stops'. Issue 1.1 June 2019. Available from: https://catalogues.rssb.co.uk/railway-group-standards#k=(rgsolDocumentNumber%3A%227016%22%20OR%20(%20Title%3A7016*)%20OR%20(%20rgsolDocumentNumber%3A7016*)%20OR%20rgsolDocumentInternalNumber%3A%227016*%22)

- Width – The minimum recommended is 3.0m.
- Columns and other obstructions - at least 2.0m clear of the platform edge
- Headroom – At least 2.5m to structures and platform signs for a width if up to 2.0m from the platform edge over the entire length. At least 2.3m for distances greater than 2.0m from the platform edge.
- Yellow line – It is used by the Train Operating Companies (TOCs) to manage the crowding and safe dispatch of trains. In general, at least 1.5m from the platform edge is needed where trains are passing at more than 100mph. Where the train speed is greater than 45mph or the 1500mm is likely to lead to overcrowding on the platform, the distance could be reduced subject to actions being taken to mitigate the risks. Relevant TOCs should be consulted whilst defining the width of this zone.
- Platform canopy – Platform canopy should be located adjacent to the platform access and egress point and to cover the entire platform length if possible. It should be linked to the footbridge canopy to ensure there is no gap. The material of canopy structure will be based upon the structure size, timber will be recommended for small spans while steel portal system is considering to be more rigid for large span roofs. To prevent rain flooding and leaking, the canopy will be inclined away from track with a drainage system and drainpipe provided within or adjacent to the canopy supporting column. A category F station would be uncovered with no canopy. However, the platform would have waiting shelters.

5.4 Station Buildings

5.4.1 For a category D station, the building entrance needs to have an appropriate size, number, and spacing to provide free and safe access to all passengers as well as the emergency evacuation arrangements. Entrance doors should not open outwards into the flow of passengers and alcoves should be avoided.

5.4.2 The station entrance canopy should draw customers towards the station entrance and provide shelters for people waiting to meet others. The design of canopy should be integrated with the station building.

5.4.3 Stairs with handrails should be featured for passengers to access to platform level. A lift within the station building would give access to both platform level and footbridge level.

5.4.4 A category F station would typically not have a station building.

5.5 Station Facilities

5.5.1 For a category D station of 0.25-0.5 million trips per year, the station should be staffed (one from TfW). The number of staffed ticket offices and ticket vending machines (TVM) needs to be assessed by the Train Operating Company (TOC) in order to meet the requirement of station customer capacity. A passenger waiting room should be provided in the station building, or otherwise a sheltered waiting room should be available on each platform.

5.5.2 Help point and information displays should be provided in the waiting room, station building and on platforms. CCTV is required for safety and security purposes for the coverage of all station public areas. Lighting on the platform and in the building should be evenly distributed with the lux level to comply with relevant standards. Male and female toilets are recommended at this station and if toilets are provided, a minimum of one unisex toilet should be accessible for disabled people.

5.5.3 Other station facilities such as a coffee shop, vending machines, cash machines, newspaper & magazine distribution racks, advertising areas and WIFI will be considered following consultation with the TOC and other key stakeholders. Smart Station sensors could also be explored, to manage station usage and provide live data to relevant stakeholders, particularly for events in Cardiff.

5.5.4 The positioning of booking offices, ticket machines, information screens and retail outlets should be considered to avoid congestion and blockage.

5.5.5 A category F station would typically have ticket vending machines, help points, information displays, lighting and CCTV.

5.5.6 TfW has committed to using renewable energy sources to power the facilities and to aid this, local renewable energy production will be considered by the scheme but is dependent on land availability. The scheme could potentially benefit for additional funding for renewable energy and could be used as a trial or exemplar.

5.5.7 The station will consider sustainability, but for greater acknowledgement, the scheme could be progressed under CEEQUAL, which is an evidence-based sustainability assessment, rating and award scheme.

5.6 Station Footbridge

5.6.1 To gain access to the platform on the opposite side from the entrance and car park, a footbridge will be required to span the four-track railway. The footbridge must be compliant to the requirements of NR/L3/CIV/020. Network Rail are currently developing a new standard footbridge design. However, a bespoke design of the footbridge may be required due to the longer span requirements of approximately 25m.

5.6.2 It is expected that the footbridge would comprise a single span with stairs and lifts either side for better accessibility. The bridge soffit should be designed high enough to accommodate future electrification of the lines. The main span, stairs and ramps should be fully enclosed with suitable lighting, to provide a safer environment.

5.6.3 The minimum structure widths may need to be determined by using passenger flow analysis for a category D station, category F may use the standard recommended widths. A category D station is likely to be a covered footbridge, a category F station is likely to be an open footbridge.

5.7 Station Approach Road and Access

5.7.1 A new station approach road would be provided to connect the existing highway to the station car park. It would be a single carriageway with designated public transport drop-off and pick-up zones close to the station. To reduce any congestion due to possible traffic overflow and vehicle manoeuvres, a vehicle turning circle would be provided at the end of station approach road. The new Gateway Station will require a passengers set-down and pick-up area alongside provision for taxis and buses. The landing area should be level and firm, ramp need to be fitted with lowest practicable gradient.

5.7.2 Rail replacement buses and coaches would need to be accommodated in case of railway services being unavailable. Moreover, Shuttle-Link or other buses/ coaches services to link to Cardiff Airport, the Vale Resort or to Cardiff venues for events for example could also be needed and will require space. An interchange facility with regional or local bus services would also be provided and a designated area at the front of station should be set up for emergency vehicles.

5.8 Vehicle Parking Facilities

5.8.1 The remit set by the Vale of Glamorgan Council is to provide a minimum of 500 vehicle parking spaces. Table 13 provides an overview of nearby stations including number of spaces and charges.

Table 13 Nearby stations official parking facilities[15]

Station	Total Parking Spaces	Access for all Spaces	Charges
Cardiff Central	426	20	£12.50 for 1 day
Pontyclun	<30 - TBC	TBC	Free

[15] https://www.nationalrail.co.uk/

Station	Total Parking Spaces	Access for all Spaces	Charges
Llanharan	42	2	Free
Pencoed	0	0	Not Applicable

5.8.2 There are also other park and ride facilities being planned as shown in Table 14.

Table 14 Planned Park & Ride Developments (values estimated from news)

Nearby Schemes Under Development	Number of Spaces
Junction 33 Park & Ride (By Bus)	1,000
Cardiff Parkway Station	2,000

5.8.3 Although challenging to accurately forecast the station use and the number of spaces required, a minimum of 500 spaces is suitable based on the nearby developments. Moreover, the forecast patronage of 133,969 per annum (not including the employment development as this would be a trip attractor rather than relate to users of the park and ride parking), can be equated to approximately 2,600 users per week. A proportion of these would car share or arrive by public transport or cycling, but provision of 500 spaces for daily use does not appear unduly large. The Gateway Station could be designed with a minimum 500 spaces, with additional land to expand/ overflow to 1000 spaces when required.

Table 15 Estimated Parking Spaces (based on scenario 4b)

Timeframe	Estimated Spaces Required
7 Day Week (assuming station is used equally all week)	300
5 Day Week (assuming station is primarily used Monday to Friday)	420

5.8.4 The availability of spaces is a key factor, more spaces will generally attract more demand up until a certain level. The spaces are assumed at this stage to have a turnover of one per day. The carpark could be linked up to the VMS network, indicating spaces available to motorists on approach roads and highlight the reduced travel time via train compared to by car. Discussions would be needed with the South Wales Trunk Road Agency regarding the potential for link up to the VMS.

5.8.5 According to the flood risk map, the station car park could potentially be located on a flood plain depending on the selected option. In case of flooding, defence, measures such as levees, bunds, reservoirs and weirs should be considered. An elevated plateau could also be provided at the car park area to control the risk of flood. Flood mitigation may also be required elsewhere.

5.8.6 Access for all spaces should be provided within 50m of the station entrance, wherever practical. For 500 or more spaces, it is recommended that 24 spaces are designed for access for all passenger purposes.[16]

[16] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

5.8.7 The parking facilities should have a minimum of 10% bays for electric vehicle charging (50 spaces). Options should consider future proofing a higher percentage of bays to accommodate future demand as by 2035, only electric vehicles may be produced, and the overall design life of the facilities is 120 years.[17] In addition to car charging, taxis and bus charging infrastructure should also be considered.

5.8.8 The following provision may also need to be considered:[18]

- Long and short stay public parking (both long and short stay)
- Motorcycle and cycle parking.
- Electric charging for buses and taxis.
- Emergency vehicles (In all case where the layout of the car park affects access by emergency service vehicles the access for such vehicles shall comply with the Building Regulations).
- Parking management measures (to control use of parking and charges and for entitlement within the Station Access Agreement).
- Permit/ contract/ preferential parking (e.g. for TOC staff, business passengers, and car hire franchise).
- Parcel collection point parking.
- Station management/ visitor parking.
- Station mobility buggy parking.
- Station contractor/ maintenance parking.
- Train crew parking (including out-of-hours access).
- Other TOC operational parking (e.g. for station staff).
- Other TfW parking (e.g. operational staff)
- British Transport Police parking (including its use for emergency response vehicles, and for accessing custody suites)
- Other tenancy parking (e.g. for train catering and postal/ parcel operations).
- Retail parking (e.g. for station retail/ catering outlet staff).
- Lineside maintenance vehicles.

5.8.9 Lighting will be required to provide adequate lighting levels that are in accordance with RIS-7700-INS: Railway Industry Standard for Lighting at Stations. It is important that lighting does not interfere in any way with the operational railway and any light overspill to adjoining neighbours be minimised. This would include consideration of any ecological impacts in this location such as impacts on bats. The lighting should be energy efficient.

5.8.10 CCTV will also be required to cover the car park, including pay stations and entrances/ exit barriers. The CCTV design should take into account national and industry standards and guidelines such as NR/L2/TEL/30135: Technical requirements for security CCTV Systems on Network Rail Infrastructure and NR/GN/TEL/50017: CCTV for stations – functional, technical, operational requirements. The function and system performance would be determined following consultation with the Local Authority and British Transport Police.

5.8.11 The cost of parking should be carefully considered and may in fact be free in order to encourage use of the park and ride rather than driving further distances on the highway network or continuing to park inappropriately in residential areas of other nearby towns and villages. It is noted that nearby stations provide free parking such as Pontyclun and Llanharan and is likely to be a large factor in the

[17] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

[18] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

public choosing one station over another. The users will be required to pay for tickets for rail/ bus services.

5.8.12 Future design activities will need to carry out option selection and design of car parking facilities, number of spaces and layouts.

5.9 Access for All

5.9.1 The proposed station and station facilities should be accessible to all people especially for those who are reduced mobility and those who use pushchairs. Designated disabled person's parking spaces should be located on firm and level ground, as close as feasible to the accessible entrance. The setting-down and pick-up points suitable for disabled passengers should be provided on firm and level ground, and they should be free of all obstacles and wide enough to allow transfer. The suggested footway width for wheelchair ramps is up to 1620mm and 4040mm plus manoeuvring space.

5.9.2 Lifts should be provided inside the station building for passengers' transport between ground level and platform level. Ramps should be installed where the lifts are not practicable to be provided. The ramp should have the lowest practical gradient which no more than 1:20. No series of ramps to a building should rise in total more than two metres. For station category D a minimum width of 2000mm between handrails is recommended.

5.9.3 Retail and catering facilities should be accessible to all passengers. Ticket sales points including manual ticket sales counters, information desks, customer assistance points and ticket vending machines should be provided along the obstacle-free route, a minimum of one desk and one machine should be at a lower level to provide better access. A minimum of one desk should be fitted with an induction loop system for hearing assistance.

5.9.4 Information signs should be installed where applicable to provide safety information, safety instructions, train timetables, warnings, and access information. The text and symbols of the signs needs to be clear, consistent and unambiguous. Tactile signs should be provided where visually impaired people need them to be able to identify and use facilities at the station. Clear announcements of important information should be given as they are particularly valuable for blind and partially sighted passengers and are a reassurance to all.

5.9.5 The station and its facilities will be designed in accordance with DfT's Accessible Railway Stations design standards.

5.10 Track

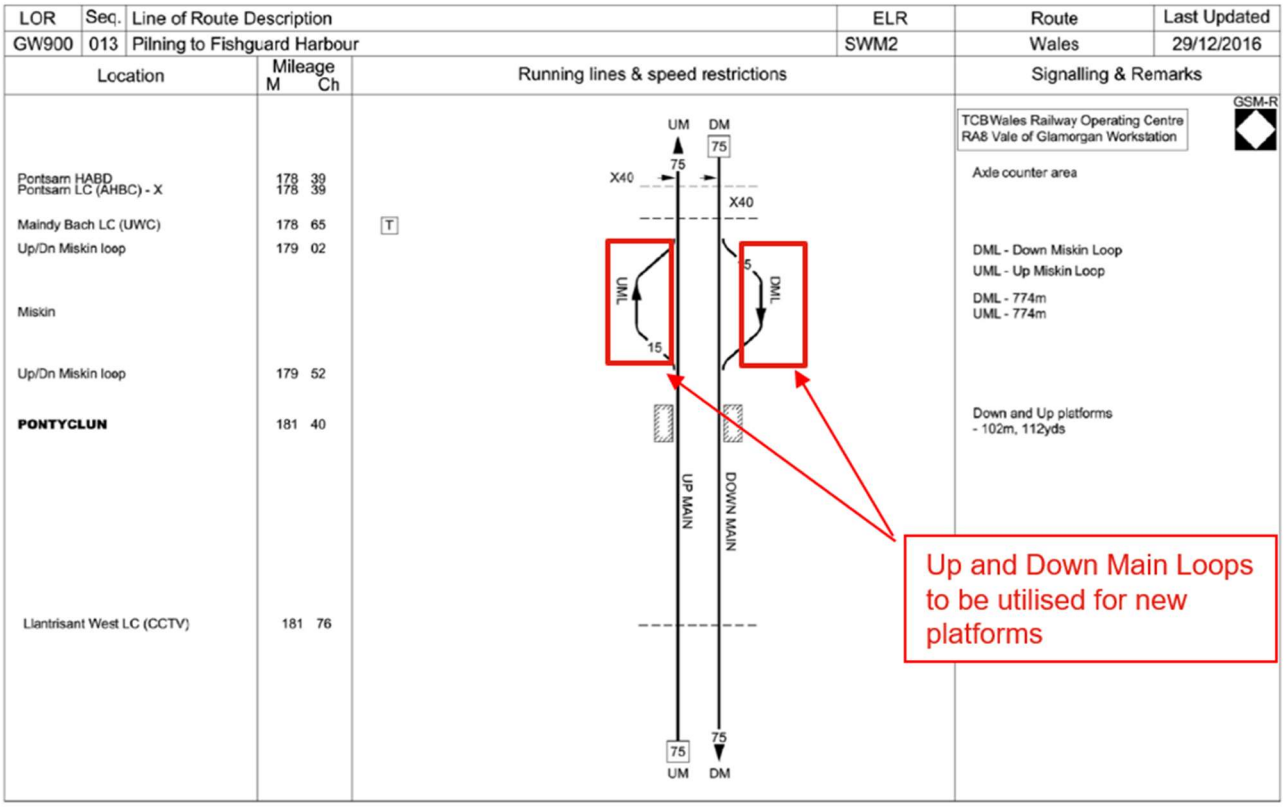
Description of Existing Track Layout

5.10.1 Located on the South Wales Main Line (SWM2) between 179m 02Ch and 179m 52Ch are the Up Main and Down Main Loops at Miskin. It is proposed that these loops are utilised for the Vale of Glamorgan Gateway Station (as shown in Figure 7 below).

5.10.2 The Up and Down Mains through this section run from Cardiff Central to Pontyclun with the loops flanking either side. The Down Main Loop is approximately 774m long and runs adjacent to the Renishaw Factory. The Up Main Loop also has an approximate length of 774m and runs adjacent to open fields and the Ely River.

5.10.3 Following the removal of the traps as part of the Cardiff Area Signalling Renewals in 2015, the Up and Down Main Loops are mainly used for goods vehicles but are occasionally used for passenger vehicles. At the high mileage end, the loops pass under an Overbridge. Limited information has been made available for this study.

Figure 7 Sectional Appendix Extract



Existing Track Geometry

5.10.4 The Up Main Loop and Down Main Loops are accessed via switches from the Up and Down Main Line. Using Bentley Rail Track regression techniques, the Up Main Loop has an approximate 1600m radius curve before entering a 600m straight. After this straight it reconnects to the Main Line via a 2400m curve and transition. Similarly, the Down Main Loop has a main straight section of approximately 650m.

5.10.5 The gradient of the lines varies between 1:180 and 1:400. A topographical survey will be required to accurately assess the track geometry for the next GRIP stages.

Track Condition

5.10.6 A visual inspection of the existing tracks will be required prior at the next design stage. Track condition will affect the existing life span of the existing track, and the line speed.

5.10.7 If the tracks and componentry are in poor condition, then they may need to be updated to handle the increase in traffic. On the contrary, if the tracks are in good condition then it will be unlikely to require significant works for the new station.

Line Speed

5.10.8 Current line speed of both the Up and Down Main lines is 75mph with the loops being 15mph. Section 4 above has indicated that raising the loops speed may reduce the amount of time required in time-table adjustments which would be advantageous for the scheme. However, without accurate geometry data that assessment cannot be made. Upgrading the line speed may not be achievable and is likely limited by the existing S&C arrangements. It is recommended that this is investigated at the next design stage. Grand Union Trains (TOC) have indicated that the loops at 15mph would cause distribution and would be highly recommended to improve the speed for the viability of future services.

5.11 Telecoms

5.11.1 New telecommunications will be required at the station. Any existing services and equipment will need to be assessed to determine if there is sufficient spare capacity to add the requirements for this station. The station will require new IT infrastructure, networking, CCTV, ticket machines, help points, specialised telecoms systems and loudspeakers. The requirements will be standard with few variations available, primarily between infrastructure owners and operators.

5.12 E&P

5.12.1 As the area has recently been re-signalled, as part of the CASR (Cardiff Area Signalling Renewals) Scheme, it is assumed that the signalling power system is Class I IT collectively earthed and that it is compliant with BS7671. Points Heating will have been provided for the 4No. Point ends, a Points Heating Control Cubicle (PHCC) and a Distribution Network Operator (DNO) should have been located in the vicinity of these points. A site survey will be required to confirm existing equipment. Trackside electrical requirements are assumed to be limited to:

- Points Heating following track changes
- Minor Signalling Power changes to reflect the track and signalling changes.
- Junction Lighting (where required) following track changes

5.12.2 Non-Trackside station elements will need to be provided – these are expected to require a segregated TOC supply:

- Ticket Machine power supplies
- Station Building Lighting
  - To include ticket office, concourse, waiting room, toilets
- Station Telecoms
  - To include help points, CCTV, CIS & specialised telecoms systems
- Retail Unit Supplies
- Lift Supplies
- Footbridge Lighting
- Platform Lighting

5.12.3 Where reasonably practicable DNO supplies for Network Rail Infrastructure, the TOC and other sub-metered supplies should be segregated and separately metered. OfGEM Compliant metering supplies, compliant with the Building Regulations Part L2 should be installed.

5.12.4 Street/ parking requirements such as:

- Carpark charging points
- Street Lighting
- Ticket Machine/ Barrier Power Supplies
- Telecoms Power Supplies (to include CCTV) will also have an electrical requirement. The car park ownership (and so DNO ownership) has not yet been determined.

5.12.5 The installation is to manage energy use, using renewable energy and metering options where applicable. Lighting shall be considered in terms of its effects on security, accessibility, the local environment and train operations.[19]

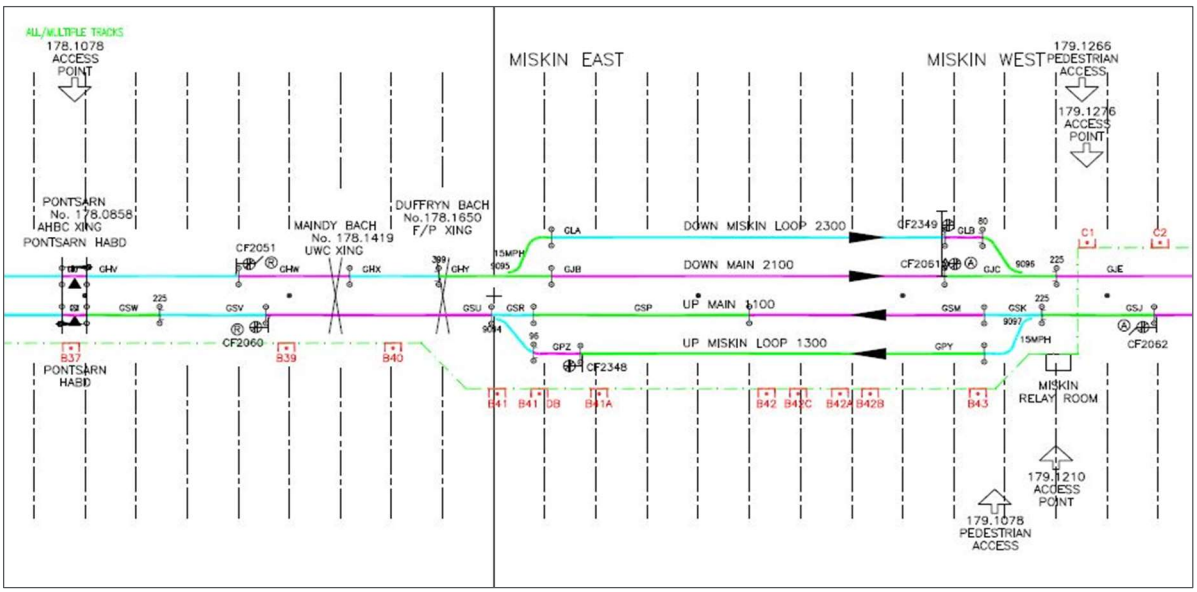
[19] Rail Industry Standard RIS-7702-INS 'Rail Industry Standard for Lighting at Stations'. Issue 1.1 June 2013. Available from: https://catalogues.rssb.co.uk/railway-group-

5.13 Signalling

Existing Signalling

5.13.1 The current signalling in this area (Figure 8) is controlled from South Wales Control Centre, Miskin Interlocking. There are existing signals CF2348 on the end of the up Miskin Loop and CF2349 on the end of the Down Miskin Loop. Axle counter sections are used in this area instead of track circuits. The signalling and track layout will be indicated at SWCC on the VDU control panels. There is Pontsarn HABD and AHBC level Crossing approximately 800 yards beyond the exit of the Up Miskin Loop.

Figure 8 Extract from 5-Mile Diagram for Miskin East



Signalling Changes Required

5.13.2 The signalling in this area is generally suitable for accommodating platforms on the outside of the loop lines. The areas that will need changes are the installation of car stop boards to be placed relevant to the length of stock that will be using this station. Care will have to be taken to ensure that stopping trains in the Up Miskin Loop do not activate Pontsarn AHBC, however as goods trains currently stop in this loop this has probably been incorporated into signalling controls. The new platforms will require to be shown on the VDU displays at SWCC, although this is a minor change this will be a long lead item to get the software changed and could be extremely expensive if not done as part of a larger scheme.

5.13.3 Any changes to the timetable and services will require level crossing assessments to be carried out along the route. Future signal sighting activities need to be undertaken to assess the impact from new station infrastructure such like footbridge, lift shafts, canopies, etc.

5.14 Sustainable Travel Requirements

5.14.1 The Welsh Government has a clear priority on increasing levels of walking and cycling in Wales to realise the many benefits that travelling actively brings – for individuals and for society. The Active Travel (Wales) Act 2013 places an onus on local authorities to provide active travel networks and forming good active travel connections to a new station would be essential. The benefits of sustainable travel are to increase the nation's health level, reduce greenhouse gas emissions, create an integrated community and support sustainable economic growth. Walking includes the use of wheelchairs and mobility scooters while cycling includes the use of electric bikes but not motorcycles.

5.14.2 Presently some 45% of passenger journeys by rail in Wales access the station on foot, whereas just 2.7% arrive by cycle.[20] The integrated Gateway Station will aim to provide transport interchange facilities for cyclists and pedestrians to enable easy and safe access by the implementation of design principles stated below. It is however recognised that the station is not location close to existing communities and therefore the level of walking and cycling to the station may be low. The new station will have dedicated active travel provision/ access, but no local provision is currently in place to connect into.

5.14.3 Nearby land is proposed to be developed, and the route could connect into other new developments, there could be potential to have a dedicated active travel route over the M4 to tie into nearby towns/ villages and future developments. The active travel network beyond the station development is outside of this study. More defined details regarding the stations active travel provisions will be investigated and developed in the future design stages.

5.15 Cycle Facilities

Cycle Parking

5.15.1 Provision of facilities to store cycles securely at stations must meet the needs of a range of different users, including those employed at the interchange, short term visitors, as well as longer term users who are using the interchange for daily journeys involving a cycling stage to or from the station. Cycle parking should be sited as close as possible to the main access to the station entrance buildings. The quantity of cycle parking will be assessed carefully to meet demand including some spare capacity to allow for growth in cycling. For commuter stations in particular, demand for cycle parking should be provided based on the future anticipated cycle mode share, a starting point of 5% of passengers entering the station is recommended for cycle parking quantities.[21] Cycle parking could also accommodate charging points for electric bicycles. Cycle parking types that suit public transport interchanges are Sheffield stands, two-tier stands or lockers/ cages.

Figure 9 Sheffield Bicycle Stands

[20] Figures for journeys commencing at stations operated by Arriva Trains Wales from Waves 16-22 of the National Passenger Survey (Passenger Focus).

[21] Green and Hall (2009), Better Rail Stations – An Independent Review. London: Department for Transport

Figure 10 Two-tier Bicycle Stands

Figure 11 Bicycle Lockers

5.15.2 The cycle parking layout should be large enough to accommodate the dimensions of a typical adult size cycle (reference the space allowances guidance for cycle parking).[22] Parking should be located on level ground and clear from obstruction of other users, particularly those with visual or mobility difficulties.

[22] Active Travel (Wales) Act 2013

Table 16 Cycle parking dimensions

Situation	Dimensions	Area per cycle
Stands on street	1.8m × 0.5m	1m^2
Within building minimum	1.8m × 0.5m spaces plus 1.8m aisle	1.35m^2
Within building generous	2.0m × 0.75m spaces plus 3–4m aisle	2–3m^2

5.15.3 Lighting, CCTV and the provision of specific equipment such as lockers or secure cycle storage compounds with covers are necessary approaches to ensure appropriate security levels. Secure cycle parking facilities with hire, repair and retail facilities can be encouraged, with local authorities working in partnership with relevant organisations and operating companies.

Signage for Cycling

5.15.4 Clear bilingual signage for route guidance, location and direction should be provided to cover the station area. Key principles such as minimising signing, minimising clutter, signing coherence, maintenance and value of signing is to be considered in the detail design stage.

Cycle Hire and Maintenance Facilities

5.15.5 Cycle hire can take the form of part of a wider cycle hire network, as part of a 'Cycle Hub', or provided as part of a standalone, or seasonal business. Some of these systems can offer cycles for hire on an automated basis, which eliminates the need for staff overheads.

5.15.6 In order to encourage cycling to the station, maintenance facilities or assistance such as pumps, tools, electric bike charging points, and cycle services shops could be set up to offer such opportunities. Whether there is potential in this location would need to be explored at a later stage.

Park and Cycle/ Car Share

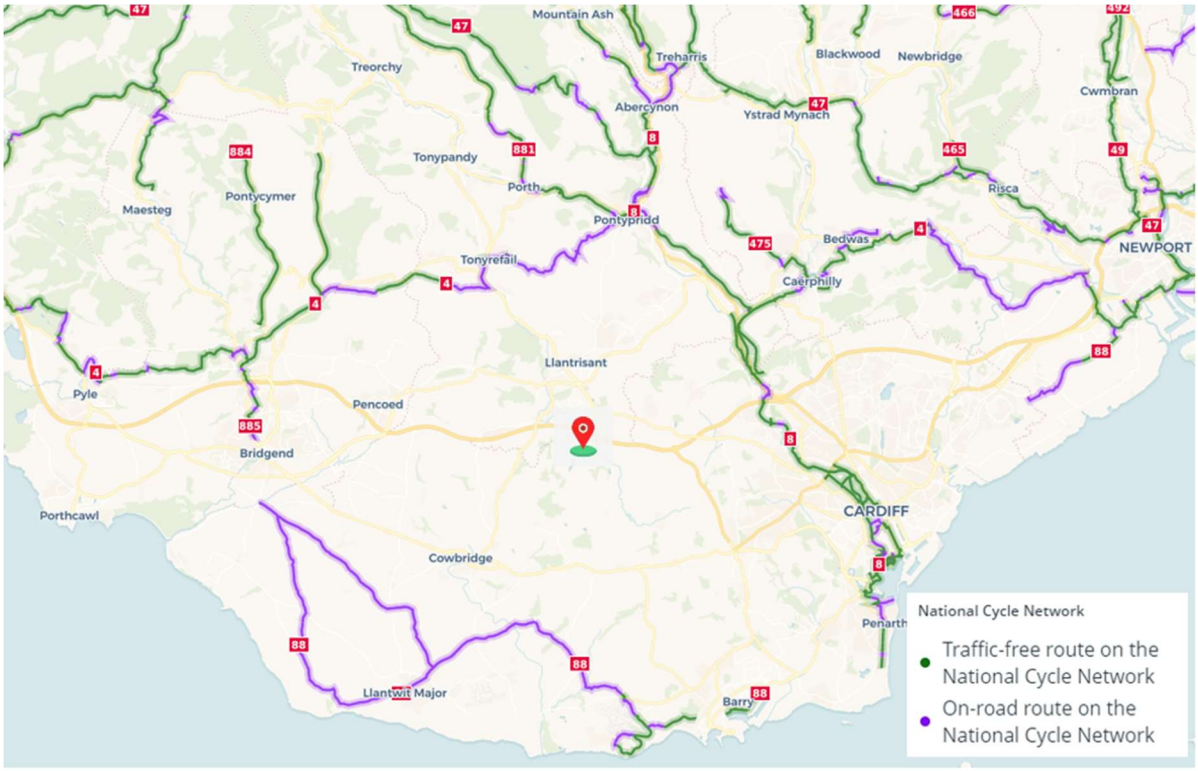
5.15.7 Park and Cycle works in the same way as a Park and Ride but with bicycles taking the place of the bus or rail journey stage. Users can travel to the Park and Cycle area by car and park their vehicle, take out their bike from an individual locker and cycle the rest of the way to their destination. Equipment such as clothing and helmets can be stored in the lockers. In order to maximise viability, the pricing strategy has to allow for payment for parking, in addition to a fare on any associated bus or train service. There may be potential for this if the improved link from the M4 Junction 34 to the A48 was implemented as this would provide a continuous cycle route from the parking site to Barry.

5.15.8 Moreover, there may also be usage by car sharers, as this already takes place around motorway junctions in the area in an informal way. Car park pricing would need to be set to ensure that this does not reduce availability of parking for station users for which it is primarily provided.

5.16 Cycle Routes

5.16.1 The current National Cycle Network (Figure 12) shows that the cycle routes network in and surrounding the proposed station area are not developed. However, as noted above, if the improved link to the A48 at Sycamore Cross is implemented, this will provide a north to south off-road route connecting to the recently completed section along Five Mile Lane and connecting to the NCN 88 at Barry. Other connections could also be considered such as a route to Hensol and the Vale Resort and hospital facilities.

Figure 12 National Cycle Network Plan



6 Site Location Feasibility Review

6.1 Background

6.1.1 Four site locations on the Miskin Goods Loops have been identified for potential sites, as shown in Figure 13. The sites are all adjacent to Renishaw. Land to the north of the railway is owned by Renishaw and is part of the adopted local development plan.

Figure 13 Site Location Plan

6.2 Location 1

6.2.1 Location 1 is south east of the Renishaw factory building and to the east of the rail line. The key advantages and disadvantages of the option are set out in Table 17. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00001.

Table 17 Location 1 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	Within the designated employment zone.	Furthest away from M4 Junction 34.
Land consideration	Flat level ground.	Area has planning permission granted for the Renishaw development. This area is considered highly important for the Renishaw development and should create a lot of employment.
Approach Road	Will tie into the existing road entering Renshaw.	Longest approach road out of the four locations. Furthest distance for buses and cyclists.

Feature	Advantages	Disadvantages
Car Park	Relatively flat ground. Room for future expansion. 1000+ spaces.	Land preparation would be required.
Ecology and Nature Conservation	Less woodland loss than some other options.	Access is likely to lead to loss of parts of a SINC: Land South West of Llanfarach Farm SINC consisting of UK BAP Priority Habitat of lowland mixed deciduous woodland, wet woodland and ponds. Loss of potential priority habitats (woodland and marshy grassland) – habitat translocation and/ or mitigation planting would be required. Further botanical survey work would be required to ascertain value of grassland. Habitats present may support protected and priority species including dormouse, bats, badger, breeding birds, great crested newts (breeding and terrestrial), reptiles and is likely to be of conservation value for terrestrial invertebrates.
Flood Risk	Predominantly located on land that is considered to be at low risk of flooding.	Land is known to have flooded in the past (DAM Zone B designation).
Heritage	Furthest option from scheduled monument. Very low potential for any impact through change to setting. No recorded heritage assets within the site.	Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	No TPOs affected.	Significant tree loss.
Platforms	Sufficient room available.	Long walking distance for passengers as platform entrance at end of platform. Platforms close/ on curve.
Signalling	North Platform Close to existing signalling.	South platform far from existing signalling and may need repeater.
Station Building & Bridge	Sufficient room is available to accommodate various sizes of buildings and facilities.	At end of platform.
Track	On the good loops.	Approaching/ close to curve on track Close to S&C.

6.2.2 Location 1 has been ruled out, due to a planned development by the landowner, Renishaw. Location 1 is within land designated as employment zoning, and the planned development expands the Renishaw factory and develops the rest of the employment zone. Renishaw is a global, high precision metrology and healthcare technology manufacturer, which is extremely important to the local economy, creating high skilled employment.

6.3 Location 2

6.3.1 Location 2 is on land south of the railway, between the railway and the Ely River. It lies on the west side of the railway. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00002.

Table 18 Location 2 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	Away from Renishaw and other future commercial area.	Watercourse in the middle.
Land consideration	No existing land usage proposals. Relatively flat land.	Multiple watercourses, flood plain and next to SSSI.
Approach Road	Shortest approach road out of all the location options.	New road junction required. Potential traffic congestion to the highway.
Car Park	Easy access through highway junction.	Space limited and constrained to no future expansion, unless multi-storey.
Ecology and Nature Conservation	Majority of location is on grassland of low ecological value. Potential for habitat enhancements along River Ely within construction buffer zone.	Access will lead to the loss of a small area of potential priority habitat (broadleaved plantation woodland). Habitat translocation and/ or mitigation planting would be required. Connecting habitat along the railway would be lost. A construction buffer of 10-20m to the River Ely SSSI would need to be in place to protect the river and its wildlife from pollution, lighting and disturbance (noise/ people). Habitats present may support protected and priority species including dormouse (woodland only, some of which may be retained), bats, otter, badgers, great crested newts (breeding and terrestrial) and breeding birds.
Flood Risk	Could possibly be mitigated.	Located in the floodplain of the River Ely, development must ensure there is no increase to third party flood risk and ensure that the flood risk onsite is suitable for the type of development proposed. Given the constrained nature of this location

Feature	Advantages	Disadvantages
		option, offsite mitigation is likely to be required.
Heritage	No recorded heritage assets within the site.	Second closest option to the scheduled monument (c. 20m), likely to cause change to setting and impact to significance. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	No TPOs affected. Limited tree loss	Area visible from Pendoylan Road.
Platforms	Platforms on straight track.	N/A
Signalling	Approximate in middle of goods loops. May provide adequate signal sighting.	Signal repeaters may be required if sighting is insufficient.
Station Building	Sufficient space.	On flood plain and takes valuable land which could be used for parking.
Track	Straight track.	N/A

6.3.2 Location 2 is not preferred. It is located adjacent to the Ely River which is a designated SSSI. The land has two watercourses flowing through it, and is a floodplain, meaning flood mitigation will likely be required as well. Development of the land would lead to potential habitat destruction and would be damaging to local biodiversity.

6.4 Location 3

6.4.1 Location 3 is set in marsh/ wet woodland, west of Renishaw. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00003.

Table 19 Location 3 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	In the vicinity of motorway and highway junction.	Area is heavily vegetated, marshy wet woodlands with priority habitat.
Land consideration	No existing development proposals.	Wet woodlands, TPO and wildlife.
Approach Road	New junction and approach road from existing highway.	Extensive land preparation required and works damaging to the local environment and biodiversity.
Car Park	Location is near Junction 34.	Extensive land preparation required and works damaging to the local environment and biodiversity.

Feature	Advantages	Disadvantages
Ecology and Nature Conservation	None	Loss of a SINC (Land South West of Llanfarach Farm SINC) consisting of UK BAP Priority Habitat – lowland mixed deciduous woodland, wet woodland, and ponds. Habitat translocation and/ or mitigation planting would be required, which is likely to require additional land purchase. Loss of connectivity of woodland habitat along and across the railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development. Construction buffer to woodland and SINC immediately to the north would need to be in place. Habitats present may support protected and priority species including dormouse, bats, badgers, breeding birds and great crested newts (possibly breeding and terrestrial phase).
Flood Risk	Located on land designated at low risk of flooding.	There is a waterbody located in the area, but no further information is available at this stage.
Heritage	Heritage asset within site is of local importance/ low value.	Quite close (c. 100m) to the scheduled monument, possibility of change to setting and impact to significance. This is likely to be minor if intervening woodland is retained. Historic landscape feature of a pond is present within the site. Removal of this would impact coherence of locally important historic landscape. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	Located across a woodland under a TPO.	Complete or partial loss of a TPO. Extensive woodland loss.
Platforms	Platforms situated on straight track.	N/A
Signalling	Close to signal on south platform.	Signal sighting would be required. May require additional signals at platform ends.

Feature	Advantages	Disadvantages
Station Building	Sufficient land available.	Extensive land preparation required and works damaging to the local environment. Size of building may be restricted to allow for additional car parking spaces.
Track	The station is situated on straight track.	Goods loops has a speed limit of 15mph.

6.4.2 Location 3 would require a large area of woodland clearance, which would need to be offset by replanting and/ or translocation of suitable trees and shrubs. If dormice are present, which is highly likely in this area, this offset planting would need to cover a greater area than the existing woodland so would require a further land purchase. It would be difficult to achieve biodiversity net benefit at this location.

6.5 Location 4

6.5.1 Location 4 utilises the existing staff car park for the Renishaw factory. The Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw, With separate floors for the railway users. This proposal would need to be negotiated and agreed with the landowners, Renishaw. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00004.

Table 20 Location 4 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	In the vicinity of motorway and highway junction.	Partially covered by trees and vegetations. Area has planning permission granted for an alternative development.
Land consideration.	Flat land already developed. Landowner – willing to discuss further.	Area has planning permission granted for an alternative development. Agreements required to use land.
Approach Road	Minor improvements required.	Forecasting has predicted congestion issues.
Car Park	Location is near Junction 34.	Nearby scheduled monuments and areas of archaeological interest.
Ecology and Nature Conservation	Largely located on hardstanding (Renishaw car park) with minimal ecological value.	Semi-natural broadleaved woodland between hardstanding and railway track. Loss of potential priority habitat (woodland). Habitat translocation and/ or mitigation planting would be required, which may require land for offset planting depending on the scheme footprint.

Feature	Advantages	Disadvantages
		Loss of connectivity of woodland habitat along railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development. Construction buffer to woodland and SINC immediately to the north would need to be in place. Habitats present may support protected and priority species, in particular dormouse, bats, badgers, breeding bird and great crested newts (terrestrial phase only).
Flood Risk	Predominantly located on land that is considered to be at low risk of flooding.	Small area known to have flooded in the past (Zone B designation in the DAM).
Heritage	No recorded heritage assets within the site.	Closest option to the scheduled monument (c. 15m), likely to cause change to setting and impact to significance. Also, potential to impact associated archaeological remains outside scheduled area that may be of equivalent national importance. Proximity to scheduled monument poses risk to granting of permission for development in this location. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	Limited tree loss.	Utilises existing parking stands.
Platforms	Platforms situated on straight track.	N/A
Signalling	South platform close to existing signal.	Signal sighting required. Potential for signal repeaters.
Station Building	Sufficient room, building could be tied into multi-storey car park.	Land preparation required. Building size may be restricted to reduce environmental & heritage impact.
Track	The station is situated on straight track.	N/A

6.5.2 Location 4 is the most feasible solution reviewed by this study. Initial talks to Renishaw indicated that they are open to the multi-storey car park proposal, however detailed discussion and agreements

would be required to take place. The Renishaw development is privately funded, and more certain to happen than the railway scheme. It is also ahead, in terms of planning permission and equivalent RIBA stages. Any proposals may need to be agreed in advance, as the area will be developed ahead of any station development.

6.6 Recommendation

6.6.1 Location 4 is the most suitable option reviewed as part of this study. However, it does contain constraints. The land required is privately owned by Renishaw and is the current staff car park. If a deal can be negotiated, it may be possible to build a multi-storey carpark on top of the staff car park. There may also be support for private financing opportunities. Although engineering feasible, locations 1 to 3 are not preferred due to their anticipated economic, environmental and social impacts. The railway factors are similar for all four sites. However, the main factor is the land available/ required for the car parking.

7 Summary

7.1 Background

7.1.1 The aim of this study was to review and determine the requirements and feasibility of opening a new railway station in the Vale of Glamorgan, near Hensol/ Miskin, Junction 34 of the M4 which borders Rhonda Cynon Taff. Strategically the location is an extremely important factor in the proposal and produces a unique opportunity to capture untapped demand of those travelling by car. The station would be strategically located to a motorway in Wales and offer quick direct trains into Cardiff city centre, with a journey time of approximately 10 minutes. The scheme is likely to be of national importance due to the location and potential significant benefits to the south wales area.

7.1.2 The station is set to generate new demand of up to 172k trips per year and up to a total of 217k trips per year, based on the assumptions of the forecast. Additional demand could also be generated by a number of other schemes/ proposals outside the remit of this project. A significant timetable exercise will be required to review all the services that travel through the area, as the typical stop is likely to add at least 4 minutes to the existing timetables.

7.1.3 The Vale of Glamorgan Gateway Station has two options, a minimum and desired/ future proofed. The minimum station would unstaffed, have two platforms, approximately 130m long, connected by a footbridge with lifts, waiting shelters and parking for up to 500 spaces. A desired/ future proofed station would be staffed, have two sheltered/ canopied platforms, approximately 300m long, connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1000 vehicles.

7.1.4 The Gateway Station will be a ‘Parkway’ type station. It may also be possible to use the station for Cardiff match days/ events, if additional changes are made to the track to provide turn back facilities and if there is suitable parking overflow.

7.2 Next Steps

7.2.1 Location 4 has been selected as most feasible but does have some significant constraints relating to land ownership/ agreements and congestion. This study does not rule out other locations that have not been explored. It is noted that there is potential to explore land to the west, on the south side of the M4, and parking land to the south of the Ely River.

7.2.2 A larger consensus with local authorities including the Vale of Glamorgan, Rhonda Cynon Taff and Cardiff and Welsh Government would greatly help the scheme, as it is likely to be classified as nationally important. The stakeholders will need to agree likely factors that may affect the scheme and possibly run more demand forecasting to determine a wider range of demand depending on assumptions not currently incorporated. Additional talks and agreements will be required with Renishaw, who are developing their land to the North of railway, as an option utilising their land is dependent on their permission. Therefore, it is advised to take forward more than one option, due to possible constraints that could halt the scheme.

7.2.3 As the station, will be on Network Rail Infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From the engineering perspective, the scheme should be feasible based on the information available for this study. The main constraints are land ownership and timetabling.

7.2.4 The major factor for selecting the location will be determined by the availability of land for parking. Ownership of the station and its facilities will need to be decided, whether TfW will own and operate, or by default Network Rail will own the station and infrastructure and the Vale of Glamorgan Council will own the parking. A detailed timetable analysis will also be required on how operational services will be timed based on future timetables. Additional stops for the rail services will add extra time onto the timetables, route enhancements could be considered to make up for this additional time, but this is beyond the scope of this study.

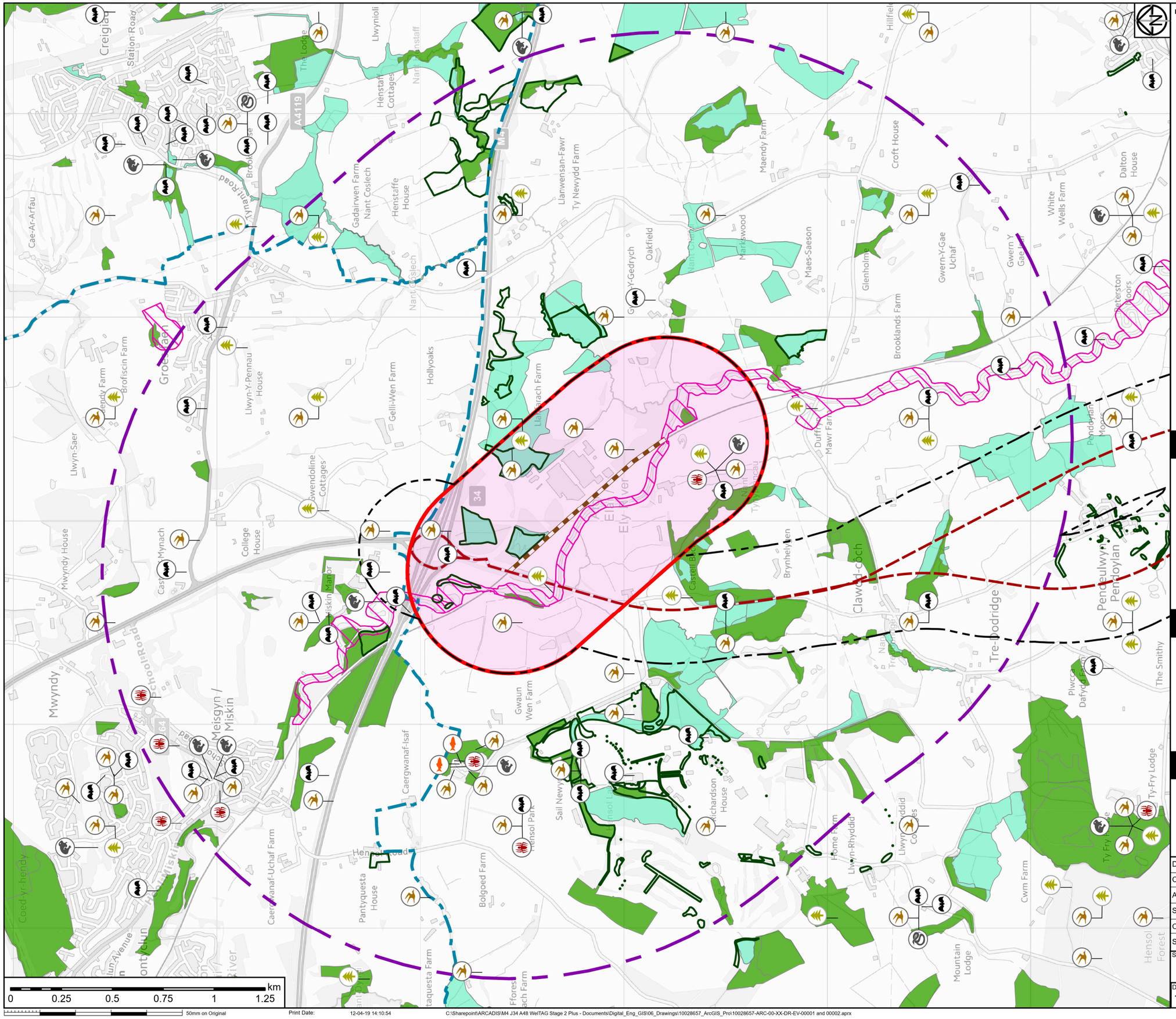
7.2.5 A WelTAG, business case and funding mechanisms for the new station will need to be explored to further develop the scheme.

7.2.6 To conclude, the recommended next steps are:

- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise
- Additional solution to be developed (as an alternative).
- Stakeholder engagement, to determine external factors and likelihood.
- Additional Demand Forecasting, including route origins and destination and additional transport modelling dependent on external factors.
- Detailed timetable analysis, including Goods Services.
- A timetable for ecological surveys required likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).
- Cost estimation.
- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).
- Network Rail Governance for Railway Investment Projects (GRIP) Product Deliverables.
- Submission of GRIP 1-2/ TfW Stage A to be brought in line with GRIP Product Deliverables.

APPENDIX A

Ecological Constraints Plan (Vale of Glamorgan Gateway Station)



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Legend :

- Sub-section Study Area
- 2km Search Area
- Overall Study Area
- Passing Loop
- Proposed highway route option
- Unitary Authority Boundaries
- Sites of Special Scientific Interest (SSSI)
- Sites of Importance for Nature Conservation (SINC)
- Tree Preservation Orders (TPO)
- Ancient Woodland Inventory

Locations of Protected, Priority and Invasive Species Records :

- Amphibians
- Birds
- Fish
- Insects
- Invasive Plants
- Mammals
- Reptiles

Client

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
Holton Road
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TITLE:

Ecological Constraints Plan

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:17,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00001

Revision: P01

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Print Date: 12-04-19 14:10:54

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APPENDIX B

Phase 1 Habitat Survey Plan (Vale of Glamorgan Gateway Station)

Table F1: Phase 1 Habitat Survey Target Notes for the Vale Gateway Station Study Area

Target Note	Description	Target Note	Description
1	Indian Balsam	116	Indian Balsam.
41	Japanese Knotweed	117	Trees with bat roosting potential.
42	Indian Balsam	124	Indian Balsam.
43	Indian Balsam	127	River Ely had a steady flow, with earth/ sand banks, a stone/ cobble bed. Banks are shaded predominately by semi mature and mature trees at this location. Very steep banks, approximately 2m from river. Water was turbid.
44	Mature trees with bat roosting potential.	128	Trees with bat roosting potential.
45	Indian Balsam	129	Trees with bat roosting potential.
46	Watercourse with water vole potential.	130	Raptor pellet.
112	Landowner indicated that a Red Kite and Goshawk had successful nest in 2019 at this location.	131	Indian Balsam.
114	Indian Balsam.	132	Trees with bat roosting potential.
115	Indian Balsam.	136	Farm Pond.

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Legend :

- Sub-section Study Area
- Overall Study Area

Phase 1 Habitat Survey :

- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - native species-rich
- Hedge with trees - native species-rich
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Running water
- Broadleaved Parkland/ scattered trees
- Broadleaved Woodland - Semi-Natural
- Broadleaved Woodland - Plantation
- Mixed Woodland - Semi-Natural
- Scrub - Dense/ Continuous
- Broadleaved Parkland/ Scattered Trees
- Neutral Grassland - Semi-Improved
- Improved Grassland
- Marsh/Marshy Grassland
- Tall Ruderal
- Standing Water
- Cultivated/ Disturbed Land - Arable
- Cultivated/ Disturbed Land - Amenity Grassland
- Buildings
- Hardstanding
- Area Not Surveyed
- Target Note

Client

VALE of GLAMORGAN
BRO MORGANNWG

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
Holton Road
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www.valeofglamorgan.gov.uk

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TITLE:

Phase 1 Habitat Surveys

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:7,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00002

Revision: P01

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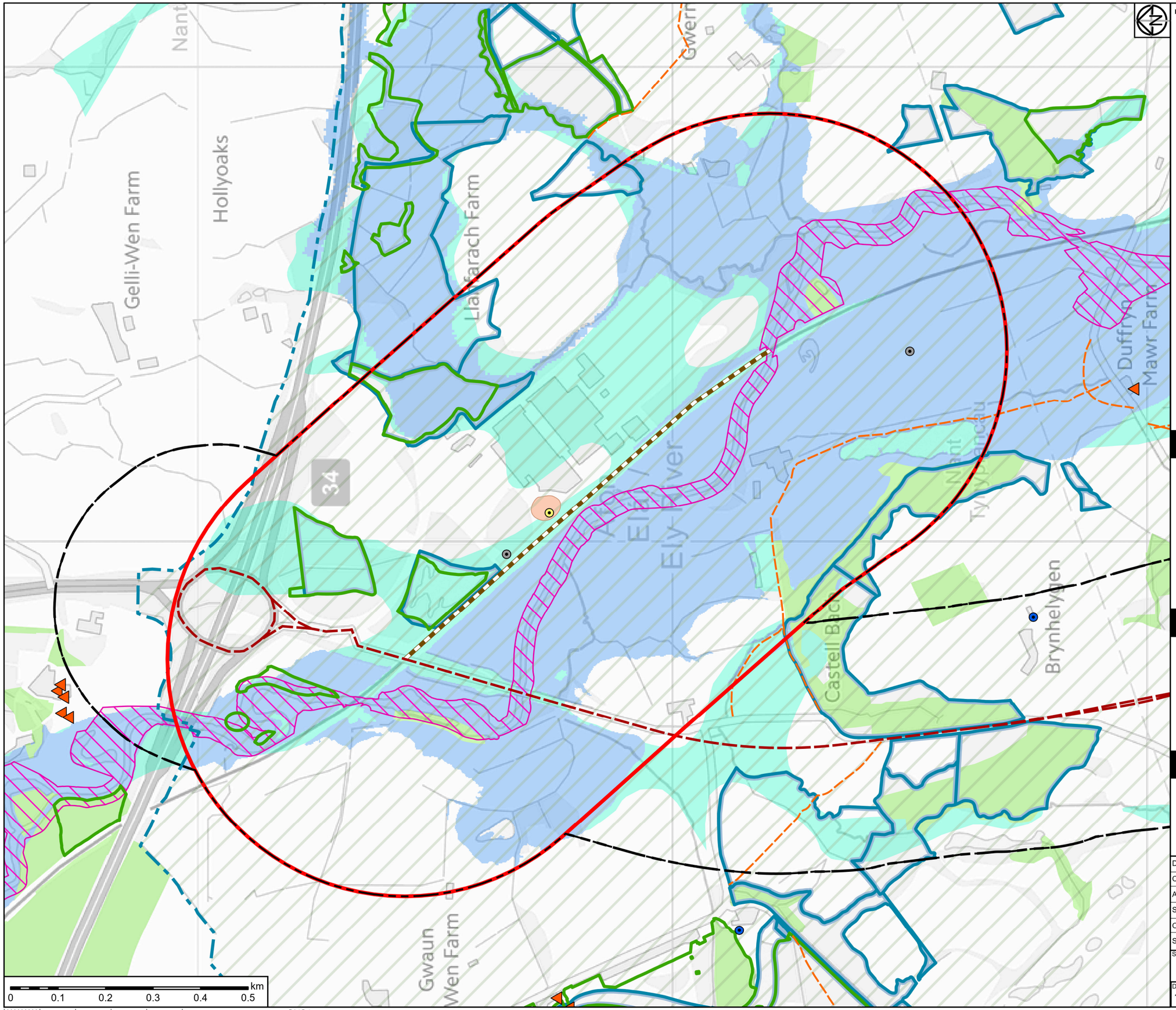
APPENDIX C

Environmental Constraints Plan (Vale of Glamorgan Gateway Station)



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Legend :

- Sub-section Study Area
- Overall Study Area
- Passing loop
- Proposed route options
- Unitary Authority Boundaries
- Scheduled Monuments
- Listed Buildings
- Historic Parks and Gardens
- Bronze Age
- Iron Age
- Medieval
- Modern
- Neolithic
- Post-Medieval
- Prehistoric
- Roman
- Unknown
- Public Rights of Way
- Tree Preservation Orders (TPO)
- Sites of Special Scientific Interest (SSSI)
- Sites of Importance for Nature Conservation (SINC)
- Registered Landscapes of Outstanding Interest
- Special Landscape Area (SLA)
- Ancient Woodland
- Flood Zone C2
- Flood Zone B
- Historic Parks and Gardens
- Conservation Areas

Client

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
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TITLE:

Environmental Constraints

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:7,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00003

Revision: P01

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APPENDIX D

Demand Forecasting

MOTT MACDONALD

Technical Note

Project:	Vale of Glamorgan M4 Junction 34 Park and Ride		
Our reference:	402338	**Your reference:**	
Prepared by:	CP	**Date:**	22/10/2019
Approved by:	PO	**Checked by:**	GB
Subject:	Modelling Assumptions		

This note has been prepared to summarise the scenario assumptions underpinning the Vale of Glamorgan M4 Junction 34 Park and Ride (P&R) modelling.

In total, model results have been provided from 4 separate scenarios:

I. Core demographic scenario without station (do-minimum);
II. Alternate demographic scenario without station (do-minimum);
III. Core demographic scenario with station (do-something); and
IV. Alternate demographic scenario with station (do-something).

1 Do-Minimum Scenario

The do-minimum scenarios are 2026 scenarios developed as part of a model maintenance exercise. These scenarios differ only in terms of the demographic inputs. The various inputs are described below.

1.1 Highway Scenario

In summary, the highway scenario consists of the following schemes in addition to the 2015 base year networks:

- M4 Junction 32 Improvements;
- M4 Junction 33 Improvements;
- Cardiff Eastern Bay Link Phase 1;
- Removal of Severn Bridge Tolls;
- A4336 Five Mile Lane Improvements;
- A465 Road Improvements including new section north of Rassau;
- A4119 / A473 Roundabout Improvements;
- Reduction of capacity on Castle Street, closure of Westgate Street to through-traffic and associated changes; and
- East Side Scheme (Cardiff City Centre), incorporating two one-way loops around Churchill Way.

1.2 Public Transport Scenario

The public transport scenario is developed from the Keolis-Amey proposals for Metro Phase 2. This includes:

- A total of 4 trains per hour (tph) from Cardiff to each of Treherbert / Aberdare / Merthyr / Rhymney;

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- New direct services (2tph) from Treherbert / Aberdare / Merthyr into Cardiff Bay, as part of the 4tph total on each of these lines; and
- Some Aberdare services routed via the City Line so that the City Line is better connected to the wider rail network.

In addition to the above changes to the rail network, the bus network includes a doubling of frequency along a section of the 122 bus service to serve new development sites in the Cardiff North West corridor.

Services which pass the new P&R site are described in Appendix A.

1.3 Demographic Scenarios

Specific planned / proposed developments have been modelled to more accurately reflect the distribution of trips on the transport network. Planned and proposed developments within the fully modelled area have been classified in order of decreasing likelihood, in accordance with DfT's WebTAG as:

- Near Certain;
- More Than Likely;
- Reasonably Foreseeable;
- and Hypothetical.

Two demographic scenarios were then developed from this information.

1.3.1 Core Scenario

The core scenario includes the two most likely categories of development specified above, with overall local authority changes controlled to growth totals in Experian data by factoring population and employment at existing locations.

1.3.2 Alternate Scenario

The alternate scenario includes the three most likely categories of development specified above and assumes no demographic changes from 2015 (except household income) at existing locations.

1.3.3 Developments in Scheme Vicinity

Table 1 documents all modelled developments incorporated into the 2026 forecast in the Vale of Glamorgan and Cardiff Local Authorities. Developments in other Local Authorities are not shown. Population is calculated on the basis of the number of dwellings provided by the Local Authority and an occupancy rate calculated from specifically selected sample locations. The calculation of population varies slightly between the core and alternate scenarios since the core scenario uses occupancy rates for 2026, whereas the alternate scenario, assumes no demographic changes at existing housing in the local authorities and therefore uses 2015 occupancy rates.

Table 1: Modelled Developments by Scenario in Vale of Glamorgan and Cardiff, 2015 – 2026

Local Authority	Scenario	Development	Employment	Population	
				Core	Alternate
Vale of Glamorgan	Core & Alternate	ITV Wales, Culverhouse Cross	-	515	515
		Land at and adjoining St. Cyres School, Murch Road	-	689	689
		Land at Ffordd y Mileniwm	890	-	-
		Land at Higher End, St. Athan (in part)	-	505	505
		Land north of the Railway Line, Rhoose	-	1608	1608
		Land to the east of Eglwys Brewis, St Athan	-	586	586
		Land to the north and west of Darren Close, Cowbridge	-	1091	1091
		Land West of Swanbridge Road, Sully	-	1149	1149
		Phase 2, Barry Waterfront	720	3905	3905
	Alternate Only	Aerospace Business Park, St Athan Rhoose	2000	-	-
		Atlantic Trading Estate	910	-	-
		Hayes Road, Sully	750	-	-
		Land adjacent to Cardiff Airport and Port Road, Rhoose	4000	-	-
		Land at Church Farm, St. Athan	-	-	577
		Land at Upper Cosmeston Farm, Lavernock	-	-	1323
		Land between new Northern Access Road and Eglwys Brewis Road	-	-	864
		Land to the South of Junction 34 M4 Hensol (Strategic & Local)	3000	-	-
		Llandow Trading Estate	680	-	-
		Vale Business Park	1240	-	-
Cardiff	Core & Alternate	Cardiff Central Enterprise Zone & Regional Transport Hub	10443	3437	3443
		Former Gas Works, Ferry Road	-	649	652
		North West Cardiff (Plas Dwr)	-	7697	7699
		North of J33 & South of Creigau	-	3345	3344
		North East Cardiff, west of Pontprennau	-	7908	7908
		East of Pontprennau Link Road	-	3248	3247

1.4 Other Inputs

Other significant inputs to the variable demand model system used to derive highway demand include, but are not limited to:

- Department for Transport Road Traffic Forecasts (2018 release) used for growth of LGV, HGV, and external-external trips, and external network speeds.

- WebTAG Databook (July 2019 version) used for values of time, vehicle operating costs, and other economic parameters.

2 Do-Something Assumptions

2.1 Services Stopping at New P&R Station

In general, services that are operated by Transport for Wales (TfW) are assumed to stop at the new P&R station whereas services of other operators are not, with a few exceptions. This results in a service frequency of approximately 3 trains per hour in each direction. Full details on which services are assumed to stop can be found in Appendix A.

2.2 Station Access

2.2.1 Public Transport Access

Walkable connectors have been added between the new park and ride site and the modelled development "Land to the South of Junction 34 M4 Hensol (Strategic & Local)", since this development is modelled as introducing 3,000 new jobs in the alternate scenario (see Table 1). A walkable connector has also been added between the new park and ride station and Hensol Castle bus stop, to allow connections to bus route 320 to Talbot Green. No consideration has been given to any rerouting of this bus route to stop at the new park and ride station, or to additional bus routes.

2.2.2 Highway Access

Both the park and ride car park, and the new development have been connected to the highway network via the same access point as the existing Renishaw employment site south of M4 Junction 34.

2.3 Parking Spaces

A total of 500 car parking spaces are assumed at the new P&R station. It should be noted that the number of spaces is used as a model attraction variable but does not provide an explicit cap on the number of P&R trips which access the rail network via the specific station. A logarithmic function is applied to the number of spaces. Therefore, each additional space is worth less in terms of attractiveness the larger an existing car park.

A. Services Via New Station

Table 2: Services via New P&R Station Location

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
1	03:52	07:32	3h 40	Swansea	London Paddington	East	Other	05:01	No
2	04:58	08:02	3h 4	Swansea	London Paddington	East	Other	05:52	No
3	05:27	08:33	3h 6	Swansea	London Paddington	East	Other	06:21	No
4	05:03	10:14	5h 11	Carmarthen	Manchester Piccadilly	East	TfW	06:43	Yes
5	05:58	08:54	2h 56	Swansea	London Paddington	East	Other	06:52	No
6	06:23	09:11	2h 48	Swansea	London Paddington	East	Other	07:13	No
7	06:39	08:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	07:33	Yes
8	06:41	07:41	1h	Swansea	Cardiff Central	East	TfW	07:41	Yes
9	05:47	07:48	2h 1	Carmarthen	Cardiff Central	East	TfW	07:48	Yes
10	06:15	11:15	5h	Carmarthen	Manchester Piccadilly	East	TfW	08:02	Yes
11	07:23	10:11	2h 48	Swansea	London Paddington	East	Other	08:13	No
12	07:39	09:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	08:33	Yes
13	05:55	12:15	6h 20	Milford Haven	Manchester Piccadilly	East	TfW	08:39	Yes
14	07:41	08:41	1h	Swansea	Cardiff Central	East	TfW	08:41	Yes
15	07:23	11:11	3h 48	Carmarthen	London Paddington	East	Other	09:13	No
16	08:39	10:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	09:33	Yes
17	08:41	09:41	1h	Swansea	Cardiff Central	East	TfW	09:41	Yes
18	07:05	13:15	6h 10	Milford Haven	Manchester Piccadilly	East	TfW	09:44	Yes
19	09:23	12:11	2h 48	Swansea	London Paddington	East	Other	10:13	No
20	06:59	10:34	3h 35	Pembroke Dock	Newport (S Wales)	East	TfW	10:18	No
21	09:39	11:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	10:33	Yes
22	05:16	10:41	5h 25	Shrewsbury	Cardiff Central	East	TfW	10:41	Yes
23	09:41	10:41	1h	Swansea	Cardiff Central	East	TfW	10:41	Yes
24	07:50	14:15	6h 25	Fishguard Harbour	Manchester Piccadilly	East	TfW	10:48	Yes
25	10:23	13:11	2h 48	Swansea	London Paddington	East	Other	11:13	No
26	10:39	12:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	11:33	Yes
27	10:41	11:41	1h	Swansea	Cardiff Central	East	TfW	11:41	Yes

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
28	09:08	15:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	11:46	Yes
29	11:23	14:11	2h 48	Swansea	London Paddington	East	Other	12:13	No
30	11:10	12:18	1h 8	Swansea	Cardiff Central	East	TfW	12:18	No
31	11:39	13:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	12:33	Yes
32	11:41	12:41	1h	Swansea	Cardiff Central	East	TfW	12:41	Yes
33	11:03	16:15	5h 12	Carmarthen	Manchester Piccadilly	East	TfW	12:48	Yes
34	12:23	15:11	2h 48	Swansea	London Paddington	East	Other	13:13	No
35	12:39	14:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	13:33	Yes
36	12:41	13:41	1h	Swansea	Cardiff Central	East	TfW	13:41	Yes
37	11:08	17:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	13:47	Yes
38	13:23	16:11	2h 48	Swansea	London Paddington	East	Other	14:13	No
39	09:00	14:15	5h 15	Shrewsbury	Cardiff Central	East	TfW	14:15	Yes
40	13:39	15:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	14:33	Yes
41	13:41	14:41	1h	Swansea	Cardiff Central	East	TfW	14:41	Yes
42	13:02	18:15	5h 13	Carmarthen	Manchester Piccadilly	East	TfW	14:47	Yes
43	14:23	17:11	2h 48	Swansea	London Paddington	East	Other	15:13	No
44	14:39	16:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	15:33	Yes
45	14:41	15:41	1h	Swansea	Cardiff Central	East	TfW	15:41	Yes
46	13:08	19:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	15:47	Yes
47	13:29	15:58	2h 29	Fishguard Harbour	Cardiff Central	East	TfW	15:58	Yes
48	15:23	18:11	2h 48	Swansea	London Paddington	East	Other	16:13	No
49	15:39	17:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	16:33	Yes
50	15:41	16:41	1h	Swansea	Cardiff Central	East	TfW	16:41	Yes
51	15:03	20:15	5h 12	Carmarthen	Manchester Piccadilly	East	TfW	16:46	Yes
52	16:23	19:11	2h 48	Swansea	London Paddington	East	Other	17:13	No
53	16:39	18:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	17:33	Yes
54	16:41	17:41	1h	Swansea	Cardiff Central	East	TfW	17:41	Yes
55	15:08	21:06	5h 58	Milford Haven	Manchester Piccadilly	East	TfW	17:46	Yes
56	17:23	20:11	2h 48	Swansea	London Paddington	East	Other	18:13	No
57	16:45	21:19	4h 34	Llanelli	Chester	East	TfW	18:14	Yes

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
58	17:39	19:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	18:33	Yes
59	17:41	18:41	1h	Swansea	Cardiff Central	East	TfW	18:41	Yes
60	16:58	22:13	5h 15	Carmarthen	Manchester Piccadilly	East	TfW	18:49	Yes
61	18:28	21:32	3h 4	Swansea	London Paddington	East	Other	19:22	No
62	18:39	20:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	19:33	Yes
63	17:08	20:03	2h 55	Milford Haven	Cardiff Central	East	TfW	20:03	Yes
64	19:29	22:49	3h 20	Swansea	London Paddington	East	Other	20:22	No
65	18:50	20:46	1h 56	Carmarthen	Cardiff Central	East	TfW	20:46	Yes
66	20:28	22:25	1h 57	Swansea	Swindon	East	Other	21:22	No
67	20:39	22:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	21:33	Yes
68	19:11	21:54	2h 43	Milford Haven	Cardiff Central	East	TfW	21:54	Yes
69	19:57	22:49	2h 52	Tenby	Cardiff Central	East	TfW	22:49	Yes
70	22:39	00:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	23:33	Yes
71	22:32	23:38	1h 6	Swansea	Cardiff Central	East	TfW	23:38	Yes
72	05:37	08:43	3h 6	Cardiff Central	Milford Haven	West	TfW	05:37	Yes
73	06:42	10:18	3h 36	Cardiff Central	Pembroke Dock	West	TfW	06:42	Yes
74	07:14	08:15	1h 1	Cardiff Central	Swansea	West	TfW	07:14	Yes
75	06:29	08:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	07:30	Yes
76	05:40	08:26	2h 46	London Paddington	Swansea	West	Other	07:34	No
77	04:54	10:57	6h 3	Crewe	Milford Haven	West	TfW	07:50	Yes
78	08:14	09:15	1h 1	Cardiff Central	Swansea	West	TfW	08:14	Yes
79	07:29	09:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	08:30	Yes
80	06:40	09:26	2h 46	London Paddington	Swansea	West	Other	08:34	No
81	05:55	10:51	4h 56	Crewe	Carmarthen	West	TfW	09:04	Yes
82	09:14	10:15	1h 1	Cardiff Central	Swansea	West	TfW	09:14	Yes
83	08:29	10:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	09:30	Yes
84	07:40	10:26	2h 46	London Paddington	Swansea	West	Other	09:34	No
85	06:30	12:48	6h 18	Manchester Piccadilly	Milford Haven	West	TfW	10:04	Yes
86	10:14	11:15	1h 1	Cardiff Central	Swansea	West	TfW	10:14	Yes
87	09:29	11:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	10:30	Yes
88	08:40	11:26	2h 46	London Paddington	Swansea	West	Other	10:34	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
89	07:30	12:26	4h 56	Manchester Piccadilly	Carmarthen	West	TfW	10:42	Yes
90	10:40	13:27	2h 47	Newport (S Wales)	Fishguard Harbour	West	TfW	10:58	No
91	11:14	12:15	1h 1	Cardiff Central	Swansea	West	TfW	11:14	Yes
92	10:29	12:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	11:30	Yes
93	09:40	12:26	2h 46	London Paddington	Swansea	West	Other	11:34	No
94	08:30	14:31	6h 1	Manchester Piccadilly	Milford Haven	West	TfW	11:38	Yes
95	12:14	13:15	1h 1	Cardiff Central	Swansea	West	TfW	12:14	Yes
96	11:29	13:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	12:30	Yes
97	10:40	13:26	2h 46	London Paddington	Swansea	West	Other	12:34	No
98	09:30	14:30	5h	Manchester Piccadilly	Carmarthen	West	TfW	12:39	Yes
99	13:14	14:15	1h 1	Cardiff Central	Swansea	West	TfW	13:14	Yes
100	12:29	14:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	13:30	Yes
101	11:40	14:26	2h 46	London Paddington	Swansea	West	Other	13:34	No
102	10:30	16:29	5h 59	Manchester Piccadilly	Milford Haven	West	TfW	13:41	Yes
103	14:14	15:15	1h 1	Cardiff Central	Swansea	West	TfW	14:14	Yes
104	13:29	15:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	14:30	Yes
105	12:40	15:26	2h 46	London Paddington	Swansea	West	Other	14:34	No
106	11:30	16:30	5h	Manchester Piccadilly	Carmarthen	West	TfW	14:43	Yes
107	10:40	16:41	6h 1	Holyhead	Llanelli	West	TfW	15:13	No
108	15:14	16:15	1h 1	Cardiff Central	Swansea	West	TfW	15:14	Yes
109	14:29	16:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	15:30	Yes
110	13:40	16:26	2h 46	London Paddington	Swansea	West	Other	15:34	No
111	12:30	18:31	6h 1	Manchester Piccadilly	Milford Haven	West	TfW	15:39	Yes
112	14:45	18:56	4h 11	Gloucester	Fishguard Harbour	West	TfW	16:04	No
113	16:14	17:15	1h 1	Cardiff Central	Swansea	West	TfW	16:14	Yes
114	15:29	17:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	16:30	Yes
115	14:40	17:26	2h 46	London Paddington	Swansea	West	Other	16:34	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
116	13:30	19:52	6h 22	Manchester Piccadilly	Tenby	West	TfW	17:04	Yes
117	17:14	18:15	1h 1	Cardiff Central	Swansea	West	TfW	17:14	Yes
118	16:29	18:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	17:30	Yes
119	15:40	18:26	2h 46	London Paddington	Swansea	West	Other	17:34	No
120	14:30	20:32	6h 2	Manchester Piccadilly	Milford Haven	West	TfW	17:40	Yes
121	18:14	19:15	1h 1	Cardiff Central	Swansea	West	TfW	18:14	Yes
122	17:29	19:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	18:30	Yes
123	16:40	19:26	2h 46	London Paddington	Swansea	West	Other	18:34	No
124	15:30	20:55	5h 25	Manchester Piccadilly	Carmarthen	West	TfW	19:04	Yes
125	17:15	21:22	4h 7	London Paddington	Carmarthen	West	Other	19:29	No
126	18:29	20:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	19:30	Yes
127	16:30	22:46	6h 16	Manchester Piccadilly	Milford Haven	West	TfW	19:46	Yes
128	17:45	20:47	3h 2	London Paddington	Swansea	West	Other	19:52	No
129	18:15	21:19	3h 4	London Paddington	Swansea	West	Other	20:25	No
130	18:45	21:50	3h 5	London Paddington	Swansea	West	Other	20:54	No
131	21:04	00:21	3h 17	Cardiff Central	Milford Haven	West	TfW	21:04	Yes
132	19:15	22:20	3h 5	London Paddington	Swansea	West	Other	21:24	No
133	20:29	22:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	21:30	Yes
134	18:30	23:57	5h 27	Manchester Piccadilly	Carmarthen	West	TfW	22:09	Yes
135	20:15	23:22	3h 7	London Paddington	Swansea	West	Other	22:26	No
136	19:30	01:40	6h 10	Manchester Piccadilly	Carmarthen	West	TfW	23:15	Yes
137	22:29	00:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	23:30	Yes
138	21:15	00:25	3h 10	London Paddington	Neath	West	Other	23:43	No
139	21:15	00:39	3h 24	London Paddington	Swansea	West	Other	23:43	No
140	22:45	02:16	3h 31	London Paddington	Swansea	West	Other	01:17	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
141	22:45	02:07	3h 22	London Paddington	Neath	West	Other	01:25	No

Vale of Glamorgan Gateway Station
Updated 10/10/2019

SEWTM Variable Demand Run Details

Do-Minimum (DM) Core Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added (unused in this scenario)
Demand:	Re-distributed LDP development 2026 (amended September 2019) *'Near certain' + 'More than likely' uncertainty log categories only* *(does not include former adjacent site redevelopment)*

Do-Minimum (DM) Alternative Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added (unused in this scenario)
Demand:	Re-distributed LDP development 2026 (amended September 2019) *ALL four uncertainty log categories* *(i.e. includes former adjacent site redevelopment)*

Do-Something (DS) Core Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added Highway access from southern (unclassified) arm at M4 J34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand:	Re-distributed LDP development 2026 (amended September 2019) *'Near certain' + 'More than likely' uncertainty log categories only* *(does not include former adjacent site redevelopment)*

Do-Something (DS) Alternative Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added Highway access from southern (unclassified) arm at M4 J34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand:	Re-distributed LDP development 2026 (amended September 2019) *ALL four uncertainty log categories* *(i.e. includes former adjacent site redevelopment)*

IUM SCENARIOS 2026

Core Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	0	-	0	-	0	0
AM	Pontyclun	29	45%	44	45%	0	14
AM	Llanharan	19	32%	25	28%	3	18
AM	Pencoed	24	96%	42	95%	0	4
AM	Bridgend	202	63%	178	61%	28	93
IP	J34 P&R	0	-	0	-	0	0
IP	Pontyclun	5	60%	6	50%	0	3
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	100%	6	100%	0	2
IP	Bridgend	49	63%	40	65%	25	22
PM	J34 P&R	0	-	0	-	0	0
PM	Pontyclun	9	44%	47	45%	0	22
PM	Llanharan	6	17%	29	31%	0	5
PM	Pencoed	14	93%	43	98%	0	2
PM	Bridgend	222	64%	197	63%	39	95
OP	J34 P&R	0	-	0	-	0	0
OP	Pontyclun	5	60%	15	47%	0	3
OP	Llanharan	3	33%	7	29%	0	2
OP	Pencoed	5	100%	9	100%	0	3
OP	Bridgend	38	66%	90	62%	13	25

**N.B. Colour bars not show for Bridgend due to significantly higher passenger volumes*

		All entries/exits
24 hr	J34 P&R	0
	Pontyclun	706
	Llanharan	402
	Pencoed	551
	Bridgend	4597
Annual	J34 P&R	-
	Pontyclun	257,588
	Llanharan	146,552
	Pencoed	201,053
	Bridgend	1,677,875

Alt Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	0	-	0	-	0	0
AM	Pontyclun	28	46%	44	43%	0	15
AM	Llanharan	18	33%	25	28%	3	18
AM	Pencoed	22	95%	40	95%	0	4
AM	Bridgend	192	64%	180	58%	28	99
IP	J34 P&R	0	-	0	-	0	0
IP	Pontyclun	5	60%	6	50%	0	3
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	100%	6	100%	0	2
IP	Bridgend	49	61%	40	63%	25	23
PM	J34 P&R	0	-	0	-	0	0
PM	Pontyclun	9	44%	46	46%	0	22
PM	Llanharan	6	17%	28	32%	0	4
PM	Pencoed	13	92%	41	95%	0	2
PM	Bridgend	222	62%	187	64%	38	100
OP	J34 P&R	0	-	0	-	0	0
OP	Pontyclun	5	60%	15	47%	0	3
OP	Llanharan	3	33%	7	29%	0	2
OP	Pencoed	5	100%	9	100%	0	3
OP	Bridgend	38	63%	87	62%	12	26

		All entries/exits
24 hr	J34 P&R	0
	Pontyclun	704
	Llanharan	396
	Pencoed	537
	Bridgend	4563
Annual	J34 P&R	-
	Pontyclun	256,828
	Llanharan	144,359
	Pencoed	196,083
	Bridgend	1,665,429

DO-SOMETHING SCENARIOS 2036

Core Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	63	100%	2	100%	6	0
AM	Pontyclun	24	38%	39	38%	0	22
AM	Llanharan	17	29%	24	25%	0	17
AM	Pencoed	20	95%	38	92%	0	3
AM	Bridgend	196	61%	179	58%	24	95
IP	J34 P&R	4	100%	4	100%	5	1
IP	Pontyclun	4	50%	5	40%	0	4
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	80%	6	100%	0	2
IP	Bridgend	48	63%	40	63%	18	23
PM	J34 P&R	4	100%	48	100%	7	1
PM	Pontyclun	10	30%	39	38%	0	25
PM	Llanharan	6	17%	25	28%	0	3
PM	Pencoed	14	86%	37	95%	0	4
PM	Bridgend	219	63%	192	61%	30	95
OP	J34 P&R	2	100%	5	100%	0	0
OP	Pontyclun	5	40%	13	38%	0	3
OP	Llanharan	3	33%	6	33%	0	2
OP	Pencoed	4	100%	7	100%	0	4
OP	Bridgend	36	64%	86	60%	13	27

**N.B. Colour bars not show for Bridgend due to significantly higher passenger volumes*

		All entries/exits	*P&R entries/exits*	*non-P&R*	
24 hr	J34 P&R	375	*367*	*8*	
	Pontyclun	662			
	Llanharan	369			
	Pencoed	500			
	Bridgend	4523			
			P&R entries/exits	*non-P&R*	*2,950*
Annual	J34 P&R	136,919	*133,969*		
	Pontyclun	241,522			- 16,066
	Llanharan	134,556			- 11,996
	Pencoed	182,472			- 18,581
	Bridgend	1,650,795			- 27,080
					- **73,724**

Forecast change from DM	% change from DM
-6%	
-8%	
-9%	
-2%	

P&R patronage achievable in scenario without added congestion caused by new development adjacent to J34

2026 forecast patronage with new development adjacent to J34, on the assumption that congestion problems associated with the new development can be mitigated:

24-hr	594
Annual	**216,982**

Alt Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	22	91%	31	3%	6	0
AM	Pontyclun	26	42%	40	43%	0	22
AM	Llanharan	17	29%	24	25%	0	17
AM	Pencoed	21	95%	38	95%	0	3
AM	Bridgend	190	63%	181	57%	26	96
IP	J34 P&R	5	20%	5	20%	5	1
IP	Pontyclun	4	50%	6	50%	0	5
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	80%	6	100%	0	2
IP	Bridgend	48	63%	40	63%	18	24
PM	J34 P&R	28	4%	18	83%	8	0
PM	Pontyclun	9	44%	42	43%	0	25
PM	Llanharan	6	17%	26	31%	0	3
PM	Pencoed	13	92%	39	92%	0	4
PM	Bridgend	219	63%	187	63%	30	98
OP	J34 P&R	3	33%	3	33%	0	0
OP	Pontyclun	5	40%	13	46%	0	4
OP	Llanharan	3	33%	6	33%	0	2
OP	Pencoed	4	100%	8	100%	0	3
OP	Bridgend	36	67%	85	62%	12	27

		All entries/exits	*P&R*	*non-P&R*	
24 hr	J34 P&R	337	*110*	*227*	
	Pontyclun	696			
	Llanharan	371			
	Pencoed	504			
	Bridgend	4506			
			P&R	*non-P&R*	
Annual	J34 P&R	123,165	*40,153*	*83,013*	
	Pontyclun	254,184			- 2,643
	Llanharan	135,317			- 9,043
	Pencoed	183,904			- 12,179
	Bridgend	1,644,703			- 20,726
					- **44,591**

Forecast change from DM	% change from DM
-1%	
-6%	
-6%	
-1%	

P&R demand reduces significantly with new adjacent development

Patronage associated with new development adjacent to J34

DM-DS (Core Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	63	2	6	0
AM	Pontyclun	-5	-5	0	8
AM	Llanharan	-2	-1	-3	-1
AM	Pencoed	-4	-4	0	-1
AM	Bridgend	-6	1	-4	2
IP	J34 P&R	4	4	5	1
IP	Pontyclun	-1	-1	0	1
IP	Llanharan	0	0	0	0
IP	Pencoed	0	0	0	0
IP	Bridgend	-1	0	-7	1
PM	J34 P&R	4	48	7	1
PM	Pontyclun	1	-8	0	3
PM	Llanharan	0	-4	0	-2
PM	Pencoed	0	-6	0	2
PM	Bridgend	-3	-5	-9	0
OP	J34 P&R	2	5	0	0
OP	Pontyclun	0	-2	0	0
OP	Llanharan	0	-1	0	0
OP	Pencoed	-1	-2	0	1
OP	Bridgend	-2	-4	0	2

DM-DS (Alt Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	22	31	6	0
AM	Pontyclun	-2	-4	0	7
AM	Llanharan	-1	-1	-3	-1
AM	Pencoed	-1	-2	0	-1
AM	Bridgend	-2	1	-2	-3
IP	J34 P&R	5	5	5	1
IP	Pontyclun	-1	0	0	2
IP	Llanharan	0	0	0	0
IP	Pencoed	0	0	0	0
IP	Bridgend	-1	0	-7	1
PM	J34 P&R	28	18	8	0
PM	Pontyclun	0	-4	0	3
PM	Llanharan	0	-2	0	-1
PM	Pencoed	0	-2	0	2
PM	Bridgend	-3	0	-8	-2
OP	J34 P&R	3	3	0	0
OP	Pontyclun	0	-2	0	1
OP	Llanharan	0	-1	0	0
OP	Pencoed	-1	-1	0	0
OP	Bridgend	-2	-2	0	1

DM-DS (Core Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	-	-	-	-
AM	Pontyclun	17.2%	-16.3%	-11.4%	-15.4%
AM	Llanharan	10.5%	-6.9%	-4.0%	-10.7%
AM	Pencoed	16.7%	-0.9%	-9.5%	-3.3%
AM	Bridgend	-3.0%	-2.6%	0.6%	-4.2%
IP	J34 P&R	-	-	-	-
IP	Pontyclun	20.0%	-16.7%	-16.7%	-20.0%
IP	Llanharan	0.0%	0.0%	0.0%	0.0%
IP	Pencoed	0.0%	-20.0%	0.0%	0.0%
IP	Bridgend	-2.0%	-1.2%	0.0%	-3.8%
PM	J34 P&R	-	-	-	-
PM	Pontyclun	11.1%	-32.5%	-17.0%	-13.9%
PM	Llanharan	0.0%	0.0%	-13.8%	-9.8%
PM	Pencoed	0.0%	-7.7%	-14.0%	-3.2%
PM	Bridgend	-1.4%	-1.5%	-2.5%	-3.1%
OP	J34 P&R	-	-	-	-
OP	Pontyclun	0.0%	-33.3%	-13.3%	-17.6%
OP	Llanharan	0.0%	0.0%	-14.3%	16.7%
OP	Pencoed	20.0%	0.0%	-22.2%	0.0%
OP	Bridgend	-5.3%	-2.9%	-4.4%	-2.8%

DM-DS (Alt Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	-	-	-	-
AM	Pontyclun	-7.1%	-8.9%	-9.1%	-1.6%
AM	Llanharan	-5.6%	-11.8%	-4.0%	-10.7%
AM	Pencoed	-4.5%	-0.2%	-5.0%	-0.3%
AM	Bridgend	-1.0%	-0.6%	0.6%	-1.5%
IP	J34 P&R	-	-	-	-
IP	Pontyclun	20.0%	-16.7%	0.0%	0.0%
IP	Llanharan	0.0%	0.0%	0.0%	0.0%
IP	Pencoed	0.0%	-20.0%	0.0%	0.0%
IP	Bridgend	-2.0%	2.1%	0.0%	0.0%
PM	J34 P&R	-	-	-	-
PM	Pontyclun	0.0%	0.0%	-8.7%	-6.1%
PM	Llanharan	0.0%	0.0%	-7.1%	-4.3%
PM	Pencoed	0.0%	0.0%	-4.9%	-3.0%
PM	Bridgend	-1.4%	0.6%	0.0%	-1.7%
OP	J34 P&R	-	-	-	-
OP	Pontyclun	0.0%	-33.3%	-13.3%	-1.1%
OP	Llanharan	0.0%	0.0%	-14.3%	16.7%
OP	Pencoed	20.0%	0.0%	-11.1%	0.0%
OP	Bridgend	-5.3%	5.6%	-2.3%	0.5%

SEWTM public transport peak period to hour factors	
AM	1.84162
IP	6
PM	2.08333
OP	13

Assumed day to annual

Annual 365 Mon-Sat *(assumption is that major events in Cardiff at weekends allow full annualisation to count 365 days)*

This is not a fixed factor and can be amended

TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES

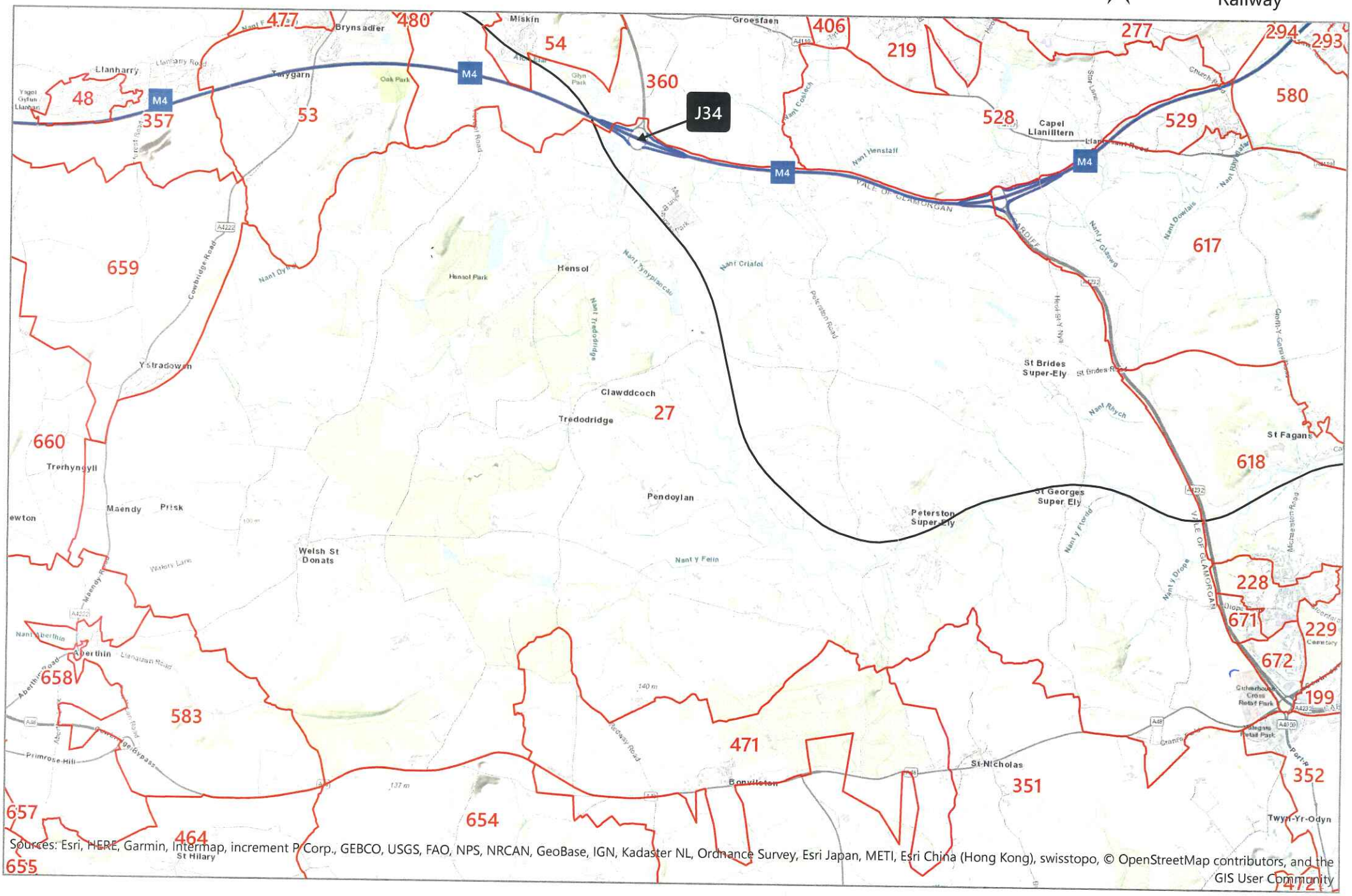
SEWTM Zone 27

0 0.5 1 1.5 2 Km

N

SEWTM Zones

Railway

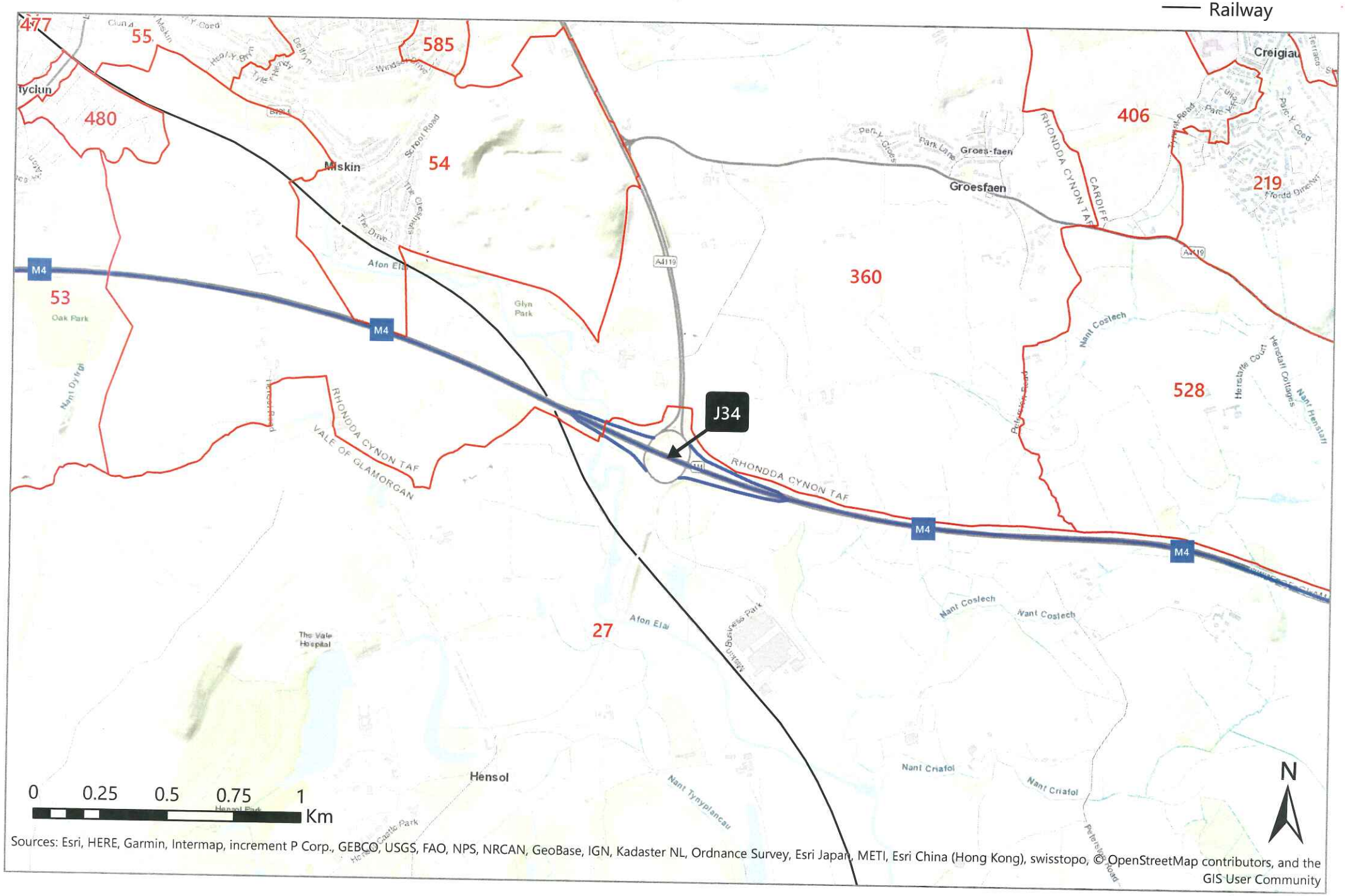


Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES

M4 J34 (Miskin) SEWTM Zones

SEWTM Zones
Railway



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

APPENDIX E

Initial Timetable Study

Tracsis plc
Operations and Planning Systems

Vale of Glamorgan Gateway Station

Initial Timetable Feasibility Study

11 April 2019 v1.0

Document Control	
File name	Arcadis – Vale of Glamorgan Gateway Station – Initial Timetable Feasibility Study v1.0
Version number	1.0
Version date	10th April 2019
Author	Graham Ward and Jonathan Barker
Reviewed By	Jonathan Barker and Jon Owen

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i. Executive Summary

Tracsis Rail Consultancy (TRC) have been commissioned by Arcadis to review the high-level implications of the introduction of a new railway station on the May 2019 timetable. The new station will be called *Vale of Glamorgan Gateway* and is planned to be situated in the Miskin loop, East of Pontyclun. A primary stakeholder aspiration is that *at least* 20 TfW (Transport for Wales) services per day, in each direction, will call at the station providing additional connectivity to Cardiff Central.

We have analysed three two-hour sample periods to gain an understanding of the timetable structure, and subsequent impact of adding calls at the new station to existing services, in the AM Peak, Off-Peak and PM Peak.

The report has been divided into two work package options:

- **Work Package 1**: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun
- **Work Package 2**: Adding *Vale of Glamorgan* station calls to all TfW services that pass Miskin loop

Although we have only considered the immediate impact between Cardiff Central and Bridgend, the key issues will include the following:

- Maesteg services currently have a very tight turnround at Maesteg and sometimes come from other single line sections (e.g. Ebbw Vale). Adding an additional call will require these services to be retimed
- Presentation at crossing points on single line sections may change, which would require retiming to other services (e.g. Ebbw Vale or Milford Haven)
- Presentation times at Cardiff Central will likely need to be amended. This may have significant implications for the long-distance services that may need to be re-timed (heading to Manchester or Milford Haven for example)
- Presentation and turnround times at Swansea will be affected. This could impact the station working margins which will result in further re-timings
- Some freight services that currently utilise the Miskin loop would need to be re-timed. This will be exacerbated on days of the week where the freight provision increases.

The level of impact, with regards to re-timing existing services, depends upon the confirmation of operational assumptions. Examples of these would be; the likely Sectional Running Times for calling at the station, required dwell time, potential line speed improvements on the Miskin loop. Reducing the additional time required to call at the station will mitigate the impact on the existing timetable as would providing higher speed switches into, out of and within the loop.

It would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds.

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iv. Glossary of Abbreviations and Acronyms

Abbreviation	Description
Down	Line or train coming from London
Up	Line or train heading towards London
ECS	Empty Coaching Stock
SO	Saturday only
SuO	Sunday only
SX	Saturday excepted (operates Monday – Friday)
TRC	Tracsis Rail Consultancy
TfW	Transport for Wales
ThO	Thursday only
WO	Wednesday only
WTT	Working Time Table (trains that are booked to run on a regular basis, rather than being run at short notice)

1. Introduction

Tracsis Rail Consultancy (TRC) have been commissioned by Arcadis to review the high-level implications of the introduction of a new railway station on the May 2019 timetable. The new station will be called *Vale of Glamorgan Gateway* and is planned to be situated in the Miskin loop, East of Pontyclun (approximate location shown below in figure 1). A primary stakeholder aspiration is that *at least* 20 TfW (Transport for Wales) services per day, in each direction, will call at the station providing additional connectivity to Cardiff Central.

We have analysed three two-hour sample periods of an SX operating day (WO) to gain an understanding of the timetable structure, and subsequent impact of adding calls at the new station to existing services, in the AM Peak, Off-Peak and PM Peak.

Figure 1. Vale of Glamorgan Gateway station - proposed location (Google Maps)

The report has been divided into two work package options:

- **Work Package 1**: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun
    - AM Peak (07:00 – 09:00)
    - Off-Peak (12:00 – 14:00)
    - PM Peak (16:00 – 18:00)
- **Work Package 2**: Adding *Vale of Glamorgan* station calls to all TfW services
    - AM Peak (07:00 – 09:00)
    - Off-Peak (12:00 – 14:00)
    - PM Peak (16:00 – 18:00)

We have also assessed the current freight provision at Miskin loop during the above time bands, as well as throughout the entire week to ascertain what the full impact may be. Freight services will not

be able to utilise Miskin loop at the same time as passenger services call at the new station so it is necessary to understand the impact of this over the entire week.

2. Methodology

2.1 Data Used

The May 2019 National Timetable, as issued by Network Rail, has been used. We have filtered the timetable to show all services that run through either Bridgend, Cardiff Central, Carmarthen and/or Swansea on Wednesdays (thus reflecting the general SX provision).

The specific date that we have referenced on the train planning graphs is Wednesday 12th June 2019.

We have referenced the Network Rail Engineering Access Statement 2019 Version 4.3 and the Network Rail Western and Wales Timetable Planning Rules Version 4.3.

2.2 Assumptions

As part of this work, we have made the following assumptions:

- Sectional Running Times for the new station have not been provided or calculated. We have therefore estimated that an additional 4 minutes will be required. This is broken down as the following:
    - 1.0 minute to slow down before stopping.
    - 1.0 minute dwell at the station.
    - 1.0 minute to accelerate after stopping.
    - 1.0 minute to account for the current TPR requirement of 2.0 minutes adjustment time approaching Miskin loop which is necessary to allow for the 15 mph line speed on the loop.
- Miskin Loop is the site of the proposed station and is used to describe the running times.
- In the Up direction this equates to 5.0 minutes Start to Stop from Pontyclun to Miskin Loop (including 2.0 minutes adjustment), 1.0 minute station dwell and 8.0 minutes Start to Pass from Miskin to Leckwith Loop North Junction. This has been used consistently, even when a service does not call at Pontyclun.
- In the Down direction this equates to 10.0 minutes Pass to Stop Leckwith Loop North Junction to Miskin (including 2.0 minutes adjustment), 1.0 minute station dwell and 3.0 minutes Start to Stop Miskin to Pontyclun. This has been used consistently, even when a service does not call at Pontyclun.
- There is currently no means for crossing other passenger services between Bridgend (Llynfi Junction) and Maesteg, although there is a freight loop just north of Tondu.

2.3 Scope of Study

The principle area of study is the section of line between Cardiff Central and Bridgend to identify how the proposed station could impact services on the route. We have referenced locations outside of this area but have not focused on them in detail as these locations may not have been picked up

by the filter criteria when the National Timetable data was cut (hence other interacting trains will not be featured in our timetable).

The geographical scope of study can be seen in figure 2.

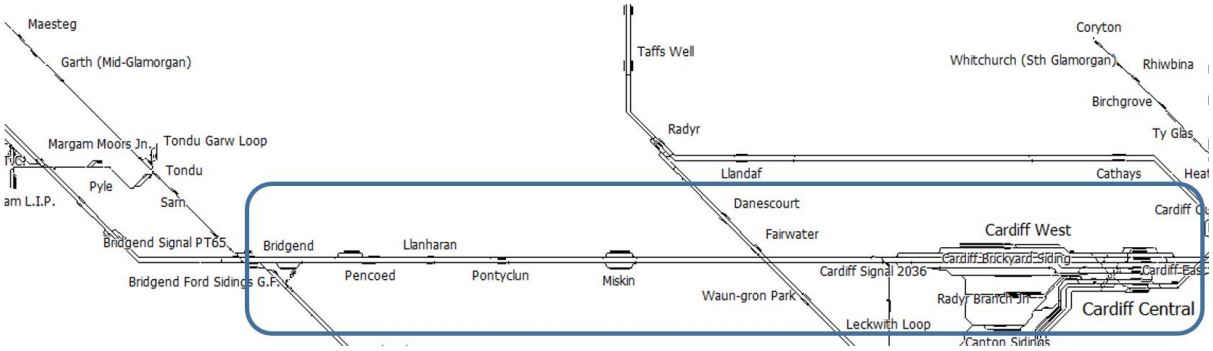


Figure 2. Geographical scope of study

2.4 Software Used

TRC have used Tracsis Consultancy Tools software to cut the National Timetable and Bellvedi ATTUne timetable planning software to view the timetable data.

3. Detailed Findings

Work Package 1: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun

AM Peak (07:00 – 09:00)

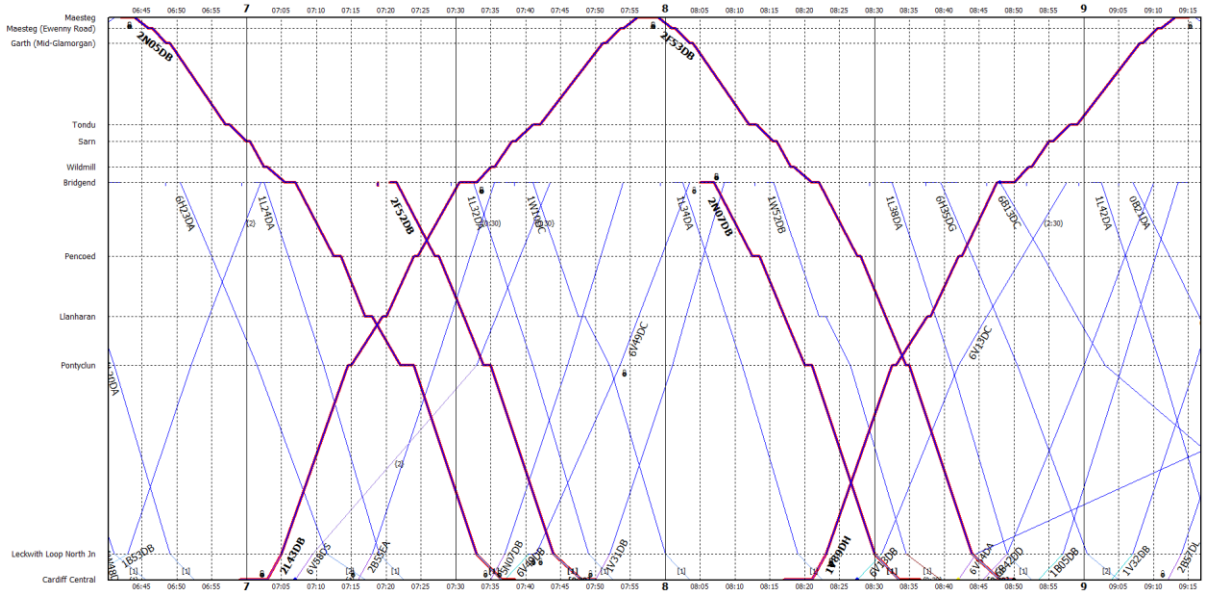


Figure 3. Existing AM Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Six services that call at Pontyclun would require an additional call at the proposed new station (as highlighted in figure 3). There are four in the Up direction and two in the Down direction. These services have a variety of origins and destinations (including; Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Shrewsbury, Maesteg and Ebbw Vale Town).

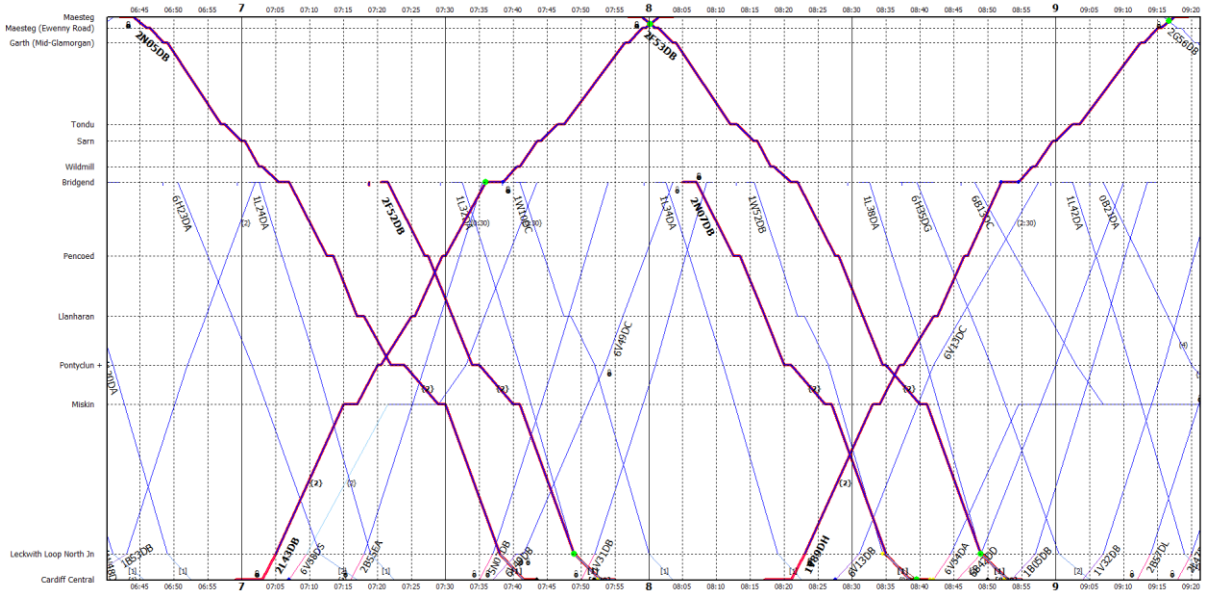


Figure 4. Amended AM Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which would

cause a conflict with the following service) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a three minute turnround at Maesteg which is very tight. It would not be feasible to compress this any further.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. This may or may not present an issue depending on whether or not there is a sufficient margin behind the existing path from Maesteg. An example of where there would not be a sufficient margin is the 2F53 (07:59 Maesteg – Cardiff Central) service which is followed by 1L38 (07:59 Swansea – London Paddington).

There are other similar issues with services that originate from the west.

2F52 (05:46 Carmarthen – Cardiff Central) service would need to run earlier in order to avoid delaying 1L32 (06:59 Swansea – London Paddington) on the approach to Cardiff Central.

2N07 (08:07 Bridgend – Ebbw Vale Town) service would also need to run earlier in order to avoid delaying 1W52 (05:55 Milford Haven – Manchester Piccadilly) on the approach to Cardiff.

Some services have an extended station dwell at Cardiff Central and this may be used to recover *some* of the time required for the additional station call. In most cases however, this would be insufficient to cover all the additional time needed for the proposed station call.

Off-Peak (12:00 – 14:00)

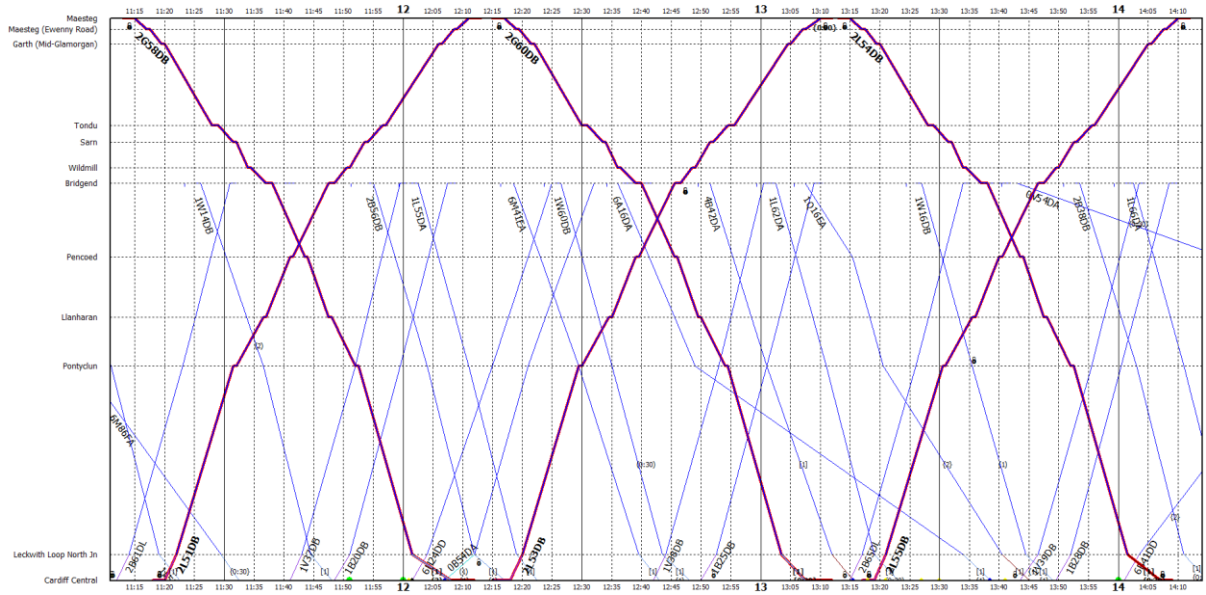


Figure 5. Existing Off-Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Six services calling at Pontyclun would require an additional call added at the proposed new station (as highlighted in figure 5). These services have a variety of origins and destinations (including; Cheltenham Spa, Gloucester and Cardiff Central) but all serve Maesteg.

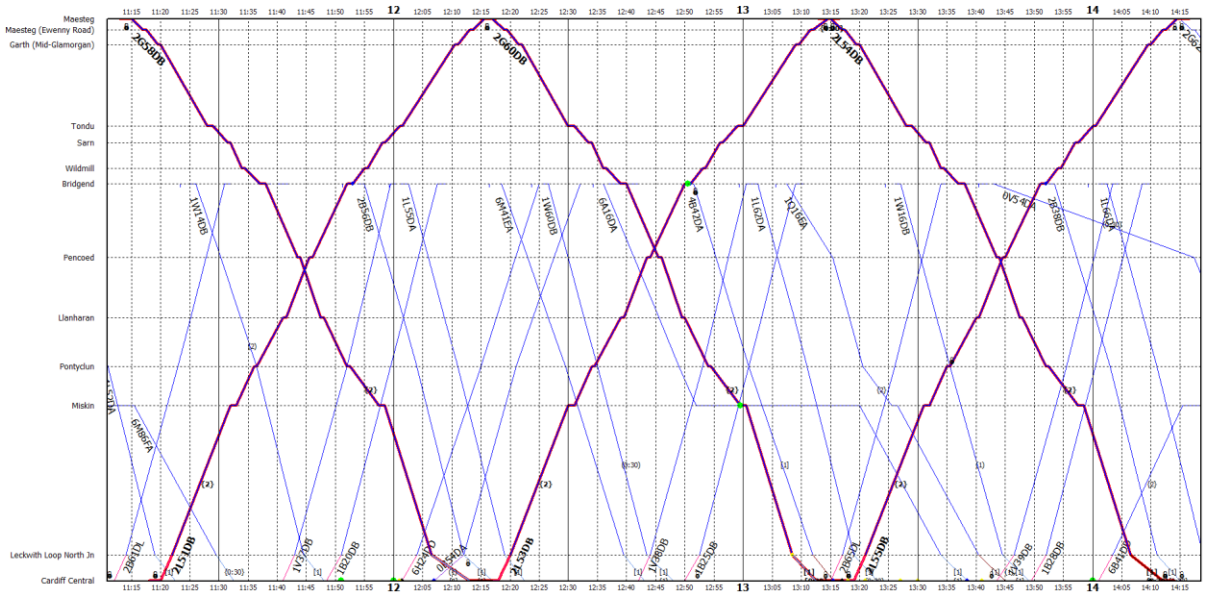


Figure 6. Amended Off-Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which may cause a junction margin conflict against the opposing service at the junction) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a five minute turnround (on average) at Maesteg which is tight. Although it would be possible to slightly compress this turnround, it would not be advisable to do so by more than one minute. This suggests that a combination of an earlier departure from Cardiff and a later presentation time at Maesteg would be required.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. With regards to the Up direction services, there does appear to be sufficient margin to reach Cardiff Central but there may be an issue with presenting later at Cardiff due to the presence of ECS moves at Cardiff West.

There is also an issue with 6A16 (09:34 Haverfordwest FD – Didcot TC), this service would need to be re-timed to avoid using Miskin Loop.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. This would however be insufficient to cover all the additional time needed for the proposed station call.

PM Peak (16:00 – 18:00)

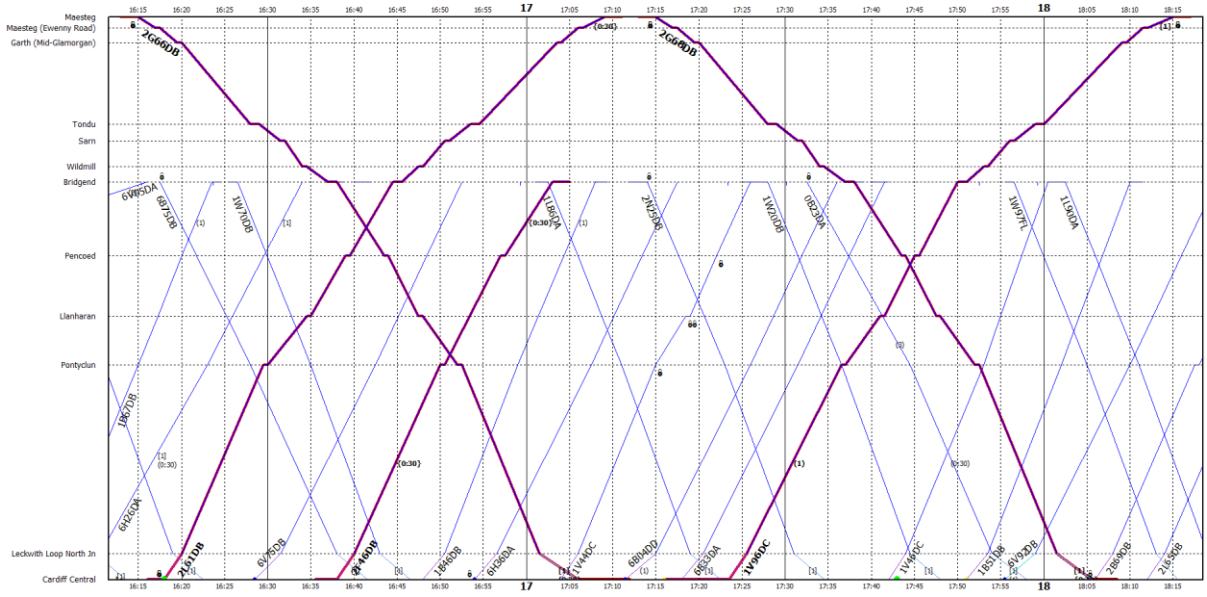


Figure 7. Existing PM Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Five services calling at Pontyclun would require an additional call added at the proposed new station (as highlighted in figure 7). These services have a variety of origins and destinations (including; Bridgend, Cardiff Central, Cheltenham Spa, Ebbw Vale Town, Holyhead and Maesteg).

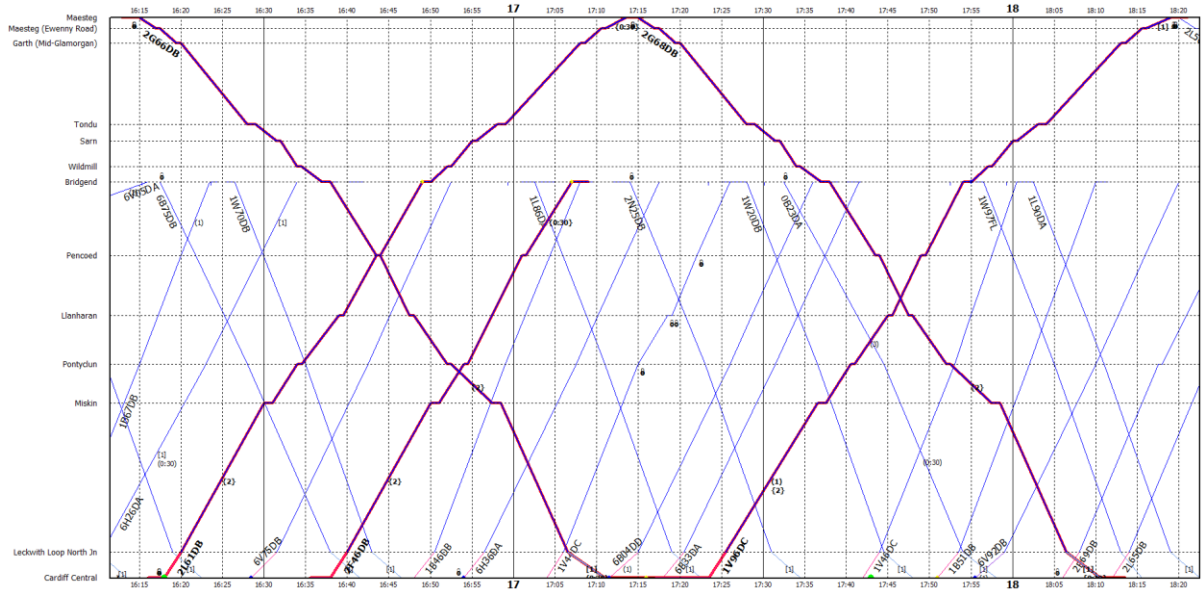


Figure 8. Amended PM Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call and to reach Maesteg in time to form the return working. It should be noted that the current timetable allows for around a five minute turnround at Maesteg which is tight. It would not be feasible to compress this by any more than one minute.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station

would result in a later presentation at Cardiff Central. For the Up direction services, this would not appear be an issue as far as Cardiff Central but would likely result in the re-timing of the schedule East of Cardiff (which is outside of the scope of this report).

2F46 (15:37 Ebbw Vale Town – Bridgend) would need retiming to avoid delaying the 1B46 (14:45 London Paddington – Swansea) service at Bridgend and to make its return working at 17:14 (which does not call at Pontyclun).

1V96 (12:32 Holyhead – Maesteg) service would need to depart Cardiff Central earlier to avoid a junction margin conflict at Bridgend with the 16:45 Llanelli – Chester service. This would likely conflict with the 6B33 (13:20 Theale – Robeston) service, which may need to be re-timed.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases however, this would be insufficient to cover all the additional time needed for the proposed station call.

Work Package 2: Adding *Vale of Glamorgan* station calls to all TfW services that pass Miskin loop

AM Peak (07:00 – 09:00)

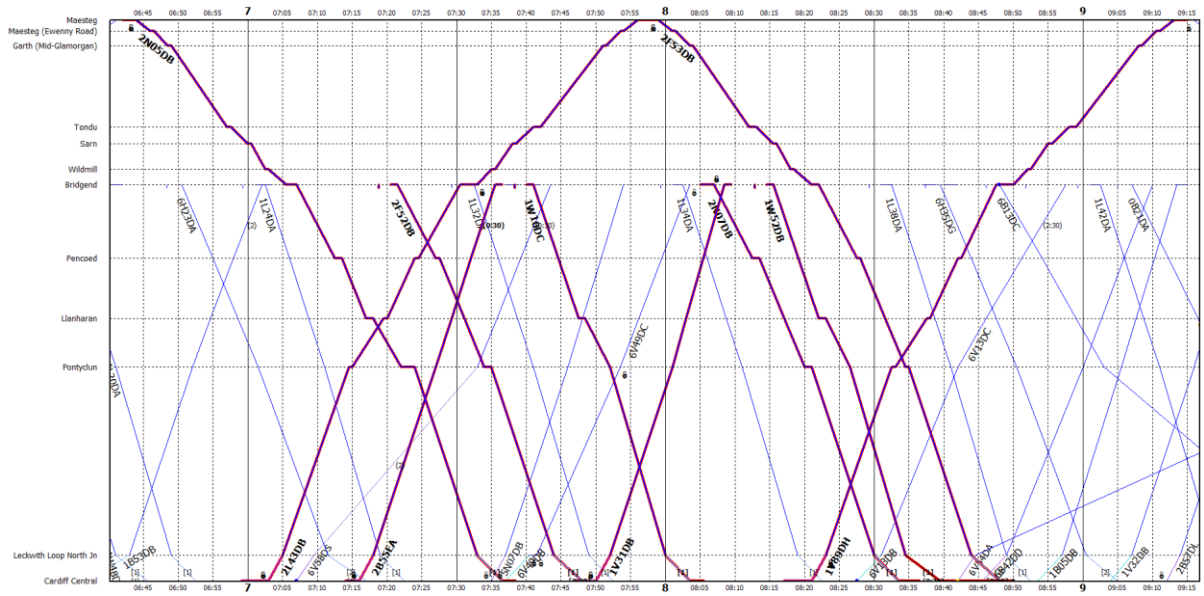


Figure 9. Existing AM Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted

Ten TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Crewe, Manchester Piccadilly, Milford Haven, Shrewsbury, Swansea, Maesteg and Ebbw Vale Town.

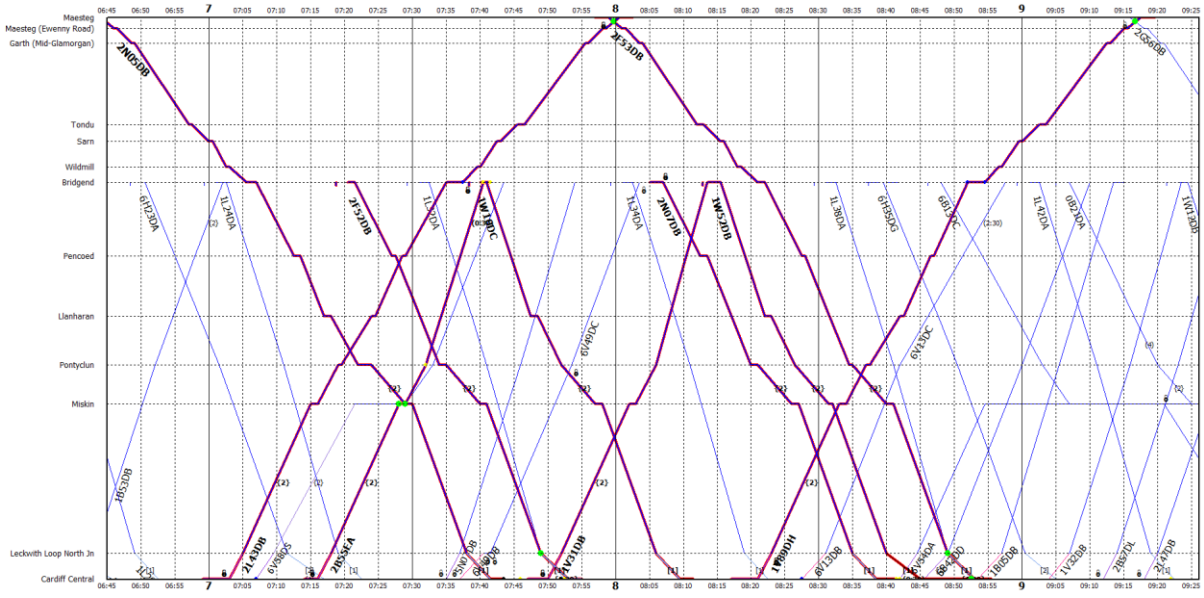


Figure 10. Amended AM Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which would cause a conflict with the following service) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a three minute turnround at Maesteg which is very tight. It would not be feasible to compress this any further.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central.

6V58DS (03:00 Wembley Euro Freight Ops – Margam TC) would need to be retimed as it currently waits in Miskin Loop for 7½ minutes.

2F52 (05:46 Carmarthen – Cardiff Central) would require to run earlier or it would delay 1L32 (06:59 Swansea – London Paddington) on the approach to Cardiff Central. Alternatively it could wait at Vale Parkway for the Paddington service to pass.

1W10 (06:15 Carmarthen – Manchester Piccadilly) would need to run earlier from Carmarthen or later to Manchester Piccadilly.

2N07 (08:07 Bridgend – Ebbw Vale Town) would require running earlier from Bridgend to make its return working from Ebbw Vale Town.

2F53 (07:59 Maesteg – Cardiff Central) would need to run earlier or later from Maesteg. Could be passed by 1L38 (07:59 Swansea – London Paddington) at Vale Parkway or run earlier throughout.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases this would this be insufficient to cover all the additional time needed for the station additional call.

Off- Peak (12:00 – 14:00)

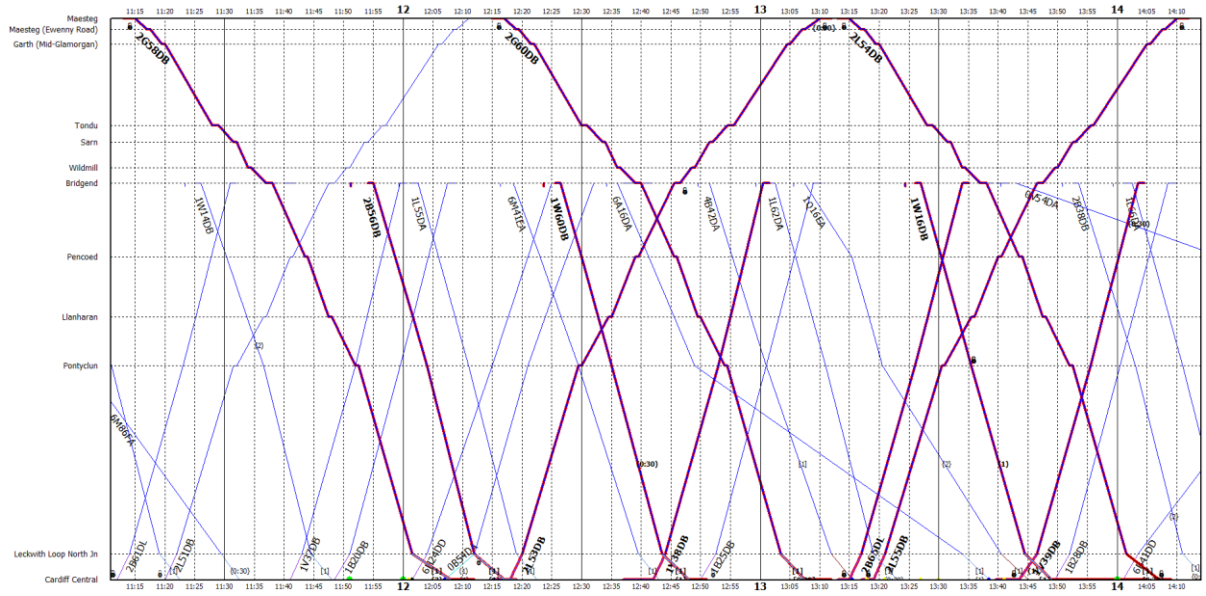


Figure 11. Existing Off-Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted.

Eleven TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Cardiff Central, Carmarthen, Cheltenham Spa, Gloucester, Maesteg, Manchester Piccadilly, Milford Haven and Swansea).

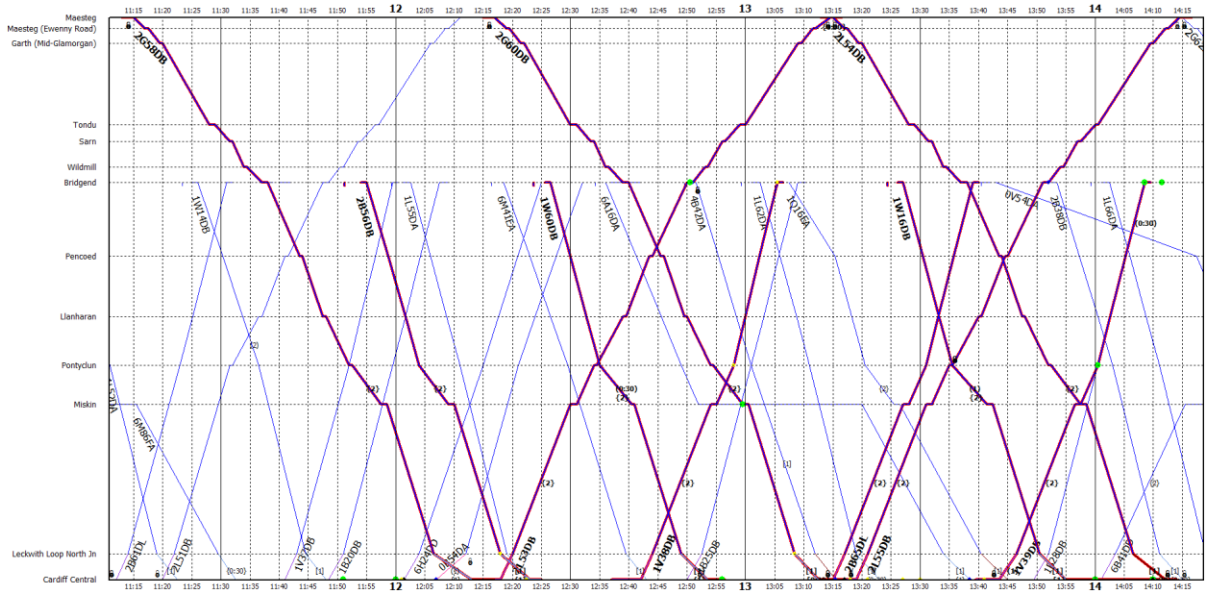


Figure 12. Amended Off-Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which may cause a junction margin conflict against the opposing service at the junction) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a five minute turnround (on average) at Maesteg which is tight. Although it would be possible to slightly compress this turnround, it would not be advisable to do so by more than one minute. This suggests

that a combination of an earlier departure from Cardiff and a later presentation time at Maesteg would be required.

2B56 (11:10 Swansea – Cardiff Central) would need to run earlier from Swansea or could wait at Vale Parkway for 1L55 (11:29 Swansea – London Paddington) to pass and then run later to Cardiff Central.

1W60 (11:03 Carmarthen – Manchester Piccadilly) would need to run earlier from Carmarthen or later to Manchester Piccadilly.

1W38 (09:31 Manchester Piccadilly – Carmarthen) would need to depart Cardiff earlier to avoid delaying 1B25 (10:45 London Paddington – Swansea).

6A16DA 09:34 Haverfordwest FD – Didcot TC would be require retiming to avoid using Miskin Loop, where it currently sits for 28 minutes.

1V39 (10:31 Manchester Piccadilly – Milford Haven) would need to depart earlier from Cardiff to give minimum delay to 1B28 (11:45 London Paddington – Swansea) or both services run later to Swansea.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. This would this be insufficient to cover all the additional time needed for the station additional call in most cases.

PM Peak (16:00 – 18:00)

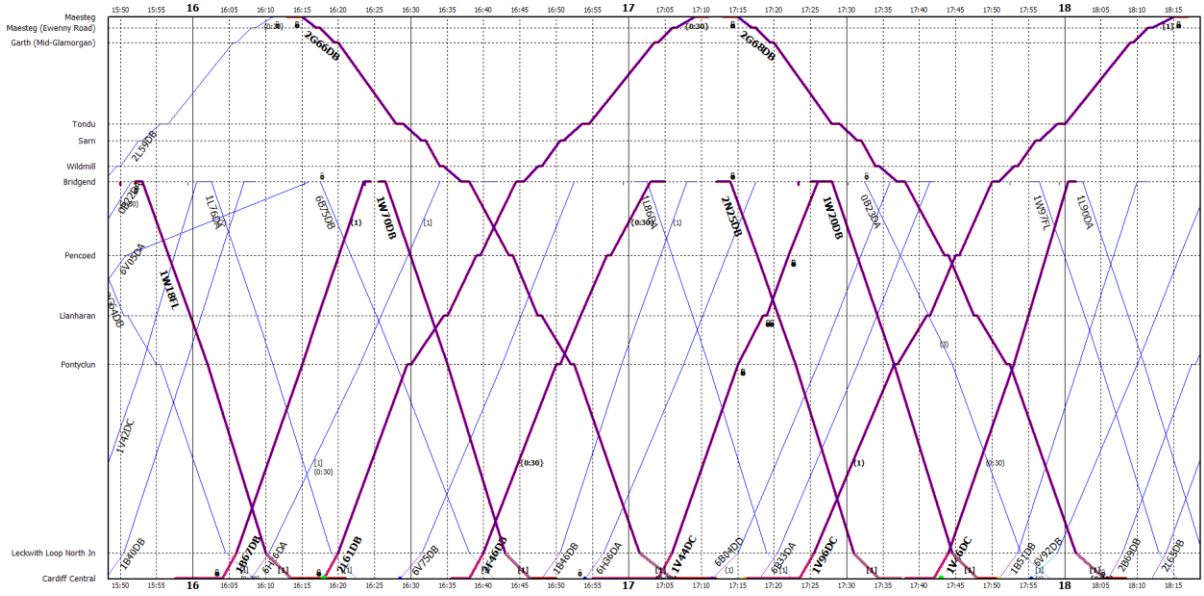


Figure 13. Existing PM Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted.

Eleven TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Chester, Ebbw Vale Town, Fishguard Harbour, Gloucester, Holyhead, Maesteg, Manchester Piccadilly, Milford haven, Tenby and Swansea).

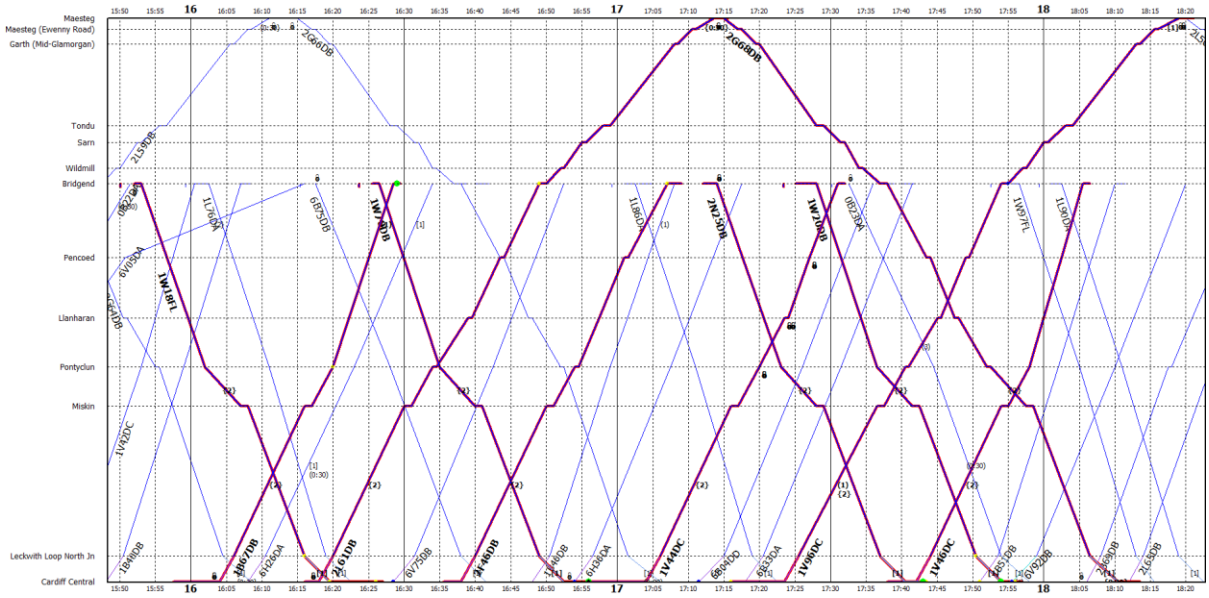


Figure 14. Amended PM Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call and to reach Maesteg in time to form the return working. It should be noted that the current timetable allows for around a five minute turnround at Maesteg which is tight. It would not be feasible to compress this by any more than one minute.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. For the Up direction services, this would not appear be an issue as far as Cardiff Central but would likely result in the re-timing of the schedule East of Cardiff (which is outside of the scope of this report).

1B67 (14:48 Gloucester – Fishguard Harbour) would need to depart earlier from Cardiff Central to avoid conflict with 6H26 (15:23 Llanwern – Margam T.C.) and 6C93 (10:39 Cwmbargoed Opencast – Port Talbot Grange Sidings).

1W70 (15:02 Carmarthen – Manchester Piccadilly) would need to run later or depart earlier to depart Cardiff Central at booked time.

2F46 (15:37 Ebbw Vale Town – Bridgend) would need retiming to avoid delaying 1B46 (14:45 London Paddington – Swansea) at Bridgend and to make its return working at 2N52 (17:14 Bridgend - Ebbw Vale Town) which does not call at Pontyclun.

1V96 (12:32 Holyhead – Maesteg) would need to depart Cardiff Central earlier to avoid conflict at Bridgend with 1W97 (16:45 Llanelli – Chester). 6B33 (13:20 Theale – Robeston) may also need re-timing.

1W20 (15:08 Milford Haven – Manchester Piccadilly) would need to either run earlier to Bridgend or later to Manchester Piccadilly.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases this would this be insufficient to cover all the additional time needed for the station additional call.

Freight occupancy of Miskin Loop for the whole day (WO), where this may impact upon the proposed service.

Only a few freight services would appear likely to cause an issue with the enhanced service using Miskin Loop.

Two uses of the loops are for light engine movements. This could require retiming to use either Pencoed or Tremains Loop. Those freight services with a longer dwell that would be likely to cause an issue are:

- 6V54DA 05:35 Chirk Kronospan – Baglan Bay
- 6B13DC 05:00 Robeston Siding – Westerleigh Puma
- 6A16DA 09:34 Haverfordwest FD GBRf – Didcot TC

These services are all likely to require re-timing as they occupy Miskin Loop for between 14 and 45½ minutes.

The Appendix section of this report contains a list of all the May 2019 WTT freight services using Miskin Loop. As the freight provision changes throughout the week, these services will need re-timing accordingly.

4. Conclusion and Recommendations

This initial assessment shows that whilst there is capacity for a new station, located in Miskin Loop with a provision of 20 calls in each direction using existing services, the existing timetable will need to be amended. The existing planning margins and turnrounds cannot absorb the additional time required for a new station call and extensive re-timings will therefore be required. These re-timings are likely to apply outside of the geographical scope of this study.

The current multitude of origins and destinations would require further study to ensure that a robust timetable is produced. This is particularly important due to the number of single line sections of railway (Ebbw Vale branch, Maesteg branch and services beyond Carmarthen to West Wales) and long distance services that would be affected.

The time penalty for an additional call is currently estimated, and may be over or under the actual time required. The amount of time required could be reduced by increasing the line speed over the switches into and out of Miskin Loop. Increasing the line speed within the loop itself may also provide some time benefit, all of which would mitigate the impact of the new station on the May 2019 timetable.

The impact of freight services also needs to be considered going forward to ensure adequate provision for services displaced from Miskin Loop.

5. Appendix

5.1 Extracts from Network Rail's Timetable Planning Rules (Version 4.3 2019)

GW900 PILNING TO FISHGUARD HARBOUR			
TIMING POINT	**DOWN**	**UP**	**NOTES**
Pilning to Severn Tunnel East	4	4	
Severn Tunnel East to Severn Tunnel West	5 6a 7b	5 6a 7b	a) following a preceding freight b) following a preceding freight that has left or will enter Pilning loop or has left Severn Tunnel Up Goods loop
Severn Tunnel West to Severn Tunnel Jn	4	4	
Severn Tunnel Jn to Newport	4 Main 5 Relief	4 Main 5 Relief	
Newport to Cardiff	4 Main 4 Relief	4 Main 4 Relief	
Cardiff Central to Court Sart Junction	4	4	

Figure 15. Required headways between services between Cardiff and Bridgend is highlighted.

Leckwith Loop North Junction			
Adjustments to Sectional Running Times (shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Passing Leckwith Loop North Junction coming from Line E	Slower Speed from Line E	All Passenger	{½}
Passing Leckwith Loop North Junction coming from Line E	Slower Speed from Line E	All Freight	{1}
Adjustments to Sectional Running Times (shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Up Main to Leckwith Loop	Approach Control	All	{1½}
Junction Margin			
First Movement	**Second Movement**		**Value**
Passenger train from Up Main to Leckwith Loop	Train passing on the Down Main		2½
Freight train from Up Main to Leckwith Loop	Train passing on the Down Main		3
Passenger train passing on the Down Main	Train passing Up Main to Leckwith Loop		2
Freight train passing on the Down Main	Train passing Up Main to Leckwith Loop		2½

Miskin Up and Down Goods Loops			
Adjustments to Sectional Running Times (allowance to be shown approaching this location)			
Movement	**Reason**	**Timing Load**	**Value**
From Up and Down main	Slow speed at loop entry (15 mph)	All traffic	+{2}

Figure 16. Train planning rules for Leckwith North Junction and Miskin Up and Down Goods Loops.

Cardiff Central			
Adjustments to Sectional Running Times (allowance to be shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Departure in the Up direction from Platform 0	*Longer distance to travel*	*Passenger*	*{½}*
Adjustments to Sectional Running Times (allowance to be shown approaching this location)			
Movement	**Reason**	**Timing Load**	**Value**
Arriving into an occupied platform	*Approach Control*	*All*	*{1}*
Connectional Allowance	7		
Dwell Time			
HST/LH/22x	3 Saturday & Sunday excepted 2 Saturday & Sunday only		
14x to 175	3		
Cardiff Valley 14x ~~and 150~~ /150/153	1½		

Figure 17. Train planning rules for Cardiff Central showing minimum dwell time required

5.2 Network Rail Sectional Appendix Extract

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
GW900	013	Pilning to Fishguard Harbour	SWM2	Wales	29/12/2016

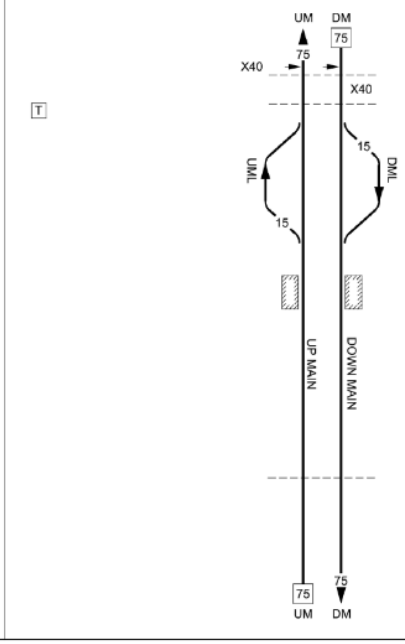
Location	Mileage M Ch	Running lines & speed restrictions	Signalling & Remarks
			TCB Wales Railway Operating Centre RA8 Vale of Glamorgan Workstation GSM-R
Pontsam HABD Pontsam LC (AHBC) - X	178 39 178 39		Axle counter area
Maindy Bach LC (UWC)	178 65	T	
Up/Dn Miskin loop	179 02		DML - Down Miskin Loop UML - Up Miskin Loop
Miskin			DML - 774m UML - 774m
Up/Dn Miskin loop	179 52		
PONTYCLUN	181 40		Down and Up platforms - 102m, 112yds
Llantrisant West LC (CCTV)	181 76		

Figure 18. Network Rail Section Appendix for Miskin Loop showing distances, line speeds and line descriptions.

5.3 High Level Freight Analysis for the Entire Week

The data has been cut for all days and w/c June 10th 2019 has been analysed.

The intention of this exercise is to perform a high-level analysis of freight throughout the week. As part of the main exercise, we are only considering WO. This appendix looks at all days of the week and reduces the risk of us missing significant issues on other operating days (for example, there may be a higher freight provision on ThO or SuO).

MONDAY

- 6V55 is in the Down loop from 05:55 – 06:10
- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 0B22 is in the Down loop from 15:21h – 15:32
- 6E11 is in the Up loop from 17:08h – 18:43h
- 6V66 is in the Down loop from 23:46h – 00:03

Tuesday

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 6M51 is in the Up loop from 18:31 – 18:42
- 1Q15 is in the Down loop from 18:32h – 18:40h
- 0L33 is in the Down loop from 19:10h – 19:17

Wednesday

- 6V58 is in the Down loop from 07:21h – 07:29
- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 0L33 is in the Down loop from 19:10h – 19:17
- 6V66 is in the Down loop from 23:46h – 00:03

Thursday

- 6V58 is in the Down loop from 07:21h – 07:29

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 0B22 is in the Down loop from 15:21h – 15:32
- 6M51 is in the Up loop from 18:31 – 18:42
- 0L33 is in the Down loop from 19:10h – 19:17

Friday

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 6V66 is in the Down loop from 23:46h – 00:03

Saturday

- 6V40 is in the Down loop from 04:45h – 04:53h
- 6B13 is in the Up loop from 09:05 – 09:44h

Sunday

No booked freights into the loop.

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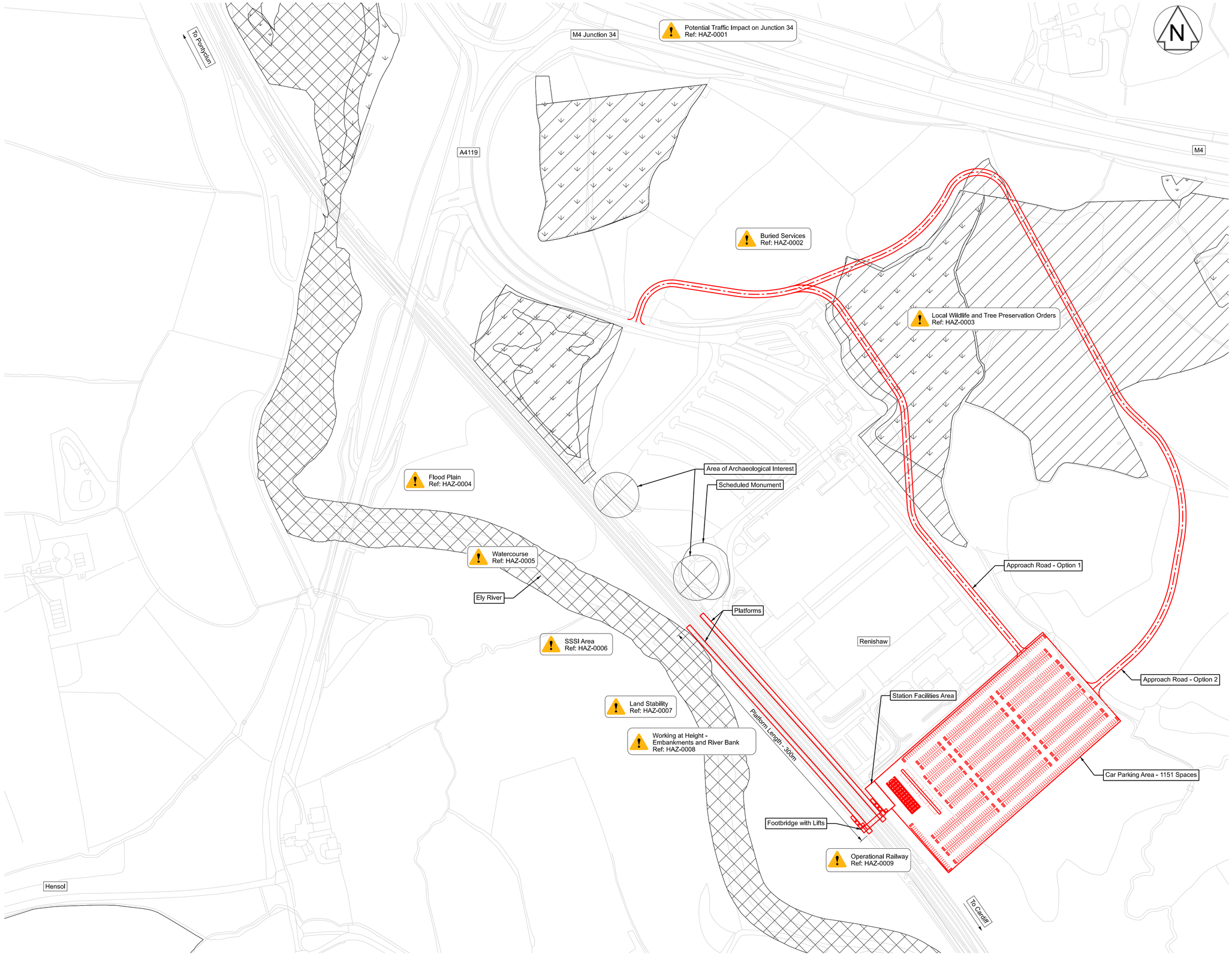
Tracsis plc

Tracsis plc: Operations & Planning Division comprises the following companies:
Tracsis plc: 05019106, Tracsis Rail Consultancy Limited: 05047148,
Safety Information Systems Limited (trading as COMPASS): 02588404,
Tracsis Retail & Operations Limited: 04225250, Tracsis Travel Compensation Services: 10390176
Registered office: Leeds Innovation Centre, 103 Clarendon Road, Leeds, LS2 9DF
VAT Registration Number: 945 787 661

APPENDIX F

Station General Arrangement Drawings



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PLAN
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0 50 100 150 200m
1 : 2000

NOTES:

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1. All dimensions are in millimetres unless stated otherwise.
2. Background mapping is based on OS Tiles, the accuracy is assumed to be +/- 10m.
3. Renishaw, owns the land to the north of the railway in this area. Renishaw are developing plans to develop the land into a business/industrial park in line with the Vale of Glamorgan County Councils Employment Zoning.

LEGEND:

KEY	
	Proposed
	Existing
	Local Wildlife Site
	Tree Preservation Orders
	Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

VALE of GLAMORGAN
BRO MORGANNWG

PROJECT:
Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site
Vale of Glamorgan Gateway Station
Hensol/M4 Junction 34

Client
Vale of Glamorgan Council
Civic offices
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ARCADIS Design & Consultancy for natural and built assets

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Coordinating office:
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Tel: 44 (0)29 2092 6700

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TITLE:
Vale of Glamorgan
Gateway Station
Feasibility General Arranagement
Location 1

Designed	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Drawn	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Checked	J.Owen	Signed: Electronically Signed	Date: 09/12/19
Approved	J.Owen	Signed: Electronically Signed	Date: 09/12/19
Scale:	AS SHOWN	Datum:	---
Original Size:	A1	Grid:	---
ELR:		Mileage:	
Suitability Code:	S3	Project Number:	10028657

Suitability Description:
Fit for Review and Comment
NOT FOR CONSTRUCTION

Drawing Number: 10028657-ARC-00-XX-DR-CE-00001
Revision: P02

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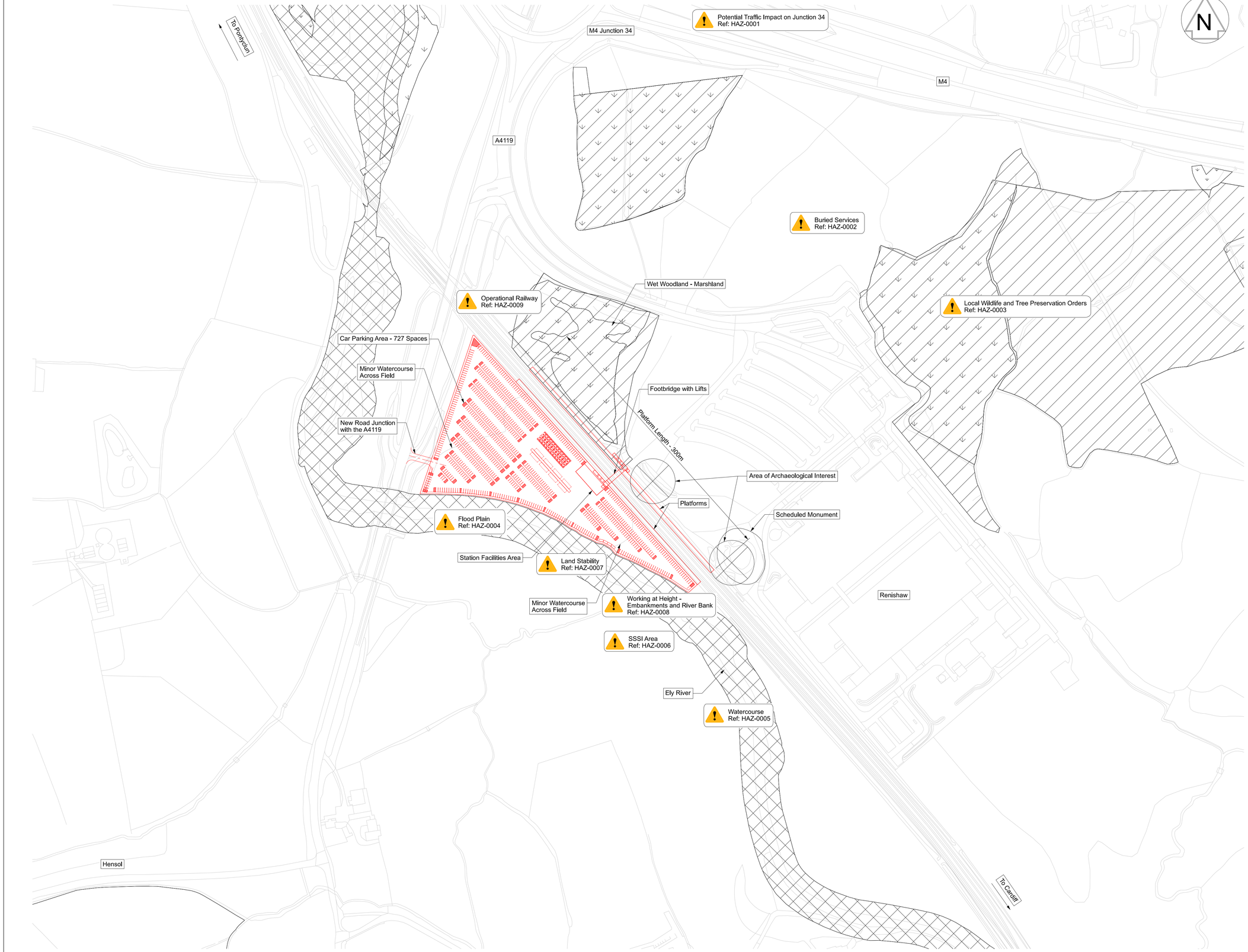

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NOTES:

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LEGEND:

KEY

- Proposed
- Existing
- Local Wildlife Site
- Tree Preservation Orders
- Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

VALE of GLAMORGAN
BRO MORGANNWG

PROJECT:
Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site
Vale of Glamorgan Gateway Station
Hensol/M4 Junction 34

Client
Vale of Glamorgan Council
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TITLE:
Vale of Glamorgan Gateway Station Feasibility General Arrangement Location 2

Designed	Z.Shi	Signed Electronically Signed	Date 06/12/19
Drawn	Z.Shi	Signed Electronically Signed	Date 06/12/19
Checked	J.Owen	Signed Electronically Signed	Date 09/12/19
Approved	J.Owen	Signed Electronically Signed	Date 09/12/19
Scale:	AS SHOWN	Datum:	---
Original Size:	A1	Grid:	---
ELR:		Mileage:	
Suitability Code:	S3	Project Number:	10028657

Suitability Description:
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Drawing Number: 10028657-ARC-00-XX-DR-CE-00002
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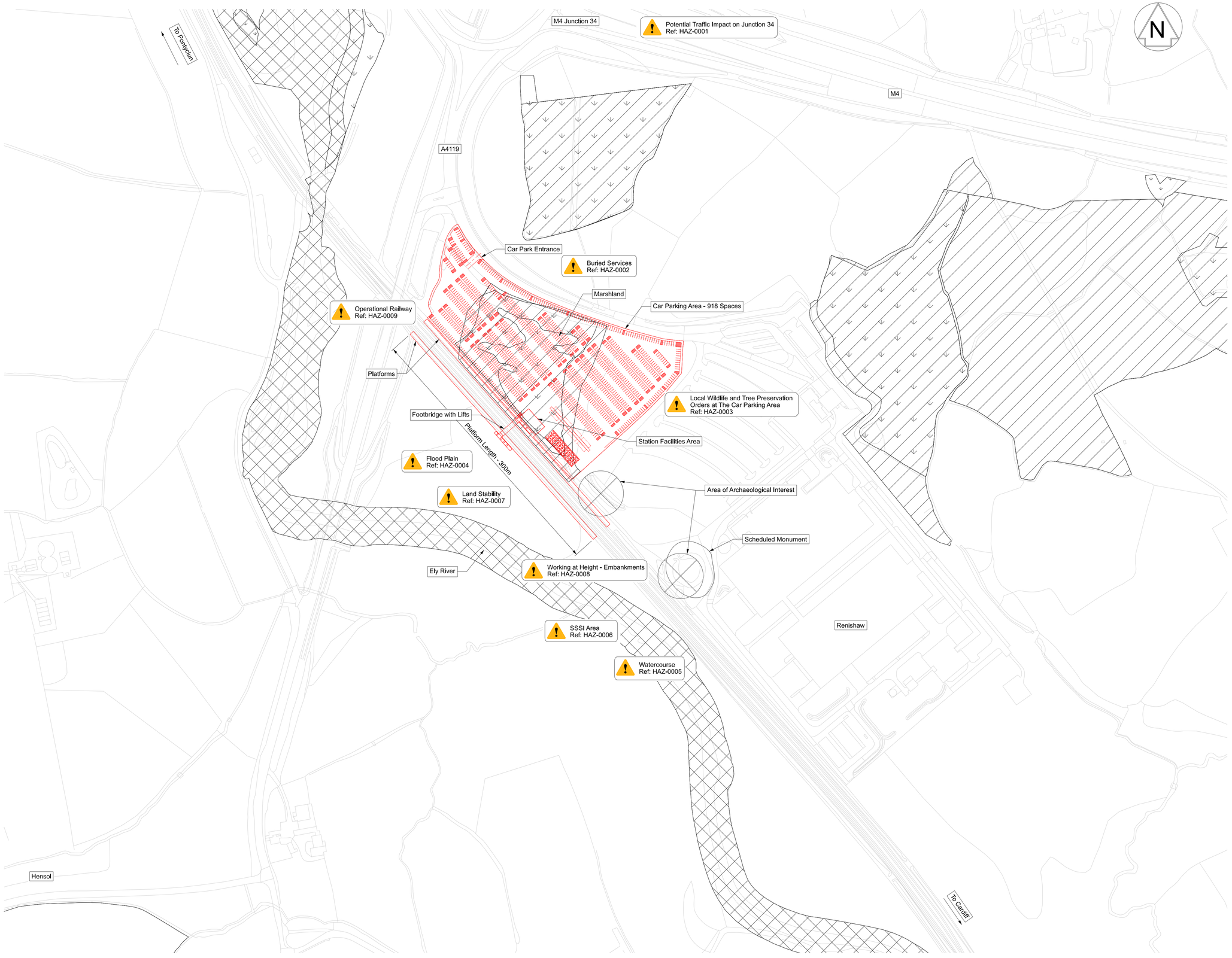

PLAN
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LEGEND:

KEY

- Proposed
- Existing
- Local Wildlife Site
- Tree Preservation Orders
- Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

VALE of GLAMORGAN
BRO MORGANNWG

PROJECT:

Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site

Vale of Glamorgan Gateway Station
Hensol/M4 Junction 34

Client

Vale of Glamorgan Council
Civic offices
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Barry, CF63 4RU

ARCADIS Design & Consultancy for natural and built assets

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Coordinating office:
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TITLE:

Vale of Glamorgan Gateway Station Feasibility General Arrangement Location 3

Designed	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Drawn	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Checked	J.Owen	Signed: Electronically Signed	Date: 09/12/19
Approved	J.Owen	Signed: Electronically Signed	Date: 09/12/19
Scale:	AS SHOWN	Datum:	---
Original Size:	A1	Grid:	---
ELR:		Mileage:	
Suitability Code:	S3	Project Number:	10028657

Suitability Description:
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Drawing Number: 10028657-ARC-00-XX-DR-CE-00003
Revision: P02

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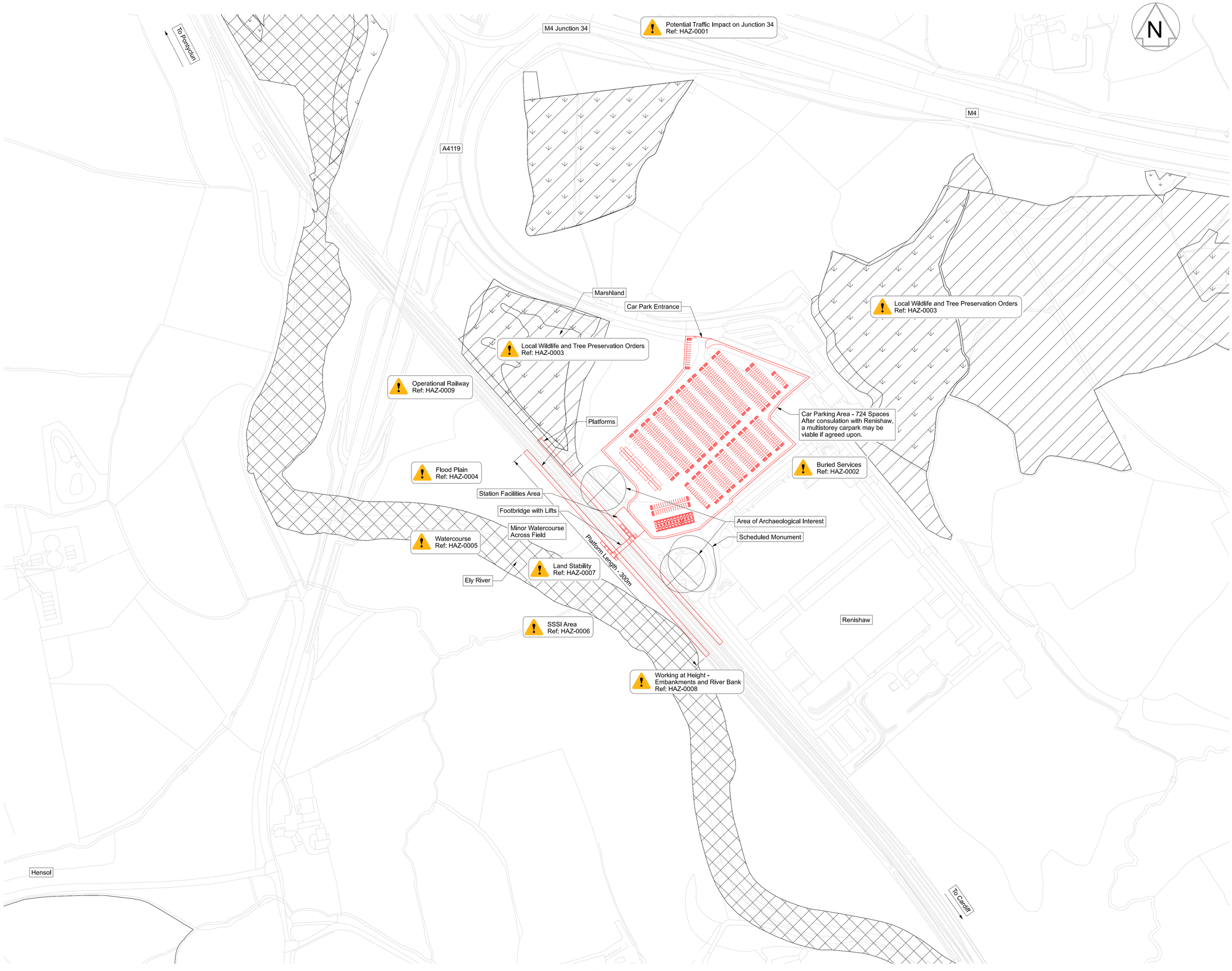

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SCALE 1:2000

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LEGEND:

KEY	
	Proposed
	Existing
	Local Wildlife Site
	Tree Preservation Orders
	Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

VALE of GLAMORGAN
BRO MORGANNWG

PROJECT:
Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site
Vale of Glamorgan Gateway Station
Hensol/M4 Junction 34

Client
Vale of Glamorgan Council
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TITLE:
Vale of Glamorgan Gateway Station Feasibility General Arrangement Location 4

Designed	Z.Shi	Signed / Date	Electronically Signed / 06/12/19
Drawn	Z.Shi	Signed / Date	Electronically Signed / 06/12/19
Checked	J.Owen	Signed / Date	Electronically Signed / 09/12/19
Approved	J.Owen	Signed / Date	Electronically Signed / 09/12/19
Scale:	AS SHOWN	Datum:	---
Original Size:	A1	Grid:	---
ELR:		Mileage:	
Suitability Code:	S3	Project Number:	10028657

Suitability Description:
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Drawing Number: 10028657-ARC-00-XX-DR-CE-00004
Revision: P02

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APPENDIX G

Hazard Log

10028657-ARC-00-XX-RG-HS-00001-P01

ARCADIS	**Designer's Hazard Identification & Risk Analysis (for Complex Projects)**
Project Name:	Vale of Glamorgan Gateway Station - Feasibility Study
Arcadis Project Number:	10028657
Revision:	P01
Revision Date:	06/12/2019
Prepared By:	Zhan Shi
Approved by:	Jason Owen

Designer’s Hazard Identification & Risk Analysis

Project Name: Vale of Glamorgan Gateway Station - Feasibility Study

Item Ref No	Hazard Description - design activity or element giving rise to hazard or constraint	Location	Population at Risk from Hazard (eg construction workers, public, users, operators, maintainers, demolition workers etc)	Risks - potential initial risks and challenges	Initial Risk Rating High/ Medium/ Low	Hazard Mitigation - Design stage action taken to eliminate/ reduce hazard Designer to provide details of action undertaken - including alteration of design, survey work undertaken to obtain information, consideration of design for operation, maintenance	Phase affected by Hazard, eg construction/use /maintenance & cleaning/demolition & dismantling	Action Required By: (Designer/ Contractor/ Maintainer/ Client/ Other)	Action by date	Residual Risk Rating High/ Medium/ Low	Is Residual Risk significant and required to be shown on drawings: Yes/No	Information about the risks that cannot be designed out (i.e. Residual Risks) and that require controls to be developed and implemented by others. Designer to provide location of relevant information.	Action Owner
HAZ-0001	Traffic impact on M4 Junction 34	M4 Junction 34	Public	The new station, along with the Renishaw development will increase traffic on the roads. The existing roads will not be able to handle the additional traffic of both developments. Congestion may cause queue on the motorway junction.	High	Additional traffic modelling to be carried out. The motor junction should be reviewed. The junction may need upgrading.	All	All	On going	Low	Yes	Mitigation measures will be by others, outside of this project. Coordination will be required.	All
HAZ-0002	Buried services	Proposed site	All	Explosion Electrical Hazard Electrocution Asset damage Hazardous materials	High	Buried Services study is required in accordance with PAS 128.	All	All	On going	Low	Yes	Buried services must be reviewed in accordance with PAS128.	All
HAZ-0003	Local wildlife and tree preservation orders	Proposed site	All	Ecosystem affected or damaged by construction activities and the proposed development.	High	The design should have a net benefit to the area. Suitable surveys will be required and mitigation. Designs can be rated on negative impact on the ecosystem.	All	All	On going	Medium	Yes	Ecology Studies to identify current constraints and mitigations required. The project should result in a net benefit to the area.	All
HAZ-0004	Flood Plain	Proposed site	All	Flood risk & damage Infrastructure damage Risk of injury or death	High	Flood mitigation measures can reduce changes of the new station and facilities flooding, however the scheme must not cause flooding elsewhere and may require flood compensation to accommodate the volume mitigated against.	All	All	On going	Medium	Yes	Dependent on selected option, to be reviewed at next design stage	All
HAZ-0005	River - Open water / watercourses	River Ely and adjacent watercourses	All	Drowning Pollution	Medium	Suitable safe system of work to be implemented for construction works. Suitable barriers to be installed for the public. Suitable construction materials and pollution controls to be implemented for construction.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All
HAZ-0006	SSSI Area	River Ely	All	Impact to the conservation areas and species	Medium	Design to accommodate SSSI	All	All	On going	Low	Yes	Dependent on selected site. To be reviewed at next design stage.	All
HAZ-0007	Land stability	Proposed site	All	Land instability Earthwork/embankment collapse	High	Suitable Ground investigation to be undertaken before any site work. Temporary structure or special measures may be required	All	All	On going	Medium	Yes	Geological investigations will be required to identify geological features of the selected site.	All
HAZ-0008	Working at height - platforms, embankments and river bank	Station	All	Slips, trips and falls Slope instability	Medium	Suitable safe system of work required.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All
HAZ-0009	Operational railway	Railway	All	Impact with train (machinery, structures, people)	High	Suitable safe system of work required.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All

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Appendix B

Transport Case | Impact Assessment Tables

Do-Minimum

Location 1 | Do-Minimum		
	Impacts	**Scale**
Social		
Physical Activity	No change in physical activity is anticipated should a station not be implemented.	0
Journey Quality	No change in journey quality is anticipated should a station not be implemented.	0
Accidents	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on road safety and therefore increase accidents particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34.	-
Security	No change in security is anticipated should a station not be implemented.	0
Access to Employment	Access to employment would be reliant on the existing transport network. In addition, it is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on congestion particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, with reduced accessibility to employment.	-
Access to Services	Access to services would be reliant on the existing transport network. In addition, it is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on congestion particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, with reduced accessibility to services.	-
Affordability	The rising cost of transport is resulting in many households struggling to afford to own and run a car. By not establishing an new strategic public transport option, this could result in making travel less affordable for some sections of society, most notable the young and elderly (21% of the study area's residents are retired which is greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%) as a whole.	-
Severance	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on severance, including the villages of Pendoylan and Clawdd Coch situated within the study area. This would be considered a slight adverse impact with <200 residents affected.	-
Option and Non-Use Values	The do-minimum scenario provides no new railway station/ sustainable means of travel and therefore travel is reliant on the existing transport network, with no step-change in transport options provided. This would be for local and regional journeys as well as those from further afield.	-
Cultural		
Cultural Facilities	No change in cultural facilities is anticipated should a station not be implemented.	0
Welsh Language	No change in Welsh language is anticipated should a station not be implemented.	0

Location 1 | Do-Minimum		
Environmental		
Noise	No change in Noise is anticipated should a station not be implemented. Local increases in noise could result as an increase in regional traffic would be anticipated, although no significant/ quantifiable change is assumed.	0
Air Quality	An assumed increase in local/ strategic traffic could adversely impact on air quality.	-
Greenhouse Gases	An assumed increase in local/ strategic traffic could adversely impact on greenhouse gasses.	-
Landscape	No change in landscape is anticipated should a station not be implemented.	0
Townscape	No change in townscape is anticipated should a station not be implemented.	0
Historic Environment	No change in historic environment is anticipated should a station not be implemented.	0
Biodiversity	No change in biodiversity is anticipated should a station not be implemented.	0
Water Environment	An assumed increase in local/ strategic traffic could adversely impact on water environment as pollution from vehicles increases correspondingly.	-
Residential Amenity	No change in residential amenity is anticipated should a station not be implemented.	0
Economic		
Journey Time Changes	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on journey times as congestion worsens, particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34.	-
Journey Time Reliability Changes	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on journey time reliability as congestion worsens, particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34.	-
Transport Costs	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on transport costs as congestion worsens, particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34.	-
Accidents	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on accidents as congestion/ traffic conditions worsens, particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34.	-
Wider Economic Impacts	It is assumed that a continued increase in car-based trips throughout the region would have the potential to adversely impact on the wider economy as congestion/ traffic conditions worsens, particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34. Limiting transport options for users and businesses also reduces the	-

Location 1 | Do-Minimum		
	potential to adversely impact journey times and reliability, with the potential to further impact the wider economy.	
Land and Property	No change in land and property is anticipated should a station not be implemented.	0
Capital Costs	No change in capital costs is anticipated should a station not be implemented.	0
Revenue Costs	No change in revenue costs is anticipated should a station not be implemented.	0

Location 1 | Land South East of the Extant Renishaw Development

Location 1 | Land South East of the Extant Renishaw Development		
	Impacts	**Scale**
Social		
Physical Activity	It is expected that the option would have a slight beneficial impact on physical activity based on the assumption that a Vale of Glamorgan Gateway Station would encourage the potential for cycling from local communities to the north and south of the M4 corridor, supported by the provision of suitable cycle facilities at the railway station. Implementation of a new railway station would also inherently support increased physical activity by walking, particularly as part of a rail users' onward journey from their destination station.	+
Journey Quality	It is anticipated that a new railway station could provide high quality public transport to key destinations including Cardiff, Bridgend and beyond establishing enhancements to traveller's care, views and stress throughout the region. A qualitative assessment has been completed in line with TAG Unit A4.1.6 (Journey Quality Impacts) that identifies an impact score of moderate beneficial. The provision of public transport within the study area is currently extensively limited with restricted alternatives available for travel by non-car modes. A new strategic and modern railway station located near to the M4 Junction 34 and designed to current standards could provide significant enhancements for traveller care with improvements to strategic facilities, cleanliness, information and environment in comparison to the existing situation. The number of rail services that would be implemented to facilitate the new railway station is subject to further assessment, however the establishment of new rail trips within and through the study area would have potential to improve the quality of a traveller's experience with regard to views. The immediate study area and subsequent location of a station is predominantly within an area of high-quality scenic countryside interspersed with ancient woodland, important nature conservation sites, SSSI and conservation areas. Encouraging new trips to be made by rail could therefore improve a traveller's perception of the local scene, as well as throughout the region with the South Wales Main Line predominantly traversing through a rural landscape. An alternative perspective on townscape could also enhance a travellers' interest as part of the rail trip as the route interconnects with urban settlements. It is further anticipated that there would be an improvement with regard to traveller stress following implementation of a new railway station. Whilst the majority of travellers would still require a car to access the station, the potential to reduce journey distances by car could reduce the impact of driver related stress associated with frustration and the fear of potential accidents. In addition, the implementation of a high-quality interchange with good security measures, environment and information provision could alleviate route uncertainty as part of the journey experience, enhancing upon existing access to public transport infrastructure and services. **To facilitate robust accessibility to and from the interchange, the option encompasses a new approach road connecting to a 1,151-space car park – two access road options have been considered as illustrated on General Arrangement plan 10028657-ARC-00-XX-DR-CE-00001. The approach road connects the railway station to an unclassified road off the Pendoylan road, which provides onward connectivity to the M4 Junction 34.**	++

Location 1 | Land South East of the Extant Renishaw Development		
	Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. Demand Forecast Scenario 2 (2026 Do-Something Core with Vale of Glamorgan Gateway Station) projects 133,969 per annum would use the station, rising to 216,982 passengers per annum under Demand Forecast Scenario 4 (Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development) assuming local congestion issues at M4 Junction 34 are mitigated. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Accidents	A new railway station is anticipated to reduce the number and distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Security	A qualitative assessment of security has been completed against TAG Unit A4.1.4 to assess the security impacts as a result of a new rail interchange facility. The delivery of a high-quality rail and bus interchange with implementation of lighting and CCTV to current design standards would establish robust formal surveillance throughout the station environment, including the Park and Ride facility. It would also be anticipated that a new interchange would be designed so as to maximise the potential for natural surveillance by passengers and staff, further enhancing the perception of safety. Informal surveillance of the station environment would likely be supported by positive use of landscaping features (design layout of planting, for example) to contribute towards visibility and deter intruders. This would be especially pertinent throughout the car park and waiting points so as to minimise the potential for hidden and screened areas to essentially improve users' perception of safety on site when leaving their vehicles. In addition, it would be anticipated that the new station would be designed with clearly marked site perimeters and well-lit, secure entrance points ensuring wayfinding and accessibility throughout the station is not compromised. Current station design standards would carefully consider the requirements of effective lighting whilst ensuring that daytime lighting enhances the station environment. Robust lighting provision would ensure that bi-lingual signage and information/ help (emergency) points are well-lit at all times, as well as reduce the potential for adverse shadows that could affect the integrity of CCTV coverage. Whilst not specifically noted as part of the TAG Unit A4.1.4 assessment, the usability of the station by all passengers is key to ensuring a safe and secure station environment. It is therefore anticipated that a new interchange would subsequently be designed to the latest design standards for accessible railway stations providing full accessibility for disabled passengers in terms of car parking facilities, waiting areas and inter-platform accessibility (lifts/ ramps) for example. Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate	++

Location 1 | Land South East of the Extant Renishaw Development		
	impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Access to Employment	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the Cardiff City Region, however the option for a Vale of Glamorgan Gateway Station inclusive of bus integration could further improve access to employment by providing interconnectivity to Cardiff Airport and other key local and regional employment areas. Employment sites in the vicinity of Junction 34 (both north and south of the M4) could particularly benefit. Moreover, it could assist in improving access between the Rhondda Valleys/ A4119 corridor and the wider City Region. The degree of benefit would depend on several factors/ variables most notably encompassing the level of rail service that can be provided at the new station, the extent of bus connectivity between the interchange and nearby employment sites, the potential enhancement of the local highway network to facilitate enhanced accessibility, as well as the potential for enhanced employment opportunities resulting from the proposed Renishaw development[1]. The railway station would serve existing residents situated near to M4 Junction 34 and would improve access to employment for those in the immediate area, in conjunction with those travelling from further distances by rail. The Welsh Government PBA report referenced herewith subsequently concludes that *'improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.'*	++
Access to Services	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the key urban settlements throughout the region, however the option for a railway station inclusive of bus integration could further improve access to services with new and enhanced rail provision establishing enhanced interconnectivity. The extent of local public transport connections would be subject to proposed bus route and timetable options provided to support the interchange facility.	++
Affordability	The rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of a reliable and direct public transport option has the potential to make travel more affordable for some sections of society, most notable the young and elderly (21% of the study area's residents are retired which is greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%) as a whole. This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, public transport services are often unaffordable for some groups within society.	+

[1] Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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.

Location 1 | Land South East of the Extant Renishaw Development		
	It should be noted that some users may require car travel in order to utilise the railway station.	
Severance	A new railway station is anticipated to reduce traffic flow through Pendoylan and Clawdd Coch with the potential to lessen the impact of severance. In line with TAG Unit A4.1 / Section 5 (Severance Impacts) a slight positive impact is anticipated with less than 200 local residents estimated to benefit from any reductions in traffic flow. It is not anticipated that the railway station would create new severance issues as existing routes and connections will be retained.	+
Option and Non-Use Values	A railway station provides a more viable alternative to journeys currently made by car and increases the resilience of the transport network through the provision of a more sustainable transport network. This would be for local and regional journeys as well as those from further afield.	+++
Cultural		
Cultural Facilities	The proposed railway station establishes the potential for improved accessibility to cultural facilities both local to the railway station (Hensol Golf Academy), as well as throughout the region with enhanced access to museums, theatre halls, cultural centres and leisure complexes particularly at key strategic destinations including Cardiff and Bridgend.	++
Welsh Language	The Vale of Glamorgan Council stated in the Local Development Plan that *'having assessed the densities of Welsh language use across the Vale of Glamorgan it is not considered to be an issue which requires addressing in the Plan. As a result, the proposals contained in the LDP are not considered to have a detrimental impact upon the Welsh language and culture or materially affect the linguistic balance of the Vale of Glamorgan or the communities within the Vale of Glamorgan.'* The Welsh Government has a strategic vision outlined in the *Cymraeg 2050; A Million Welsh Speakers (2017)* to increase the number of Welsh speakers throughout Wales, stating *'The year 2050: The Welsh language is thriving, the number of speakers has reached a million, and it is used in every aspect of life. Among those who do not speak Welsh there is goodwill and a sense of ownership towards the language and a recognition by all of its contribution to the culture, society and economy of Wales.'* The strategy plans to achieve this vision by using three strategic themes including (1) increasing the number of Welsh speakers, (2) increasing the use of Welsh and (3) creating favourable conditions – infrastructure and context. Implementation of a new railway station would require all passenger information, signage and public announcements to be bi-lingual, inherently supporting the Welsh Government's vision.	+
Environmental		
Noise	This review is not yet quantifiable in the absence of quantitative data, but a minor adverse impact is considered reasonable to assume principally as a result of stopping trains at the station, whilst also noting the impacts from short-term construction noise and vibration impacts associated with the new station. There are no Noise Planning Priority Areas within the 2km study area and the number of residential receptors within close proximity of the proposed site is extensively low.	-

Location 1 | Land South East of the Extant Renishaw Development		
Air Quality	Based upon the 2016 Air Quality Progress Report for the Vale of Glamorgan, the overall air quality across the county complies with regulations to protect human health[2]. There are no Air Quality Management Areas (AQMAs) within 2km of the study area. The impact of construction on managing air quality/ dust would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved air quality.	+
Greenhouse Gases	The impact of construction on managing greenhouse emissions would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved greenhouse emissions per user.	+
Landscape	**The implementation of this option would lead to significant tree loss and TPOs could be adversely affected by the construction of the access road options. The construction of the railway station encompassing a building, car park and footbridge could establish a slight adverse impact on the local landscape, impacting on short distance views and the night-time setting.** **Impacts can be mitigated through landscape design around the railway station and retention or planting of new vegetation and moreover, good landscape design is needed to mitigate lighting impacts at night. It should however be noted that the M4 corridor, the existing Renishaw buildings/ car park and rail infrastructure are a key part of the existing local landscape pattern.**	-
Townscape	Due to the location of the site away from towns and urban areas, the impact on townscape is considered neutral.	0
Historic Environment	There is one Scheduled Monument, nine Grade II Listed Buildings and two parks within the 250m buffer and 500m study area. The Scheduled Monument views could be impacted by the new railway station, however the assets surrounding have already been impacted by the South Wales Main Line, Renishaw complex and M4 corridor. All the other assets would be not impacted by the new railway station as they are either too far away or screened from view. The non-designed assets within the 250m buffer and 500m study area have revealed a low potential for Prehistoric and Roman remains. However, the lack of artefacts and features may be due to the lack of opportunity to recover and record such remains. The archaeological event record is weak within the local study area and can offer little in the way of archaeological potential. The Medieval and Post Medieval period is more apparent with the Scheduled Monument, built heritage and archaeological remains. The walkover survey identified several assets such as non-extant field boundaries which were removed to create larger fields. A review of historic maps revealed that the study area has been severely impacted by the creation of the M4 including Junction 34, the South Wales Main Line, the northern extension to the A4119 and the creation of the Renishaw complex. Any archaeological remains that would have been under the road, railway and industrial units would have been severely impacted by these modern additions to the landscape.	0

[2] Vale of Glamorgan Council Air Quality Progress Report 2016

Location 1 | Land South East of the Extant Renishaw Development		
	There are no recorded heritage assets within the site. The site is situated furthest away from the Felin Isaf Castle Mound (SM3) scheduled monument. **There is one modern asset encompassing a watercourse located adjacent to the railway line within the site boundary and in proximity to the (SM3) scheduled monument. The watercourse was created due to the removal of the northern arm of the River Ely prior to 1888, due to the creation of the railway. The 1847 Pendoylan and 1843 Llantrisant title maps do not show these features but do show the sinuous northern arm of the river. By the first edition OS map of the area the river has been moved and the feature has been created. It is not clear if the watercourse is still extant. This asset is of low significance and has historical significance.** **The proposed Development has the potential to have a negligible impact on the setting of the scheduled monument, particularly during the construction phase.** **The Listed Buildings and the two Registered Parks and Gardens (Grade II) are far enough away and screened from view so the impact would be considered neutral.** **The impact to the archaeological resources would be neutral, although there is potential for unknown archaeology of unknown value to be present. Further survey and assessment work would be required during later design stages.**	
Biodiversity	Impacts on Ely Valley will depend on the results of surveys for Monk's-hood along the riverbank and the exact proposals at this location. It is likely that any Monk's-hood could be translocated to reduce impacts. Aerial photography, ground truthing exercise and a Phase 1 survey identified the potential for both important hedgerows and priority habitats including marshy grassland, but this would need to be verified through a Phase Two Botanical survey. Further data including protected species surveys are required and potential mitigation activities should be recommended in an Ecological Impact Assessment. **Access is likely to lead to loss of parts of a SINC: Land South West of Llanfarach Farm SINC consisting of UK BAP Priority Habitat of lowland mixed deciduous woodland, wet woodland and ponds.** **Loss of potential priority habitats (woodland and marshy grassland) – habitat translocation and/ or mitigation planting would be required. Further botanical survey work would be required to ascertain value of grassland.** **Habitats present may support protected and priority species including dormouse, bats, badger, breeding birds, great crested newts (breeding and terrestrial), reptiles and is likely to be of conservation value for terrestrial invertebrates.** **The implementation of this option would lead to significant tree loss and TPOs could be adversely affected by the construction of the access road options.**	-
Water Environment	**Land is known to have flooded in the past (Zone B designation in the DAM), although the proposed site is located on land that is predominantly considered to be at low risk of flooding.** **The environmental appraisal of the site has identified one modern asset encompassing a watercourse located adjacent to the railway line within the site boundary and in close proximity to Felin Isaf Castle Mound (SM3). The watercourse was created due to the removal of the northern arm of the River Ely prior to 1888, due to the**	-

Location 1 | Land South East of the Extant Renishaw Development		
	creation of the railway. The 1847 Pendoylan and 1843 Llantrisant title maps do not show these features but do show the sinuous northern arm of the river. By the first edition OS map of the area the river has been moved and the feature has been created. It is not clear if the watercourse is still extant.	
Residential Amenity	The impact on residential amenity considers the cumulative impact of air quality, noise and visual intrusion on residential properties. The combined assessment from the above indicates that the properties in the communities of Clawdd Coch and Pendoylan will largely benefit from reductions in traffic through the village.	0
Economic		
Journey Time Changes	The implementation of a new railway station could result in a reduced journey time by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions traffic on the M4, A48 and A4232 given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Journey Time Reliability Changes	The implementation of a new railway station could result in improved journey time reliability by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions in congestion on the M4, A48 and A4232, given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time reliability is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Transport Costs	Rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of new public transport options has the potential to make travel more affordable for some sections of society, most notable the young and elderly - 21% of the study area's residents are retired which is much greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%). This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, it should be noted that public transport services can be unaffordable for some groups within society, although the provision of linked bus and rail services means they are usable for those without access to a car.	+
Accidents	A new railway station is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+

Location 1 | Land South East of the Extant Renishaw Development		
Wider Economic Impacts	It is anticipated that there would be additional wider economic impacts associated with the implementation of a new railway station. This may include induced investment through additional strategic development arising due to improved connectivity to the EZs (existing connections are constraining growth). Moreover, there may be benefits to those larger commercial businesses (such as the airport and Aston Martin) through transport improvements where competitive markets are imperfect. In this case, it will assist by providing an improved level of connectivity for the airport and businesses. There may also be beneficial labour supply impacts by improving connectivity between the employment sites and population centres, notably assisting access to employment from the Rhondda Valleys to the EZ. Whilst the EZ presents a regionally significant opportunity, the labour market catchment of the site is limited by the current transport infrastructure and services. If this issue is not resolved, it may have longer term implications for firms currently located in the Vale of Glamorgan and in terms of the business location decisions of prospective investors. The limited labour market catchment of the EZ currently is also compounded by comparatively poor business-to-business accessibility. Moreover, the accessibility analysis undertaken (as contained in the report in Appendix A) found that relatively modest reductions in journey times to/ from the Vale of Glamorgan would significantly increase the labour market and business-to-business catchment of the EZ. The improvement in accessibility may also bring a relocation of more productive jobs to the area. As a Vale of Glamorgan Gateway Station would improve connections between functioning parts of the Capital Region, there may also be productivity impacts due to agglomeration benefits for the Vale of Glamorgan in terms of linking in developments in the area to similar businesses/ clusters in the region. Moreover, productivity in the Cardiff Capital Region is very low compared to other UK City Regions, so improving connectivity to the Vale of Glamorgan, as well as Rhondda Cynon Taff, may form part of a package of measures to address this (and in part addressing the issue of a lack of appropriate industrial premises).	++
Land and Property	**The Renishaw Development encompasses a privately funded proposal to develop land allocated in the adopted Vale of Glamorgan Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha encompassing B1, B2 and B8 land uses to meet strategic and local employment needs. The LDP site is situated south east of M4 Junction 34 adjacent to the extant Renishaw factory. Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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 proposed site is directly affected by the extant Renishaw planning application, specifically affecting proposals to implement new industrial units with associated car parking facilities south east of the existing Renishaw complex. Following consultation with Renishaw, their proposed development at this location is considered integral for their long-term goals and aspirations for the site including the potential to support local and regional job**	--

Location 1 | Land South East of the Extant Renishaw Development		
	creation. The impacts of this location are therefore considered large adverse and recognised as a significant constraint to potential development of the Vale of Glamorgan Gateway Station at this site.	
Capital Costs	No firm capital costs are currently available and would be developed as part of a GRIP 3 Option Selection report, although it is anticipated that a new railway station with associated facilities would be of high cost in terms of capital investment. A typical cost is in the order of £25M.	--
Revenue Costs	New revenue costs would have to be established with regard to enhanced rail and bus services. There may be knock on revenue costs on existing services as a result and this would require evaluation.	-

Location 2 | Land South of the Railway between the Railway and River Ely

Location 2 | Land South of the Railway between the Railway and River Ely		
	Impacts	**Scale**
Social		
Physical Activity	It is expected that the option would have a slight beneficial impact on physical activity based on the assumption that a Vale of Glamorgan Gateway Station would encourage the potential for cycling from local communities to the north and south of the M4 corridor, supported by the provision of suitable cycle facilities at the railway station. Implementation of a new railway station would also inherently support increased physical activity by walking, particularly as part of a rail users' onward journey from their destination station.	+
Journey Quality	It is anticipated that a new railway station could provide high quality public transport to key destinations including Cardiff, Bridgend and beyond establishing enhancements to traveller's care, views and stress throughout the region. A qualitative assessment has been completed in line with TAG Unit A4.1.6 (Journey Quality Impacts) that identifies an impact score of moderate beneficial. The provision of public transport within the study area is currently extensively limited with restricted alternatives available for travel by non-car modes. A new strategic and modern railway station located near to the M4 Junction 34 and designed to current standards could provide significant enhancements for traveller care with improvements to strategic facilities, cleanliness, information and environment in comparison to the existing situation. The number of rail services that would be implemented to facilitate the new railway station is subject to further assessment, however the establishment of new rail trips within and through the study area would have potential to improve the quality of a traveller's experience with regard to views. The immediate study area and subsequent location of a station is predominantly within an area of high-quality scenic countryside interspersed with ancient woodland, important nature conservation sites, SSSI and conservation areas. Encouraging new trips to be made by rail could therefore improve a traveller's perception of the local scene, as well as throughout the region with the South Wales Main Line predominantly traversing through a rural landscape. An alternative perspective on townscape could also enhance a travellers' interest as part of the rail trip as the route interconnects with urban settlements. It is further anticipated that there would be an improvement with regard to traveller stress following implementation of a new railway station. Whilst the majority of travellers would still require a car to access the station, the potential to reduce journey distances by car could reduce the impact of driver related stress associated with frustration and the fear of potential accidents. In addition, the implementation of a high-quality interchange with good security measures, environment and information provision could alleviate route uncertainty as part of the journey experience, enhancing upon existing access to public transport infrastructure and services. **To facilitate robust accessibility to and from the interchange, the option encompasses a new road junction with the Pendoylan road connecting to a 727-space car park as illustrated on General Arrangement plan 10028657-ARC-00-XX-DR-CE-00002.** Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate impact has been allocated for the overall assessment with a proposed	++

Location 2 | Land South of the Railway between the Railway and River Ely		
	interchange station anticipated to affect between 500 to 10,000 travellers per day. Demand Forecast Scenario 2 (2026 Do-Something Core with Vale of Glamorgan Gateway Station) projects 133,969 per annum would use the station, rising to 216,982 passengers per annum under Demand Forecast Scenario 4 (Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development) assuming local congestion issues at M4 Junction 34 are mitigated. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Accidents	A new railway station is anticipated to reduce the number and distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Security	A qualitative assessment of security has been completed against TAG Unit A4.1.4 to assess the security impacts as a result of a new rail interchange facility. The delivery of a high-quality rail and bus interchange with implementation of lighting and CCTV to current design standards would establish robust formal surveillance throughout the station environment, including the Park and Ride facility. It would also be anticipated that a new interchange would be designed so as to maximise the potential for natural surveillance by passengers and staff, further enhancing the perception of safety. Informal surveillance of the station environment would likely be supported by positive use of landscaping features (design layout of planting, for example) to contribute towards visibility and deter intruders. This would be especially pertinent throughout the car park and waiting points so as to minimise the potential for hidden and screened areas to essentially improve users' perception of safety on site when leaving their vehicles. In addition, it would be anticipated that the new station would be designed with clearly marked site perimeters and well-lit, secure entrance points ensuring wayfinding and accessibility throughout the station is not compromised. Current station design standards would carefully consider the requirements of effective lighting whilst ensuring that daytime lighting enhances the station environment. Robust lighting provision would ensure that bi-lingual signage and information/ help (emergency) points are well-lit at all times, as well as reduce the potential for adverse shadows that could affect the integrity of CCTV coverage. Whilst not specifically noted as part of the TAG Unit A4.1.4 assessment, the usability of the station by all passengers is key to ensuring a safe and secure station environment. It is therefore anticipated that a new interchange would subsequently be designed to the latest design standards for accessible railway stations providing full accessibility for disabled passengers in terms of car parking facilities, waiting areas and inter-platform accessibility (lifts/ ramps) for example. Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. This impact assumption encompasses all travellers who would	++

Location 2 | Land South of the Railway between the Railway and River Ely		
	benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Access to Employment	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the Cardiff City Region, however the option for a Vale of Glamorgan Gateway Station inclusive of bus integration could further improve access to employment by providing interconnectivity to Cardiff Airport and other key local and regional employment areas. Employment sites in the vicinity of Junction 34 (both north and south of the M4) could particularly benefit. Moreover, it could assist in improving access between the Rhondda Valleys/ A4119 corridor and the wider City Region. The degree of benefit would depend on several factors/ variables most notably encompassing the level of rail service that can be provided at the new station, the extent of bus connectivity between the interchange and nearby employment sites, the potential enhancement of the local highway network to facilitate enhanced accessibility, as well as the potential for enhanced employment opportunities resulting from the proposed Renishaw development[3]. The railway station would serve existing residents situated near to M4 Junction 34 and would improve access to employment for those in the immediate area, in conjunction with those travelling from further distances by rail. The Welsh Government PBA report referenced herewith subsequently concludes that *'improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.'*	++
Access to Services	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the key urban settlements throughout the region, however the option for a railway station inclusive of bus integration could further improve access to services with new and enhanced rail provision establishing enhanced interconnectivity. The extent of local public transport connections would be subject to proposed bus route and timetable options provided to support the interchange facility.	++
Affordability	The rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of a reliable and direct public transport option has the potential to make travel more affordable for some sections of society, most notable the young and elderly (21% of the study area's residents are retired which is greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%) as a whole. This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, public transport services are often unaffordable for some groups within society. It should be noted that some users may require car travel in order to utilise the railway station.	+

[3] Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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.

Location 2 | Land South of the Railway between the Railway and River Ely		
Severance	A new railway station is anticipated to reduce traffic flow through Pendoylan and Clawdd Coch with the potential to lessen the impact of severance. In line with TAG Unit A4.1 / Section 5 (Severance Impacts) a slight positive impact is anticipated with less than 200 local residents estimated to benefit from any reductions in traffic flow. It is not anticipated that the railway station would create new severance issues as existing routes and connections will be retained.	+
Option and Non-Use Values	A railway station provides a more viable alternative to journeys currently made by car and increases the resilience of the transport network through the provision of a more sustainable transport network. This would be for local and regional journeys as well as those from further afield.	+++
Cultural		
Cultural Facilities	The proposed railway station establishes the potential for improved accessibility to cultural facilities both local to the railway station (Hensol Golf Academy), as well as throughout the region with enhanced access to museums, theatre halls, cultural centres and leisure complexes particularly at key strategic destinations including Cardiff and Bridgend.	++
Welsh Language	The Vale of Glamorgan Council stated in the Local Development Plan that *'having assessed the densities of Welsh language use across the Vale of Glamorgan it is not considered to be an issue which requires addressing in the Plan. As a result, the proposals contained in the LDP are not considered to have a detrimental impact upon the Welsh language and culture or materially affect the linguistic balance of the Vale of Glamorgan or the communities within the Vale of Glamorgan.'* The Welsh Government has a strategic vision outlined in the *Cymraeg 2050; A Million Welsh Speakers (2017)* to increase the number of Welsh speakers throughout Wales, stating *'The year 2050: The Welsh language is thriving, the number of speakers has reached a million, and it is used in every aspect of life. Among those who do not speak Welsh there is goodwill and a sense of ownership towards the language and a recognition by all of its contribution to the culture, society and economy of Wales.'* The strategy plans to achieve this vision by using three strategic themes including (1) increasing the number of Welsh speakers, (2) increasing the use of Welsh and (3) creating favourable conditions – infrastructure and context. Implementation of a new railway station would require all passenger information, signage and public announcements to be bi-lingual, inherently supporting the Welsh Government's vision.	+
Environmental		
Noise	This review is not yet quantifiable in the absence of quantitative data, but a minor adverse impact is considered reasonable to assume principally as a result of stopping trains at the station, whilst also noting the impacts from short-term construction noise and vibration impacts associated with the new station. There are no Noise Planning Priority Areas within the 2km study area and the number of residential receptors within close proximity of the proposed site is extensively low.	-
Air Quality	Based upon the 2016 Air Quality Progress Report for the Vale of Glamorgan, the overall air quality across the county complies with regulations to protect human health[4].	+

[4] Vale of Glamorgan Council Air Quality Progress Report 2016

Location 2 | Land South of the Railway between the Railway and River Ely		
	There are no Air Quality Management Areas (AQMAs) within 2km of the study area. The impact of construction on managing air quality/ dust would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved air quality.	
Greenhouse Gases	The impact of construction on managing greenhouse emissions would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved greenhouse emissions per user.	+
Landscape	**The proposed development would be visible from the adjacent road leading between M4 Junction 34 and the A48 and therefore the railway station encompassing a building, car park and footbridge could establish a moderate adverse impact on the local landscape, impacting on short distance views and the night-time setting. The impact score is further influenced by the development of extant greenfield land south of the South Wales Main Line. All substantial development at this location is currently retained north of the railway line.** **Impacts can be mitigated through landscape design around the railway station and retention or planting of new vegetation and moreover, good landscape design is needed to mitigate lighting impacts at night. It should however be noted that the M4 corridor, the existing Renishaw buildings/ car park and rail infrastructure are a key part of the existing local landscape pattern.**	--
Townscape	Due to the location of the site away from towns and urban areas, the impact on townscape is considered neutral.	0
Historic Environment	There is one Scheduled Monument, nine Grade II Listed Buildings and two parks within the 250m buffer and 500m study area. The Scheduled Monument views could be impacted by the new railway station, however the assets surrounding have already been impacted by the South Wales Main Line, Renishaw complex and M4 corridor. All the other assets would be not impacted by the new railway station as they are either too far away or screened from view. The non-designed assets within the 250m buffer and 500m study area have revealed a low potential for Prehistoric and Roman remains. However, the lack of artefacts and features may be due to the lack of opportunity to recover and record such remains. The archaeological event record is weak within the local study area and can offer little in the way of archaeological potential. The Medieval and Post Medieval period is more apparent with the Scheduled Monument, built heritage and archaeological remains. The walkover survey identified several assets such as non-extant field boundaries which were removed to create larger fields. A review of historic maps revealed that the study area has been severely impacted by the creation of the M4 including Junction 34, the South Wales Main Line, the northern extension to the A4119 and the creation of the Renishaw complex. Any archaeological remains that would have been under the road, railway and industrial units would have been severely impacted by these modern additions to the landscape. **There are no recorded heritage assets within the site. However, during the walkover survey a possible mound formed of dump material was located within the boundary of the proposed site. Its function and date are unknown but as it was located close to the River Ely and maybe associated with some sort of river defence.**	-

Location 2 | Land South of the Railway between the Railway and River Ely		
	Alternatively, as the asset was located within in a field it could be agricultural in origin. This asset is of low significance and has evidential value. **The platform located north of the South Wales Main Line is situated near to existing areas of archaeological interest encompassing Felin Isaf Castle Mound (SM3) scheduled monument, an earth work pond (modern asset) and large pond (modern asset). A new railway station and the location is therefore likely to cause change to the local setting and impact to significance particularly with regard to he scheduled monument.** **The Listed Buildings and the two Registered Parks and Gardens (Grade II) are far enough away and screened from view so the impact would be considered neutral.** **The impact to the archaeological resources would be neutral, although there is potential for unknown archaeology of unknown value to be present. Further survey and assessment work would be required during later design stages.**	
Biodiversity	Impacts on Ely Valley will depend on the results of surveys for Monk's-hood along the riverbank and the exact proposals at this location. It is likely that any Monk's-hood could be translocated to reduce impacts. Aerial photography, ground truthing exercise and a Phase 1 survey identified the potential for both important hedgerows and priority habitats including marshy grassland, but this would need to be verified through a Phase Two Botanical survey. Further data including protected species surveys are required and potential mitigation activities should be recommended in an Ecological Impact Assessment. **The majority of the site is on grassland of low ecological value and there is potential for habitat enhancements along the River Ely within the construction buffer zone.** **Access will lead to the loss of a small area of potential priority habitat (broadleaved plantation woodland). Habitat translocation and/ or mitigation planting would be required.** **Connecting habitat along the railway would be lost.** **A construction buffer of 10-20m to the River Ely SSSI would need to be in place to protect the river and its wildlife from pollution, lighting and disturbance (noise/people).** **Habitats present may support protected and priority species including dormouse (woodland only, some of which may be retained), bats, otter, badgers, great crested newts (breeding and terrestrial) and breeding birds.**	–
Water Environment	**The site is located in the floodplain of the River Ely and categorised as Flood Zone C2 (areas of the floodplain without significant flood defence infrastructure). Development at this location must ensure there is no increase to third party flood risk and ensure that the flood risk onsite is suitable for the type of development proposed. Given the constrained nature of this location option, offsite mitigation is likely to be required.**	– –
Residential Amenity	The impact on residential amenity considers the cumulative impact of air quality, noise and visual intrusion on residential properties. The combined assessment from the above indicates that the properties in the communities of Clawdd Coch and Pendoylan will largely benefit from reductions in traffic through the village.	0

Location 2 | Land South of the Railway between the Railway and River Ely		
Economic		
Journey Time Changes	The implementation of a new railway station could result in a reduced journey time by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions traffic on the M4, A48 and A4232 given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Journey Time Reliability Changes	The implementation of a new railway station could result in improved journey time reliability by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions in congestion on the M4, A48 and A4232, given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time reliability is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Transport Costs	Rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of new public transport options has the potential to make travel more affordable for some sections of society, most notable the young and elderly - 21% of the study area's residents are retired which is much greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%). This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, it should be noted that public transport services can be unaffordable for some groups within society, although the provision of linked bus and rail services means they are usable for those without access to a car.	+
Accidents	A new railway station is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Wider Economic Impacts	It is anticipated that there would be additional wider economic impacts associated with the implementation of a new railway station. This may include induced investment through additional strategic development arising due to improved connectivity to the EZs (existing connections are constraining growth). Moreover, there may be benefits to those larger commercial businesses (such as the airport and Aston Martin) through transport improvements where competitive markets are imperfect. In this case, it will assist by providing an improved level of connectivity for the airport and businesses. There may also be beneficial labour supply impacts by improving connectivity between the employment sites and population centres,	++

Location 2 | Land South of the Railway between the Railway and River Ely		
	notably assisting access to employment from the Rhondda Valleys to the EZ. Whilst the EZ presents a regionally significant opportunity, the labour market catchment of the site is limited by the current transport infrastructure and services. If this issue is not resolved, it may have longer term implications for firms currently located in the Vale of Glamorgan and in terms of the business location decisions of prospective investors. The limited labour market catchment of the EZ currently is also compounded by comparatively poor business-to-business accessibility. Moreover, the accessibility analysis undertaken (as contained in the report in Appendix A) found that relatively modest reductions in journey times to/ from the Vale of Glamorgan would significantly increase the labour market and business-to-business catchment of the EZ. The improvement in accessibility may also bring a relocation of more productive jobs to the area. As a Vale of Glamorgan Gateway Station would improve connections between functioning parts of the Capital Region, there may also be productivity impacts due to agglomeration benefits for the Vale of Glamorgan in terms of linking in developments in the area to similar businesses/ clusters in the region. Moreover, productivity in the Cardiff Capital Region is very low compared to other UK City Regions, so improving connectivity to the Vale of Glamorgan, as well as Rhondda Cynon Taff, may form part of a package of measures to address this (and in part addressing the issue of a lack of appropriate industrial premises).	
Land and Property	**The land is relatively flat with no existing or future proposed land use proposals. Purchase of land would be subject to third party negotiation, although is retained outside of the proposed Renishaw development.**	-
Capital Costs	No firm capital costs are currently available and would be developed as part of a GRIP 3 Option Selection report, although it is anticipated that a new railway station with associated facilities would be of high cost in terms of capital investment. A typical cost is in the order of £25M.	--
Revenue Costs	New revenue costs would have to be established with regard to enhanced rail and bus services. There may be knock on revenue costs on existing services as a result and this would require evaluation.	-

Location 3 | Situated on Marshland and Woodland West of Renishaw

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	Impacts	**Scale**
Social		
Physical Activity	It is expected that the option would have a slight beneficial impact on physical activity based on the assumption that a Vale of Glamorgan Gateway Station would encourage the potential for cycling from local communities to the north and south of the M4 corridor, supported by the provision of suitable cycle facilities at the railway station. Implementation of a new railway station would also inherently support increased physical activity by walking, particularly as part of a rail users' onward journey from their destination station.	+
Journey Quality	It is anticipated that a new railway station could provide high quality public transport to key destinations including Cardiff, Bridgend and beyond establishing enhancements to traveller's care, views and stress throughout the region. A qualitative assessment has been completed in line with TAG Unit A4.1.6 (Journey Quality Impacts) that identifies an impact score of moderate beneficial. The provision of public transport within the study area is currently extensively limited with restricted alternatives available for travel by non-car modes. A new strategic and modern railway station located near to the M4 Junction 34 and designed to current standards could provide significant enhancements for traveller care with improvements to strategic facilities, cleanliness, information and environment in comparison to the existing situation. The number of rail services that would be implemented to facilitate the new railway station is subject to further assessment, however the establishment of new rail trips within and through the study area would have potential to improve the quality of a traveller's experience with regard to views. The immediate study area and subsequent location of a station is predominantly within an area of high-quality scenic countryside interspersed with ancient woodland, important nature conservation sites, SSSI and conservation areas. Encouraging new trips to be made by rail could therefore improve a traveller's perception of the local scene, as well as throughout the region with the South Wales Main Line predominantly traversing through a rural landscape. An alternative perspective on townscape could also enhance a travellers' interest as part of the rail trip as the route interconnects with urban settlements. It is further anticipated that there would be an improvement with regard to traveller stress following implementation of a new railway station. Whilst the majority of travellers would still require a car to access the station, the potential to reduce journey distances by car could reduce the impact of driver related stress associated with frustration and the fear of potential accidents. In addition, the implementation of a high-quality interchange with good security measures, environment and information provision could alleviate route uncertainty as part of the journey experience, enhancing upon existing access to public transport infrastructure and services. **To facilitate robust accessibility to and from the interchange, the option encompasses a junction connecting the station's 927-space car park with an unclassified road that provides existing connectivity between M4 Junction 34 and the Renishaw factory as illustrated on General Arrangement plan 10028657-ARC-00-XX-DR-CE-00003.**	++

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. Demand Forecast Scenario 2 (2026 Do-Something Core with Vale of Glamorgan Gateway Station) projects 133,969 per annum would use the station, rising to 216,982 passengers per annum under Demand Forecast Scenario 4 (Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development) assuming local congestion issues at M4 Junction 34 are mitigated. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Accidents	A new railway station is anticipated to reduce the number and distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Security	A qualitative assessment of security has been completed against TAG Unit A4.1.4 to assess the security impacts as a result of a new rail interchange facility. The delivery of a high-quality rail and bus interchange with implementation of lighting and CCTV to current design standards would establish robust formal surveillance throughout the station environment, including the Park and Ride facility. It would also be anticipated that a new interchange would be designed so as to maximise the potential for natural surveillance by passengers and staff, further enhancing the perception of safety. Informal surveillance of the station environment would likely be supported by positive use of landscaping features (design layout of planting, for example) to contribute towards visibility and deter intruders. This would be especially pertinent throughout the car park and waiting points so as to minimise the potential for hidden and screened areas to essentially improve users' perception of safety on site when leaving their vehicles. In addition, it would be anticipated that the new station would be designed with clearly marked site perimeters and well-lit, secure entrance points ensuring wayfinding and accessibility throughout the station is not compromised. Current station design standards would carefully consider the requirements of effective lighting whilst ensuring that daytime lighting enhances the station environment. Robust lighting provision would ensure that bi-lingual signage and information/ help (emergency) points are well-lit at all times, as well as reduce the potential for adverse shadows that could affect the integrity of CCTV coverage. Whilst not specifically noted as part of the TAG Unit A4.1.4 assessment, the usability of the station by all passengers is key to ensuring a safe and secure station environment. It is therefore anticipated that a new interchange would subsequently be designed to the latest design standards for accessible railway stations providing full accessibility for disabled passengers in terms of car parking facilities, waiting areas and inter-platform accessibility (lifts/ ramps) for example. Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate	++

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Access to Employment	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the Cardiff City Region, however the option for a Vale of Glamorgan Gateway Station inclusive of bus integration could further improve access to employment by providing interconnectivity to Cardiff Airport and other key local and regional employment areas. Employment sites in the vicinity of Junction 34 (both north and south of the M4) could particularly benefit. Moreover, it could assist in improving access between the Rhondda Valleys/ A4119 corridor and the wider City Region. The degree of benefit would depend on several factors/ variables most notably encompassing the level of rail service that can be provided at the new station, the extent of bus connectivity between the interchange and nearby employment sites, the potential enhancement of the local highway network to facilitate enhanced accessibility, as well as the potential for enhanced employment opportunities resulting from the proposed Renishaw development[5]. The railway station would serve existing residents situated near to M4 Junction 34 and would improve access to employment for those in the immediate area, in conjunction with those travelling from further distances by rail. The Welsh Government PBA report referenced herewith subsequently concludes that *'improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.'*	++
Access to Services	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the key urban settlements throughout the region, however the option for a railway station inclusive of bus integration could further improve access to services with new and enhanced rail provision establishing enhanced interconnectivity. The extent of local public transport connections would be subject to proposed bus route and timetable options provided to support the interchange facility.	++
Affordability	The rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of a reliable and direct public transport option has the potential to make travel more affordable for some sections of society, most notable the young and elderly (21% of the study area's residents are retired which is greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%) as a whole. This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, public transport services are often unaffordable for some groups within society.	+

[5] Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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.

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	It should be noted that some users may require car travel in order to utilise the railway station.	
Severance	A new railway station is anticipated to reduce traffic flow through Pendoylan and Clawdd Coch with the potential to lessen the impact of severance. In line with TAG Unit A4.1 / Section 5 (Severance Impacts) a slight positive impact is anticipated with less than 200 local residents estimated to benefit from any reductions in traffic flow. It is not anticipated that the railway station would create new severance issues as existing routes and connections will be retained.	+
Option and Non-Use Values	A railway station provides a more viable alternative to journeys currently made by car and increases the resilience of the transport network through the provision of a more sustainable transport network. This would be for local and regional journeys as well as those from further afield.	+++
Cultural		
Cultural Facilities	The proposed railway station establishes the potential for improved accessibility to cultural facilities both local to the railway station (Hensol Golf Academy), as well as throughout the region with enhanced access to museums, theatre halls, cultural centres and leisure complexes particularly at key strategic destinations including Cardiff and Bridgend.	++
Welsh Language	The Vale of Glamorgan Council stated in the Local Development Plan that *'having assessed the densities of Welsh language use across the Vale of Glamorgan it is not considered to be an issue which requires addressing in the Plan. As a result, the proposals contained in the LDP are not considered to have a detrimental impact upon the Welsh language and culture or materially affect the linguistic balance of the Vale of Glamorgan or the communities within the Vale of Glamorgan.'* The Welsh Government has a strategic vision outlined in the *Cymraeg 2050; A Million Welsh Speakers (2017)* to increase the number of Welsh speakers throughout Wales, stating *'The year 2050: The Welsh language is thriving, the number of speakers has reached a million, and it is used in every aspect of life. Among those who do not speak Welsh there is goodwill and a sense of ownership towards the language and a recognition by all of its contribution to the culture, society and economy of Wales.'* The strategy plans to achieve this vision by using three strategic themes including (1) increasing the number of Welsh speakers, (2) increasing the use of Welsh and (3) creating favourable conditions – infrastructure and context. Implementation of a new railway station would require all passenger information, signage and public announcements to be bi-lingual, inherently supporting the Welsh Government's vision.	+
Environmental		
Noise	This review is not yet quantifiable in the absence of quantitative data, but a minor adverse impact is considered reasonable to assume principally as a result of stopping trains at the station, whilst also noting the impacts from short-term construction noise and vibration impacts associated with the new station. There are no Noise Planning Priority Areas within the 2km study area and the number of residential receptors within close proximity of the proposed site is extensively low.	-

Location 3 | Situated on Marshland and Woodland West of Renishaw		
Air Quality	Based upon the 2016 Air Quality Progress Report for the Vale of Glamorgan, the overall air quality across the county complies with regulations to protect human health[6]. There are no Air Quality Management Areas (AQMAs) within 2km of the study area. The impact of construction on managing air quality/ dust would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved air quality.	+
Greenhouse Gases	The impact of construction on managing greenhouse emissions would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved greenhouse emissions per user.	+
Landscape	**The implementation of proposed development at this location would lead to significant tree loss and TPOs could be adversely affected. The construction of the railway station encompassing a building, car park and footbridge could establish a slight adverse impact on the local landscape, impacting on short distance views and the night-time setting.** **Impacts can be mitigated through landscape design around the railway station and retention or planting of new vegetation and moreover, good landscape design is needed to mitigate lighting impacts at night. It should however be noted that the M4 corridor, the existing Renishaw buildings/ car park and rail infrastructure are a key part of the existing local landscape pattern.**	-
Townscape	Due to the location of the site away from towns and urban areas, the impact on townscape is considered neutral.	0
Historic Environment	There is one Scheduled Monument, nine Grade II Listed Buildings and two parks within the 250m buffer and 500m study area. The Scheduled Monument views could be impacted by the new railway station, however the assets surrounding have already been impacted by the South Wales Main Line, Renishaw complex and M4 corridor. All the other assets would be not impacted by the new railway station as they are either too far away or screened from view. The non-designed assets within the 250m buffer and 500m study area have revealed a low potential for Prehistoric and Roman remains. However, the lack of artefacts and features may be due to the lack of opportunity to recover and record such remains. The archaeological event record is weak within the local study area and can offer little in the way of archaeological potential. The Medieval and Post Medieval period is more apparent with the Scheduled Monument, built heritage and archaeological remains. The walkover survey identified several assets such as non-extant field boundaries which were removed to create larger fields. A review of historic maps revealed that the study area has been severely impacted by the creation of the M4 including Junction 34, the South Wales Main Line, the northern extension to the A4119 and the creation of the Renishaw complex. Any archaeological remains that would have been under the road, railway and industrial units would have been severely impacted by these modern additions to the landscape.	-

[6] Vale of Glamorgan Council Air Quality Progress Report 2016

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	There are no recorded heritage assets within the site. The site is situated furthest away from the Felin Isaf Castle Mound (SM3) scheduled monument. **There is one modern asset encompassing a large pond located within the site boundary and in proximity to the (SM3) scheduled monument. The large pond is still extant. The 1847 Pendoylan and 1843 Llantrisant title maps does not show this feature. By the first edition OS map of the area the large pond has been created. This asset is of low significance and have historical significance.** **The proposed Development has the potential to have a slight impact on the setting of the scheduled monument, particularly during the construction phase.** **The Listed Buildings and the two Registered Parks and Gardens (Grade II) are far enough away and screened from view so the impact would be considered neutral.** **The impact to the archaeological resources would be neutral, although there is potential for unknown archaeology of unknown value to be present. Further survey and assessment work would be required during later design stages.**	
Biodiversity	Impacts on Ely Valley will depend on the results of surveys for Monk's-hood along the riverbank and the exact proposals at this location. It is likely that any Monk's-hood could be translocated to reduce impacts. Aerial photography, ground truthing exercise and a Phase 1 survey identified the potential for both important hedgerows and priority habitats including marshy grassland, but this would need to be verified through a Phase Two Botanical survey. Further data including protected species surveys are required and potential mitigation activities should be recommended in an Ecological Impact Assessment. **Loss of a SINC (Land South West of Llanfarach Farm SINC) consisting of UK BAP Priority Habitat – lowland mixed deciduous woodland, wet woodland, and ponds. Habitat translocation and/or mitigation planting would be required, which is likely to require additional land purchase.** **Loss of connectivity of woodland habitat along and across the railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development.** **Construction buffer to woodland and SINC immediately to the north would need to be in place. Habitats present may support protected and priority species including dormouse, bats, badgers, breeding birds and great crested newts (possibly breeding and terrestrial phase).**	--
Water Environment	**Land is known to have flooded in the past (Zone B designation in the DAM), although the proposed site is located on land that is predominantly considered to be at low risk of flooding.** **There is one modern asset encompassing a large pond located within the site boundary and in proximity to the (SM3) scheduled monument. The large pond is still extant. The 1847 Pendoylan and 1843 Llantrisant title maps does not show this feature. By the first edition OS map of the area the large pond has been created. This asset is of low significance and have historical significance.**	-
Residential Amenity	The impact on residential amenity considers the cumulative impact of air quality, noise and visual intrusion on residential properties. The combined assessment from the above indicates that the properties in the	0

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	communities of Clawdd Coch and Pendoylan will largely benefit from reductions in traffic through the village.	
Economic		
Journey Time Changes	The implementation of a new railway station could result in a reduced journey time by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions traffic on the M4, A48 and A4232 given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Journey Time Reliability Changes	The implementation of a new railway station could result in improved journey time reliability by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions in congestion on the M4, A48 and A4232, given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time reliability is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Transport Costs	Rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of new public transport options has the potential to make travel more affordable for some sections of society, most notable the young and elderly - 21% of the study area's residents are retired which is much greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%). This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, it should be noted that public transport services can be unaffordable for some groups within society, although the provision of linked bus and rail services means they are usable for those without access to a car.	+
Accidents	A new railway station is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Wider Economic Impacts	It is anticipated that there would be additional wider economic impacts associated with the implementation of a new railway station. This may include induced investment through additional strategic development arising due to improved connectivity to the EZs (existing connections are constraining growth). Moreover, there may be benefits to those larger commercial businesses (such as the airport and Aston Martin) through transport improvements where competitive markets are imperfect. In this	++

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	case, it will assist by providing an improved level of connectivity for the airport and businesses. There may also be beneficial labour supply impacts by improving connectivity between the employment sites and population centres, notably assisting access to employment from the Rhondda Valleys to the EZ. Whilst the EZ presents a regionally significant opportunity, the labour market catchment of the site is limited by the current transport infrastructure and services. If this issue is not resolved, it may have longer term implications for firms currently located in the Vale of Glamorgan and in terms of the business location decisions of prospective investors. The limited labour market catchment of the EZ currently is also compounded by comparatively poor business-to-business accessibility. Moreover, the accessibility analysis undertaken (as contained in the report in Appendix A) found that relatively modest reductions in journey times to/ from the Vale of Glamorgan would significantly increase the labour market and business-to-business catchment of the EZ. The improvement in accessibility may also bring a relocation of more productive jobs to the area. As a Vale of Glamorgan Gateway Station would improve connections between functioning parts of the Capital Region, there may also be productivity impacts due to agglomeration benefits for the Vale of Glamorgan in terms of linking in developments in the area to similar businesses/ clusters in the region. Moreover, productivity in the Cardiff Capital Region is very low compared to other UK City Regions, so improving connectivity to the Vale of Glamorgan, as well as Rhondda Cynon Taff, may form part of a package of measures to address this (and in part addressing the issue of a lack of appropriate industrial premises).	
Land and Property	**No property is currently situated within the boundary of this proposed site.** **The Renishaw Development encompasses a privately funded proposal to develop land allocated in the adopted Vale of Glamorgan Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha encompassing B1, B2 and B8 land uses to meet strategic and local employment needs. The LDP site is situated south east of M4 Junction 34 adjacent to the extant Renishaw factory. Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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 proposed site is directly affected by the extant Renishaw planning application, specifically affecting proposals to implement new car parking north west of the existing car park. Further consultation with Renishaw would be required to determine the viability of locating a station at this site, although there is currently a general preference towards further consideration of this proposed site.**	
Capital Costs	No firm capital costs are currently available and would be developed as part of a GRIP 3 Option Selection report, although it is anticipated that a	

Location 3 | Situated on Marshland and Woodland West of Renishaw		
	new railway station with associated facilities would be of high cost in terms of capital investment. A typical cost is in the order of £25M.	
Revenue Costs	New revenue costs would have to be established with regard to enhanced rail and bus services. There may be knock on revenue costs on existing services as a result and this would require evaluation.	-

Location 4 | Existing Renishaw Car Park

Location 4 | Existing Renishaw Car Park Site		
	Impacts	**Scale**
Social		
Physical Activity	It is expected that the option would have a slight beneficial impact on physical activity based on the assumption that a Vale of Glamorgan Gateway Station would encourage the potential for cycling from local communities to the north and south of the M4 corridor, supported by the provision of suitable cycle facilities at the railway station. Implementation of a new railway station would also inherently support increased physical activity by walking, particularly as part of a rail users' onward journey from their destination station.	+
Journey Quality	It is anticipated that a new railway station could provide high quality public transport to key destinations including Cardiff, Bridgend and beyond establishing enhancements to traveller's care, views and stress throughout the region. A qualitative assessment has been completed in line with TAG Unit A4.1.6 (Journey Quality Impacts) that identifies an impact score of moderate beneficial. The provision of public transport within the study area is currently extensively limited with restricted alternatives available for travel by non-car modes. A new strategic and modern railway station located near to the M4 Junction 34 and designed to current standards could provide significant enhancements for traveller care with improvements to strategic facilities, cleanliness, information and environment in comparison to the existing situation. The number of rail services that would be implemented to facilitate the new railway station is subject to further assessment, however the establishment of new rail trips within and through the study area would have potential to improve the quality of a traveller's experience with regard to views. The immediate study area and subsequent location of a station is predominantly within an area of high-quality scenic countryside interspersed with ancient woodland, important nature conservation sites, SSSI and conservation areas. Encouraging new trips to be made by rail could therefore improve a traveller's perception of the local scene, as well as throughout the region with the South Wales Main Line predominantly traversing through a rural landscape. An alternative perspective on townscape could also enhance a travellers' interest as part of the rail trip as the route interconnects with urban settlements. It is further anticipated that there would be an improvement with regard to traveller stress following implementation of a new railway station. Whilst the majority of travellers would still require a car to access the station, the potential to reduce journey distances by car could reduce the impact of driver related stress associated with frustration and the fear of potential accidents. In addition, the implementation of a high-quality interchange with good security measures, environment and information provision could alleviate route uncertainty as part of the journey experience, enhancing upon existing access to public transport infrastructure and services. **To facilitate robust accessibility to and from the interchange, the option encompasses a new 724-space car park as illustrated on General Arrangement plan 10028657-ARC-00-XX-DR-CE-00004. A new junction would connect the car park with the unclassified road providing existing accessibility between the Renishaw factory and M4 Junction 34. The Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw.**	++

Location 4 | Existing Renishaw Car Park Site		
	Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. Demand Forecast Scenario 2 (2026 Do-Something Core with Vale of Glamorgan Gateway Station) projects 133,969 per annum would use the station, rising to 216,982 passengers per annum under Demand Forecast Scenario 4 (Do-Something with Vale of Glamorgan Gateway Station + Renishaw Development) assuming local congestion issues at M4 Junction 34 are mitigated. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Accidents	A new railway station is anticipated to reduce the number and distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the station. It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	+
Security	A qualitative assessment of security has been completed against TAG Unit A4.1.4 to assess the security impacts as a result of a new rail interchange facility. The delivery of a high-quality rail and bus interchange with implementation of lighting and CCTV to current design standards would establish robust formal surveillance throughout the station environment, including the Park and Ride facility. It would also be anticipated that a new interchange would be designed so as to maximise the potential for natural surveillance by passengers and staff, further enhancing the perception of safety. Informal surveillance of the station environment would likely be supported by positive use of landscaping features (design layout of planting, for example) to contribute towards visibility and deter intruders. This would be especially pertinent throughout the car park and waiting points so as to minimise the potential for hidden and screened areas to essentially improve users' perception of safety on site when leaving their vehicles. In addition, it would be anticipated that the new station would be designed with clearly marked site perimeters and well-lit, secure entrance points ensuring wayfinding and accessibility throughout the station is not compromised. Current station design standards would carefully consider the requirements of effective lighting whilst ensuring that daytime lighting enhances the station environment. Robust lighting provision would ensure that bi-lingual signage and information/ help (emergency) points are well-lit at all times, as well as reduce the potential for adverse shadows that could affect the integrity of CCTV coverage. Whilst not specifically noted as part of the TAG Unit A4.1.4 assessment, the usability of the station by all passengers is key to ensuring a safe and secure station environment. It is therefore anticipated that a new interchange would subsequently be designed to the latest design standards for accessible railway stations providing full accessibility for disabled passengers in terms of car parking facilities, waiting areas and inter-platform accessibility (lifts/ ramps) for example. Whilst significant benefits have been identified when considered against current local and strategic provision of public transport, a moderate	++

Location 4 | Existing Renishaw Car Park Site		
	impact has been allocated for the overall assessment with a proposed interchange station anticipated to affect between 500 to 10,000 travellers per day. This impact assumption encompasses all travellers who would benefit from the improvements to rail provision at this strategic location, as well as those who would transfer to buses as a consequence of the public transport infrastructure and service enhancements.	
Access to Employment	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the Cardiff City Region, however the option for a Vale of Glamorgan Gateway Station inclusive of bus integration could further improve access to employment by providing interconnectivity to Cardiff Airport and other key local and regional employment areas. Employment sites in the vicinity of Junction 34 (both north and south of the M4) could particularly benefit. Moreover, it could assist in improving access between the Rhondda Valleys/ A4119 corridor and the wider City Region. The degree of benefit would depend on several factors/ variables most notably encompassing the level of rail service that can be provided at the new station, the extent of bus connectivity between the interchange and nearby employment sites, the potential enhancement of the local highway network to facilitate enhanced accessibility, as well as the potential for enhanced employment opportunities resulting from the proposed Renishaw development[7]. The railway station would serve existing residents situated near to M4 Junction 34 and would improve access to employment for those in the immediate area, in conjunction with those travelling from further distances by rail. The Welsh Government PBA report referenced herewith subsequently concludes that *'improving the transport connectivity of the Vale of Glamorgan is considered necessary to support national, regional and local economic performance.'*	++
Access to Services	Rail services within close proximity of the study area (at Pontyclun), already interconnect with the key urban settlements throughout the region, however the option for a railway station inclusive of bus integration could further improve access to services with new and enhanced rail provision establishing enhanced interconnectivity. The extent of local public transport connections would be subject to proposed bus route and timetable options provided to support the interchange facility.	++
Affordability	The rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of a reliable and direct public transport option has the potential to make travel more affordable for some sections of society, most notable the young and elderly (21% of the study area's residents are retired which is greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%) as a whole. This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, public transport services are often unaffordable for some groups within society.	+

[7] Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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.

Location 4 | Existing Renishaw Car Park Site		
	It should be noted that some users may require car travel in order to utilise the railway station.	
Severance	A new railway station is anticipated to reduce traffic flow through Pendoylan and Clawdd Coch with the potential to lessen the impact of severance. In line with TAG Unit A4.1 / Section 5 (Severance Impacts) a slight positive impact is anticipated with less than 200 local residents estimated to benefit from any reductions in traffic flow. It is not anticipated that the railway station would create new severance issues as existing routes and connections will be retained.	+
Option and Non-Use Values	A railway station provides a more viable alternative to journeys currently made by car and increases the resilience of the transport network through the provision of a more sustainable transport network. This would be for local and regional journeys as well as those from further afield.	+++
Cultural		
Cultural Facilities	The proposed railway station establishes the potential for improved accessibility to cultural facilities both local to the railway station (Hensol Golf Academy), as well as throughout the region with enhanced access to museums, theatre halls, cultural centres and leisure complexes particularly at key strategic destinations including Cardiff and Bridgend.	++
Welsh Language	The Vale of Glamorgan Council stated in the Local Development Plan that *'having assessed the densities of Welsh language use across the Vale of Glamorgan it is not considered to be an issue which requires addressing in the Plan. As a result, the proposals contained in the LDP are not considered to have a detrimental impact upon the Welsh language and culture or materially affect the linguistic balance of the Vale of Glamorgan or the communities within the Vale of Glamorgan.'* The Welsh Government has a strategic vision outlined in the *Cymraeg 2050; A Million Welsh Speakers (2017)* to increase the number of Welsh speakers throughout Wales, stating *'The year 2050: The Welsh language is thriving, the number of speakers has reached a million, and it is used in every aspect of life. Among those who do not speak Welsh there is goodwill and a sense of ownership towards the language and a recognition by all of its contribution to the culture, society and economy of Wales.'* The strategy plans to achieve this vision by using three strategic themes including (1) increasing the number of Welsh speakers, (2) increasing the use of Welsh and (3) creating favourable conditions – infrastructure and context. Implementation of a new railway station would require all passenger information, signage and public announcements to be bi-lingual, inherently supporting the Welsh Government's vision.	+
Environmental		
Noise	This review is not yet quantifiable in the absence of quantitative data, but a minor adverse impact is considered reasonable to assume principally as a result of stopping trains at the station, whilst also noting the impacts from short-term construction noise and vibration impacts associated with the new station. There are no Noise Planning Priority Areas within the 2km study area and the number of residential receptors within close proximity of the proposed site is extensively low.	-

Location 4 | Existing Renishaw Car Park Site		
Air Quality	Based upon the 2016 Air Quality Progress Report for the Vale of Glamorgan, the overall air quality across the county complies with regulations to protect human health[8]. There are no Air Quality Management Areas (AQMAs) within 2km of the study area. The impact of construction on managing air quality/ dust would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved air quality.	+
Greenhouse Gases	The impact of construction on managing greenhouse emissions would need to be considered, although the potential transfer of trips from road to rail reducing journey distances by car has the potential to support improved greenhouse emissions per user.	+
Landscape	**The construction of the railway station encompassing a building, car park and footbridge is likely to establish a neutral impact on the local landscape as the development would broadly be constructed on the site of the existing Renishaw car park.** The impact of the development would still benefit from landscape enhanced landscape design/ mitigation around the railway station including the retention or planting of new vegetation. Moreover, good landscape design is needed to mitigate lighting impacts at night. It should however be noted that the M4 corridor, the existing Renishaw buildings/ car park and rail infrastructure are a key part of the existing local landscape pattern.	0
Townscape	Due to the location of the site away from towns and urban areas, the impact on townscape is considered neutral.	0
Historic Environment	There is one Scheduled Monument, nine Grade II Listed Buildings and two parks within the 250m buffer and 500m study area. The Scheduled Monument views could be impacted by the new railway station, however the assets surrounding have already been impacted by the South Wales Main Line, Renishaw complex and M4 corridor. All the other assets would be not impacted by the new railway station as they are either too far away or screened from view. The non-designed assets within the 250m buffer and 500m study area have revealed a low potential for Prehistoric and Roman remains. However, the lack of artefacts and features may be due to the lack of opportunity to recover and record such remains. The archaeological event record is weak within the local study area and can offer little in the way of archaeological potential. The Medieval and Post Medieval period is more apparent with the Scheduled Monument, built heritage and archaeological remains. The walkover survey identified several assets such as non-extant field boundaries which were removed to create larger fields. A review of historic maps revealed that the study area has been severely impacted by the creation of the M4 including Junction 34, the South Wales Main Line, the northern extension to the A4119 and the creation of the Renishaw complex. Any archaeological remains that would have been under the road, railway and industrial units would have been severely impacted by these modern additions to the landscape. **There are no recorded heritage assets within the site, although the site is situated closest to the scheduled monument (SM3) of the four locations appraised. The development is therefore likely to cause**	-

[8] Vale of Glamorgan Council Air Quality Progress Report 2016

Location 4 | Existing Renishaw Car Park Site		
	change to the setting and impact to significance. Also, the potential to impact associated archaeological remains outside scheduled area that may be of equivalent national importance. Proximity to scheduled monument poses risk to granting of permission for development in this location. **There is one modern asset encompassing an earthwork pond adjacent to the railway line and site boundary, and in proximity to the (SM3) scheduled monument. The pond (14) was created due to the removal of the northern arm of the River Ely prior to 1888 due to the creation of the railway. The 1847 Pendoylan and 1843 Llantrisant tithe maps does not show this feature but does show the sinuous northern arm of the river. By the first edition OS map of the area the river has been moved and the feature has been created. These assets are of low significance and have historical significance.** **The Listed Buildings and the two Registered Parks and Gardens (Grade II) are far enough away and screened from view so the impact would be considered neutral.** **The impact to the archaeological resources would be neutral, although there is potential for unknown archaeology of unknown value to be present. Further survey and assessment work would be required during later design stages.**	
Biodiversity	Impacts on Ely Valley will depend on the results of surveys for Monk's-hood along the riverbank and the exact proposals at this location. It is likely that any Monk's-hood could be translocated to reduce impacts. Aerial photography, ground truthing exercise and a Phase 1 survey identified the potential for both important hedgerows and priority habitats including marshy grassland, but this would need to be verified through a Phase Two Botanical survey. Further data including protected species surveys are required and potential mitigation activities should be recommended in an Ecological Impact Assessment. **Semi-natural broadleaved woodland between hardstanding and railway track. Loss of potential priority habitat (woodland). Habitat translocation and/ or mitigation planting would be required, which may require land for offset planting depending on the scheme footprint.** **Loss of connectivity of woodland habitat along railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development.** **Construction buffer to woodland and SINC immediately to the north would need to be in place.** **Habitats present may support protected and priority species, in particular dormouse, bats, badgers, breeding bird and great crested newts (terrestrial phase only).** **The proposal is however mainly located on hardstanding (Renishaw car park) with minimal ecological value and therefore a slight adverse impact is considered reasonable at this location, on the assumption ecological mitigation forms a key design element of the proposal where applicable.**	-
Water Environment	**Land is known to have flooded in the past (Zone B designation in the DAM), although the proposed site is located on land that is predominantly considered to be at low risk of flooding.** **There is one modern asset encompassing an earthwork pond adjacent to the railway line and site boundary, and in proximity to the (SM3) scheduled monument. The pond (14) was created due to**	-

Location 4 | Existing Renishaw Car Park Site		
	the removal of the northern arm of the River Ely prior to 1888 due to the creation of the railway. The 1847 Pendoylan and 1843 Llantrisant tithe maps does not show this feature but does show the sinuous northern arm of the river. By the first edition OS map of the area the river has been moved and the feature has been created. These assets are of low significance and have historical significance.	
Residential Amenity	The impact on residential amenity considers the cumulative impact of air quality, noise and visual intrusion on residential properties. The combined assessment from the above indicates that the properties in the communities of Clawdd Coch and Pendoylan will largely benefit from reductions in traffic through the village.	0
Economic		
Journey Time Changes	The implementation of a new railway station could result in a reduced journey time by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions traffic on the M4, A48 and A4232 given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Journey Time Reliability Changes	The implementation of a new railway station could result in improved journey time reliability by public transport to Cardiff, Bridgend and other strategic destinations, including Cardiff. The implementation of a new railway station is anticipated to result in measurable improvements in journey times due to reductions in congestion on the M4, A48 and A4232, given the transfer of trips to rail/ bus, especially during peak commuter periods. Traffic would, however, be generated on routes to and from the Vale of Glamorgan Gateway Station, therefore the impact on journey time reliability is slight beneficial subject to the potential implementation of highway mitigation to alleviate traffic impacts associated with the railway station and/ or wider development proposals.	+
Transport Costs	Rising cost of transport is resulting in many households struggling to afford to own and run a car. The provision of new public transport options has the potential to make travel more affordable for some sections of society, most notable the young and elderly - 21% of the study area's residents are retired which is much greater than the percentage for the Vale of Glamorgan (16%), South East Wales (15%) and Wales (16%). This is particularly the case if car parking costs at the facility are cheaper than those at the user's desired destination. However, it should be noted that public transport services can be unaffordable for some groups within society, although the provision of linked bus and rail services means they are usable for those without access to a car.	+
Accidents	A new railway station is anticipated to reduce the number/ distance of car-based trips throughout the region. Reduced traffic flows on the strategic highway network has the potential to improve road safety and reduce accidents particularly on the M4, A48 and A4232 routes, but also on the A4119 north of M4 Junction 34, although traffic would be generated on routes to and from the Vale of Glamorgan Gateway Station.	+

Location 4 | Existing Renishaw Car Park Site		
	It is therefore expected that the Vale of Glamorgan Gateway Station will have a slight beneficial impact on accident rates.	
Wider Economic Impacts	It is anticipated that there would be additional wider economic impacts associated with the implementation of a new railway station. This may include induced investment through additional strategic development arising due to improved connectivity to the EZs (existing connections are constraining growth). Moreover, there may be benefits to those larger commercial businesses (such as the airport and Aston Martin) through transport improvements where competitive markets are imperfect. In this case, it will assist by providing an improved level of connectivity for the airport and businesses. There may also be beneficial labour supply impacts by improving connectivity between the employment sites and population centres, notably assisting access to employment from the Rhondda Valleys to the EZ. Whilst the EZ presents a regionally significant opportunity, the labour market catchment of the site is limited by the current transport infrastructure and services. If this issue is not resolved, it may have longer term implications for firms currently located in the Vale of Glamorgan and in terms of the business location decisions of prospective investors. The limited labour market catchment of the EZ currently is also compounded by comparatively poor business-to-business accessibility. Moreover, the accessibility analysis undertaken (as contained in the report in Appendix A) found that relatively modest reductions in journey times to/ from the Vale of Glamorgan would significantly increase the labour market and business-to-business catchment of the EZ. The improvement in accessibility may also bring a relocation of more productive jobs to the area. As a Vale of Glamorgan Gateway Station would improve connections between functioning parts of the Capital Region, there may also be productivity impacts due to agglomeration benefits for the Vale of Glamorgan in terms of linking in developments in the area to similar businesses/ clusters in the region. Moreover, productivity in the Cardiff Capital Region is very low compared to other UK City Regions, so improving connectivity to the Vale of Glamorgan, as well as Rhondda Cynon Taff, may form part of a package of measures to address this (and in part addressing the issue of a lack of appropriate industrial premises).	++
Land and Property	**The Renishaw Development encompasses a privately funded proposal to develop land allocated in the adopted Vale of Glamorgan Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha encompassing B1, B2 and B8 land uses to meet strategic and local employment needs. The LDP site is situated south east of M4 Junction 34 adjacent to the extant Renishaw factory. Renishaw achieved outline planning permission with all matters reserved (except for access) for their proposed Development under application reference 2014/00228/EAO (dated 30 Jul 2015) for development comprising class B1, B2 and 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 site is not affected by the extant Renishaw planning application and whilst the proposal is situated on the extant Renishaw car park, Renishaw have expressed a general preference towards further consideration of this site for development of a new railway station.**	-

Location 4 | Existing Renishaw Car Park Site		
	A slight adverse impact has been retained as the land remains in third party ownership and further consultation with Renishaw would be required to determine future viability of this site location, although there could be opportunity for the rail and Renishaw development to be integrated/ refined to maximise the potential of the site.	
Capital Costs	No firm capital costs are currently available and would be developed as part of a GRIP 3 Option Selection report, although it is anticipated that a new railway station with associated facilities would be of high cost in terms of capital investment. A typical cost is in the order of £25M.	--
Revenue Costs	New revenue costs would have to be established with regard to enhanced rail and bus services. There may be knock on revenue costs on existing services as a result and this would require evaluation.	-

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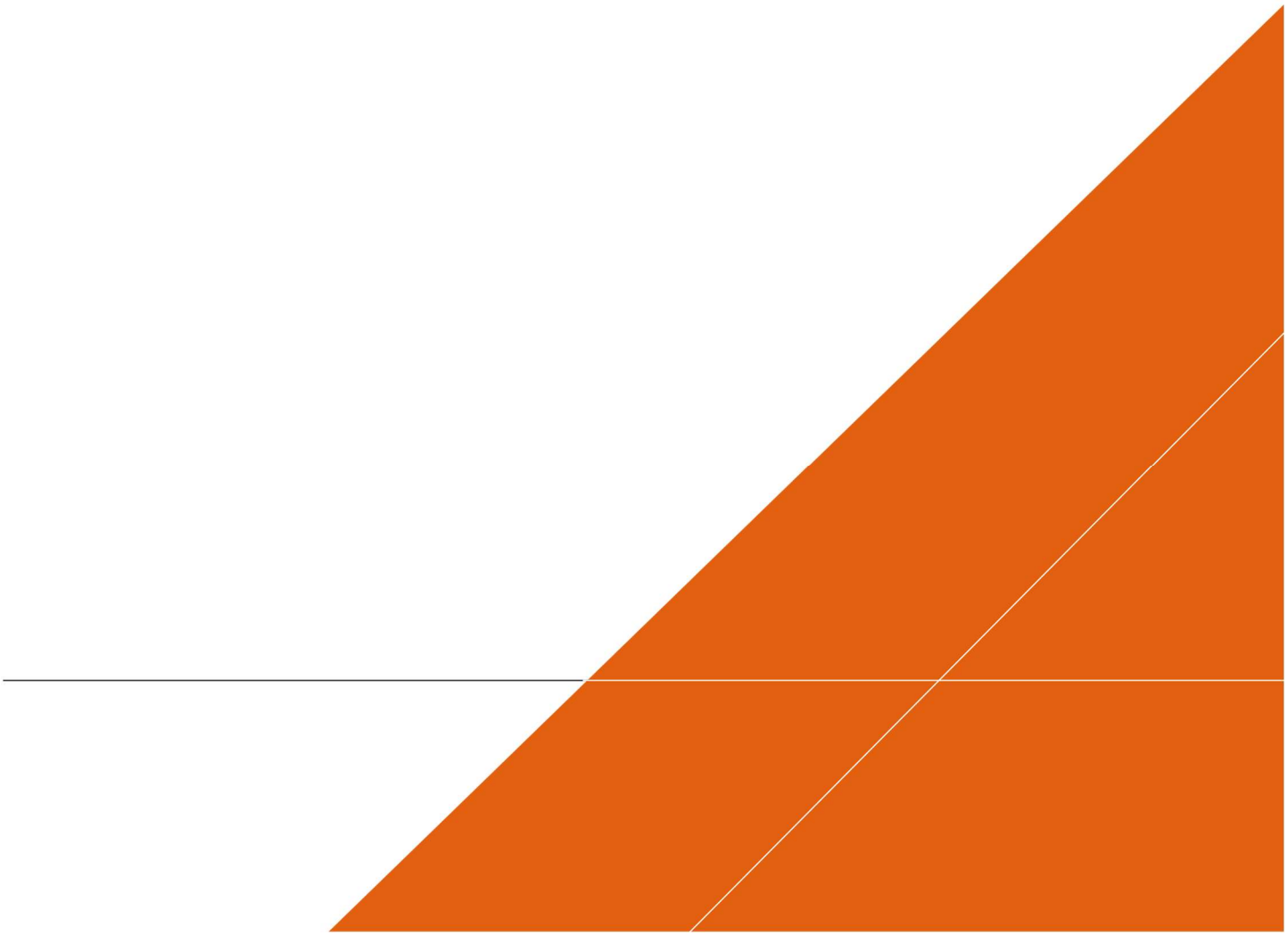
VALE OF GLAMORGAN GATEWAY STATION

GRIP 1-2 Feasibility Report
TfW Stage A

SEPTEMBER 2020



Vale of Glamorgan Gateway Station

GRIP 1-2 Feasibility Report | TfW Stage A

Author	JO
Checker	MF
Approver	JH
Report No	10028657-ARC-00-XX-RP-ZZ-00001
Date	SEPTEMBER 2020

VERSION CONTROL

Version	Date	Author	Checker	Approver	Changes
P01	06/12/2019	ZS Assistant Engineer	JO Design Manager	JL Technical Director	First issue for comment
P02	17/12/2019	DH Senior Engineer	JO Design Manager	JO Design Manager	Updated following client comments
P03	28/02/2020	JO Design Manager	JH Senior Technical Director	JH Senior Technical Director	Updated following Review Group comments
P04	09/09/2020	JO Design Manager	MF Principal Transport Consultant	JH Senior Technical Director	Updated following client comments

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Abbreviations

AHBC	Automatic Half Barrier Crossing
AoD	Above Ordnance Datum
AQMA	Air Quality Management Area
BSA	Basic Service Agreement
BAPA	Basic Asset Protection Agreement
CASR	Cardiff Area Signalling Renewal
CCTV	Close Circuit Television
DAM	Welsh Government's Development Advice Map
DNO	Distribution Network Operator
DfT	Department for Transport
ELR	Engineers Line Reference
FRAP	Flood Risk Activity Permit
FCA	Flood Consequences Assessment
FoC	Freight Operating Company
GGAT HER	Glamorgan Gwent Archaeological Trust Historic Environment Record
GRIP	Governance of Railway Investment Projects
GWR	Great Western Railway
HABD	Hot Axle Box Detector
NR	Network Rail
NRW	National Resources Wales
MAGIC	Multi-Agency Geographic Information for the Countryside
OS	Ordnance Survey
OWC	Ordinary Watercourse Consents
PHCC	Points Heating Control Cubicle
PRoW	Public Right of Way
RIBA	Royal Institute of British Architects
ROGS	The Railway and Other Guided Transport Systems (Safety Regulations)
S&C	Switches and crossings
SAC	Special Areas of Conservation
SEWBReC	South-East Wales Biodiversity Records Centre
SEWTM	South East Wales Transport Model
SLA	Special Landscape Area
SINC	Site of Interest for Nature Conservation
SSSI	Site of Special Scientific Interest
SWCC	South Wales Control Centre
SWM2	South Wales Mainline 2
TAN	Welsh Government's Technical Advice Note
TfW	Transport for Wales
TOC	Train Operating Company
TPO	Tree Preservation Order(s)
TSI	Technical Specifications for Interoperability
TVM	Ticket Vending Machine
VDU	Visual Display Unit
WG	Welsh Government

TfW Plan of Works Comparison Table

	Initiate		Choose Options	Design			Build	Close	
TfW Plan of Works	**Stage A** Output Requirements and Options		**Stage B** Options Development and Selection	**Stage C** Preliminary Design	**Stage D** Statutory Process	**Stage E** Detailed Design	**Stage F** Construction, Commission and handover	**Stage G** Close Out	
Network Rail GRIP	**GRIP 1** Output Definition	**GRIP 2** Feasibility	**GRIP 3** Option Selection	**GRIP 4** Single Option development		**GRIP 5** Detailed Design	**GRIP 6** Construction, Test and Commission	**GRIP 7** Scheme Hand back	**GRIP 8** Close out
WelTAG	**Stage 1** Strategic Case		**Stage 2** Outline Business Case	**Stage 3** Full Business Case			**Stage 4** Implementation		**Stage 5** Post-Implementation
Highways-Infrastructure	**Stage A** Output Definition		**Stage B** Design Development	**Stage C** Preliminary Design (Pre-planning) Stage 1 Road Safety Audit	**Stage D** *Developed Design & Assessment , DAS, Planning Application*	**Stage E** Detailed Design Highway-Drainage Approvals (S278/ S104), Stage 2 RSA	**Stage F** Construction, and handover (Stage 3 Road Safety Audit)	**Stage G** Close Out	

Executive Summary

The Vale of Glamorgan Gateway Station is a proposal for a new transport interchange/ parkway development located near Junction 34 of the M4, close to Miskin and Hensol. The South Wales Mainline has two running tracks (ELR SWM2 179m 27ch) and at this location features the 'Miskin Loops', which provide two additional tracks (four tracks in total). The purpose of the loops is for freight trains to wait while faster passenger services overtake.

The aim of this Study was to review the suitability of the Miskin Loops for the new railway station and develop a GRIP 1-2/ TfW Stage A report to determine requirements and feasibility. The provision of a Vale of Glamorgan Gateway Station has the subsequent potential to bring substantial sustainable travel benefits at a regional scale, particularly focussed on the M4 corridor and communities throughout south east Wales, and whilst embracing the Metro is one of several key factors already identified as needed to connect the region, facilitating enhanced transport accessibility through implementation of additional flagship initiatives (such as the Gateway Station) could further help address the issue of existing low levels of productivity.

Connectivity is seen by the region as critical towards boosting sustainable productivity and prosperity over the longer-term. Supporting development of a prosperous, sustainable economy, as well as enhanced accessibility to social facilities and services, is an approach promoted by national, regional and local policy with a common vision towards increased reliance on sustainable forms of travel including public transport, walking and cycling. And where there is opportunity to enhance the transport network interconnecting southwards within the Vale of Glamorgan (outside the scope of this study), then this would offer additional local and regional benefits for residents and businesses.

To support the appraisal, an initial demand forecasting exercise has been completed with a Vale of Glamorgan Gateway Station forecast to generate up to circa 172,000 new rail trips per annum, assuming local M4 Junction 34 congestion problems are mitigated. The total demand (new plus existing from other stations) indicates up to circa 217,000 trips per annum, based on the assumptions of the forecast and local TfW services only. If London bound services were also to stop at the railway station the demand would considerably increase. A number of external factors have been identified that may also affect the potential demand for the station and it will require local and regional consideration to determine the full demand analysis at the next stage of WelTAG appraisal.

An initial timetable study has concluded that significant amendment of the timetable would be required to facilitate station calls at the new station, as the additional required time cannot be absorbed by the current planning margins and turn rounds. The new station is likely to add at least four minutes to those services that would stop at the station. The goods loops also provide additional resilience and redundancy for the railway, which may be affected by utilisation of them for the new station. A further timetable study will be required once operational assumptions are defined with key stakeholders. Whilst several key timetable issues have been highlighted at this early stage of the analysis, more detailed engagement with both Network Rail and TfW will be taken forward to confirm all viable opportunities available for the proposed station.

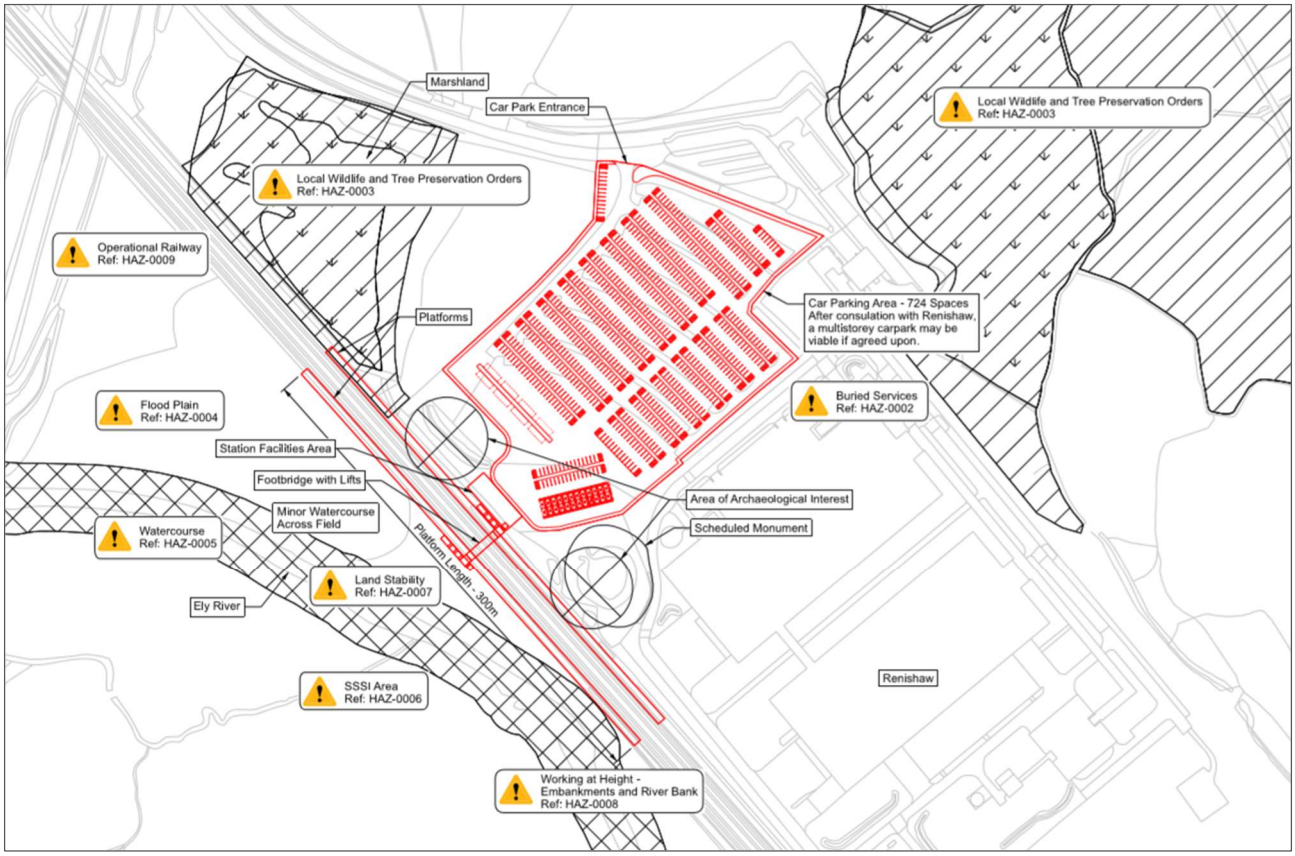
The Vale of Glamorgan Gateway Station has two main design options, a minimum and a desired. The minimum station would be unstaffed, have two platforms each approximately 130m long, connected by a footbridge with lifts, waiting shelters and car parking for up to 500 spaces. A desired/ future proofed station would be staffed, have two sheltered/ canopied platforms approximately 300m long, connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1,000 vehicles.

Ownership of the new railway station and its facilities will need to be decided, determining whether TfW will own and operate the station or by default Network Rail will own the station and infrastructure, with the Vale of Glamorgan Council owning and operating the car park. The management case will need to be developed through close consultation with key stakeholders.

Four locations along the Miskin Loops have been assessed with Location 4 considered the most feasible solution reviewed, which proposes a multi-storey car park on the existing Renishaw staff car park. Whilst further consultation would be required with Renishaw, initial talks have been constructive and indicated they are open to a potential multi-storey car park solution to facilitate the station's development. The potential wider benefits for the proposed Renishaw development could be substantial following the implementation of

a railway station. Such benefits could be realised with regard to commercial land/ property value and sustainable accessibility with all parts of the proposed development within reasonable walking distance of all four station location options.

Vale of Glamorgan Gateway Station | Feasibility General Arrangement Location 4



Renishaw do retain privately funded proposals to develop land surrounding Location 4 under application reference 2014/00228/EAO. Having already secured outline planning permission, their proposals are ahead in terms of planning and equivalent RIBA design stages. The integration of proposals would need to be agreed in advance as the Renishaw development is likely to be implemented ahead of any potential station development.

As the station will impact on Network Rail infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From an engineering perspective, the scheme is considered feasible based on existing information available for this study, although further development of design options will evolve the business case, including further clarity regarding the funding mechanisms that could be available to facilitate development.

Proposals for a new station require further, more detailed technical feasibility work as part of a GRIP Stage 3/ TfW Stage B Option Development and Selection appraisal encompassing an economic value for money exercise. A significant timetable study will be required to review all the services that travel through the area, although it is positive that the principle of a new station in the Miskin area is incorporated into the new rail franchise. There were some comments made by stakeholders that it would be appropriate to retain the option of a bus Park and Ride at Junction 34. This might be best considered as part of ongoing discussions surrounding the Vale of Glamorgan Gateway Station.

In summary, the Vale of Glamorgan Gateway Station has large potential. The new station will be in close proximity to a key motorway junction giving it a strategic location close to existing and potential areas of population. With the potential for new strategic road infrastructure/ enhancements (subject to separate WelTAG appraisals) in addition to existing provision, the station could be extremely well connected to the Vale of Glamorgan, Rhonda Cynon Taff and the M4 corridor. The station will offer quick direct trains into

Cardiff city centre with a journey time of just 10 minutes. The scheme is likely to be of regional importance due to the location and potential for significant benefits to the South Wales area and will need general consensus from local authorities and Welsh Government.

The recommended next steps are as follows:

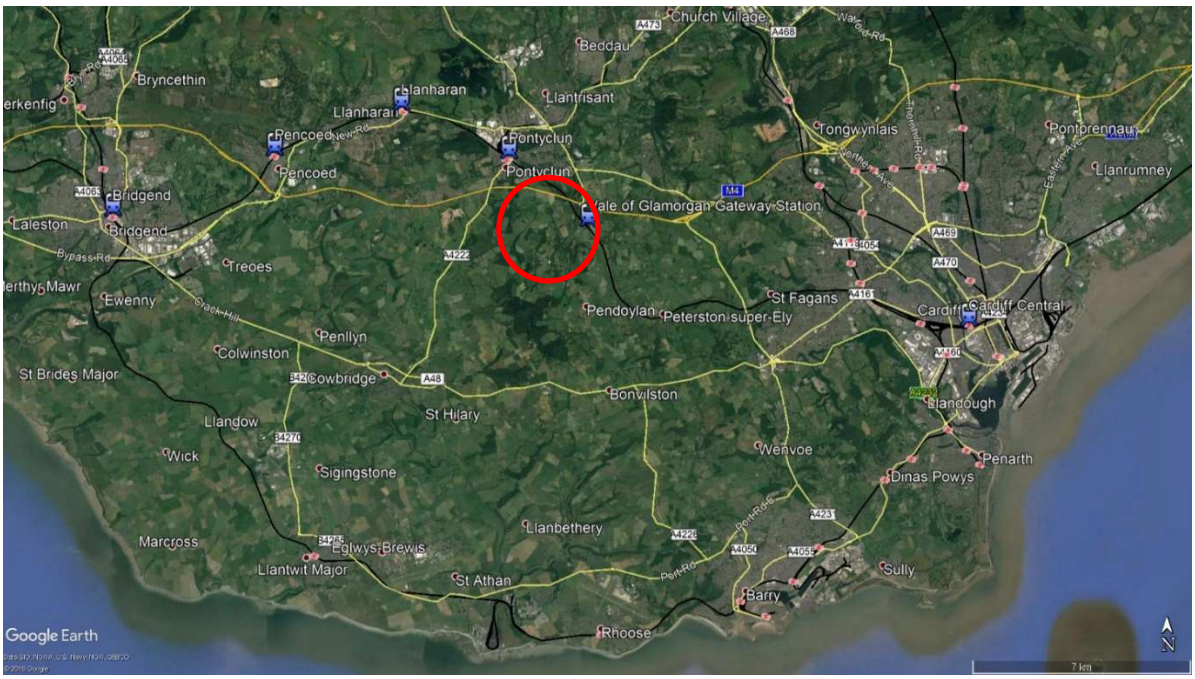
- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise.
- Consideration given to an additional solution to be developed (as an alternative option, with potentially fewer constraints).
- Stakeholder engagement and general consensus, to determine likelihood of external factors.
- Additional demand forecasting (dependent on external factors) route origin/ destination reviews including additional detail on traffic impact within the Vale of Glamorgan road network.
- Detailed timetable analysis, including Goods/ Freight Services, and resilience/ redundancy review in the rail network.
- Cost estimation.
- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).
- Network Rail Governance for Railway Investment Projects (GRIP) Product Deliverables.
- Submission of GRIP 1-2/ TfW Stage A to be brought in line with GRIP Product Deliverables.
- GRIP 3/ Stage B – Option Development and Selection.

1 Introduction

1.1 Overview

1.1.1 The Vale of Glamorgan Gateway Station is a proposal for a new transport interchange to be located near Junction 34 of the M4, near Hensol. The railway station would be strategically located near to the M4 and A4119 corridors to be easily accessible for commuters and leisure travel to destinations on the rail network including Cardiff and Bridgend. Moreover, if separate proposals for an improved highway link to the A48 are taken forward, it could also have bus services from the station to Cardiff Airport, the Enterprise Zone and other strategic employment opportunities.

Figure 1 Location Plan

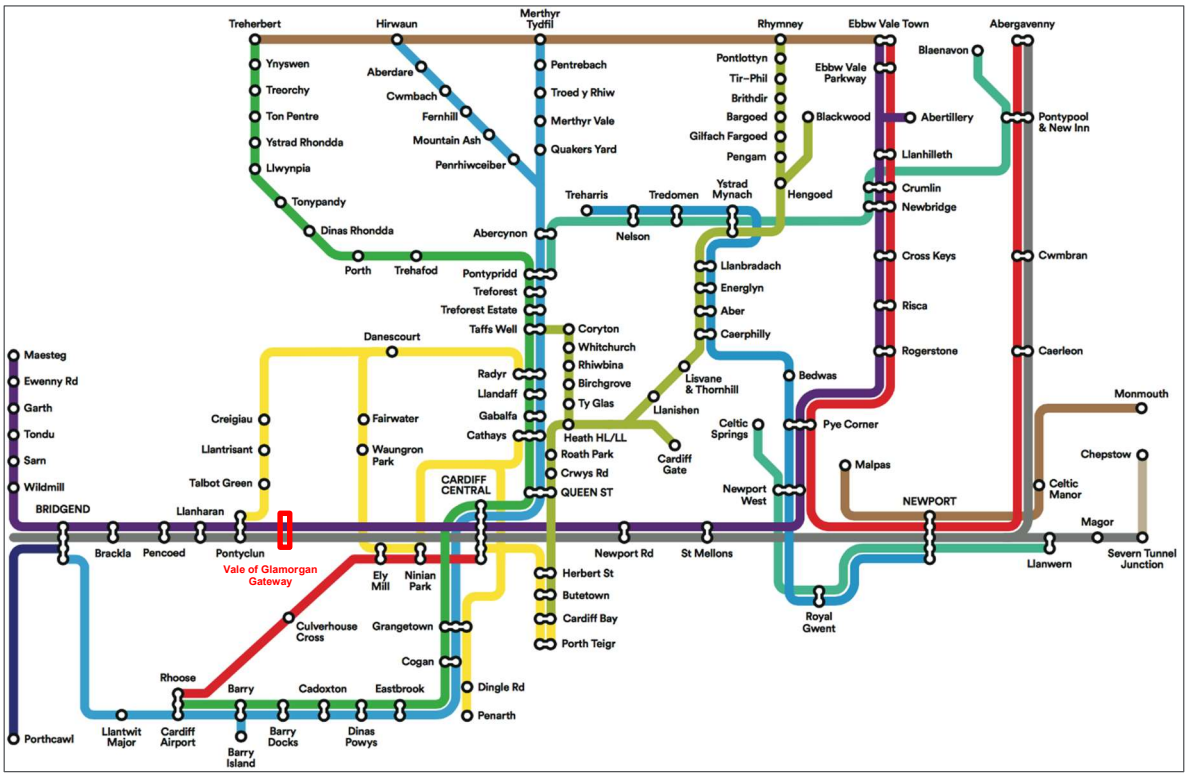


1.1.2 The railway station will offer direct trains into Cardiff, with an expected journey time of 10 minutes. The new station would be located on the South Wales Mainline (SWM2), approximately 9 miles away from Cardiff Central, and 11 miles from Bridgend Station. Figure 2 shows the location of the station on the rail network.

Table 1 Location Information

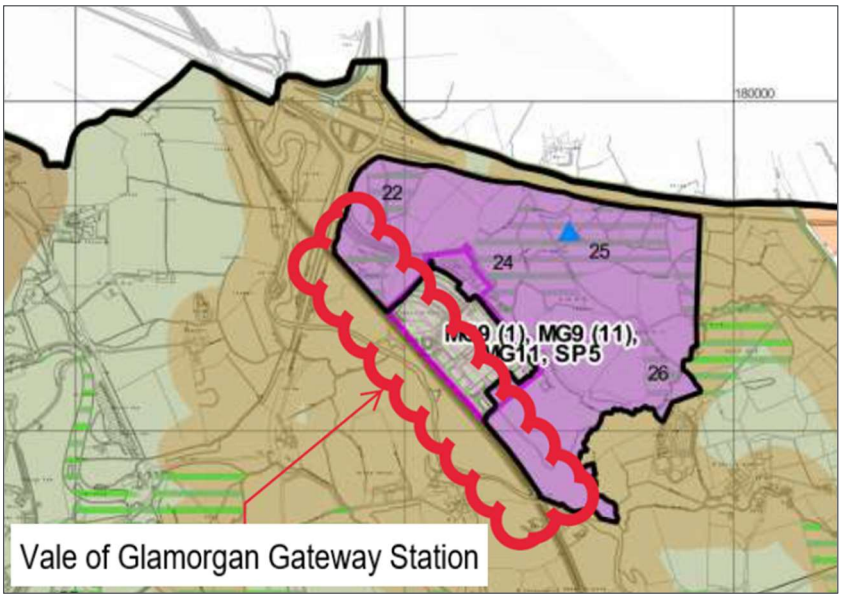
Feature	Location
Google maps approximate location	https://google/maps/vmzFAYJx3QW685r97
Engineers Line Reference (ELR) (Distances from route origin, Paddington Station)	Between SWM2 178 miles 1614 yards and 179 miles 1348 yards
M4	Junction 34
National Grid Reference	ST059792

Figure 2 South Wales Metro Map



1.1.3 The area identified for the railway station (as shown in Figure 3) is allocated in the adopted Local Development Plan under policies SP5 (employment requirements) and MG9 (employment allocations) for a total of 61.8ha of land for B1, B2 and B8 uses to meet strategic and local employment needs. It is situated adjacent to the Renishaw Factory. The area was identified as appropriate for the railway station given the proximity to a four track section of the railway, which would enable trains stopped at the station to be passed by through trains on the Great Western Mainline, together with good accessibility from Junction 34 of the M4 and the development land as set out above.

Figure 3 Adopted Vale of Glamorgan Local Development Plan (2011-2026)



1.2 Scheme Definition & Scope

1.2.1 The scheme definition and scope has been arrived at through consultation with Vale of Glamorgan Council and key stakeholders (Welsh Government and TfW) as follows:

- A new Vale of Glamorgan Gateway Station with park and ride facilities located off Junction 34 of the M4.
- A minimum of 500 car parking spaces with the ability to extend to 1,000 car parking spaces.
- Provision of a station interchange access/ approach road.
- Platform Length to meet aspirations to accommodate all rolling stock including GWR Intercity (10 cars) (For this Study, 300m of platform has been provided).
- Station buildings including entrance, canopy, waiting room/ shelter to meet the requirements of Disability Discrimination Act (DDA).
- Provision of a footbridge with lifts for better accessibility and in compliance with DfT standards.
- Provision of facilities for sustainable travel such as cycle parking/ lockers and bus services.
- Ultra-Low Emission Vehicle (ULEV) infrastructure including opportunity for renewable energy and Digital.
- Station to be designed in accordance with DfT Accessible Railway Stations Design Standards[1].
- Ensuring the well-being goals of the Well-being of Future Generations (Wales) Act 2015 are considered throughout the process.

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

1.3.1 The Well-being of Future Generations (Wales) Act (Welsh Government, 2015) strives to improve the social, economic, environmental and cultural well-being of Wales. The Vision is that *'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 deliver a joined-up approach. The well-being goals to represent what the long-term economic, social and environmental well-being of Wales are shown in Table 2 and the five ways of working as set out within the Act are shown in Figure 4.

Table 2 Well-being of Future Generations (Wales) Act – Well-being Goals

Goal	Description of the Goal
A prosperous Wales	An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
A resilient Wales	A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change).

[1] https://www.gov.uk/government/publications/accessible-railway-stations-design-standards

Goal	Description of the Goal
A healthier Wales	A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
A more equal Wales	A society that enables people to fulfil their potential no matter what their background or circumstances (including their socio-economic background and circumstances).
A Wales of cohesive communities	Attractive, viable, safe and well-connected communities.
A Wales of vibrant culture and thriving Welsh language	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.
A globally responsible Wales	A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

Figure 4 Well-being of Future Generations (Wales) Act – Five Ways of Working[2]

Five Ways of Working

1.3.2 This section provides an overview of how the approach and proposals set out in this report evidence the Five Ways of Working and support the Well-being goals set out in the Future Generations of Wales Act 2015. The WelTAG guidance (which can be considered similarly applicable for the GRIP 1-2 Study) states it is required *'to ensure the needs of future generations are considered and understand how well they help public bodies to meet the well-being objectives and maximise their*

[2] http://futuregenerations.wales/about-us/future-generations-act/

contribution to each of the seven goals.' Consideration should be given to long-term challenges, trends, opportunities, as well as integration, collaboration, involvement and preventing problems from occurring or getting worse.

Long Term

1.3.3 The Impacts Assessment Report (IAR) which accompanies the Stage Two Outline Case Report for the M4 Junction 34 to A48 Study provides the evidence of both current and future problems, trends and opportunities in the study area[3] to inform consideration of the long-term perspective and the development of options.

1.3.4 Improvements are needed to address the congestion and road safety issues associated with the M4 corridor and key connections to the A48 and the subsequent impacts on the economy, access to education, jobs and services, health and the environment.

1.3.5 Current traffic congestion and connectivity issues will be exacerbated in the future with traffic growth. The development of a new Gateway Station close to the M4 offers a substantial long-term solution by encouraging sustainable travel and reducing road-based journey lengths.

Prevention

1.3.6 The rail station under consideration offers the opportunity to prevent as far as possible the future problems and trends from occurring, through a substantial enhancement in public transport.

1.3.7 Moreover, this GRIP 1-2 report seeks to identify the potential deliverability risks to aid decision making and prevent long term liabilities for public money by considering all of the issues at the outset.

Integration

1.3.8 The rail station options under consideration involve the integration of active travel, rail and bus modes together with the highway network. The study has been undertaken in an integrated manner to consider and take account of other schemes and proposals through discussion with stakeholders as well as integration with adjacent studies.

Collaboration

1.3.9 In undertaking the study, there has been collaboration between departments within the local authority, with Welsh Government and TfW, between stakeholders and between Arcadis and other consultants working on adjacent projects influencing the study area issues and solutions.

Involvement

1.3.10 The WelTAG Stage Two study which led to further consideration of the railway station proposal involved stakeholder workshops and consultation with the public. A good level of response was received through the engagement process and strong support for a new station.

1.3.11 Early development of the Vale of Glamorgan Gateway Station (formerly Parkway Station) option (plus highway options) has been subject to a series of Review Group meetings as part of the original WelTAG Stage One and Stage Two studies completed. These meetings are referenced as follows:

- WelTAG Stage One Strategic Outline Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th November 2017.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 16th January 2018.
- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 27th March 2018.

[3] https://www.valeofglamorgan.gov.uk/Documents/Our%20Council/consultation/J34-to-A48/WelTAG-Stage-Two-M4-A48-Impacts-Assessment-Report-D03.pdf

- WelTAG Stage Two Outline Business Case (Improving Strategic Transport Encompassing Corridors from M4 Junction 34 to the A48) | Review Group Meeting 2nd October 2018.

1.3.12 The GRIP Stage 1-2 Feasibility Report/ TfW Stage A has subsequently been reported to the project Review Group on 9th January 2020 and these considerations have been taken into account in this report. The Review Group brought together key stakeholders to oversee the studies and included representatives of the Cardiff Capital Region and the neighbouring authorities.

Well-being Goals

1.3.13 The contribution of a new railway station to well-being goals will be further considered in a subsequent Outline Business Case report for the scheme.

1.4 Report Structure

1.4.1 The remainder of the report comprises the following sections:

- Chapter 2 – Environmental Constraints
- Chapter 3 – Demand Forecasting
- Chapter 4 – Initial Timetable Review
- Chapter 5 – Station Requirements
- Chapter 6 – Site Location Feasibility Review
- Chapter 7 – Summary

2 Environmental Constraints

2.1 Introduction

2.1.1 A desk-based study to identify the environmental considerations has been undertaken to inform the feasibility study. This has been based on mapping associated with the Local Development Plan (LDP) (2017) and has been informed by web-based searches using the following sources:

- Multi-Agency Geographic Information for the Countryside website (MAGIC).
- Historic Wales – Portal for historic environment information in Wales.
- Lle Geo-Portal.
- Cadw - Historic Landscapes.
- Glamorgan Gwent Archaeological Trust Historic Environment Record (GGAT HER).
- Natural Resources Wales' Flood Risk Map Viewer.
- Extrium Wales Noise and Air Quality Viewer.
- Air Quality Management Areas Interactive Map.
- Vale of Glamorgan GIS datasets.

2.1.2 Most of the study area currently comprises agricultural land dissected centrally by the existing Railway. The River Ely meanders through the land to the west of the railway while an industrial site (Renishaw) occupies approximately half of the study area located to the east of the railway. The environmental constraints from the above data sources are presented in the Environmental Constraints Plan (Appendix A).

2.2 Ecology and Nature Conservation

2.2.1 The ecological features of importance to the proposed scheme have been presented in relation to the following two categories:

- The **study area** which refers to a 500m radius buffer around the proposed passing loop.
- The **2km search area** which refers to a 2km radius buffer around the proposed passing loop.

2.2.2 A desk study was undertaken in order to identify any existing ecological information relating to the study area and the 2km search area. The Multi-Agency Geographic Information for the Countryside (MAGIC) website[4] was used to search for statutory designated nature conservation sites within the 2km search area; the search area was extended to 10km for Special Areas of Conservation (SACs) designated for bats.

2.2.3 The South-East Wales Biodiversity Records Centre (SEWBReC) was consulted in February 2019 to request records of local nature conservation sites and of protected/ notable habitats and species within the 2km search area. This included a request for records of Priority Habitats and Priority Species, as listed within Section 7 of the Environment (Wales) Act 2016[5].

2.2.4 The Natural Resources Wales (NRW) Ancient Woodland Inventory Map[6] was reviewed in February 2019 in order to identify areas of ancient woodland, including Ancient Semi-Natural Woodland (ASNW), Restored Ancient Woodland Sites (RAWS) and Plantation on Ancient Woodland Sites (PAWS), within the 2km search area.

[4] MAGIC, 2014: Magic Interactive Mapping Application. Available from http://www.magic.gov.uk/MagicMap.aspx [Accessed online in January 2019].

[5] The Environment Wales Act (2016). Her Majesty's Stationery Office

[6] Natural Resources Wales, 2011. Ancient Woodland Inventory 2011 Data Set. Available from http://lle.gov.wales/map#m=-4.83334,51.90838,14&b=europa&l=60 [Accessed Online in January 2019].

2.2.5 The Vale of Glamorgan GIS data set was searched for Tree Preservation Orders (TPOs) within the 2km search area.

2.2.6 An extended Phase 1 habitat survey was undertaken by Arcadis Ecologists in July 2019. Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types, but there was no attempt to compile exhaustive species lists. Habitats were assessed for their potential to support protected/ notable species of fauna and observation was made of any incidental signs of protected/ notable species. Where access was restricted or refused by landowners, habitats were assessed using a combination of viewing from public footpaths or public roads and supported by aerial imagery. It must be noted that certain features may not have been visible (e.g. ponds in the corners of fields overtopped by trees) and areas which could not be surveyed have been identified and presented on the Phase 1 Habitat Survey Plan in Appendix B.

2.2.7 A number of important ecological features have been identified within the study area, presented in the Ecological Constraints Plan (Appendix C). The railway track crosses the Ely Valley Site of Special Scientific Interest (SSSI) and there are seven Sites of Interest for Nature Conservation (SINC) within the study area. Six groups of Tree Preservation Orders (TPOs) are present within the study area. One area of Ancient Semi-Natural Woodland (ASNW) and one Restored Ancient Woodland Site (RAWS) are present within the study area. There are also a number of priority habitats (woodland, marshy grassland, and ponds) and the potential presence of protected and priority species within the study area.

2.2.8 A total of two SSSIs, 35 SINCs, 96 TPOs and 73 ancient woodland sites, including ASNWs, RAWS and Plantation on Ancient Woodland Site (PAWS), are present within the 2km search area. The locations of the SSSIs, SINCs, TPOs and ancient woodland sites are presented in the Ecological Constraints Plan (Appendix C).

2.2.9 The desk study returned records of a number of protected and priority species including three floral species (e.g. *Parmotrema perlatum* (a lichen)), 17 terrestrial and aquatic invertebrate species (e.g. golden-ringed dragonfly *Cordulegaster boltonii*, short-winged cone-head *Conocephalus dorsalis*), numerous bird species (e.g. fieldfare *Turdus pilaris*, spotted flycatcher *Muscicapa striata*, starling *Sturnus vulgaris*), five bat species (e.g. common pipistrelle *Pipistrellus pipstrellus*, otter (*Lutra lutra*) and dormice (*Muscardinus avellanrius*) within the 2km search area.

2.2.10 The Phase 1 Habitat Survey recorded a range of habitats within the study area, summarised in the Phase 1 Habitat Survey Plan and Target Notes in Appendix B.

2.2.11 The dominant habitat type was improved grassland with large sections of semi-improved neutral grassland, marshy grassland and broadleaved woodland (both plantation and semi-natural). Smaller sections of amenity grassland, scattered trees, scrub, tall ruderal, running water, standing water, intact hedges, invasive non-native species and buildings were also recorded within the study area.

2.2.12 The key ecological constraints to the proposed development in the study area are:

- **River Ely SSSI south of the railway –** appropriate construction buffers would need to be implemented to the SSSI boundary and riverbank. Any works within the SSSI boundary would need assent from Natural Resources Wales and a method statement to protect designated features agreed. Pre-construction checks for otters Lutra within 30m of the riverbank should be undertaken. Pollution prevention guidelines to protect water quality of surface and ground waters would need to be followed during construction and lighting mitigation to retain the river as a dark corridor put in place.
- **SINCs and TPOs north of the railway –** works should avoid or minimise impacts to these areas to avoid damaging priority habitats (woodland, marshy grassland, ponds). If works in the SINCs cannot be avoided a detailed botanical survey would be required to identify the plant communities within the SINC and design appropriate mitigation measures to ensure no net loss of biodiversity. Construction would need to follow sensitive vegetation clearance and habitat translocation, or compensatory planting may be required to provide an area of habitat of the same or greater area.

- **Potential for protected species –** the habitats present are considered to have the potential to support otters, bats (foraging and roosting), dormice, badgers, nesting birds, great crested newts Triturus cristatus and reptiles.

2.2.13 Surveys are recommended to assess habitats in more detail, and surveys for protected species would be required to inform planning for the proposed development. At this stage it is anticipated that the following surveys would be required, but the scope would vary between options and would need to be agreed in consultation with the Vale of Glamorgan Council Ecologist and Natural Resources Wales (NRW):

- Extended Phase 1 habitat survey of areas which have not yet been accessed.
- Phase 2 botanical surveys.
- Terrestrial & aquatic invertebrate surveys.
- Environmental DNA survey and Habitat Suitability Index assessment for great crested newts in waterbodies within 250m of proposals.
- Breeding bird and barn owl surveys.
- Bat roost (trees and buildings) and activity surveys.
- Water vole and otter surveys.
- Dormouse surveys (nest tube and nut search).
- Badger surveys.
- Fish survey (may be needed if there are direct impacts to the River Ely).

2.3 Heritage

2.3.1 A desk-based review of heritage assets located within the study area has been undertaken using data on designated heritage assets obtained from the Lle Geo-Portal website, which provides data from Cadw, and non-designated heritage assets from the GGAT HER.

2.3.2 There is one statutory designation within the study area, the scheduled monument of Felin Isaf Castle Mound (reference number GM370). This is located immediately north of the railway line and west of Renishaw Factory, in a partially wooded area bordered to the north by the factory car park. The scheduled monument comprises the remains of a medieval motte (mound) and surrounding ditch. It is of national importance for its potential to enhance knowledge of medieval defensive practices and is well preserved with significant archaeological potential.

2.3.3 There are four non-designated heritage assets recorded by GGAT HER within the study area. To the north of the railway line and south east of M4 junction 34 is the site of a pond recorded on the 1st edition Ordnance Survey (OS) map (04389s), it is unclear whether the pond is still extant. To the south east of this, also to the north of the railway, is the earthwork remains of another pond recorded on the 1st edition OS map (04318s). Further south east and immediately adjacent to the north of the railway line and south west of Renishaw Factory is the route of a former watercourse recorded on the 1st edition OS map (04388.0s). In the south of the study area, to the west of the railway line is an earthwork of a semi-circular ditch (01480s), which was rejected as a moated site and is thought to be a possible orchard ditch. These four non-designated assets are of local importance as they illustrate the historic landscape and past agricultural use of the landscape in this area.

2.3.4 To the north west of M4 junction 34 is the grade II registered park and garden at Miskin Manor, which comprises a landscape park, Victorian and Edwardian pleasure grounds and a walled kitchen garden. The park and garden are of regional/ national importance. The essential setting of the park and garden is located to the west and north of the park, adjacent to the M4 and A4119 respectively and outside the study area.

2.4 Landscape

2.4.1 The study area (with the exception of the area north of the M4 motorway) falls within the Ely Valley & Ridge Slopes Valley 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.

2.4.2 The Ely Valley & Ridge Slopes Valley SLA is designated for its predominantly lowland rolling landscape with the Ely River valley running through it from north to south-east. The majority of the lowland valley floor is flood plain. The area is very flat with a sense of openness and contains the meandering River Ely towards its centre with a rectilinear pattern of drainage ditches running into the river. The highest point is approximately 55m Above Ordnance Datum (AOD) in the north towards Llanerch Farm. The landcover is dominated by a mosaic field pattern of pastures bounded by hedgerows.

2.4.3 Some fields are very small and narrow and overall, the field size is no more than medium size. Settlement is sparse with only a few scattered farms within the study area. There is riparian vegetation which defines the path of the River Ely and there are areas of severely fragmented woodland. The M4 is located to the north of the study area and the Cardiff to Bridgend railway line runs along the valley floor.

2.4.4 To the north-west, the landscape is one of lowland valleys and hills, forming the upper reaches of various tributaries that flow into the Thaw and Ely valleys. The study area has high scenic, but low habitat value, the landscape includes semi-natural broadleaf woodland, improved grassland, arable and amenity grassland[7].

2.4.5 The extensive woodland around the station site north of the railway line is a key landscape feature although is not designated as ancient woodland. It screens the site from the M4 and provides integration into the surrounding landscape.

2.5 Noise and Air Quality

2.5.1 There are no Air Quality Management Areas (AQMAs) or Noise Planning Priority Areas located within 2km of the study area.

2.6 Public Rights of Way

2.6.1 There are four Public Rights of Way (PRoW) located within the study area (Environmental Constraints Plan Appendix C). These are found to the south west of the River Ely.

2.7 Ground Conditions

2.7.1 A high-level desk-based review of publicly available information has been undertaken to inform this feasibility report.

Topography

2.7.2 Ground levels across the study area range from approximately +28m to +32m Above Ordnance Datum (AOD), with the land to the west of the existing railway line being lower than the east.

Historical Land Use

2.7.3 A review of historical Ordnance Survey maps available on the Old Maps Website[8] has been completed. The available maps (dated 1877 through to 1992) indicates that the study area has remained agricultural land since the first available published map. The railway was shown present on the first available published map (1877). The sewage works, located approximately 300m west of the

[7] LDP Special Landscape Areas Integration with Adjoining Authorities Update 2013 - https://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP-2013/37_LDP_Special_Landscape_Areas_Integration_with_Adjoining_Authorities_Update_2013.pdf

[8] Old Maps Website 2019 - https://www.old-maps.co.uk

study area is first shown on the 1942 map while the M4 motorway, located approximately 300m north of the study area, is first shown on the 1974 map. The industrial site present to the east of the railway is first shown on the 1992 map.

Radon

2.7.4 The Public Health England website[9] indicates the study area is in an area where 3 to 5% of properties are at or exceed the Radon Action Level.

Geology

2.7.5 The 1:50,000 scale British Geological Survey (BGS) Geological Map (Sheet No. 262) for Bridgend indicates most of the study area is underlain by Superficial Deposits of Alluvium (comprising clay, silt, sand and gravel). The area northeast of the railway line is shown to be underlain by Glacial Till. The map further indicates that the solid geology underlying the study area is the Llanishen Conglomerate (comprising Conglomerate interbedded with Sandstone). A fault, trending northeast to southwest, is located approximately 500m west of the study area and coincides with the axis of the Ely Valley.

Mining

2.7.6 The study area is not located within a Coal Mining Reporting Area. There is no evidence of historical mines or quarries located in the study area on the available historical maps.

Unexploded Ordnance

2.7.7 The Zetica Risk Map[10] indicates the study area is located in an area designated as having 'Low' (15 bombs per 1000 acres or less) risk of Unexploded ordnance (UXO).

Ground Conditions | BGS Boreholes

2.7.8 The BGS Geoindex Onshore website[11] indicates that there are four exploratory holes located within the study area.

Table 3 Summary of Ground Conditions from Available Exploratory Holes

Top Depth (m bgl)	Base Depth to (m bgl)	Thickness (m)	Stratum Name	Typical Stratum Description
GL	0.30	0.30	Topsoil	Soft to firm brown sandy CLAY.
0.30	1.50-5.10	1.20-4.80	Alluvium (Cohesive)	Soft sandy CLAY
1.50-5.10	5.10 – 10.00	3.00-8.10	Alluvium (Granular)	SAND or GRAVEL with boulders.
5.10-10.00	7.60->11.2	>2.4 (base not proven)	Glacial Deposits (Cohesive)	Stiff to hard sandy CLAY, locally with boulders.

2.7.9 The ground conditions recorded in the available exploratory holes are in general similar to that shown on the geological mapping. No groundwater data is presented on the available exploratory hole records. Noting that the site is located adjacent to the River Ely and that there are many areas

[9] UK maps of radon 2019 - https://www.ukradon.org/information/ukmaps

[10] Zetica Risk Map 2019 - https://zeticauxo.com/downloads-and-resources/risk-maps/

[11] British Geological Survey – Geoindex Onshore 2019 - http://mapapps2.bgs.ac.uk/geoindex/home.html

of standing water visible on the available aerial imagery it is likely that groundwater is present at shallow depth beneath the ground surface and at a similar level to the River Ely.

Potential Geotechnical and Geo-Environmental Constraints

2.7.10 The following potential constraints have been identified from the desk-based review:

- The land within the study area is mainly agricultural and has not been subject to historical development except the existing railway and industrial site (i.e. Renishaw). Though mainly agricultural, the existing railway and industrial site may have impacted the land quality. The M4 located to the north (and upstream) of the study area may also have impacted land quality.
- Ground conditions at the site comprise Alluvium and Glacial Till. The upper Alluvium comprises soft clay which extends to depths of approximately 5m below existing ground level. This material is likely to provide low bearing capacity and may pose a long-term settlement risk to proposed foundations.
- Groundwater within the study area is likely to be shallow (circa 1-2m below existing ground level).

2.7.11 It is recommended that a detailed geotechnical and geo-environmental desk study, followed by appropriate intrusive ground investigation and assessment is undertaken early in the design of the proposed station to identify any further ground related constraints and provide a suitable basis for design.

2.8 Flood Risk

2.8.1 According to the NRW Long Term Flood Risk Map[12] (Figure 5), the River Ely is designated as a Main River. Works in, over, under or within 8m of the top of bank of a Main River or flood defence, and within a floodplain, require an application to NRW for a Flood Risk Activity Permit (FRAP). Ordinary Watercourse Consents (OWCs) may be required for works on watercourses that are not Main Rivers. The Lead Local Flood Authority would need to be contacted for information and advice on OWCs.

2.8.2 The NRW Long Term Flood Risk Map[6] (Figure 5) shows that land between the rail track and the River Ely is designated as Flood Zones 2 and 3. Flood Zone 2 shows the extent of a flood from rivers or from the sea with up to a 0.1% (1 in 1000) chance of happening in any given year and contains areas recorded to have flooded in the past. Flood Zone 3 shows the extent of a flood from rivers with a 1% (1 in 100) chance or greater of happening in any given year or the extent of a flood from the sea with a 0.5% (1 in 200) chance or greater of happening in any given year.

2.8.3 In addition to the Long-Term Flood Risk Map, the Welsh Government produce a Development Advice Map (DAM) which is for land use planning purposes and should be used alongside the Welsh Government's Technical Advice Note 15: Development and Flood Risk (TAN15)[13]. The DAM (Figure 6) shows that the majority of the land in the study area is designated as Zone C2 (areas of the floodplain without significant defence infrastructure) and Zone B (areas that have flooded in the past evidenced by sedimentary deposits). Parts of the study area designated as Zone A are considered to be at little or no risk of fluvial or tidal/ coastal flooding.

2.8.4 Given that parts of the study area are designated as Zones B and C2 (defined by the extent of NRW Flood Zone 2), the plans for the station should be informed by a detailed Flood Consequences Assessment (FCA) in accordance with TAN15. An FCA is required to show that development would be safe from flooding over its lifetime and does not cause any detriment to flood risk on third party lands. Potential flood risk management measures may include earthworks to create flood free development platforms or flood protection bunds, offset by provision of compensation for any loss of floodplain storage volume. A hydraulic model of the River Ely and its floodplain that includes the

[12] NRW, 2019. Long Term Flood Risk Map. Available from https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en [Accessed online February 2019].

[13] Welsh Assembly Government, 2004. Planning Policy Wales, Technical Advice Note 15: Development and Flood Risk

Gateway Station site is currently being developed by Arcadis, in consultation with NRW. This model will generate robust flood risk data to inform a detailed FCA for the proposed development, and could be used to explore flood risk management measures to demonstrate that the future development would be free from flooding over its lifetime and would not increase flood risk to third party lands, in accordance with the requirements of TAN15.

Table 4 Watercourses within the Study Area

Watercourses	Description and Location	Consents/ Permits potentially required	Advisory timescale
River Ely	The River Ely flows south easterly across the centre of the study area, south west of the rail track. The River Ely is crossed by the rail track at NGR: ST 06397 78798	Flood Risk Activity Permits (FRAPs) may be required	Can take 2 months for a decision
Nant Criafol, Nant Coslech and other unnamed ordinary watercourses	The ordinary watercourses are located south of the M4 and are primarily located north east of the rail track and Miskin Business Park	Ordinary Watercourse Consent (OWC)	

Figure 5 NRW Long Term Flood Risk Map

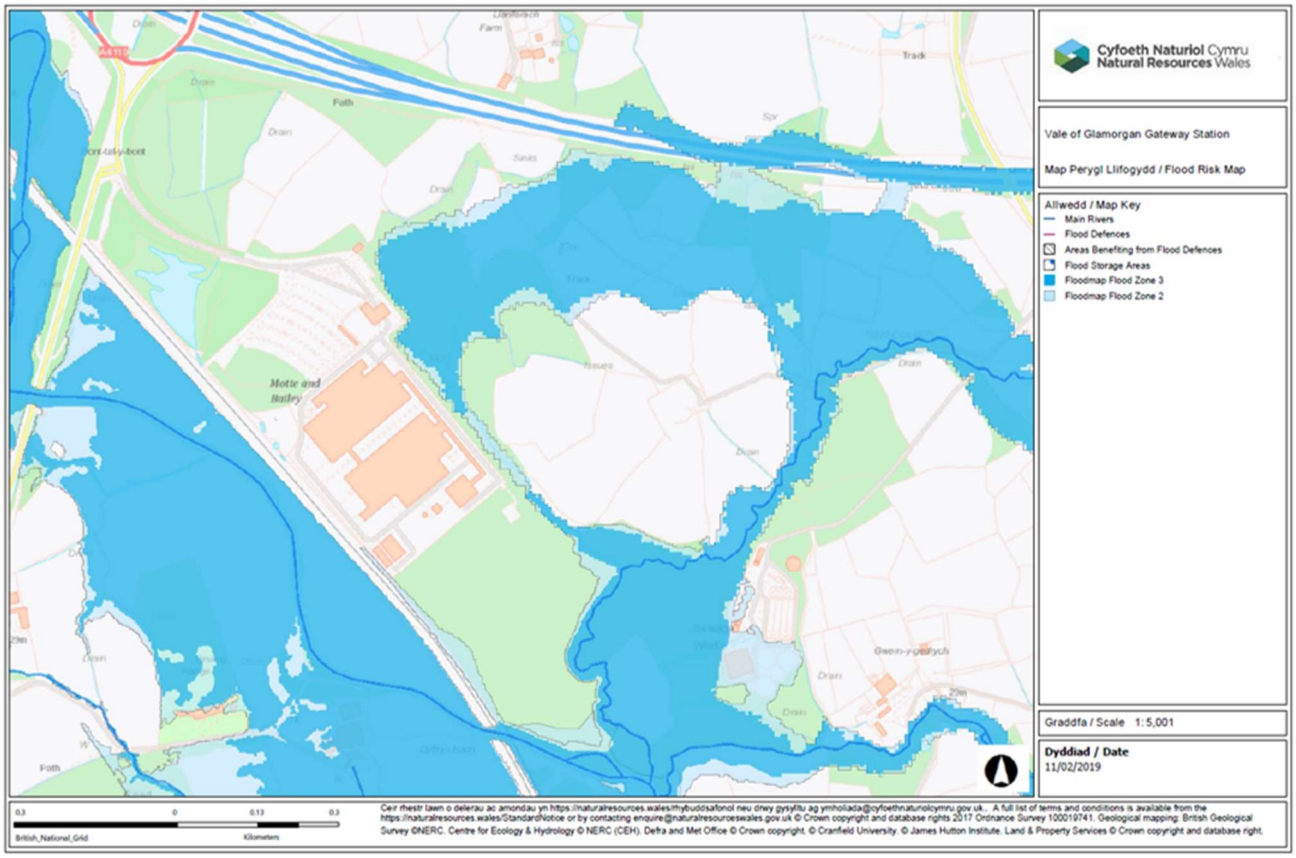
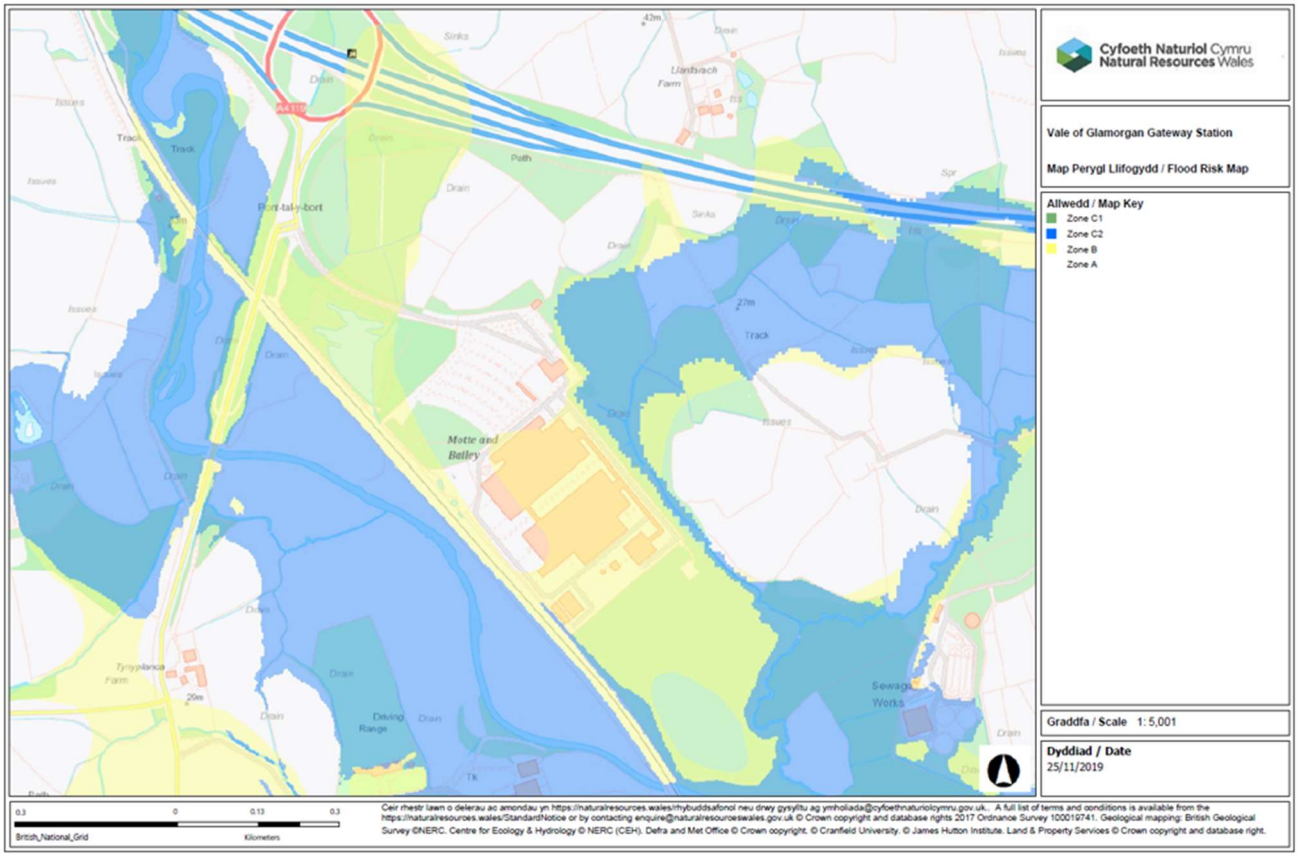


Figure 6 Development Advice Map



3 Demand Forecasting

3.1.1 The Welsh Government and TfW have developed the South East Wales Transport Model (SEWTM). SEWTM is a multi-modal model covering the South East Wales network in detail. The use of the model allows consideration of highway and public transport interventions together and evaluates the interaction between the schemes, allowing for a forecast for future demand.

3.1.2 The new Gateway Station has been tested using SEWTM as an independent option, as well as a combined option with the proposed Renishaw Development (i.e. implementation of the employment allocation). The model is managed by TfW and Arcadis has liaised with TfW on commissioning the model runs, and to ensure the outputs provided are applicable in future appraisal work as the project develops.

3.1.3 The SEWTM has been run on four 2026 scenarios:

- Scenario 1: Do-Minimum Core
- Scenario 2: Do-Something Core
- Scenario 3: Do-Minimum with Renishaw Development
- Scenario 4: Do-Something with Renishaw Development

Table 5 Do-Minimum (DM) Core Demographic (Scenario 1)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added (unused in this scenario)
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (does not include adjacent site development)

Table 6 Do-Something (DS) Core Demographic (Scenario 2)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added Highway access from southern (unclassified) arm at M4 Junction 34 All passing TfW services (i.e. those on the Ebbw Vale to Maesteg Line) to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (does not include adjacent site development)

Table 7 Do-Minimum (DM) Alternative Demographic (Scenario 3)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added (unused in this scenario)
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (includes adjacent site development)

Table 8 Do-Something (DS) Alternative Demographic (Scenario 4)

Item	Description
Networks	A470/ M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments	New zone for Vale of Glamorgan Gateway Station added Highway access from southern (unclassified) arm at M4 Junction 34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand	Re-distributed LDP development 2026 (amended September 2019) 'Near certain' + 'More than likely' uncertainty log categories only (includes adjacent site development)

3.1.4 Table 9 summarises the forecast number of passengers in 2026 per annum under each scenario at the proposed station, as well as the existing stations in the vicinity.

Table 9 SEWTM 2026 Forecast

Station	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Vale of Glamorgan Gateway Station	0	133,969	0	40,153 (216,982, if congestion issues mitigated)
Pontyclun	257,588	241,522	256,828	254,184
Llanharan	146,552	134,556	144,359	135,317
Pencoed	201,053	182,472	196,083	183,904
Bridgend	1,677,875	1,650,795	1,665,429	1,644,703

3.1.5 The new station is forecast to attract 133,969 individual trips per year by 2026 if the Renishaw development does not take place on the adjacent land. If the development does occur, then demand for the station is shown to decrease by 70% comparing Scenario 4 to 2. This anomaly is due to the capacity of the highway network infrastructure.

3.1.6 The model predicts that the existing highways and motorway junction would be over utilised/ highly congested in the future year with the development taking place, which would supress demand for the station. An additional forecast was undertaken to demonstrate that if the local congestion problems were mitigated, the expected demand for the station is 216,982, with it decreasing by 82% between scenarios 4b and 4a if congestion is not addressed.

Table 10 New Demand Forecast

Scenario	Demand	New demand generated
Scenario 1	0	0
Scenario 2	133,969	60,245
Scenario 3	0	-20,369
Scenario 4a	40,153	-4,438
Scenario 4 b (with congestion mitigation)	216,982	172,391

3.1.7 As shown above in Table 10, the new station generates new demand, for scenario 2 and 4b with congestion mitigation. The new demand generated for those scenario's is 60,245 and 172,391 of new trips by rail. It can be seen that a large proportion of new trips are related to the adjacent strategic employment development. In perspective, that is equivalent to up to 60 thousand and 172 thousand trips by car (assuming single occupancy) making potentially shorter or no journey by road per year. The new Renishaw development is shown to have a negative effect on car usage on the road network without any congestion mitigation, both without and with the new Vale of Glamorgan Gateway Station.

3.1.8 Overall, demand forecasting indicates that the station usage in 2026 (133,969, 40,153 and 216,982 trips) should be classified as category F (under 250,000).

3.1.9 The station demand data can be highly skewed from factors outside the control and remit of this project. It will require local and regional consideration to determine the full demand analysis.

3.1.10 The station demand is highly likely to be affected by:

- Renishaw Development of the strategic employment area.
- M4 Junction 34 capacity issues.
- M4 and A4232 congestion to the west of Junction 34, which will influence decisions to use the park and ride.
- Existing constraints on the local connection through Pendoylan to the A48.
- Whether or not proposals for an improved link from Junction 34 to the A48 goes forward.
- Growth of Cardiff Airport and strategic employment in the wider area and bus connections from the station.
- Event parking for Cardiff, if the station hosts turn back facilities for event shuttle services and availability of overflow car parks.
- London Rail Services (Great Western Railway, Grand Union Trains).

- Cardiff City Vehicle Policy (i.e. congestion zones, vehicle ban).
- Emerging proposals at J33 and the Cardiff north western corridor.
- Cardiff Metro.

3.1.11 The initial assumption is that most demand will come from commuters on the M4 who usually drive into Cardiff. Local community councils have raised concern that the station may also possibly increase private car journeys on rural roads from within the Vale of Glamorgan to the station. During the next stage of design and preparation of a business case, additional transport modelling will be required to establish modal change as a result of the new station and take into account route origins and destination, to review local journeys within the Vale of Glamorgan and the impact on the local road infrastructure.

3.1.12 Comparison with nearby stations indicates that the development could possibly achieve a category D classification (medium staffed facility), which is the ambition of the scheme. With the factors listed above, and potential upgrades to local road infrastructure, the demand may well increase beyond forecasted levels and planning for a future with increased role of the station would seem appropriate given the uncertainties in forecasting.

3.1.13 Concerns have been raised by the project stakeholders regarding existing capacity issues on TfW rail services. Many services within the area appear to have overcrowding. There may be a possibility that existing rail services stopping at a new station will not be able to accommodate the new additional passengers. TfW have committed to introducing new rolling stock, with higher capacities and more frequent services across the network. TfW have been contacted to determine existing capacity numbers against future capacity numbers, but at present a response is awaited.

3.1.14 The demand forecasting technical note is included as Appendix D.

4 Initial Timetable Review

4.1.1 An initial timetable study has been undertaken, looking at all TfW services stopping at the Gateway Station. For the purpose of the timetable study, other TOCs have not been included due to the uncertainty and additional requirement. The study has considered the immediate impact of the new station between Cardiff Central and Bridgend. As with any new station, additional time will be required within the timetable to accommodate the stop, time can add up to a few minutes, estimated to be at least four minutes, to take account of the train slowing down, dwelling and then accelerating back up to normal speeds. The study has indicated some key issues including the following:

- Maesteg services currently have a very tight turnround at Maesteg and sometimes come from other single line sections (e.g. Ebbw Vale). Adding an additional call will require these services to be retimed
- Presentation at crossing points on single line sections may change, which would require retiming to other services (e.g. Ebbw Vale or Milford Haven)
- Presentation times at Cardiff Central will likely need to be amended. This may have significant implications for the long-distance services that may need to be re-timed (heading to Manchester or Milford Haven for example)
- Presentation and turnround times at Swansea will be affected. This could impact the station working margins which will result in further re-timings
- Some freight services that currently utilise the Miskin loop would need to be re-timed. This will be exacerbated on days of the week when the freight provision increases.
- Reduced redundancy – Sidings offer additional redundancy for freight, main and local services.

4.1.2 The level of impact, with regards to re-timing existing services, depends upon the confirmation of operational assumptions. Examples of these would be the likely Sectional Running Times for calling at the station, required dwell time, potential line speed improvements on the Miskin loop. Reducing the additional time required to call at the station will mitigate the impact on the existing timetable as would providing higher speed switches into, out of and within the loop, currently rated at 15mph. Grand Union Trains has indicated that 15mph is an issue that would need to be addressed. Timetable activities as part of this scheme will not consider introducing non-stops at existing stations.

4.1.3 It would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds. Network Rail has also confirmed that the sidings offer additional redundancy which aids performance and have often been used for broken down trains. Additional reviews will have to consider other suitable locations to offer this redundancy. An alternative location for the station could also be considered as the goods loops offer both advantages and disadvantages.

4.1.4 A further timetable study will be required once operational assumptions are confirmed/ more defined. Appendix E contains the initial timetable study.

5 Station Requirements

5.1 Introduction

5.1.1 Stations are categorised in accordance with Department for Transport (DfT) ratings as shown in Table 11 below.

Table 11 Station Categories

Category	Description	Trips per annum
A	National Hub	Over 2 million
B	Regional Interchange	Over 2 million
C	Important Feeder	0.5 to 2 million
D	Medium Staffed	0.25-0.5 million
E	Small Staffed	Under 0.25 million
F	Small unstaffed.	Under 0.25 million

5.1.2 The demand forecasting has rated the station as a category F, with up to 0.216 million trips per annum by 2026. The aspiration of the project and the Vale of Glamorgan Council is to achieve the patronage that would require a category D station. As set out in Section 3, the various factors involved in forecasting mean that providing for a category D station is likely to be appropriate to future proof the station and enable it to meet potentially higher demand in future.

5.1.3 In general, two scheme ideas of ‘do something’ and ‘future proofed’ has been considered to represent the category F and category D respectively. The do something scheme has the proposed Vale of Glamorgan Gateway Station, the highway access from the southern (unclassified) arm at M4 Junction 34, all passing TfW services to call and a 500-space P&R at the station. The future proofed scheme also includes the development of local employment area, upgrades to local road infrastructure, event parking and shuttle services to Cardiff, Cardiff City Vehicle Policy (i.e. congestion zones, vehicle ban), London Rail Services and provision of 500 – 1000 parking spaces.

5.1.4 For the purpose of this study, a category D station will have more facilities, and have a higher land usage. Therefore, for future proofing the station, a larger station footprint suitable for a category D station has subsequently been used throughout the study. In reality, the station could initially be constructed to a smaller footprint and then upgraded/ expanded depending on actual demand, as long as land for the expansion is safeguarded for development.

5.1.5 The scheme is anticipated to lead to some switch of patronage from other stations in the locality which may have the advantage of reducing congestion in those villages/ towns, where station car parks are over utilised and railway users often park on nearby residential streets.

5.2 Rolling Stock

5.2.1 The type of rolling stock that would be expected to utilise the station determines the length of platform required for the new station. Rolling stock information is provided in Table 12.

Table 12 Rolling Stock Information

Type	Class 170	CAF Civity	Stadler FLIRT DEMU	Class 800 5-car	Class 800 9-car
Routes	Cardiff to Maesteg/ Swansea/ west Wales local services	Manchester to West Wales long distance services	Cardiff to Maesteg/ Swansea local services	West Wales to London Paddington	West Wales to London Paddington
Max no. of vehicles (typical service)	3	5	4 (plus 1 power vehicle)	2x5	1x9
Length of vehicles (m)(approx.)	23.5	24	21 (power vehicle 16)	26	26
Normal train length (approx.)	70	120	100	260	234

5.2.2 The Rail Safety and Standards Board (RSSB) standardRIS-7016-INS[14] states that '*the usable length of platforms shall be long enough to accommodate the longest train formation regularly booked to stop at a platform, with allowances for inaccurate stopping and operational (including train control) requirements.'*

5.2.3 There are a number of decisions to be made which will dictate the length of the platforms depending on which Train Operating Companies (TOCs) use the station.

5.2.4 For TfW services, 120m plus allowances is required. For Great Western Railway 260m plus allowances is required. A new TOC with plans to operate in south Wales, Grand Union Trains, would likely require similar lengths as GWR.

5.2.5 For the purpose of developing this scheme, 300m has been allocated for the full platform length, as this will take up the largest land usage and thus provides a robust approach to considering the feasibility of the station. This value will need to be assessed at a later GRIP stage in regard to Technical Specifications for Interoperability (TSIs) and The Railway and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

5.3 Platforms

5.3.1 The Vale of Glamorgan Gateway Station is anticipated to feature two platforms, located on the cess next to the goods loops. The size, number and location of platform entrances influence passenger distribution clearance times. Factors such as this have to be considered and integrated with station capacity assessment, safety and accessibility as below:

- Length – Dictated by the rolling stock that will be stopping at the station. For this study 300m is assumed as established in Section 5.2.

[14] Rail Industry Standard RIS-7016-INS 'Interface between Station Platforms, Track, Trains and Buffer Stops'. Issue 1.1 June 2019. Available from: https://catalogues.rssb.co.uk/railway-group-standards#k=(rgsolDocumentNumber%3A%227016%22%20OR%20(%20Title%3A7016*)%20OR%20(%20rgsolDocumentNumber%3A7016*)%20OR%20rgsolDocumentInternalNumber%3A%227016*%22)

- Width – The minimum recommended is 3.0m.
- Columns and other obstructions - at least 2.0m clear of the platform edge
- Headroom – At least 2.5m to structures and platform signs for a width if up to 2.0m from the platform edge over the entire length. At least 2.3m for distances greater than 2.0m from the platform edge.
- Yellow line – It is used by the Train Operating Companies (TOCs) to manage the crowding and safe dispatch of trains. In general, at least 1.5m from the platform edge is needed where trains are passing at more than 100mph. Where the train speed is greater than 45mph or the 1500mm is likely to lead to overcrowding on the platform, the distance could be reduced subject to actions being taken to mitigate the risks. Relevant TOCs should be consulted whilst defining the width of this zone.
- Platform canopy – Platform canopy should be located adjacent to the platform access and egress point and to cover the entire platform length if possible. It should be linked to the footbridge canopy to ensure there is no gap. The material of canopy structure will be based upon the structure size, timber will be recommended for small spans while steel portal system is considering to be more rigid for large span roofs. To prevent rain flooding and leaking, the canopy will be inclined away from track with a drainage system and drainpipe provided within or adjacent to the canopy supporting column. A category F station would be uncovered with no canopy. However, the platform would have waiting shelters.

5.4 Station Buildings

5.4.1 For a category D station, the building entrance needs to have an appropriate size, number, and spacing to provide free and safe access to all passengers as well as the emergency evacuation arrangements. Entrance doors should not open outwards into the flow of passengers and alcoves should be avoided.

5.4.2 The station entrance canopy should draw customers towards the station entrance and provide shelters for people waiting to meet others. The design of canopy should be integrated with the station building.

5.4.3 Stairs with handrails should be featured for passengers to access to platform level. A lift within the station building would give access to both platform level and footbridge level.

5.4.4 A category F station would typically not have a station building.

5.5 Station Facilities

5.5.1 For a category D station of 0.25-0.5 million trips per year, the station should be staffed (one from TfW). The number of staffed ticket offices and ticket vending machines (TVM) needs to be assessed by the Train Operating Company (TOC) in order to meet the requirement of station customer capacity. A passenger waiting room should be provided in the station building, or otherwise a sheltered waiting room should be available on each platform.

5.5.2 Help point and information displays should be provided in the waiting room, station building and on platforms. CCTV is required for safety and security purposes for the coverage of all station public areas. Lighting on the platform and in the building should be evenly distributed with the lux level to comply with relevant standards. Male and female toilets are recommended at this station and if toilets are provided, a minimum of one unisex toilet should be accessible for disabled people.

5.5.3 Other station facilities such as a coffee shop, vending machines, cash machines, newspaper & magazine distribution racks, advertising areas and WIFI will be considered following consultation with the TOC and other key stakeholders. Smart Station sensors could also be explored, to manage station usage and provide live data to relevant stakeholders, particularly for events in Cardiff.

5.5.4 The positioning of booking offices, ticket machines, information screens and retail outlets should be considered to avoid congestion and blockage.

5.5.5 A category F station would typically have ticket vending machines, help points, information displays, lighting and CCTV.

5.5.6 TfW has committed to using renewable energy sources to power the facilities and to aid this, local renewable energy production will be considered by the scheme but is dependent on land availability. The scheme could potentially benefit for additional funding for renewable energy and could be used as a trial or exemplar.

5.5.7 The station will consider sustainability, but for greater acknowledgement, the scheme could be progressed under CEEQUAL, which is an evidence-based sustainability assessment, rating and award scheme.

5.6 Station Footbridge

5.6.1 To gain access to the platform on the opposite side from the entrance and car park, a footbridge will be required to span the four-track railway. The footbridge must be compliant to the requirements of NR/L3/CIV/020. Network Rail are currently developing a new standard footbridge design. However, a bespoke design of the footbridge may be required due to the longer span requirements of approximately 25m.

5.6.2 It is expected that the footbridge would comprise a single span with stairs and lifts either side for better accessibility. The bridge soffit should be designed high enough to accommodate future electrification of the lines. The main span, stairs and ramps should be fully enclosed with suitable lighting, to provide a safer environment.

5.6.3 The minimum structure widths may need to be determined by using passenger flow analysis for a category D station, category F may use the standard recommended widths. A category D station is likely to be a covered footbridge, a category F station is likely to be an open footbridge.

5.7 Station Approach Road and Access

5.7.1 A new station approach road would be provided to connect the existing highway to the station car park. It would be a single carriageway with designated public transport drop-off and pick-up zones close to the station. To reduce any congestion due to possible traffic overflow and vehicle manoeuvres, a vehicle turning circle would be provided at the end of station approach road. The new Gateway Station will require a passengers set-down and pick-up area alongside provision for taxis and buses. The landing area should be level and firm, ramp need to be fitted with lowest practicable gradient.

5.7.2 Rail replacement buses and coaches would need to be accommodated in case of railway services being unavailable. Moreover, Shuttle-Link or other buses/ coaches services to link to Cardiff Airport, the Vale Resort or to Cardiff venues for events for example could also be needed and will require space. An interchange facility with regional or local bus services would also be provided and a designated area at the front of station should be set up for emergency vehicles.

5.8 Vehicle Parking Facilities

5.8.1 The remit set by the Vale of Glamorgan Council is to provide a minimum of 500 vehicle parking spaces. Table 13 provides an overview of nearby stations including number of spaces and charges.

Table 13 Nearby stations official parking facilities[15]

Station	Total Parking Spaces	Access for all Spaces	Charges
Cardiff Central	426	20	£12.50 for 1 day
Pontyclun	<30 - TBC	TBC	Free

[15] https://www.nationalrail.co.uk/

Station	Total Parking Spaces	Access for all Spaces	Charges
Llanharan	42	2	Free
Pencoed	0	0	Not Applicable

5.8.2 There are also other park and ride facilities being planned as shown in Table 14.

Table 14 Planned Park & Ride Developments (values estimated from news)

Nearby Schemes Under Development	Number of Spaces
Junction 33 Park & Ride (By Bus)	1,000
Cardiff Parkway Station	2,000

5.8.3 Although challenging to accurately forecast the station use and the number of spaces required, a minimum of 500 spaces is suitable based on the nearby developments. Moreover, the forecast patronage of 133,969 per annum (not including the employment development as this would be a trip attractor rather than relate to users of the park and ride parking), can be equated to approximately 2,600 users per week. A proportion of these would car share or arrive by public transport or cycling, but provision of 500 spaces for daily use does not appear unduly large. The Gateway Station could be designed with a minimum 500 spaces, with additional land to expand/ overflow to 1000 spaces when required.

Table 15 Estimated Parking Spaces (based on scenario 4b)

Timeframe	Estimated Spaces Required
7 Day Week (assuming station is used equally all week)	300
5 Day Week (assuming station is primarily used Monday to Friday)	420

5.8.4 The availability of spaces is a key factor, more spaces will generally attract more demand up until a certain level. The spaces are assumed at this stage to have a turnover of one per day. The carpark could be linked up to the VMS network, indicating spaces available to motorists on approach roads and highlight the reduced travel time via train compared to by car. Discussions would be needed with the South Wales Trunk Road Agency regarding the potential for link up to the VMS.

5.8.5 According to the flood risk map, the station car park could potentially be located on a flood plain depending on the selected option. In case of flooding, defence, measures such as levees, bunds, reservoirs and weirs should be considered. An elevated plateau could also be provided at the car park area to control the risk of flood. Flood mitigation may also be required elsewhere.

5.8.6 Access for all spaces should be provided within 50m of the station entrance, wherever practical. For 500 or more spaces, it is recommended that 24 spaces are designed for access for all passenger purposes.[16]

[16] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

5.8.7 The parking facilities should have a minimum of 10% bays for electric vehicle charging (50 spaces). Options should consider future proofing a higher percentage of bays to accommodate future demand as by 2035, only electric vehicles may be produced, and the overall design life of the facilities is 120 years.[17] In addition to car charging, taxis and bus charging infrastructure should also be considered.

5.8.8 The following provision may also need to be considered:[18]

- Long and short stay public parking (both long and short stay)
- Motorcycle and cycle parking.
- Electric charging for buses and taxis.
- Emergency vehicles (In all case where the layout of the car park affects access by emergency service vehicles the access for such vehicles shall comply with the Building Regulations).
- Parking management measures (to control use of parking and charges and for entitlement within the Station Access Agreement).
- Permit/ contract/ preferential parking (e.g. for TOC staff, business passengers, and car hire franchise).
- Parcel collection point parking.
- Station management/ visitor parking.
- Station mobility buggy parking.
- Station contractor/ maintenance parking.
- Train crew parking (including out-of-hours access).
- Other TOC operational parking (e.g. for station staff).
- Other TfW parking (e.g. operational staff)
- British Transport Police parking (including its use for emergency response vehicles, and for accessing custody suites)
- Other tenancy parking (e.g. for train catering and postal/ parcel operations).
- Retail parking (e.g. for station retail/ catering outlet staff).
- Lineside maintenance vehicles.

5.8.9 Lighting will be required to provide adequate lighting levels that are in accordance with RIS-7700-INS: Railway Industry Standard for Lighting at Stations. It is important that lighting does not interfere in any way with the operational railway and any light overspill to adjoining neighbours be minimised. This would include consideration of any ecological impacts in this location such as impacts on bats. The lighting should be energy efficient.

5.8.10 CCTV will also be required to cover the car park, including pay stations and entrances/ exit barriers. The CCTV design should take into account national and industry standards and guidelines such as NR/L2/TEL/30135: Technical requirements for security CCTV Systems on Network Rail Infrastructure and NR/GN/TEL/50017: CCTV for stations – functional, technical, operational requirements. The function and system performance would be determined following consultation with the Local Authority and British Transport Police.

5.8.11 The cost of parking should be carefully considered and may in fact be free in order to encourage use of the park and ride rather than driving further distances on the highway network or continuing to park inappropriately in residential areas of other nearby towns and villages. It is noted that nearby stations provide free parking such as Pontyclun and Llanharan and is likely to be a large factor in the

[17] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

[18] The Design of car parks for railway stations and depots – Network Rail – NR/L3/CIV/160 Issue 1

public choosing one station over another. The users will be required to pay for tickets for rail/ bus services.

5.8.12 Future design activities will need to carry out option selection and design of car parking facilities, number of spaces and layouts.

5.9 Access for All

5.9.1 The proposed station and station facilities should be accessible to all people especially for those who are reduced mobility and those who use pushchairs. Designated disabled person's parking spaces should be located on firm and level ground, as close as feasible to the accessible entrance. The setting-down and pick-up points suitable for disabled passengers should be provided on firm and level ground, and they should be free of all obstacles and wide enough to allow transfer. The suggested footway width for wheelchair ramps is up to 1620mm and 4040mm plus manoeuvring space.

5.9.2 Lifts should be provided inside the station building for passengers' transport between ground level and platform level. Ramps should be installed where the lifts are not practicable to be provided. The ramp should have the lowest practical gradient which no more than 1:20. No series of ramps to a building should rise in total more than two metres. For station category D a minimum width of 2000mm between handrails is recommended.

5.9.3 Retail and catering facilities should be accessible to all passengers. Ticket sales points including manual ticket sales counters, information desks, customer assistance points and ticket vending machines should be provided along the obstacle-free route, a minimum of one desk and one machine should be at a lower level to provide better access. A minimum of one desk should be fitted with an induction loop system for hearing assistance.

5.9.4 Information signs should be installed where applicable to provide safety information, safety instructions, train timetables, warnings, and access information. The text and symbols of the signs needs to be clear, consistent and unambiguous. Tactile signs should be provided where visually impaired people need them to be able to identify and use facilities at the station. Clear announcements of important information should be given as they are particularly valuable for blind and partially sighted passengers and are a reassurance to all.

5.9.5 The station and its facilities will be designed in accordance with DfT's Accessible Railway Stations design standards.

5.10 Track

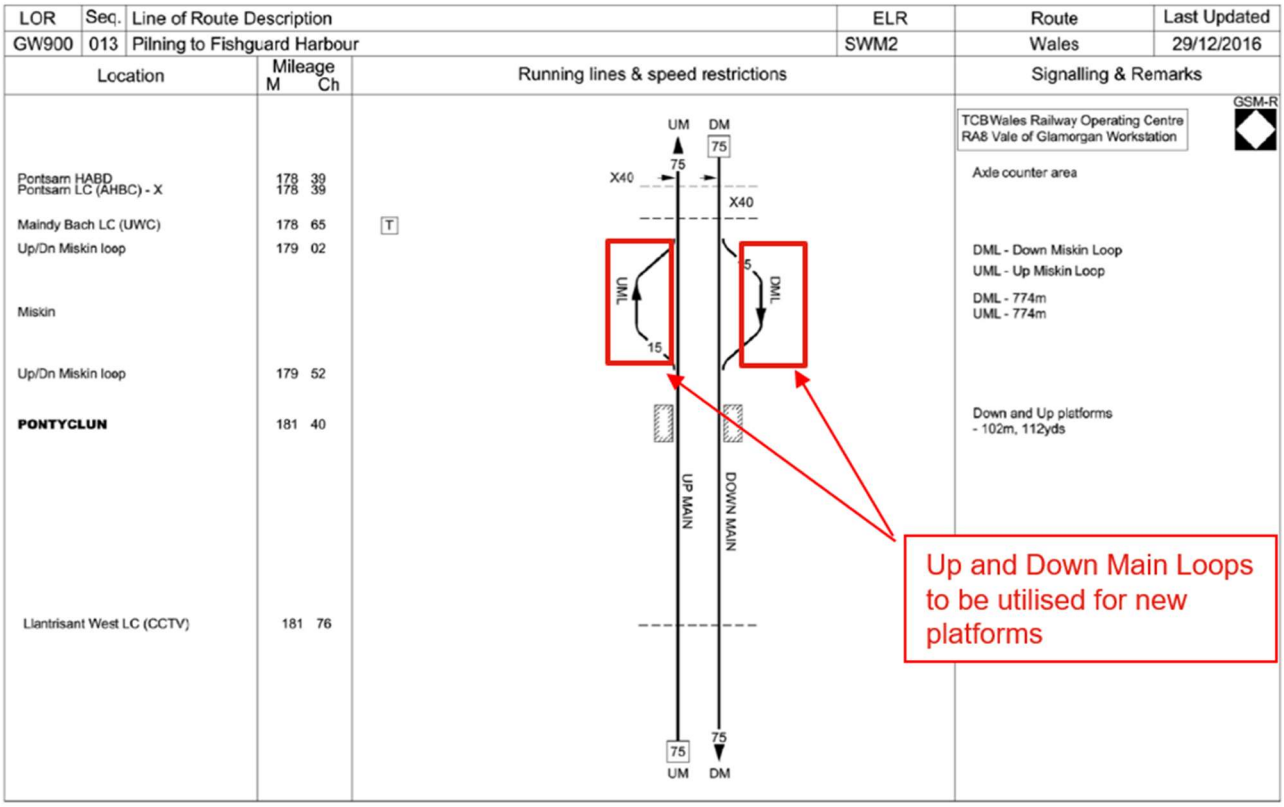
Description of Existing Track Layout

5.10.1 Located on the South Wales Main Line (SWM2) between 179m 02Ch and 179m 52Ch are the Up Main and Down Main Loops at Miskin. It is proposed that these loops are utilised for the Vale of Glamorgan Gateway Station (as shown in Figure 7 below).

5.10.2 The Up and Down Mains through this section run from Cardiff Central to Pontyclun with the loops flanking either side. The Down Main Loop is approximately 774m long and runs adjacent to the Renishaw Factory. The Up Main Loop also has an approximate length of 774m and runs adjacent to open fields and the Ely River.

5.10.3 Following the removal of the traps as part of the Cardiff Area Signalling Renewals in 2015, the Up and Down Main Loops are mainly used for goods vehicles but are occasionally used for passenger vehicles. At the high mileage end, the loops pass under an Overbridge. Limited information has been made available for this study.

Figure 7 Sectional Appendix Extract



Existing Track Geometry

5.10.4 The Up Main Loop and Down Main Loops are accessed via switches from the Up and Down Main Line. Using Bentley Rail Track regression techniques, the Up Main Loop has an approximate 1600m radius curve before entering a 600m straight. After this straight it reconnects to the Main Line via a 2400m curve and transition. Similarly, the Down Main Loop has a main straight section of approximately 650m.

5.10.5 The gradient of the lines varies between 1:180 and 1:400. A topographical survey will be required to accurately assess the track geometry for the next GRIP stages.

Track Condition

5.10.6 A visual inspection of the existing tracks will be required prior at the next design stage. Track condition will affect the existing life span of the existing track, and the line speed.

5.10.7 If the tracks and componentry are in poor condition, then they may need to be updated to handle the increase in traffic. On the contrary, if the tracks are in good condition then it will be unlikely to require significant works for the new station.

Line Speed

5.10.8 Current line speed of both the Up and Down Main lines is 75mph with the loops being 15mph. Section 4 above has indicated that raising the loops speed may reduce the amount of time required in time-table adjustments which would be advantageous for the scheme. However, without accurate geometry data that assessment cannot be made. Upgrading the line speed may not be achievable and is likely limited by the existing S&C arrangements. It is recommended that this is investigated at the next design stage. Grand Union Trains (TOC) have indicated that the loops at 15mph would cause distribution and would be highly recommended to improve the speed for the viability of future services.

5.11 Telecoms

5.11.1 New telecommunications will be required at the station. Any existing services and equipment will need to be assessed to determine if there is sufficient spare capacity to add the requirements for this station. The station will require new IT infrastructure, networking, CCTV, ticket machines, help points, specialised telecoms systems and loudspeakers. The requirements will be standard with few variations available, primarily between infrastructure owners and operators.

5.12 E&P

5.12.1 As the area has recently been re-signalled, as part of the CASR (Cardiff Area Signalling Renewals) Scheme, it is assumed that the signalling power system is Class I IT collectively earthed and that it is compliant with BS7671. Points Heating will have been provided for the 4No. Point ends, a Points Heating Control Cubicle (PHCC) and a Distribution Network Operator (DNO) should have been located in the vicinity of these points. A site survey will be required to confirm existing equipment. Trackside electrical requirements are assumed to be limited to:

- Points Heating following track changes
- Minor Signalling Power changes to reflect the track and signalling changes.
- Junction Lighting (where required) following track changes

5.12.2 Non-Trackside station elements will need to be provided – these are expected to require a segregated TOC supply:

- Ticket Machine power supplies
- Station Building Lighting
  - To include ticket office, concourse, waiting room, toilets
- Station Telecoms
  - To include help points, CCTV, CIS & specialised telecoms systems
- Retail Unit Supplies
- Lift Supplies
- Footbridge Lighting
- Platform Lighting

5.12.3 Where reasonably practicable DNO supplies for Network Rail Infrastructure, the TOC and other sub-metered supplies should be segregated and separately metered. OfGEM Compliant metering supplies, compliant with the Building Regulations Part L2 should be installed.

5.12.4 Street/ parking requirements such as:

- Carpark charging points
- Street Lighting
- Ticket Machine/ Barrier Power Supplies
- Telecoms Power Supplies (to include CCTV) will also have an electrical requirement. The car park ownership (and so DNO ownership) has not yet been determined.

5.12.5 The installation is to manage energy use, using renewable energy and metering options where applicable. Lighting shall be considered in terms of its effects on security, accessibility, the local environment and train operations.[19]

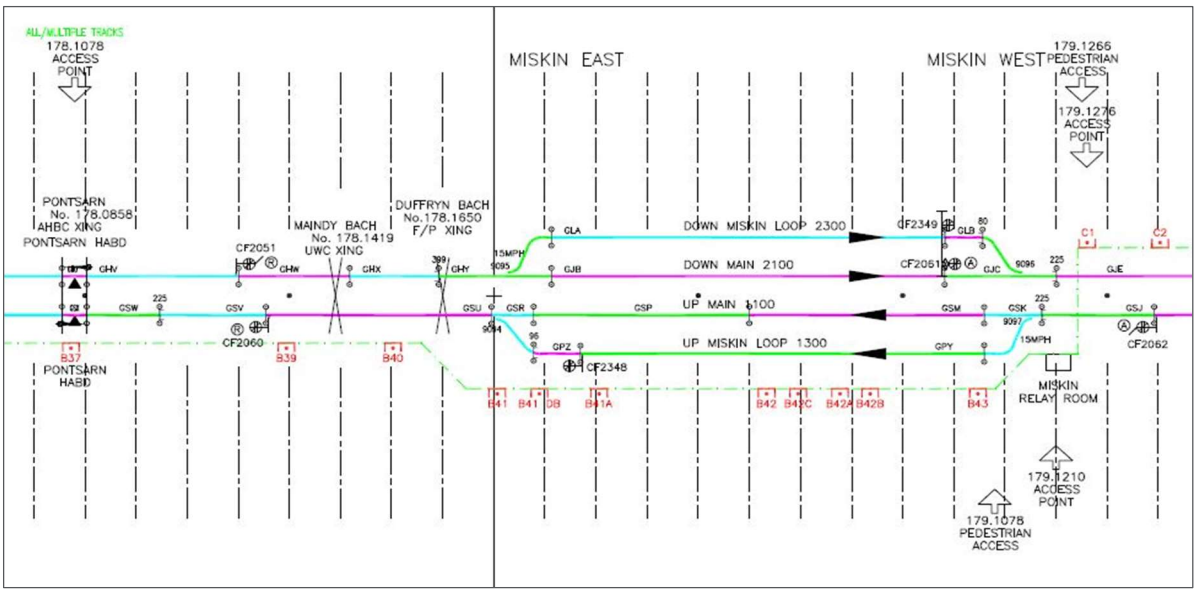
[19] Rail Industry Standard RIS-7702-INS 'Rail Industry Standard for Lighting at Stations'. Issue 1.1 June 2013. Available from: https://catalogues.rssb.co.uk/railway-group-

5.13 Signalling

Existing Signalling

5.13.1 The current signalling in this area (Figure 8) is controlled from South Wales Control Centre, Miskin Interlocking. There are existing signals CF2348 on the end of the up Miskin Loop and CF2349 on the end of the Down Miskin Loop. Axle counter sections are used in this area instead of track circuits. The signalling and track layout will be indicated at SWCC on the VDU control panels. There is Pontsarn HABD and AHBC level Crossing approximately 800 yards beyond the exit of the Up Miskin Loop.

Figure 8 Extract from 5-Mile Diagram for Miskin East



Signalling Changes Required

5.13.2 The signalling in this area is generally suitable for accommodating platforms on the outside of the loop lines. The areas that will need changes are the installation of car stop boards to be placed relevant to the length of stock that will be using this station. Care will have to be taken to ensure that stopping trains in the Up Miskin Loop do not activate Pontsarn AHBC, however as goods trains currently stop in this loop this has probably been incorporated into signalling controls. The new platforms will require to be shown on the VDU displays at SWCC, although this is a minor change this will be a long lead item to get the software changed and could be extremely expensive if not done as part of a larger scheme.

5.13.3 Any changes to the timetable and services will require level crossing assessments to be carried out along the route. Future signal sighting activities need to be undertaken to assess the impact from new station infrastructure such like footbridge, lift shafts, canopies, etc.

5.14 Sustainable Travel Requirements

5.14.1 The Welsh Government has a clear priority on increasing levels of walking and cycling in Wales to realise the many benefits that travelling actively brings – for individuals and for society. The Active Travel (Wales) Act 2013 places an onus on local authorities to provide active travel networks and forming good active travel connections to a new station would be essential. The benefits of sustainable travel are to increase the nation's health level, reduce greenhouse gas emissions, create an integrated community and support sustainable economic growth. Walking includes the use of wheelchairs and mobility scooters while cycling includes the use of electric bikes but not motorcycles.

5.14.2 Presently some 45% of passenger journeys by rail in Wales access the station on foot, whereas just 2.7% arrive by cycle.[20] The integrated Gateway Station will aim to provide transport interchange facilities for cyclists and pedestrians to enable easy and safe access by the implementation of design principles stated below. It is however recognised that the station is not location close to existing communities and therefore the level of walking and cycling to the station may be low. The new station will have dedicated active travel provision/ access, but no local provision is currently in place to connect into.

5.14.3 Nearby land is proposed to be developed, and the route could connect into other new developments, there could be potential to have a dedicated active travel route over the M4 to tie into nearby towns/ villages and future developments. The active travel network beyond the station development is outside of this study. More defined details regarding the stations active travel provisions will be investigated and developed in the future design stages.

5.15 Cycle Facilities

Cycle Parking

5.15.1 Provision of facilities to store cycles securely at stations must meet the needs of a range of different users, including those employed at the interchange, short term visitors, as well as longer term users who are using the interchange for daily journeys involving a cycling stage to or from the station. Cycle parking should be sited as close as possible to the main access to the station entrance buildings. The quantity of cycle parking will be assessed carefully to meet demand including some spare capacity to allow for growth in cycling. For commuter stations in particular, demand for cycle parking should be provided based on the future anticipated cycle mode share, a starting point of 5% of passengers entering the station is recommended for cycle parking quantities.[21] Cycle parking could also accommodate charging points for electric bicycles. Cycle parking types that suit public transport interchanges are Sheffield stands, two-tier stands or lockers/ cages.

Figure 9 Sheffield Bicycle Stands

[20] Figures for journeys commencing at stations operated by Arriva Trains Wales from Waves 16-22 of the National Passenger Survey (Passenger Focus).

[21] Green and Hall (2009), Better Rail Stations – An Independent Review. London: Department for Transport

Figure 10 Two-tier Bicycle Stands

Figure 11 Bicycle Lockers

5.15.2 The cycle parking layout should be large enough to accommodate the dimensions of a typical adult size cycle (reference the space allowances guidance for cycle parking).[22] Parking should be located on level ground and clear from obstruction of other users, particularly those with visual or mobility difficulties.

[22] Active Travel (Wales) Act 2013

Table 16 Cycle parking dimensions

Situation	Dimensions	Area per cycle
Stands on street	1.8m × 0.5m	1m^2
Within building minimum	1.8m × 0.5m spaces plus 1.8m aisle	1.35m^2
Within building generous	2.0m × 0.75m spaces plus 3–4m aisle	2–3m^2

5.15.3 Lighting, CCTV and the provision of specific equipment such as lockers or secure cycle storage compounds with covers are necessary approaches to ensure appropriate security levels. Secure cycle parking facilities with hire, repair and retail facilities can be encouraged, with local authorities working in partnership with relevant organisations and operating companies.

Signage for Cycling

5.15.4 Clear bilingual signage for route guidance, location and direction should be provided to cover the station area. Key principles such as minimising signing, minimising clutter, signing coherence, maintenance and value of signing is to be considered in the detail design stage.

Cycle Hire and Maintenance Facilities

5.15.5 Cycle hire can take the form of part of a wider cycle hire network, as part of a 'Cycle Hub', or provided as part of a standalone, or seasonal business. Some of these systems can offer cycles for hire on an automated basis, which eliminates the need for staff overheads.

5.15.6 In order to encourage cycling to the station, maintenance facilities or assistance such as pumps, tools, electric bike charging points, and cycle services shops could be set up to offer such opportunities. Whether there is potential in this location would need to be explored at a later stage.

Park and Cycle/ Car Share

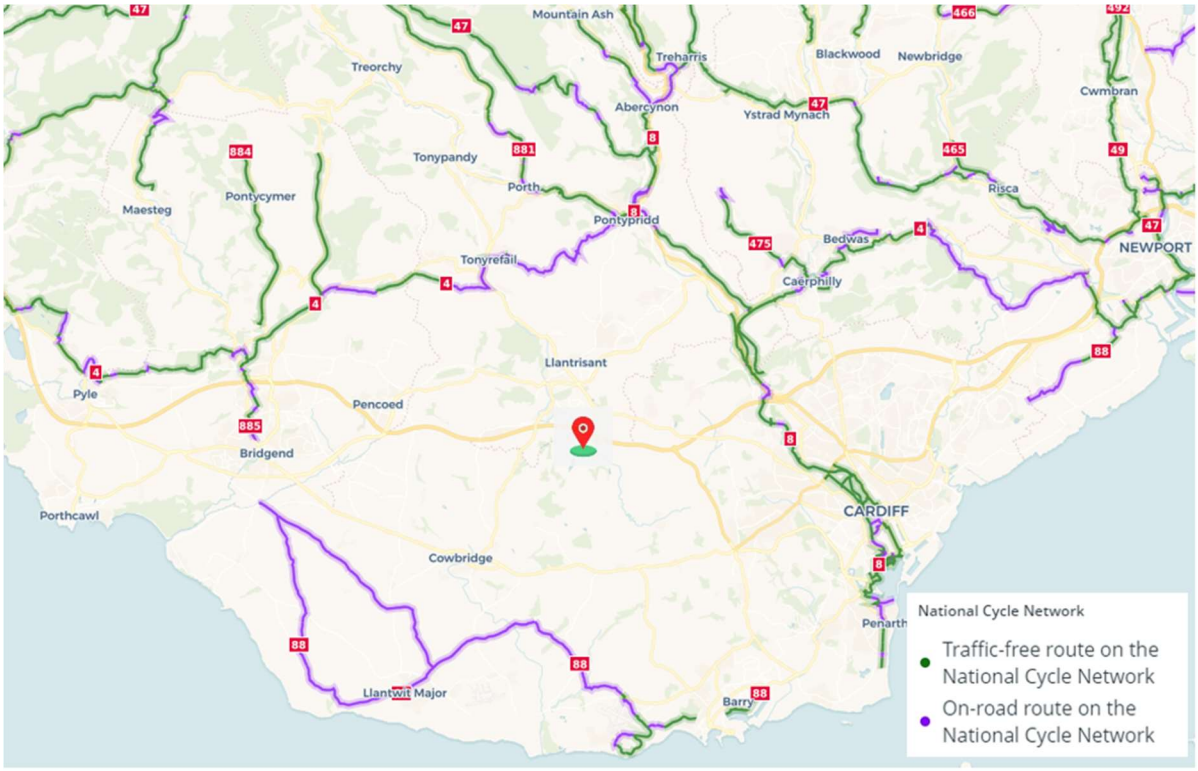
5.15.7 Park and Cycle works in the same way as a Park and Ride but with bicycles taking the place of the bus or rail journey stage. Users can travel to the Park and Cycle area by car and park their vehicle, take out their bike from an individual locker and cycle the rest of the way to their destination. Equipment such as clothing and helmets can be stored in the lockers. In order to maximise viability, the pricing strategy has to allow for payment for parking, in addition to a fare on any associated bus or train service. There may be potential for this if the improved link from the M4 Junction 34 to the A48 was implemented as this would provide a continuous cycle route from the parking site to Barry.

5.15.8 Moreover, there may also be usage by car sharers, as this already takes place around motorway junctions in the area in an informal way. Car park pricing would need to be set to ensure that this does not reduce availability of parking for station users for which it is primarily provided.

5.16 Cycle Routes

5.16.1 The current National Cycle Network (Figure 12) shows that the cycle routes network in and surrounding the proposed station area are not developed. However, as noted above, if the improved link to the A48 at Sycamore Cross is implemented, this will provide a north to south off-road route connecting to the recently completed section along Five Mile Lane and connecting to the NCN 88 at Barry. Other connections could also be considered such as a route to Hensol and the Vale Resort and hospital facilities.

Figure 12 National Cycle Network Plan



6 Site Location Feasibility Review

6.1 Background

6.1.1 Four site locations on the Miskin Goods Loops have been identified for potential sites, as shown in Figure 13. The sites are all adjacent to Renishaw. Land to the north of the railway is owned by Renishaw and is part of the adopted local development plan.

Figure 13 Site Location Plan

6.2 Location 1

6.2.1 Location 1 is south east of the Renishaw factory building and to the east of the rail line. The key advantages and disadvantages of the option are set out in Table 17. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00001.

Table 17 Location 1 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	Within the designated employment zone.	Furthest away from M4 Junction 34.
Land consideration	Flat level ground.	Area has planning permission granted for the Renishaw development. This area is considered highly important for the Renishaw development and should create a lot of employment.
Approach Road	Will tie into the existing road entering Renshaw.	Longest approach road out of the four locations. Furthest distance for buses and cyclists.

Feature	Advantages	Disadvantages
Car Park	Relatively flat ground. Room for future expansion. 1000+ spaces.	Land preparation would be required.
Ecology and Nature Conservation	Less woodland loss than some other options.	Access is likely to lead to loss of parts of a SINC: Land South West of Llanfarach Farm SINC consisting of UK BAP Priority Habitat of lowland mixed deciduous woodland, wet woodland and ponds. Loss of potential priority habitats (woodland and marshy grassland) – habitat translocation and/ or mitigation planting would be required. Further botanical survey work would be required to ascertain value of grassland. Habitats present may support protected and priority species including dormouse, bats, badger, breeding birds, great crested newts (breeding and terrestrial), reptiles and is likely to be of conservation value for terrestrial invertebrates.
Flood Risk	Predominantly located on land that is considered to be at low risk of flooding.	Land is known to have flooded in the past (DAM Zone B designation).
Heritage	Furthest option from scheduled monument. Very low potential for any impact through change to setting. No recorded heritage assets within the site.	Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	No TPOs affected.	Significant tree loss.
Platforms	Sufficient room available.	Long walking distance for passengers as platform entrance at end of platform. Platforms close/ on curve.
Signalling	North Platform Close to existing signalling.	South platform far from existing signalling and may need repeater.
Station Building & Bridge	Sufficient room is available to accommodate various sizes of buildings and facilities.	At end of platform.
Track	On the good loops.	Approaching/ close to curve on track Close to S&C.

6.2.2 Location 1 has been ruled out, due to a planned development by the landowner, Renishaw. Location 1 is within land designated as employment zoning, and the planned development expands the Renishaw factory and develops the rest of the employment zone. Renishaw is a global, high precision metrology and healthcare technology manufacturer, which is extremely important to the local economy, creating high skilled employment.

6.3 Location 2

6.3.1 Location 2 is on land south of the railway, between the railway and the Ely River. It lies on the west side of the railway. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00002.

Table 18 Location 2 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	Away from Renishaw and other future commercial area.	Watercourse in the middle.
Land consideration	No existing land usage proposals. Relatively flat land.	Multiple watercourses, flood plain and next to SSSI.
Approach Road	Shortest approach road out of all the location options.	New road junction required. Potential traffic congestion to the highway.
Car Park	Easy access through highway junction.	Space limited and constrained to no future expansion, unless multi-storey.
Ecology and Nature Conservation	Majority of location is on grassland of low ecological value. Potential for habitat enhancements along River Ely within construction buffer zone.	Access will lead to the loss of a small area of potential priority habitat (broadleaved plantation woodland). Habitat translocation and/ or mitigation planting would be required. Connecting habitat along the railway would be lost. A construction buffer of 10-20m to the River Ely SSSI would need to be in place to protect the river and its wildlife from pollution, lighting and disturbance (noise/ people). Habitats present may support protected and priority species including dormouse (woodland only, some of which may be retained), bats, otter, badgers, great crested newts (breeding and terrestrial) and breeding birds.
Flood Risk	Could possibly be mitigated.	Located in the floodplain of the River Ely, development must ensure there is no increase to third party flood risk and ensure that the flood risk onsite is suitable for the type of development proposed. Given the constrained nature of this location

Feature	Advantages	Disadvantages
		option, offsite mitigation is likely to be required.
Heritage	No recorded heritage assets within the site.	Second closest option to the scheduled monument (c. 20m), likely to cause change to setting and impact to significance. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	No TPOs affected. Limited tree loss	Area visible from Pendoylan Road.
Platforms	Platforms on straight track.	N/A
Signalling	Approximate in middle of goods loops. May provide adequate signal sighting.	Signal repeaters may be required if sighting is insufficient.
Station Building	Sufficient space.	On flood plain and takes valuable land which could be used for parking.
Track	Straight track.	N/A

6.3.2 Location 2 is not preferred. It is located adjacent to the Ely River which is a designated SSSI. The land has two watercourses flowing through it, and is a floodplain, meaning flood mitigation will likely be required as well. Development of the land would lead to potential habitat destruction and would be damaging to local biodiversity.

6.4 Location 3

6.4.1 Location 3 is set in marsh/ wet woodland, west of Renishaw. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00003.

Table 19 Location 3 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	In the vicinity of motorway and highway junction.	Area is heavily vegetated, marshy wet woodlands with priority habitat.
Land consideration	No existing development proposals.	Wet woodlands, TPO and wildlife.
Approach Road	New junction and approach road from existing highway.	Extensive land preparation required and works damaging to the local environment and biodiversity.
Car Park	Location is near Junction 34.	Extensive land preparation required and works damaging to the local environment and biodiversity.

Feature	Advantages	Disadvantages
Ecology and Nature Conservation	None	Loss of a SINC (Land South West of Llanfarach Farm SINC) consisting of UK BAP Priority Habitat – lowland mixed deciduous woodland, wet woodland, and ponds. Habitat translocation and/ or mitigation planting would be required, which is likely to require additional land purchase. Loss of connectivity of woodland habitat along and across the railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development. Construction buffer to woodland and SINC immediately to the north would need to be in place. Habitats present may support protected and priority species including dormouse, bats, badgers, breeding birds and great crested newts (possibly breeding and terrestrial phase).
Flood Risk	Located on land designated at low risk of flooding.	There is a waterbody located in the area, but no further information is available at this stage.
Heritage	Heritage asset within site is of local importance/ low value.	Quite close (c. 100m) to the scheduled monument, possibility of change to setting and impact to significance. This is likely to be minor if intervening woodland is retained. Historic landscape feature of a pond is present within the site. Removal of this would impact coherence of locally important historic landscape. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	Located across a woodland under a TPO.	Complete or partial loss of a TPO. Extensive woodland loss.
Platforms	Platforms situated on straight track.	N/A
Signalling	Close to signal on south platform.	Signal sighting would be required. May require additional signals at platform ends.

Feature	Advantages	Disadvantages
Station Building	Sufficient land available.	Extensive land preparation required and works damaging to the local environment. Size of building may be restricted to allow for additional car parking spaces.
Track	The station is situated on straight track.	Goods loops has a speed limit of 15mph.

6.4.2 Location 3 would require a large area of woodland clearance, which would need to be offset by replanting and/ or translocation of suitable trees and shrubs. If dormice are present, which is highly likely in this area, this offset planting would need to cover a greater area than the existing woodland so would require a further land purchase. It would be difficult to achieve biodiversity net benefit at this location.

6.5 Location 4

6.5.1 Location 4 utilises the existing staff car park for the Renishaw factory. The Park & Ride facilities would require a multi-storey car park, with allocated parking for Renishaw, With separate floors for the railway users. This proposal would need to be negotiated and agreed with the landowners, Renishaw. Refer to Appendix F drawing 10028657-ARC-00-XX-DR-CE-00004.

Table 20 Location 4 Advantages and Disadvantages

Feature	Advantages	Disadvantages
General Location	In the vicinity of motorway and highway junction.	Partially covered by trees and vegetations. Area has planning permission granted for an alternative development.
Land consideration.	Flat land already developed. Landowner – willing to discuss further.	Area has planning permission granted for an alternative development. Agreements required to use land.
Approach Road	Minor improvements required.	Forecasting has predicted congestion issues.
Car Park	Location is near Junction 34.	Nearby scheduled monuments and areas of archaeological interest.
Ecology and Nature Conservation	Largely located on hardstanding (Renishaw car park) with minimal ecological value.	Semi-natural broadleaved woodland between hardstanding and railway track. Loss of potential priority habitat (woodland). Habitat translocation and/ or mitigation planting would be required, which may require land for offset planting depending on the scheme footprint.

Feature	Advantages	Disadvantages
		Loss of connectivity of woodland habitat along railway track. Retention of woodland to provide a habitat corridor would be required within the proposed development. Construction buffer to woodland and SINC immediately to the north would need to be in place. Habitats present may support protected and priority species, in particular dormouse, bats, badgers, breeding bird and great crested newts (terrestrial phase only).
Flood Risk	Predominantly located on land that is considered to be at low risk of flooding.	Small area known to have flooded in the past (Zone B designation in the DAM).
Heritage	No recorded heritage assets within the site.	Closest option to the scheduled monument (c. 15m), likely to cause change to setting and impact to significance. Also, potential to impact associated archaeological remains outside scheduled area that may be of equivalent national importance. Proximity to scheduled monument poses risk to granting of permission for development in this location. Potential for currently unknown archaeology, of unknown value, to be present. Further survey and assessment required.
Landscape and TPOs	Limited tree loss.	Utilises existing parking stands.
Platforms	Platforms situated on straight track.	N/A
Signalling	South platform close to existing signal.	Signal sighting required. Potential for signal repeaters.
Station Building	Sufficient room, building could be tied into multi-storey car park.	Land preparation required. Building size may be restricted to reduce environmental & heritage impact.
Track	The station is situated on straight track.	N/A

6.5.2 Location 4 is the most feasible solution reviewed by this study. Initial talks to Renishaw indicated that they are open to the multi-storey car park proposal, however detailed discussion and agreements

would be required to take place. The Renishaw development is privately funded, and more certain to happen than the railway scheme. It is also ahead, in terms of planning permission and equivalent RIBA stages. Any proposals may need to be agreed in advance, as the area will be developed ahead of any station development.

6.6 Recommendation

6.6.1 Location 4 is the most suitable option reviewed as part of this study. However, it does contain constraints. The land required is privately owned by Renishaw and is the current staff car park. If a deal can be negotiated, it may be possible to build a multi-storey carpark on top of the staff car park. There may also be support for private financing opportunities. Although engineering feasible, locations 1 to 3 are not preferred due to their anticipated economic, environmental and social impacts. The railway factors are similar for all four sites. However, the main factor is the land available/ required for the car parking.

7 Summary

7.1 Background

7.1.1 The aim of this study was to review and determine the requirements and feasibility of opening a new railway station in the Vale of Glamorgan, near Hensol/ Miskin, Junction 34 of the M4 which borders Rhonda Cynon Taff. Strategically the location is an extremely important factor in the proposal and produces a unique opportunity to capture untapped demand of those travelling by car. The station would be strategically located to a motorway in Wales and offer quick direct trains into Cardiff city centre, with a journey time of approximately 10 minutes. The scheme is likely to be of national importance due to the location and potential significant benefits to the south wales area.

7.1.2 The station is set to generate new demand of up to 172k trips per year and up to a total of 217k trips per year, based on the assumptions of the forecast. Additional demand could also be generated by a number of other schemes/ proposals outside the remit of this project. A significant timetable exercise will be required to review all the services that travel through the area, as the typical stop is likely to add at least 4 minutes to the existing timetables.

7.1.3 The Vale of Glamorgan Gateway Station has two options, a minimum and desired/ future proofed. The minimum station would unstaffed, have two platforms, approximately 130m long, connected by a footbridge with lifts, waiting shelters and parking for up to 500 spaces. A desired/ future proofed station would be staffed, have two sheltered/ canopied platforms, approximately 300m long, connected by a footbridge with lifts, and a station building with passenger facilities, retail opportunities and parking for 500 to 1000 vehicles.

7.1.4 The Gateway Station will be a ‘Parkway’ type station. It may also be possible to use the station for Cardiff match days/ events, if additional changes are made to the track to provide turn back facilities and if there is suitable parking overflow.

7.2 Next Steps

7.2.1 Location 4 has been selected as most feasible but does have some significant constraints relating to land ownership/ agreements and congestion. This study does not rule out other locations that have not been explored. It is noted that there is potential to explore land to the west, on the south side of the M4, and parking land to the south of the Ely River.

7.2.2 A larger consensus with local authorities including the Vale of Glamorgan, Rhonda Cynon Taff and Cardiff and Welsh Government would greatly help the scheme, as it is likely to be classified as nationally important. The stakeholders will need to agree likely factors that may affect the scheme and possibly run more demand forecasting to determine a wider range of demand depending on assumptions not currently incorporated. Additional talks and agreements will be required with Renishaw, who are developing their land to the North of railway, as an option utilising their land is dependent on their permission. Therefore, it is advised to take forward more than one option, due to possible constraints that could halt the scheme.

7.2.3 As the station, will be on Network Rail Infrastructure, the scheme must be coordinated with Network Rail and their requirements must be addressed. From the engineering perspective, the scheme should be feasible based on the information available for this study. The main constraints are land ownership and timetabling.

7.2.4 The major factor for selecting the location will be determined by the availability of land for parking. Ownership of the station and its facilities will need to be decided, whether TfW will own and operate, or by default Network Rail will own the station and infrastructure and the Vale of Glamorgan Council will own the parking. A detailed timetable analysis will also be required on how operational services will be timed based on future timetables. Additional stops for the rail services will add extra time onto the timetables, route enhancements could be considered to make up for this additional time, but this is beyond the scope of this study.

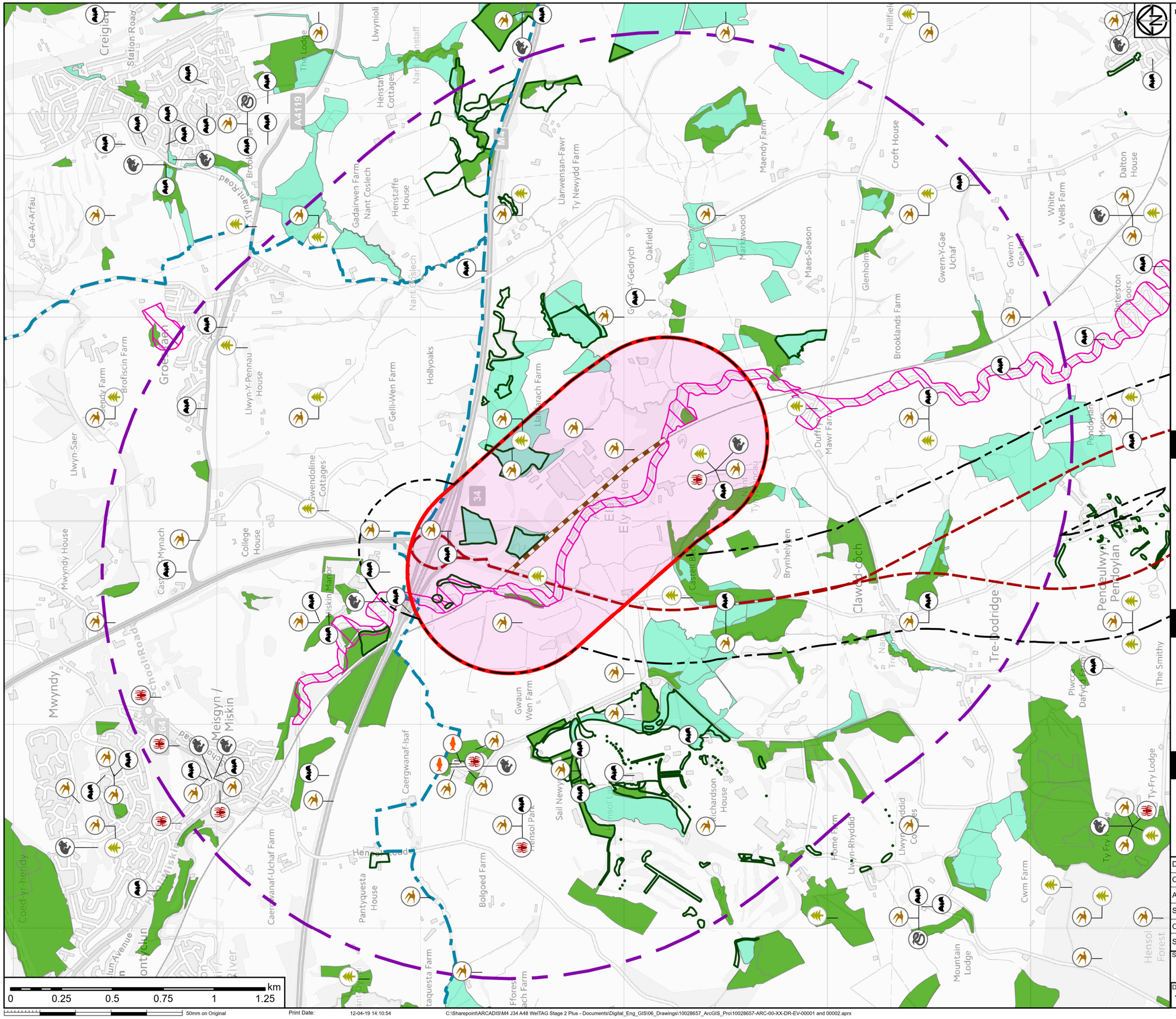
7.2.5 A WelTAG, business case and funding mechanisms for the new station will need to be explored to further develop the scheme.

7.2.6 To conclude, the recommended next steps are:

- Completion of a full WelTAG Stage Two Outline Business Case, inclusive of full economic appraisal encompassing a value for money exercise
- Additional solution to be developed (as an alternative).
- Stakeholder engagement, to determine external factors and likelihood.
- Additional Demand Forecasting, including route origins and destination and additional transport modelling dependent on external factors.
- Detailed timetable analysis, including Goods Services.
- A timetable for ecological surveys required likely to include dormouse nest tube surveys (six months survey effort between April and November), great crested newt eDNA surveys of surrounding ponds (undertaken between 15th April and 30th June) and bat activity surveys undertaken between April/ May and September).
- Cost estimation.
- Network Rail Engagement via a Basic Services Agreement (BSA)/ Basic Asset Protection Agreement (BAPA).
- Network Rail Governance for Railway Investment Projects (GRIP) Product Deliverables.
- Submission of GRIP 1-2/ TfW Stage A to be brought in line with GRIP Product Deliverables.

APPENDIX A

Ecological Constraints Plan (Vale of Glamorgan Gateway Station)



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Legend :

- Sub-section Study Area
- 2km Search Area
- Overall Study Area
- Passing Loop
- Proposed highway route option
- Unitary Authority Boundaries
- Sites of Special Scientific Interest (SSSI)
- Sites of Importance for Nature Conservation (SINC)
- Tree Preservation Orders (TPO)
- Ancient Woodland Inventory

Locations of Protected, Priority and Invasive Species Records :

- Amphibians
- Birds
- Fish
- Insects
- Invasive Plants
- Mammals
- Reptiles

Client

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
Holton Road
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TITLE:

Ecological Constraints Plan

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:17,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00001

Revision: P01

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APPENDIX B

Phase 1 Habitat Survey Plan (Vale of Glamorgan Gateway Station)

Table F1: Phase 1 Habitat Survey Target Notes for the Vale Gateway Station Study Area

Target Note	Description	Target Note	Description
1	Indian Balsam	116	Indian Balsam.
41	Japanese Knotweed	117	Trees with bat roosting potential.
42	Indian Balsam	124	Indian Balsam.
43	Indian Balsam	127	River Ely had a steady flow, with earth/ sand banks, a stone/ cobble bed. Banks are shaded predominately by semi mature and mature trees at this location. Very steep banks, approximately 2m from river. Water was turbid.
44	Mature trees with bat roosting potential.	128	Trees with bat roosting potential.
45	Indian Balsam	129	Trees with bat roosting potential.
46	Watercourse with water vole potential.	130	Raptor pellet.
112	Landowner indicated that a Red Kite and Goshawk had successful nest in 2019 at this location.	131	Indian Balsam.
114	Indian Balsam.	132	Trees with bat roosting potential.
115	Indian Balsam.	136	Farm Pond.

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Legend :

- Sub-section Study Area
- Overall Study Area

Phase 1 Habitat Survey :

- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - native species-rich
- Hedge with trees - native species-rich
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Running water
- Broadleaved Parkland/ scattered trees
- Broadleaved Woodland - Semi-Natural
- Broadleaved Woodland - Plantation
- Mixed Woodland - Semi-Natural
- Scrub - Dense/ Continuous
- Broadleaved Parkland/ Scattered Trees
- Neutral Grassland - Semi-Improved
- Improved Grassland
- Marsh/Marshy Grassland
- Tall Ruderal
- Standing Water
- Cultivated/ Disturbed Land - Arable
- Cultivated/ Disturbed Land - Amenity Grassland
- Buildings
- Hardstanding
- Area Not Surveyed
- Target Note

Client

VALE of GLAMORGAN
BRO MORGANNWG

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
Holton Road
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TITLE:

Phase 1 Habitat Surveys

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:7,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00002

Revision: P01

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Print Date: 12-04-19 14:10:12

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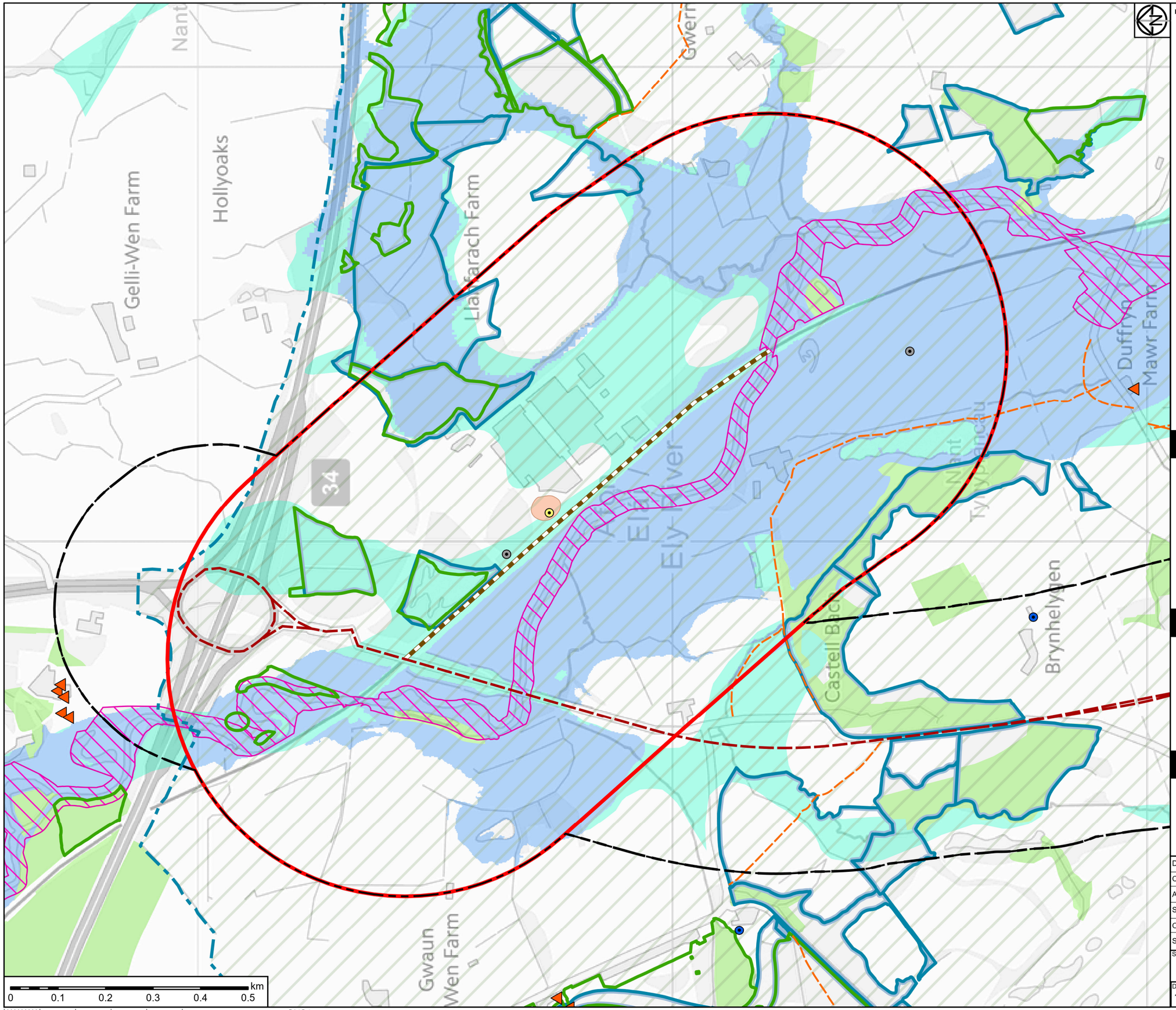
APPENDIX C

Environmental Constraints Plan (Vale of Glamorgan Gateway Station)



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Legend :

- Sub-section Study Area
- Overall Study Area
- Passing loop
- Proposed route options
- Unitary Authority Boundaries
- Scheduled Monuments
- Listed Buildings
- Historic Parks and Gardens
- Bronze Age
- Iron Age
- Medieval
- Modern
- Neolithic
- Post-Medieval
- Prehistoric
- Roman
- Unknown
- Public Rights of Way
- Tree Preservation Orders (TPO)
- Sites of Special Scientific Interest (SSSI)
- Sites of Importance for Nature Conservation (SINC)
- Registered Landscapes of Outstanding Interest
- Special Landscape Area (SLA)
- Ancient Woodland
- Flood Zone C2
- Flood Zone B
- Historic Parks and Gardens
- Conservation Areas

Client

Vale of Glamorgan Council

PROJECT:

M4 Junction 34 to A48
WelTAG Stage Two Plus
Environmental Baseline

Site

Client

Vale of Glamorgan Council
Civic Offices
Holton Road
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TITLE:

Environmental Constraints

(VoG Gateway Station)

Drawn	M. Azzopardi	Date 04DEC19	Signed Electronically Signed
Checked	J. D'Souza	Date 04DEC19	Signed Electronically Signed
Approved	S. Hancock	Date 04DEC19	Signed Electronically Signed
Scale:	1:7,500	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10028657

Suitability Description:

Issued for information

Drawing Number: 10028657-ARC-00-XX-DR-EV-00003

Revision: P01

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APPENDIX D

Demand Forecasting

MOTT MACDONALD

Technical Note

Project:	Vale of Glamorgan M4 Junction 34 Park and Ride		
Our reference:	402338	**Your reference:**	
Prepared by:	CP	**Date:**	22/10/2019
Approved by:	PO	**Checked by:**	GB
Subject:	Modelling Assumptions		

This note has been prepared to summarise the scenario assumptions underpinning the Vale of Glamorgan M4 Junction 34 Park and Ride (P&R) modelling.

In total, model results have been provided from 4 separate scenarios:

I. Core demographic scenario without station (do-minimum);
II. Alternate demographic scenario without station (do-minimum);
III. Core demographic scenario with station (do-something); and
IV. Alternate demographic scenario with station (do-something).

1 Do-Minimum Scenario

The do-minimum scenarios are 2026 scenarios developed as part of a model maintenance exercise. These scenarios differ only in terms of the demographic inputs. The various inputs are described below.

1.1 Highway Scenario

In summary, the highway scenario consists of the following schemes in addition to the 2015 base year networks:

- M4 Junction 32 Improvements;
- M4 Junction 33 Improvements;
- Cardiff Eastern Bay Link Phase 1;
- Removal of Severn Bridge Tolls;
- A4336 Five Mile Lane Improvements;
- A465 Road Improvements including new section north of Rassau;
- A4119 / A473 Roundabout Improvements;
- Reduction of capacity on Castle Street, closure of Westgate Street to through-traffic and associated changes; and
- East Side Scheme (Cardiff City Centre), incorporating two one-way loops around Churchill Way.

1.2 Public Transport Scenario

The public transport scenario is developed from the Keolis-Amey proposals for Metro Phase 2. This includes:

- A total of 4 trains per hour (tph) from Cardiff to each of Treherbert / Aberdare / Merthyr / Rhymney;

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- New direct services (2tph) from Treherbert / Aberdare / Merthyr into Cardiff Bay, as part of the 4tph total on each of these lines; and
- Some Aberdare services routed via the City Line so that the City Line is better connected to the wider rail network.

In addition to the above changes to the rail network, the bus network includes a doubling of frequency along a section of the 122 bus service to serve new development sites in the Cardiff North West corridor.

Services which pass the new P&R site are described in Appendix A.

1.3 Demographic Scenarios

Specific planned / proposed developments have been modelled to more accurately reflect the distribution of trips on the transport network. Planned and proposed developments within the fully modelled area have been classified in order of decreasing likelihood, in accordance with DfT's WebTAG as:

- Near Certain;
- More Than Likely;
- Reasonably Foreseeable;
- and Hypothetical.

Two demographic scenarios were then developed from this information.

1.3.1 Core Scenario

The core scenario includes the two most likely categories of development specified above, with overall local authority changes controlled to growth totals in Experian data by factoring population and employment at existing locations.

1.3.2 Alternate Scenario

The alternate scenario includes the three most likely categories of development specified above and assumes no demographic changes from 2015 (except household income) at existing locations.

1.3.3 Developments in Scheme Vicinity

Table 1 documents all modelled developments incorporated into the 2026 forecast in the Vale of Glamorgan and Cardiff Local Authorities. Developments in other Local Authorities are not shown. Population is calculated on the basis of the number of dwellings provided by the Local Authority and an occupancy rate calculated from specifically selected sample locations. The calculation of population varies slightly between the core and alternate scenarios since the core scenario uses occupancy rates for 2026, whereas the alternate scenario, assumes no demographic changes at existing housing in the local authorities and therefore uses 2015 occupancy rates.

Table 1: Modelled Developments by Scenario in Vale of Glamorgan and Cardiff, 2015 – 2026

Local Authority	Scenario	Development	Employment	Population	
				Core	Alternate
Vale of Glamorgan	Core & Alternate	ITV Wales, Culverhouse Cross	-	515	515
		Land at and adjoining St. Cyres School, Murch Road	-	689	689
		Land at Ffordd y Mileniwm	890	-	-
		Land at Higher End, St. Athan (in part)	-	505	505
		Land north of the Railway Line, Rhoose	-	1608	1608
		Land to the east of Eglwys Brewis, St Athan	-	586	586
		Land to the north and west of Darren Close, Cowbridge	-	1091	1091
		Land West of Swanbridge Road, Sully	-	1149	1149
		Phase 2, Barry Waterfront	720	3905	3905
	Alternate Only	Aerospace Business Park, St Athan Rhoose	2000	-	-
		Atlantic Trading Estate	910	-	-
		Hayes Road, Sully	750	-	-
		Land adjacent to Cardiff Airport and Port Road, Rhoose	4000	-	-
		Land at Church Farm, St. Athan	-	-	577
		Land at Upper Cosmeston Farm, Lavernock	-	-	1323
		Land between new Northern Access Road and Eglwys Brewis Road	-	-	864
		Land to the South of Junction 34 M4 Hensol (Strategic & Local)	3000	-	-
		Llandow Trading Estate	680	-	-
		Vale Business Park	1240	-	-
Cardiff	Core & Alternate	Cardiff Central Enterprise Zone & Regional Transport Hub	10443	3437	3443
		Former Gas Works, Ferry Road	-	649	652
		North West Cardiff (Plas Dwr)	-	7697	7699
		North of J33 & South of Creigau	-	3345	3344
		North East Cardiff, west of Pontprennau	-	7908	7908
		East of Pontprennau Link Road	-	3248	3247

1.4 Other Inputs

Other significant inputs to the variable demand model system used to derive highway demand include, but are not limited to:

- Department for Transport Road Traffic Forecasts (2018 release) used for growth of LGV, HGV, and external-external trips, and external network speeds.

- WebTAG Databook (July 2019 version) used for values of time, vehicle operating costs, and other economic parameters.

2 Do-Something Assumptions

2.1 Services Stopping at New P&R Station

In general, services that are operated by Transport for Wales (TfW) are assumed to stop at the new P&R station whereas services of other operators are not, with a few exceptions. This results in a service frequency of approximately 3 trains per hour in each direction. Full details on which services are assumed to stop can be found in Appendix A.

2.2 Station Access

2.2.1 Public Transport Access

Walkable connectors have been added between the new park and ride site and the modelled development "Land to the South of Junction 34 M4 Hensol (Strategic & Local)", since this development is modelled as introducing 3,000 new jobs in the alternate scenario (see Table 1). A walkable connector has also been added between the new park and ride station and Hensol Castle bus stop, to allow connections to bus route 320 to Talbot Green. No consideration has been given to any rerouting of this bus route to stop at the new park and ride station, or to additional bus routes.

2.2.2 Highway Access

Both the park and ride car park, and the new development have been connected to the highway network via the same access point as the existing Renishaw employment site south of M4 Junction 34.

2.3 Parking Spaces

A total of 500 car parking spaces are assumed at the new P&R station. It should be noted that the number of spaces is used as a model attraction variable but does not provide an explicit cap on the number of P&R trips which access the rail network via the specific station. A logarithmic function is applied to the number of spaces. Therefore, each additional space is worth less in terms of attractiveness the larger an existing car park.

A. Services Via New Station

Table 2: Services via New P&R Station Location

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
1	03:52	07:32	3h 40	Swansea	London Paddington	East	Other	05:01	No
2	04:58	08:02	3h 4	Swansea	London Paddington	East	Other	05:52	No
3	05:27	08:33	3h 6	Swansea	London Paddington	East	Other	06:21	No
4	05:03	10:14	5h 11	Carmarthen	Manchester Piccadilly	East	TfW	06:43	Yes
5	05:58	08:54	2h 56	Swansea	London Paddington	East	Other	06:52	No
6	06:23	09:11	2h 48	Swansea	London Paddington	East	Other	07:13	No
7	06:39	08:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	07:33	Yes
8	06:41	07:41	1h	Swansea	Cardiff Central	East	TfW	07:41	Yes
9	05:47	07:48	2h 1	Carmarthen	Cardiff Central	East	TfW	07:48	Yes
10	06:15	11:15	5h	Carmarthen	Manchester Piccadilly	East	TfW	08:02	Yes
11	07:23	10:11	2h 48	Swansea	London Paddington	East	Other	08:13	No
12	07:39	09:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	08:33	Yes
13	05:55	12:15	6h 20	Milford Haven	Manchester Piccadilly	East	TfW	08:39	Yes
14	07:41	08:41	1h	Swansea	Cardiff Central	East	TfW	08:41	Yes
15	07:23	11:11	3h 48	Carmarthen	London Paddington	East	Other	09:13	No
16	08:39	10:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	09:33	Yes
17	08:41	09:41	1h	Swansea	Cardiff Central	East	TfW	09:41	Yes
18	07:05	13:15	6h 10	Milford Haven	Manchester Piccadilly	East	TfW	09:44	Yes
19	09:23	12:11	2h 48	Swansea	London Paddington	East	Other	10:13	No
20	06:59	10:34	3h 35	Pembroke Dock	Newport (S Wales)	East	TfW	10:18	No
21	09:39	11:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	10:33	Yes
22	05:16	10:41	5h 25	Shrewsbury	Cardiff Central	East	TfW	10:41	Yes
23	09:41	10:41	1h	Swansea	Cardiff Central	East	TfW	10:41	Yes
24	07:50	14:15	6h 25	Fishguard Harbour	Manchester Piccadilly	East	TfW	10:48	Yes
25	10:23	13:11	2h 48	Swansea	London Paddington	East	Other	11:13	No
26	10:39	12:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	11:33	Yes
27	10:41	11:41	1h	Swansea	Cardiff Central	East	TfW	11:41	Yes

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
28	09:08	15:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	11:46	Yes
29	11:23	14:11	2h 48	Swansea	London Paddington	East	Other	12:13	No
30	11:10	12:18	1h 8	Swansea	Cardiff Central	East	TfW	12:18	No
31	11:39	13:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	12:33	Yes
32	11:41	12:41	1h	Swansea	Cardiff Central	East	TfW	12:41	Yes
33	11:03	16:15	5h 12	Carmarthen	Manchester Piccadilly	East	TfW	12:48	Yes
34	12:23	15:11	2h 48	Swansea	London Paddington	East	Other	13:13	No
35	12:39	14:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	13:33	Yes
36	12:41	13:41	1h	Swansea	Cardiff Central	East	TfW	13:41	Yes
37	11:08	17:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	13:47	Yes
38	13:23	16:11	2h 48	Swansea	London Paddington	East	Other	14:13	No
39	09:00	14:15	5h 15	Shrewsbury	Cardiff Central	East	TfW	14:15	Yes
40	13:39	15:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	14:33	Yes
41	13:41	14:41	1h	Swansea	Cardiff Central	East	TfW	14:41	Yes
42	13:02	18:15	5h 13	Carmarthen	Manchester Piccadilly	East	TfW	14:47	Yes
43	14:23	17:11	2h 48	Swansea	London Paddington	East	Other	15:13	No
44	14:39	16:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	15:33	Yes
45	14:41	15:41	1h	Swansea	Cardiff Central	East	TfW	15:41	Yes
46	13:08	19:15	6h 7	Milford Haven	Manchester Piccadilly	East	TfW	15:47	Yes
47	13:29	15:58	2h 29	Fishguard Harbour	Cardiff Central	East	TfW	15:58	Yes
48	15:23	18:11	2h 48	Swansea	London Paddington	East	Other	16:13	No
49	15:39	17:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	16:33	Yes
50	15:41	16:41	1h	Swansea	Cardiff Central	East	TfW	16:41	Yes
51	15:03	20:15	5h 12	Carmarthen	Manchester Piccadilly	East	TfW	16:46	Yes
52	16:23	19:11	2h 48	Swansea	London Paddington	East	Other	17:13	No
53	16:39	18:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	17:33	Yes
54	16:41	17:41	1h	Swansea	Cardiff Central	East	TfW	17:41	Yes
55	15:08	21:06	5h 58	Milford Haven	Manchester Piccadilly	East	TfW	17:46	Yes
56	17:23	20:11	2h 48	Swansea	London Paddington	East	Other	18:13	No
57	16:45	21:19	4h 34	Llanelli	Chester	East	TfW	18:14	Yes

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
58	17:39	19:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	18:33	Yes
59	17:41	18:41	1h	Swansea	Cardiff Central	East	TfW	18:41	Yes
60	16:58	22:13	5h 15	Carmarthen	Manchester Piccadilly	East	TfW	18:49	Yes
61	18:28	21:32	3h 4	Swansea	London Paddington	East	Other	19:22	No
62	18:39	20:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	19:33	Yes
63	17:08	20:03	2h 55	Milford Haven	Cardiff Central	East	TfW	20:03	Yes
64	19:29	22:49	3h 20	Swansea	London Paddington	East	Other	20:22	No
65	18:50	20:46	1h 56	Carmarthen	Cardiff Central	East	TfW	20:46	Yes
66	20:28	22:25	1h 57	Swansea	Swindon	East	Other	21:22	No
67	20:39	22:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	21:33	Yes
68	19:11	21:54	2h 43	Milford Haven	Cardiff Central	East	TfW	21:54	Yes
69	19:57	22:49	2h 52	Tenby	Cardiff Central	East	TfW	22:49	Yes
70	22:39	00:36	1h 57	Maesteg	Ebbw Vale Town	East	TfW	23:33	Yes
71	22:32	23:38	1h 6	Swansea	Cardiff Central	East	TfW	23:38	Yes
72	05:37	08:43	3h 6	Cardiff Central	Milford Haven	West	TfW	05:37	Yes
73	06:42	10:18	3h 36	Cardiff Central	Pembroke Dock	West	TfW	06:42	Yes
74	07:14	08:15	1h 1	Cardiff Central	Swansea	West	TfW	07:14	Yes
75	06:29	08:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	07:30	Yes
76	05:40	08:26	2h 46	London Paddington	Swansea	West	Other	07:34	No
77	04:54	10:57	6h 3	Crewe	Milford Haven	West	TfW	07:50	Yes
78	08:14	09:15	1h 1	Cardiff Central	Swansea	West	TfW	08:14	Yes
79	07:29	09:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	08:30	Yes
80	06:40	09:26	2h 46	London Paddington	Swansea	West	Other	08:34	No
81	05:55	10:51	4h 56	Crewe	Carmarthen	West	TfW	09:04	Yes
82	09:14	10:15	1h 1	Cardiff Central	Swansea	West	TfW	09:14	Yes
83	08:29	10:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	09:30	Yes
84	07:40	10:26	2h 46	London Paddington	Swansea	West	Other	09:34	No
85	06:30	12:48	6h 18	Manchester Piccadilly	Milford Haven	West	TfW	10:04	Yes
86	10:14	11:15	1h 1	Cardiff Central	Swansea	West	TfW	10:14	Yes
87	09:29	11:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	10:30	Yes
88	08:40	11:26	2h 46	London Paddington	Swansea	West	Other	10:34	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
89	07:30	12:26	4h 56	Manchester Piccadilly	Carmarthen	West	TfW	10:42	Yes
90	10:40	13:27	2h 47	Newport (S Wales)	Fishguard Harbour	West	TfW	10:58	No
91	11:14	12:15	1h 1	Cardiff Central	Swansea	West	TfW	11:14	Yes
92	10:29	12:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	11:30	Yes
93	09:40	12:26	2h 46	London Paddington	Swansea	West	Other	11:34	No
94	08:30	14:31	6h 1	Manchester Piccadilly	Milford Haven	West	TfW	11:38	Yes
95	12:14	13:15	1h 1	Cardiff Central	Swansea	West	TfW	12:14	Yes
96	11:29	13:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	12:30	Yes
97	10:40	13:26	2h 46	London Paddington	Swansea	West	Other	12:34	No
98	09:30	14:30	5h	Manchester Piccadilly	Carmarthen	West	TfW	12:39	Yes
99	13:14	14:15	1h 1	Cardiff Central	Swansea	West	TfW	13:14	Yes
100	12:29	14:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	13:30	Yes
101	11:40	14:26	2h 46	London Paddington	Swansea	West	Other	13:34	No
102	10:30	16:29	5h 59	Manchester Piccadilly	Milford Haven	West	TfW	13:41	Yes
103	14:14	15:15	1h 1	Cardiff Central	Swansea	West	TfW	14:14	Yes
104	13:29	15:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	14:30	Yes
105	12:40	15:26	2h 46	London Paddington	Swansea	West	Other	14:34	No
106	11:30	16:30	5h	Manchester Piccadilly	Carmarthen	West	TfW	14:43	Yes
107	10:40	16:41	6h 1	Holyhead	Llanelli	West	TfW	15:13	No
108	15:14	16:15	1h 1	Cardiff Central	Swansea	West	TfW	15:14	Yes
109	14:29	16:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	15:30	Yes
110	13:40	16:26	2h 46	London Paddington	Swansea	West	Other	15:34	No
111	12:30	18:31	6h 1	Manchester Piccadilly	Milford Haven	West	TfW	15:39	Yes
112	14:45	18:56	4h 11	Gloucester	Fishguard Harbour	West	TfW	16:04	No
113	16:14	17:15	1h 1	Cardiff Central	Swansea	West	TfW	16:14	Yes
114	15:29	17:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	16:30	Yes
115	14:40	17:26	2h 46	London Paddington	Swansea	West	Other	16:34	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
116	13:30	19:52	6h 22	Manchester Piccadilly	Tenby	West	TfW	17:04	Yes
117	17:14	18:15	1h 1	Cardiff Central	Swansea	West	TfW	17:14	Yes
118	16:29	18:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	17:30	Yes
119	15:40	18:26	2h 46	London Paddington	Swansea	West	Other	17:34	No
120	14:30	20:32	6h 2	Manchester Piccadilly	Milford Haven	West	TfW	17:40	Yes
121	18:14	19:15	1h 1	Cardiff Central	Swansea	West	TfW	18:14	Yes
122	17:29	19:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	18:30	Yes
123	16:40	19:26	2h 46	London Paddington	Swansea	West	Other	18:34	No
124	15:30	20:55	5h 25	Manchester Piccadilly	Carmarthen	West	TfW	19:04	Yes
125	17:15	21:22	4h 7	London Paddington	Carmarthen	West	Other	19:29	No
126	18:29	20:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	19:30	Yes
127	16:30	22:46	6h 16	Manchester Piccadilly	Milford Haven	West	TfW	19:46	Yes
128	17:45	20:47	3h 2	London Paddington	Swansea	West	Other	19:52	No
129	18:15	21:19	3h 4	London Paddington	Swansea	West	Other	20:25	No
130	18:45	21:50	3h 5	London Paddington	Swansea	West	Other	20:54	No
131	21:04	00:21	3h 17	Cardiff Central	Milford Haven	West	TfW	21:04	Yes
132	19:15	22:20	3h 5	London Paddington	Swansea	West	Other	21:24	No
133	20:29	22:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	21:30	Yes
134	18:30	23:57	5h 27	Manchester Piccadilly	Carmarthen	West	TfW	22:09	Yes
135	20:15	23:22	3h 7	London Paddington	Swansea	West	Other	22:26	No
136	19:30	01:40	6h 10	Manchester Piccadilly	Carmarthen	West	TfW	23:15	Yes
137	22:29	00:22	1h 53	Ebbw Vale Town	Maesteg	West	TfW	23:30	Yes
138	21:15	00:25	3h 10	London Paddington	Neath	West	Other	23:43	No
139	21:15	00:39	3h 24	London Paddington	Swansea	West	Other	23:43	No
140	22:45	02:16	3h 31	London Paddington	Swansea	West	Other	01:17	No

	Dep	Arr	Dur	From	To	Dir	Operator	Time at Cardiff Central	Stop?
141	22:45	02:07	3h 22	London Paddington	Neath	West	Other	01:25	No

Vale of Glamorgan Gateway Station
Updated 10/10/2019

SEWTM Variable Demand Run Details

Do-Minimum (DM) Core Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added (unused in this scenario)
Demand:	Re-distributed LDP development 2026 (amended September 2019) *'Near certain' + 'More than likely' uncertainty log categories only* *(does not include former adjacent site redevelopment)*

Do-Minimum (DM) Alternative Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added (unused in this scenario)
Demand:	Re-distributed LDP development 2026 (amended September 2019) *ALL four uncertainty log categories* *(i.e. includes former adjacent site redevelopment)*

Do-Something (DS) Core Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added Highway access from southern (unclassified) arm at M4 J34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand:	Re-distributed LDP development 2026 (amended September 2019) *'Near certain' + 'More than likely' uncertainty log categories only* *(does not include former adjacent site redevelopment)*

Do-Something (DS) Alternative Demographic Scenario

Networks:	A470/M4 WelTAG Stage 2 Do-Minimum 2026 [Includes Metro Phase 2 (with CVL transformation) & Eastern Bay Link Phase 1]
Amendments:	New zone for VoG Gateway station added Highway access from southern (unclassified) arm at M4 J34 All passing TfW services to call at new station (approx. 2-3 tph in each direction) 500-space P&R at new station
Demand:	Re-distributed LDP development 2026 (amended September 2019) *ALL four uncertainty log categories* *(i.e. includes former adjacent site redevelopment)*

IUM SCENARIOS 2026

Core Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	0	-	0	-	0	0
AM	Pontyclun	29	45%	44	45%	0	14
AM	Llanharan	19	32%	25	28%	3	18
AM	Pencoed	24	96%	42	95%	0	4
AM	Bridgend	202	63%	178	61%	28	93
IP	J34 P&R	0	-	0	-	0	0
IP	Pontyclun	5	60%	6	50%	0	3
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	100%	6	100%	0	2
IP	Bridgend	49	63%	40	65%	25	22
PM	J34 P&R	0	-	0	-	0	0
PM	Pontyclun	9	44%	47	45%	0	22
PM	Llanharan	6	17%	29	31%	0	5
PM	Pencoed	14	93%	43	98%	0	2
PM	Bridgend	222	64%	197	63%	39	95
OP	J34 P&R	0	-	0	-	0	0
OP	Pontyclun	5	60%	15	47%	0	3
OP	Llanharan	3	33%	7	29%	0	2
OP	Pencoed	5	100%	9	100%	0	3
OP	Bridgend	38	66%	90	62%	13	25

**N.B. Colour bars not show for Bridgend due to significantly higher passenger volumes*

		All entries/exits
24 hr	J34 P&R	0
	Pontyclun	706
	Llanharan	402
	Pencoed	551
	Bridgend	4597
Annual	J34 P&R	-
	Pontyclun	257,588
	Llanharan	146,552
	Pencoed	201,053
	Bridgend	1,677,875

Alt Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	0	-	0	-	0	0
AM	Pontyclun	28	46%	44	43%	0	15
AM	Llanharan	18	33%	25	28%	3	18
AM	Pencoed	22	95%	40	95%	0	4
AM	Bridgend	192	64%	180	58%	28	99
IP	J34 P&R	0	-	0	-	0	0
IP	Pontyclun	5	60%	6	50%	0	3
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	100%	6	100%	0	2
IP	Bridgend	49	61%	40	63%	25	23
PM	J34 P&R	0	-	0	-	0	0
PM	Pontyclun	9	44%	46	46%	0	22
PM	Llanharan	6	17%	28	32%	0	4
PM	Pencoed	13	92%	41	95%	0	2
PM	Bridgend	222	62%	187	64%	38	100
OP	J34 P&R	0	-	0	-	0	0
OP	Pontyclun	5	60%	15	47%	0	3
OP	Llanharan	3	33%	7	29%	0	2
OP	Pencoed	5	100%	9	100%	0	3
OP	Bridgend	38	63%	87	62%	12	26

		All entries/exits
24 hr	J34 P&R	0
	Pontyclun	704
	Llanharan	396
	Pencoed	537
	Bridgend	4563
Annual	J34 P&R	-
	Pontyclun	256,828
	Llanharan	144,359
	Pencoed	196,083
	Bridgend	1,665,429

DO-SOMETHING SCENARIOS 2036

Core Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	63	100%	2	100%	6	0
AM	Pontyclun	24	38%	39	38%	0	22
AM	Llanharan	17	29%	24	25%	0	17
AM	Pencoed	20	95%	38	92%	0	3
AM	Bridgend	196	61%	179	58%	24	95
IP	J34 P&R	4	100%	4	100%	5	1
IP	Pontyclun	4	50%	5	40%	0	4
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	80%	6	100%	0	2
IP	Bridgend	48	63%	40	63%	18	23
PM	J34 P&R	4	100%	48	100%	7	1
PM	Pontyclun	10	30%	39	38%	0	25
PM	Llanharan	6	17%	25	28%	0	3
PM	Pencoed	14	86%	37	95%	0	4
PM	Bridgend	219	63%	192	61%	30	95
OP	J34 P&R	2	100%	5	100%	0	0
OP	Pontyclun	5	40%	13	38%	0	3
OP	Llanharan	3	33%	6	33%	0	2
OP	Pencoed	4	100%	7	100%	0	4
OP	Bridgend	36	64%	86	60%	13	27

**N.B. Colour bars not show for Bridgend due to significantly higher passenger volumes*

		All entries/exits	*P&R entries/exits*	*non-P&R*	
24 hr	J34 P&R	375	*367*	*8*	
	Pontyclun	662			
	Llanharan	369			
	Pencoed	500			
	Bridgend	4523			
			P&R entries/exits	*non-P&R*	*2,950*
Annual	J34 P&R	136,919	*133,969*		
	Pontyclun	241,522			- 16,066
	Llanharan	134,556			- 11,996
	Pencoed	182,472			- 18,581
	Bridgend	1,650,795			- 27,080
					- **73,724**

Forecast change from DM	% change from DM
-6%	
-8%	
-9%	
-2%	

P&R patronage achievable in scenario without added congestion caused by new development adjacent to J34

2026 forecast patronage with new development adjacent to J34, on the assumption that congestion problems associated with the new development can be mitigated:

24-hr	594
Annual	**216,982**

Alt Demographic Scenario

Time Period	Station	Origin (Passengers)	Origin (% P&R)	Destination (Passengers)	Destination (% P&R)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	22	91%	31	3%	6	0
AM	Pontyclun	26	42%	40	43%	0	22
AM	Llanharan	17	29%	24	25%	0	17
AM	Pencoed	21	95%	38	95%	0	3
AM	Bridgend	190	63%	181	57%	26	96
IP	J34 P&R	5	20%	5	20%	5	1
IP	Pontyclun	4	50%	6	50%	0	5
IP	Llanharan	3	33%	4	25%	0	1
IP	Pencoed	5	80%	6	100%	0	2
IP	Bridgend	48	63%	40	63%	18	24
PM	J34 P&R	28	4%	18	83%	8	0
PM	Pontyclun	9	44%	42	43%	0	25
PM	Llanharan	6	17%	26	31%	0	3
PM	Pencoed	13	92%	39	92%	0	4
PM	Bridgend	219	63%	187	63%	30	98
OP	J34 P&R	3	33%	3	33%	0	0
OP	Pontyclun	5	40%	13	46%	0	4
OP	Llanharan	3	33%	6	33%	0	2
OP	Pencoed	4	100%	8	100%	0	3
OP	Bridgend	36	67%	85	62%	12	27

		All entries/exits	*P&R*	*non-P&R*	
24 hr	J34 P&R	337	*110*	*227*	
	Pontyclun	696			
	Llanharan	371			
	Pencoed	504			
	Bridgend	4506			
			P&R	*non-P&R*	
Annual	J34 P&R	123,165	*40,153*	*83,013*	
	Pontyclun	254,184			- 2,643
	Llanharan	135,317			- 9,043
	Pencoed	183,904			- 12,179
	Bridgend	1,644,703			- 20,726
					- **44,591**

Forecast change from DM	% change from DM
-1%	
-6%	
-6%	
-1%	

P&R demand reduces significantly with new adjacent development

Patronage associated with new development adjacent to J34

DM-DS (Core Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	63	2	6	0
AM	Pontyclun	-5	-5	0	8
AM	Llanharan	-2	-1	-3	-1
AM	Pencoed	-4	-4	0	-1
AM	Bridgend	-6	1	-4	2
IP	J34 P&R	4	4	5	1
IP	Pontyclun	-1	-1	0	1
IP	Llanharan	0	0	0	0
IP	Pencoed	0	0	0	0
IP	Bridgend	-1	0	-7	1
PM	J34 P&R	4	48	7	1
PM	Pontyclun	1	-8	0	3
PM	Llanharan	0	-4	0	-2
PM	Pencoed	0	-6	0	2
PM	Bridgend	-3	-5	-9	0
OP	J34 P&R	2	5	0	0
OP	Pontyclun	0	-2	0	0
OP	Llanharan	0	-1	0	0
OP	Pencoed	-1	-2	0	1
OP	Bridgend	-2	-4	0	2

DM-DS (Alt Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	22	31	6	0
AM	Pontyclun	-2	-4	0	7
AM	Llanharan	-1	-1	-3	-1
AM	Pencoed	-1	-2	0	-1
AM	Bridgend	-2	1	-2	-3
IP	J34 P&R	5	5	5	1
IP	Pontyclun	-1	0	0	2
IP	Llanharan	0	0	0	0
IP	Pencoed	0	0	0	0
IP	Bridgend	-1	0	-7	1
PM	J34 P&R	28	18	8	0
PM	Pontyclun	0	-4	0	3
PM	Llanharan	0	-2	0	-1
PM	Pencoed	0	-2	0	2
PM	Bridgend	-3	0	-8	-2
OP	J34 P&R	3	3	0	0
OP	Pontyclun	0	-2	0	1
OP	Llanharan	0	-1	0	0
OP	Pencoed	-1	-1	0	0
OP	Bridgend	-2	-2	0	1

DM-DS (Core Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	-	-	-	-
AM	Pontyclun	17.2%	-16.3%	-11.4%	-15.4%
AM	Llanharan	10.5%	-6.9%	-4.0%	-10.7%
AM	Pencoed	16.7%	-0.9%	-9.5%	-3.3%
AM	Bridgend	-3.0%	-2.6%	0.6%	-4.2%
IP	J34 P&R	-	-	-	-
IP	Pontyclun	20.0%	-16.7%	-16.7%	-20.0%
IP	Llanharan	0.0%	0.0%	0.0%	0.0%
IP	Pencoed	0.0%	-20.0%	0.0%	0.0%
IP	Bridgend	-2.0%	-1.2%	0.0%	-3.8%
PM	J34 P&R	-	-	-	-
PM	Pontyclun	11.1%	-32.5%	-17.0%	-13.9%
PM	Llanharan	0.0%	0.0%	-13.8%	-9.8%
PM	Pencoed	0.0%	-7.7%	-14.0%	-3.2%
PM	Bridgend	-1.4%	-1.5%	-2.5%	-3.1%
OP	J34 P&R	-	-	-	-
OP	Pontyclun	0.0%	-33.3%	-13.3%	-17.6%
OP	Llanharan	0.0%	0.0%	-14.3%	16.7%
OP	Pencoed	20.0%	0.0%	-22.2%	0.0%
OP	Bridgend	-5.3%	-2.9%	-4.4%	-2.8%

DM-DS (Alt Demographic Scenario)

Time Period	Station	Origin (Passengers)	Destination (Passengers)	Direct Rail Transfers	Other Transfers
AM	J34 P&R	-	-	-	-
AM	Pontyclun	-7.1%	-8.9%	-9.1%	-1.6%
AM	Llanharan	-5.6%	-11.8%	-4.0%	-10.7%
AM	Pencoed	-4.5%	-0.2%	-5.0%	-0.3%
AM	Bridgend	-1.0%	-0.6%	0.6%	-1.5%
IP	J34 P&R	-	-	-	-
IP	Pontyclun	20.0%	-16.7%	0.0%	0.0%
IP	Llanharan	0.0%	0.0%	0.0%	0.0%
IP	Pencoed	0.0%	-20.0%	0.0%	0.0%
IP	Bridgend	-2.0%	2.1%	0.0%	0.0%
PM	J34 P&R	-	-	-	-
PM	Pontyclun	0.0%	0.0%	-8.7%	-6.1%
PM	Llanharan	0.0%	0.0%	-7.1%	-4.3%
PM	Pencoed	0.0%	0.0%	-4.9%	-3.0%
PM	Bridgend	-1.4%	0.6%	0.0%	-1.7%
OP	J34 P&R	-	-	-	-
OP	Pontyclun	0.0%	-33.3%	-13.3%	-1.1%
OP	Llanharan	0.0%	0.0%	-14.3%	16.7%
OP	Pencoed	20.0%	0.0%	-11.1%	0.0%
OP	Bridgend	-5.3%	5.6%	-2.3%	0.5%

SEWTM public transport peak period to hour factors	
AM	1.84162
IP	6
PM	2.08333
OP	13

Assumed day to annual

Annual 365 Mon-Sat *(assumption is that major events in Cardiff at weekends allow full annualisation to count 365 days)*

This is not a fixed factor and can be amended

TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES

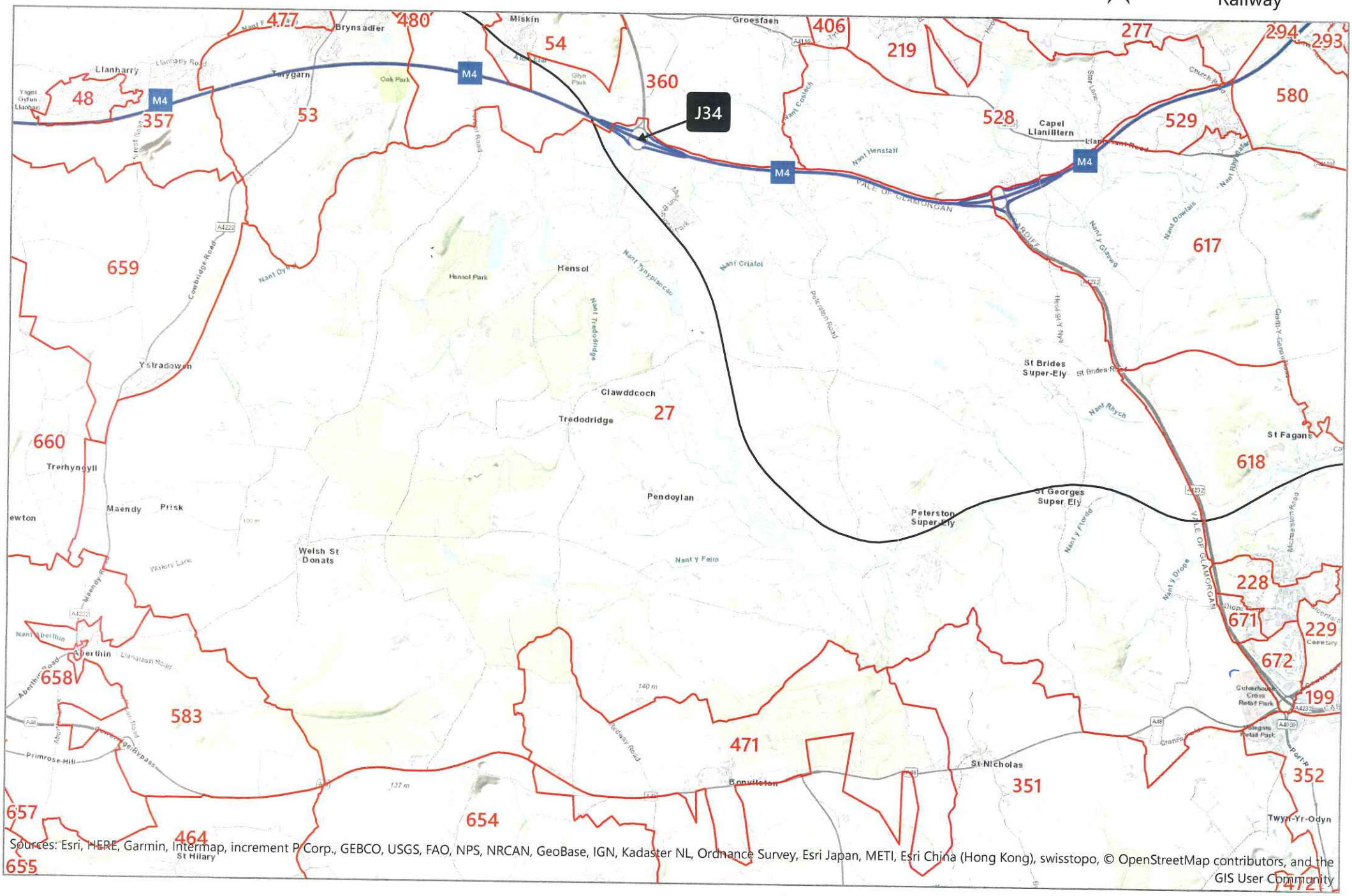
SEWTM Zone 27

0 0.5 1 1.5 2 Km

N

SEWTM Zones

Railway

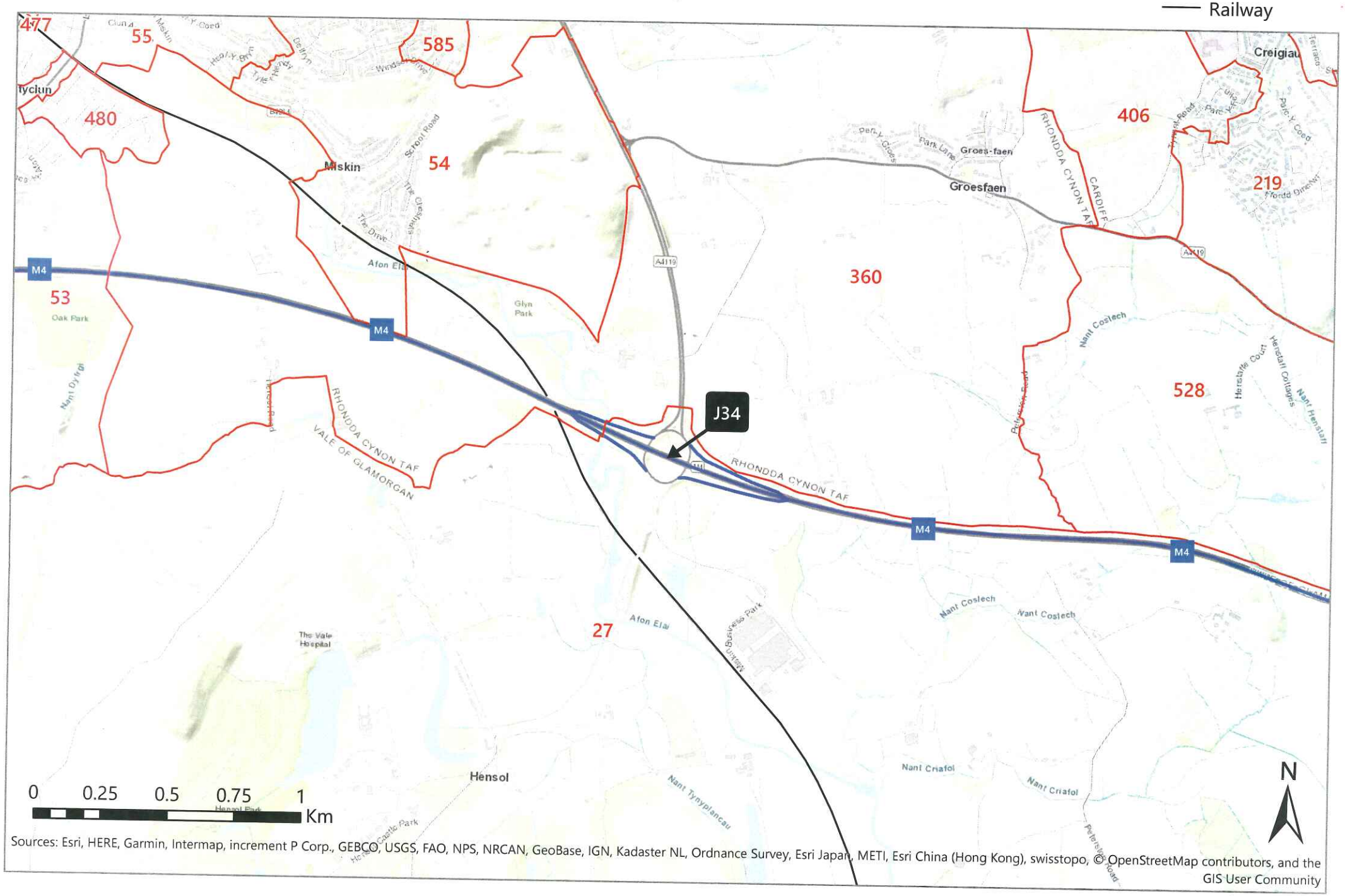


Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

TRAFNIDIAETH CYMRU
TRANSPORT FOR WALES

M4 J34 (Miskin) SEWTM Zones

SEWTM Zones
Railway



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

APPENDIX E

Initial Timetable Study

Tracsis plc
Operations and Planning Systems

Vale of Glamorgan Gateway Station

Initial Timetable Feasibility Study

11 April 2019 v1.0

Document Control	
File name	Arcadis – Vale of Glamorgan Gateway Station – Initial Timetable Feasibility Study v1.0
Version number	1.0
Version date	10th April 2019
Author	Graham Ward and Jonathan Barker
Reviewed By	Jonathan Barker and Jon Owen

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i. Executive Summary

Tracsis Rail Consultancy (TRC) have been commissioned by Arcadis to review the high-level implications of the introduction of a new railway station on the May 2019 timetable. The new station will be called *Vale of Glamorgan Gateway* and is planned to be situated in the Miskin loop, East of Pontyclun. A primary stakeholder aspiration is that *at least* 20 TfW (Transport for Wales) services per day, in each direction, will call at the station providing additional connectivity to Cardiff Central.

We have analysed three two-hour sample periods to gain an understanding of the timetable structure, and subsequent impact of adding calls at the new station to existing services, in the AM Peak, Off-Peak and PM Peak.

The report has been divided into two work package options:

- **Work Package 1**: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun
- **Work Package 2**: Adding *Vale of Glamorgan* station calls to all TfW services that pass Miskin loop

Although we have only considered the immediate impact between Cardiff Central and Bridgend, the key issues will include the following:

- Maesteg services currently have a very tight turnround at Maesteg and sometimes come from other single line sections (e.g. Ebbw Vale). Adding an additional call will require these services to be retimed
- Presentation at crossing points on single line sections may change, which would require retiming to other services (e.g. Ebbw Vale or Milford Haven)
- Presentation times at Cardiff Central will likely need to be amended. This may have significant implications for the long-distance services that may need to be re-timed (heading to Manchester or Milford Haven for example)
- Presentation and turnround times at Swansea will be affected. This could impact the station working margins which will result in further re-timings
- Some freight services that currently utilise the Miskin loop would need to be re-timed. This will be exacerbated on days of the week where the freight provision increases.

The level of impact, with regards to re-timing existing services, depends upon the confirmation of operational assumptions. Examples of these would be; the likely Sectional Running Times for calling at the station, required dwell time, potential line speed improvements on the Miskin loop. Reducing the additional time required to call at the station will mitigate the impact on the existing timetable as would providing higher speed switches into, out of and within the loop.

It would not appear possible to include station calls at the new station without significant amendment of the timetable as the additional required time cannot be absorbed by the current planning margins and turnrounds.

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iv. Glossary of Abbreviations and Acronyms

Abbreviation	Description
Down	Line or train coming from London
Up	Line or train heading towards London
ECS	Empty Coaching Stock
SO	Saturday only
SuO	Sunday only
SX	Saturday excepted (operates Monday – Friday)
TRC	Tracsis Rail Consultancy
TfW	Transport for Wales
ThO	Thursday only
WO	Wednesday only
WTT	Working Time Table (trains that are booked to run on a regular basis, rather than being run at short notice)

1. Introduction

Tracsis Rail Consultancy (TRC) have been commissioned by Arcadis to review the high-level implications of the introduction of a new railway station on the May 2019 timetable. The new station will be called *Vale of Glamorgan Gateway* and is planned to be situated in the Miskin loop, East of Pontyclun (approximate location shown below in figure 1). A primary stakeholder aspiration is that *at least* 20 TfW (Transport for Wales) services per day, in each direction, will call at the station providing additional connectivity to Cardiff Central.

We have analysed three two-hour sample periods of an SX operating day (WO) to gain an understanding of the timetable structure, and subsequent impact of adding calls at the new station to existing services, in the AM Peak, Off-Peak and PM Peak.

Figure 1. Vale of Glamorgan Gateway station - proposed location (Google Maps)

The report has been divided into two work package options:

- **Work Package 1**: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun
    - AM Peak (07:00 – 09:00)
    - Off-Peak (12:00 – 14:00)
    - PM Peak (16:00 – 18:00)
- **Work Package 2**: Adding *Vale of Glamorgan* station calls to all TfW services
    - AM Peak (07:00 – 09:00)
    - Off-Peak (12:00 – 14:00)
    - PM Peak (16:00 – 18:00)

We have also assessed the current freight provision at Miskin loop during the above time bands, as well as throughout the entire week to ascertain what the full impact may be. Freight services will not

be able to utilise Miskin loop at the same time as passenger services call at the new station so it is necessary to understand the impact of this over the entire week.

2. Methodology

2.1 Data Used

The May 2019 National Timetable, as issued by Network Rail, has been used. We have filtered the timetable to show all services that run through either Bridgend, Cardiff Central, Carmarthen and/or Swansea on Wednesdays (thus reflecting the general SX provision).

The specific date that we have referenced on the train planning graphs is Wednesday 12th June 2019.

We have referenced the Network Rail Engineering Access Statement 2019 Version 4.3 and the Network Rail Western and Wales Timetable Planning Rules Version 4.3.

2.2 Assumptions

As part of this work, we have made the following assumptions:

- Sectional Running Times for the new station have not been provided or calculated. We have therefore estimated that an additional 4 minutes will be required. This is broken down as the following:
    - 1.0 minute to slow down before stopping.
    - 1.0 minute dwell at the station.
    - 1.0 minute to accelerate after stopping.
    - 1.0 minute to account for the current TPR requirement of 2.0 minutes adjustment time approaching Miskin loop which is necessary to allow for the 15 mph line speed on the loop.
- Miskin Loop is the site of the proposed station and is used to describe the running times.
- In the Up direction this equates to 5.0 minutes Start to Stop from Pontyclun to Miskin Loop (including 2.0 minutes adjustment), 1.0 minute station dwell and 8.0 minutes Start to Pass from Miskin to Leckwith Loop North Junction. This has been used consistently, even when a service does not call at Pontyclun.
- In the Down direction this equates to 10.0 minutes Pass to Stop Leckwith Loop North Junction to Miskin (including 2.0 minutes adjustment), 1.0 minute station dwell and 3.0 minutes Start to Stop Miskin to Pontyclun. This has been used consistently, even when a service does not call at Pontyclun.
- There is currently no means for crossing other passenger services between Bridgend (Llynfi Junction) and Maesteg, although there is a freight loop just north of Tondu.

2.3 Scope of Study

The principle area of study is the section of line between Cardiff Central and Bridgend to identify how the proposed station could impact services on the route. We have referenced locations outside of this area but have not focused on them in detail as these locations may not have been picked up

by the filter criteria when the National Timetable data was cut (hence other interacting trains will not be featured in our timetable).

The geographical scope of study can be seen in figure 2.

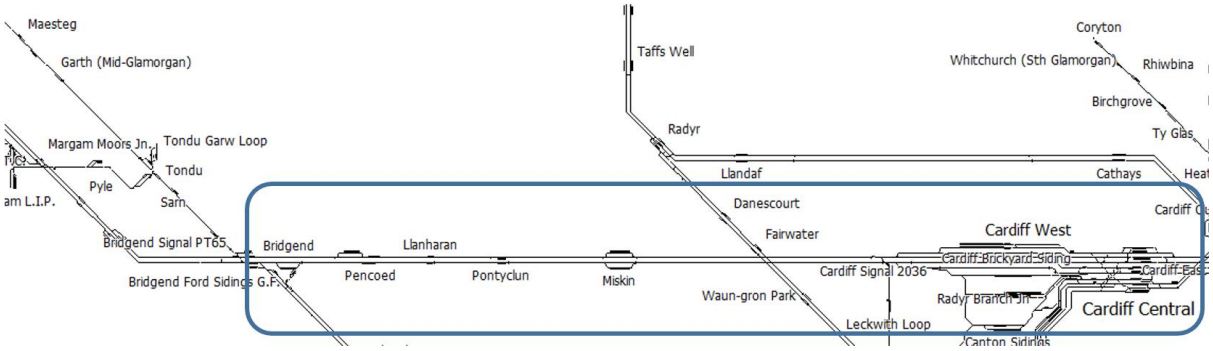


Figure 2. Geographical scope of study

2.4 Software Used

TRC have used Tracsis Consultancy Tools software to cut the National Timetable and Bellvedi ATTUne timetable planning software to view the timetable data.

3. Detailed Findings

Work Package 1: Adding *Vale of Glamorgan* station calls to existing TfW services that call at Pontyclun

AM Peak (07:00 – 09:00)

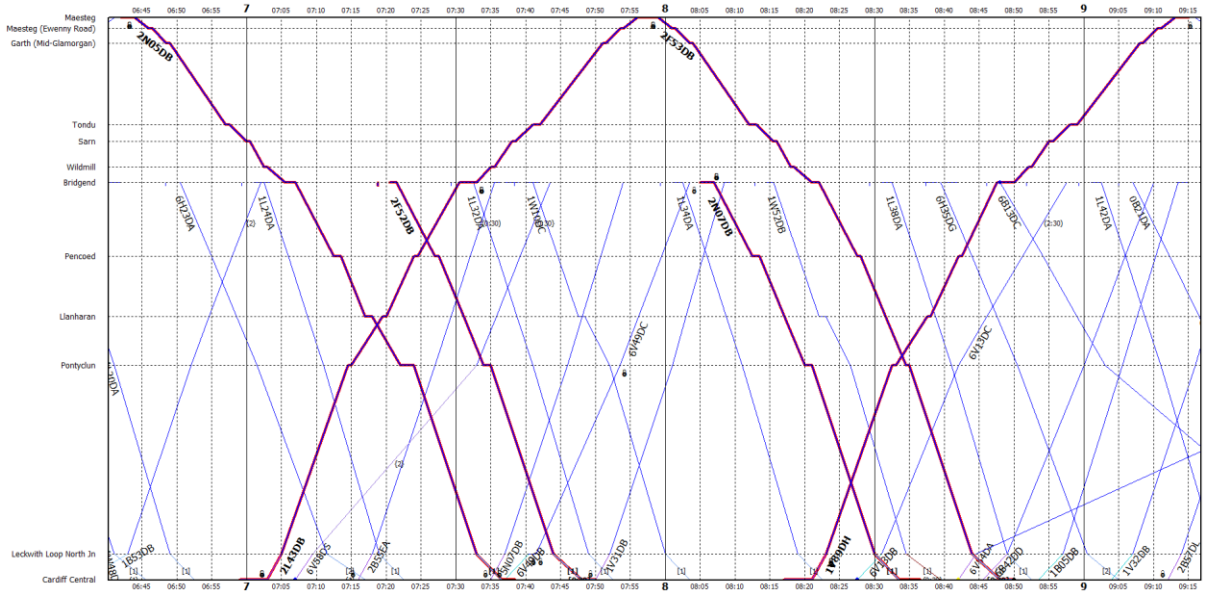


Figure 3. Existing AM Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Six services that call at Pontyclun would require an additional call at the proposed new station (as highlighted in figure 3). There are four in the Up direction and two in the Down direction. These services have a variety of origins and destinations (including; Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Shrewsbury, Maesteg and Ebbw Vale Town).

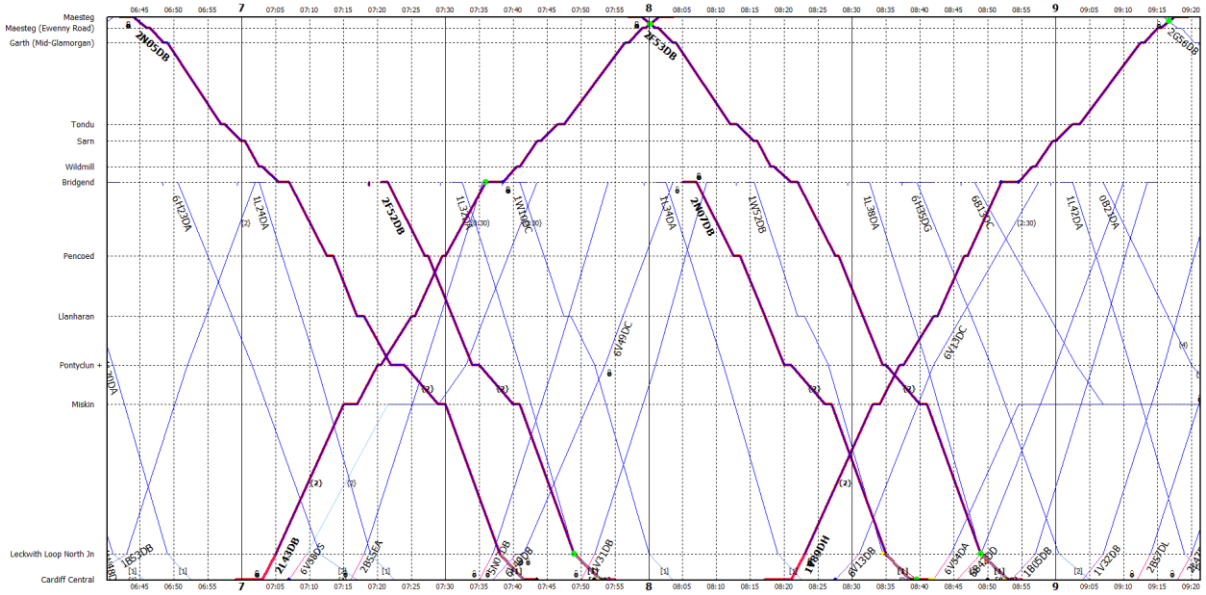


Figure 4. Amended AM Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which would

cause a conflict with the following service) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a three minute turnround at Maesteg which is very tight. It would not be feasible to compress this any further.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. This may or may not present an issue depending on whether or not there is a sufficient margin behind the existing path from Maesteg. An example of where there would not be a sufficient margin is the 2F53 (07:59 Maesteg – Cardiff Central) service which is followed by 1L38 (07:59 Swansea – London Paddington).

There are other similar issues with services that originate from the west.

2F52 (05:46 Carmarthen – Cardiff Central) service would need to run earlier in order to avoid delaying 1L32 (06:59 Swansea – London Paddington) on the approach to Cardiff Central.

2N07 (08:07 Bridgend – Ebbw Vale Town) service would also need to run earlier in order to avoid delaying 1W52 (05:55 Milford Haven – Manchester Piccadilly) on the approach to Cardiff.

Some services have an extended station dwell at Cardiff Central and this may be used to recover *some* of the time required for the additional station call. In most cases however, this would be insufficient to cover all the additional time needed for the proposed station call.

Off-Peak (12:00 – 14:00)

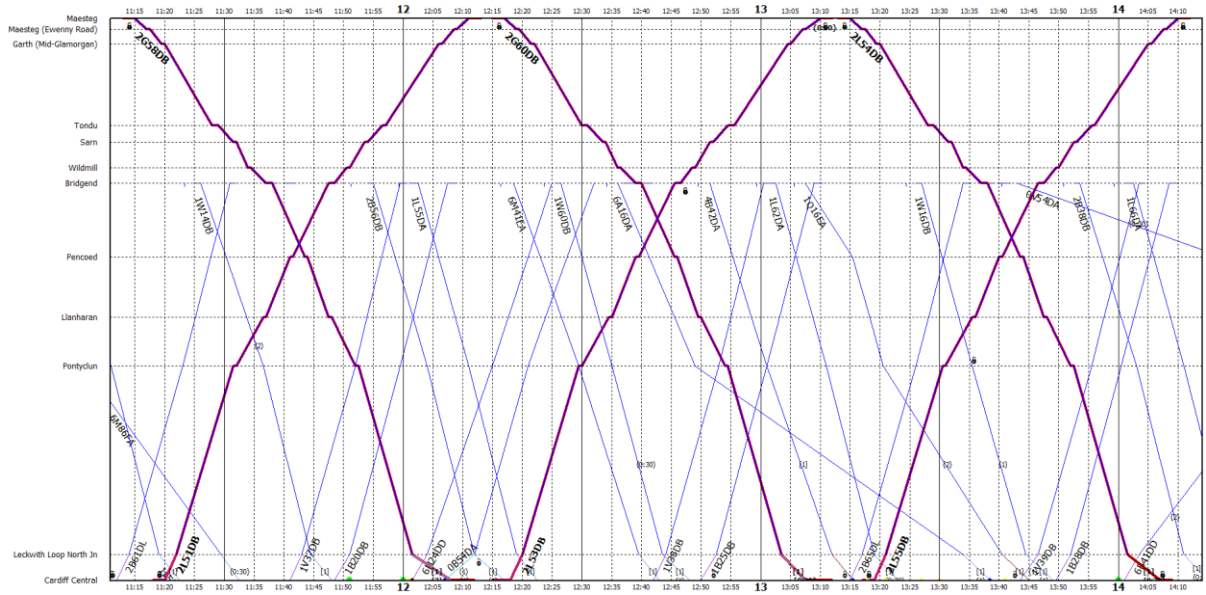


Figure 5. Existing Off-Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Six services calling at Pontyclun would require an additional call added at the proposed new station (as highlighted in figure 5). These services have a variety of origins and destinations (including; Cheltenham Spa, Gloucester and Cardiff Central) but all serve Maesteg.

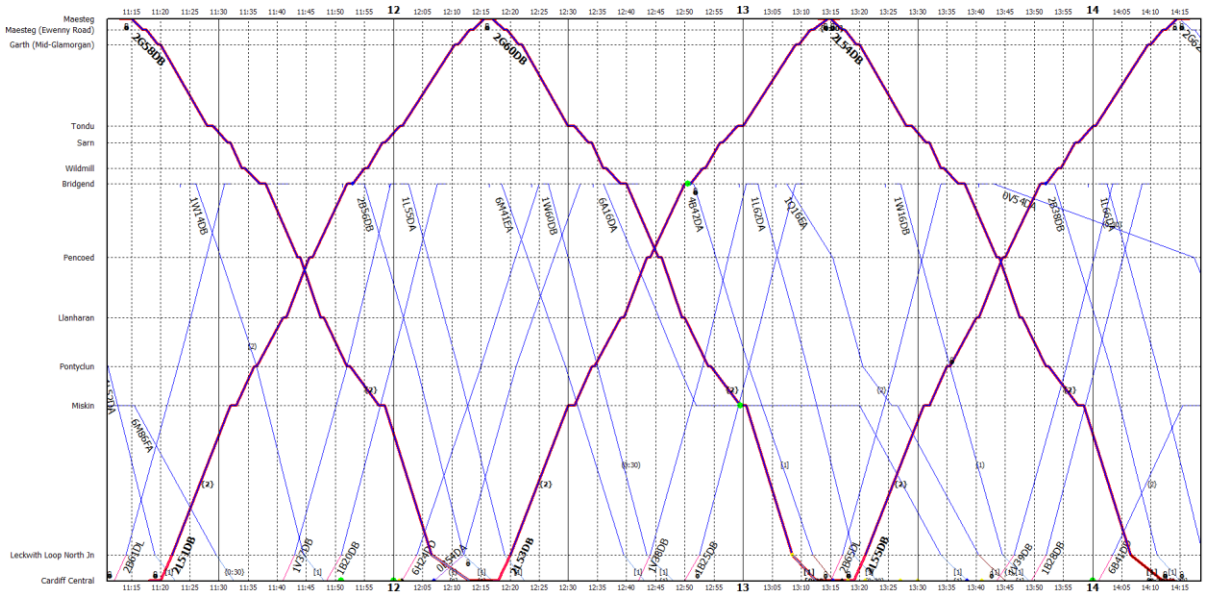


Figure 6. Amended Off-Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which may cause a junction margin conflict against the opposing service at the junction) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a five minute turnround (on average) at Maesteg which is tight. Although it would be possible to slightly compress this turnround, it would not be advisable to do so by more than one minute. This suggests that a combination of an earlier departure from Cardiff and a later presentation time at Maesteg would be required.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. With regards to the Up direction services, there does appear to be sufficient margin to reach Cardiff Central but there may be an issue with presenting later at Cardiff due to the presence of ECS moves at Cardiff West.

There is also an issue with 6A16 (09:34 Haverfordwest FD – Didcot TC), this service would need to be re-timed to avoid using Miskin Loop.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. This would however be insufficient to cover all the additional time needed for the proposed station call.

PM Peak (16:00 – 18:00)

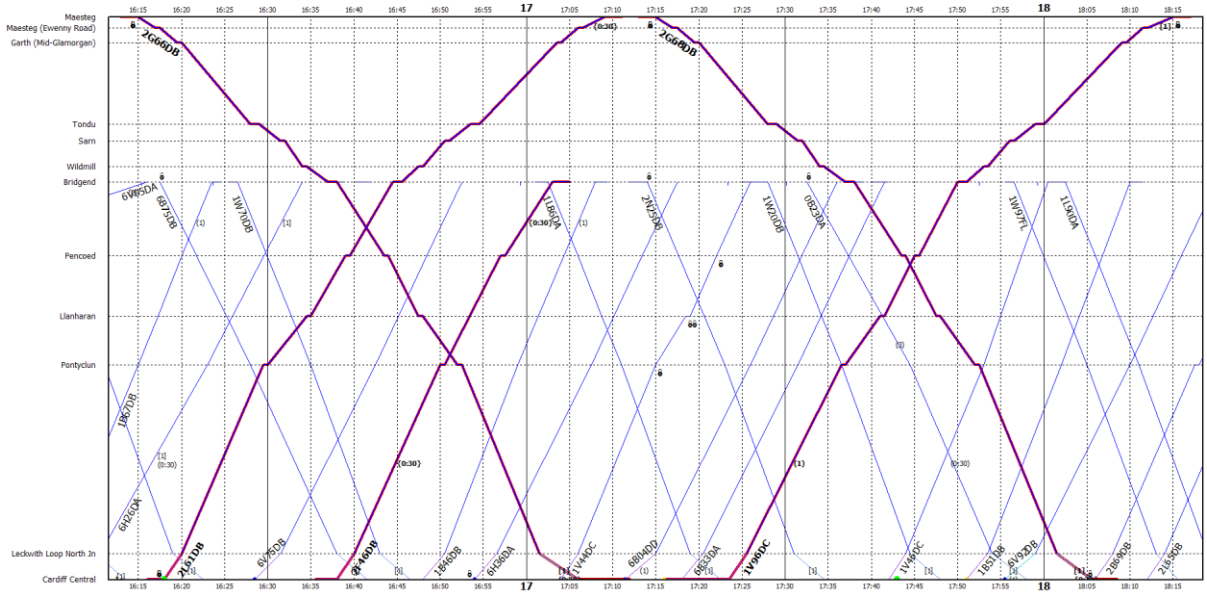


Figure 7. Existing PM Peak timetable with the potential Vale of Glamorgan Gateway services highlighted

Five services calling at Pontyclun would require an additional call added at the proposed new station (as highlighted in figure 7). These services have a variety of origins and destinations (including; Bridgend, Cardiff Central, Cheltenham Spa, Ebbw Vale Town, Holyhead and Maesteg).

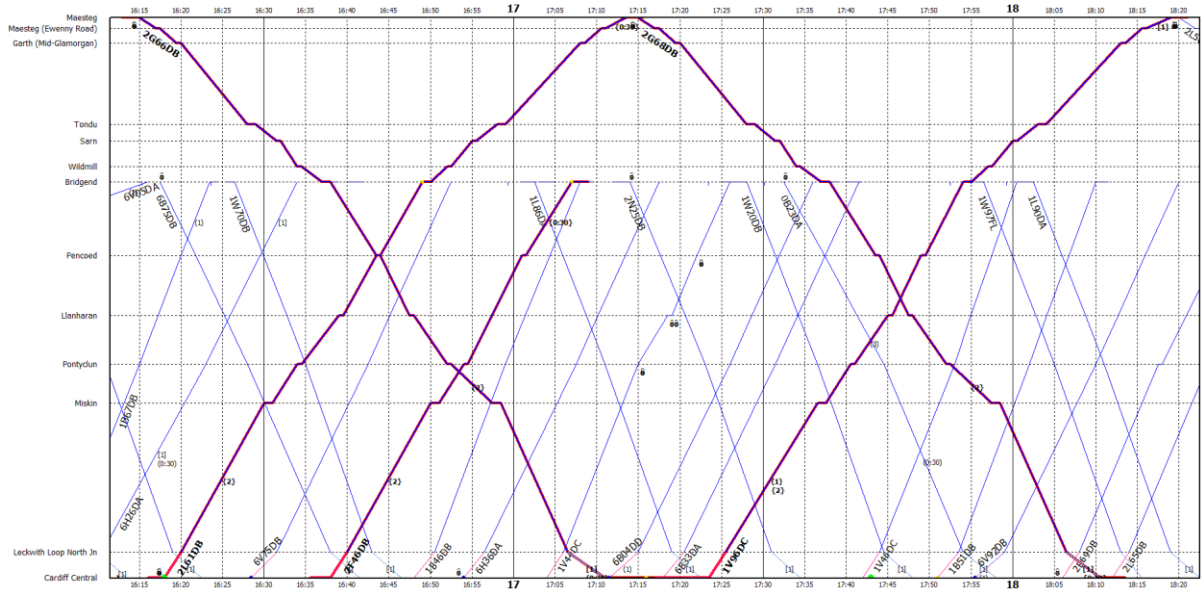


Figure 8. Amended PM Peak timetable services calling at Vale of Glamorgan Gateway highlighted

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call and to reach Maesteg in time to form the return working. It should be noted that the current timetable allows for around a five minute turnround at Maesteg which is tight. It would not be feasible to compress this by any more than one minute.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station

would result in a later presentation at Cardiff Central. For the Up direction services, this would not appear be an issue as far as Cardiff Central but would likely result in the re-timing of the schedule East of Cardiff (which is outside of the scope of this report).

2F46 (15:37 Ebbw Vale Town – Bridgend) would need retiming to avoid delaying the 1B46 (14:45 London Paddington – Swansea) service at Bridgend and to make its return working at 17:14 (which does not call at Pontyclun).

1V96 (12:32 Holyhead – Maesteg) service would need to depart Cardiff Central earlier to avoid a junction margin conflict at Bridgend with the 16:45 Llanelli – Chester service. This would likely conflict with the 6B33 (13:20 Theale – Robeston) service, which may need to be re-timed.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases however, this would be insufficient to cover all the additional time needed for the proposed station call.

Work Package 2: Adding *Vale of Glamorgan* station calls to all TfW services that pass Miskin loop

AM Peak (07:00 – 09:00)

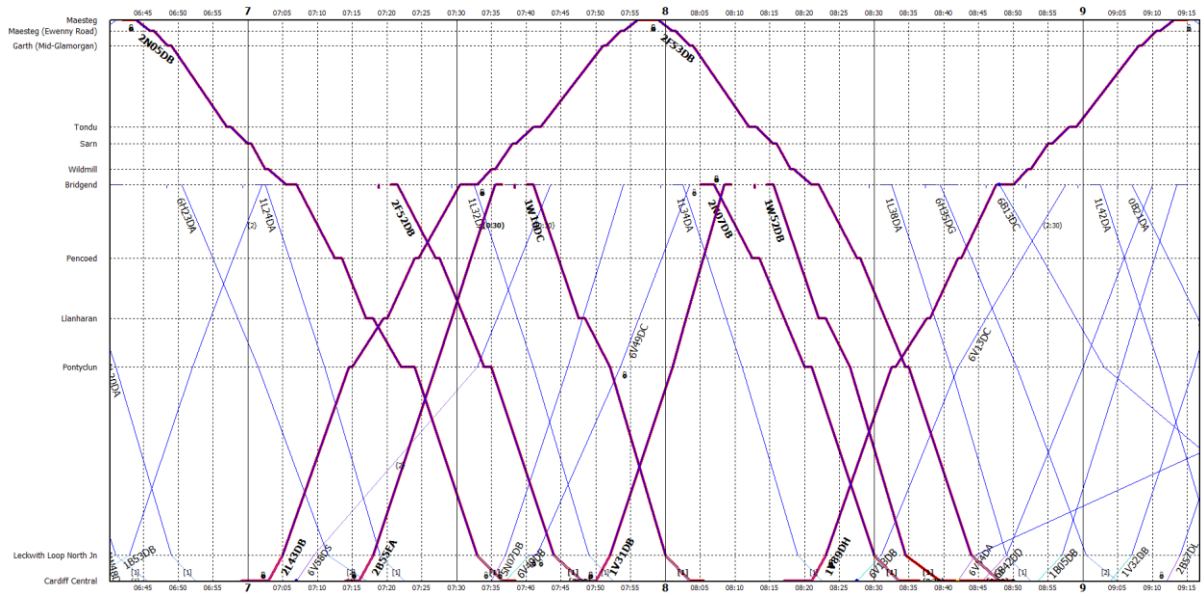


Figure 9. Existing AM Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted

Ten TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Crewe, Manchester Piccadilly, Milford Haven, Shrewsbury, Swansea, Maesteg and Ebbw Vale Town.

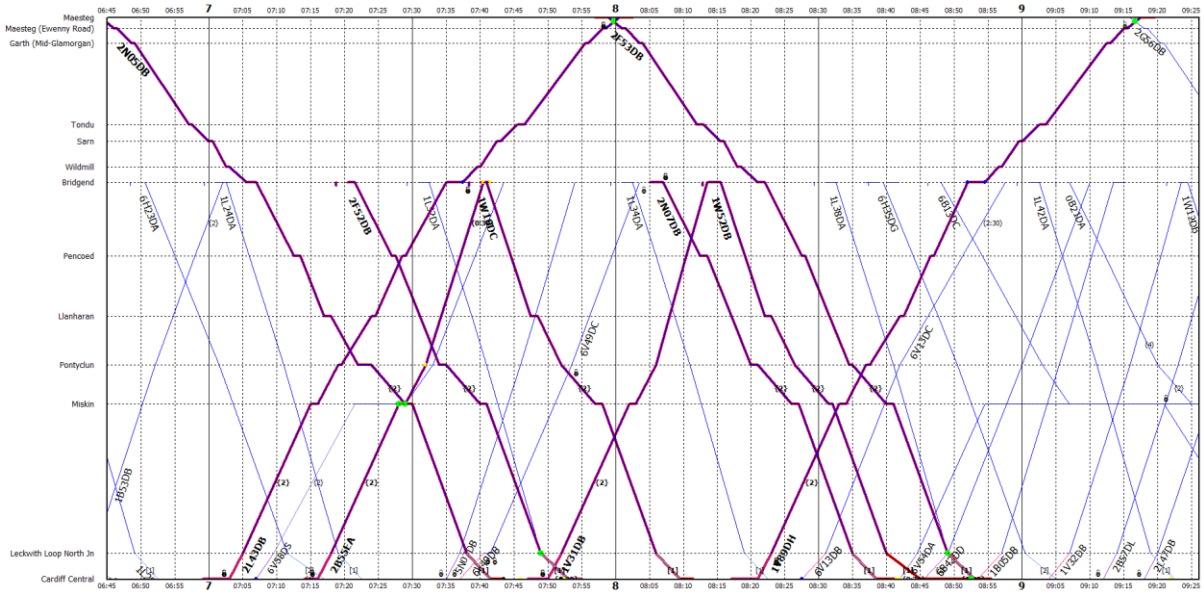


Figure 10. Amended AM Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which would cause a conflict with the following service) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a three minute turnround at Maesteg which is very tight. It would not be feasible to compress this any further.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central.

6V58DS (03:00 Wembley Euro Freight Ops – Margam TC) would need to be retimed as it currently waits in Miskin Loop for 7½ minutes.

2F52 (05:46 Carmarthen – Cardiff Central) would require to run earlier or it would delay 1L32 (06:59 Swansea – London Paddington) on the approach to Cardiff Central. Alternatively it could wait at Vale Parkway for the Paddington service to pass.

1W10 (06:15 Carmarthen – Manchester Piccadilly) would need to run earlier from Carmarthen or later to Manchester Piccadilly.

2N07 (08:07 Bridgend – Ebbw Vale Town) would require running earlier from Bridgend to make its return working from Ebbw Vale Town.

2F53 (07:59 Maesteg – Cardiff Central) would need to run earlier or later from Maesteg. Could be passed by 1L38 (07:59 Swansea – London Paddington) at Vale Parkway or run earlier throughout.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases this would this be insufficient to cover all the additional time needed for the station additional call.

Off- Peak (12:00 – 14:00)

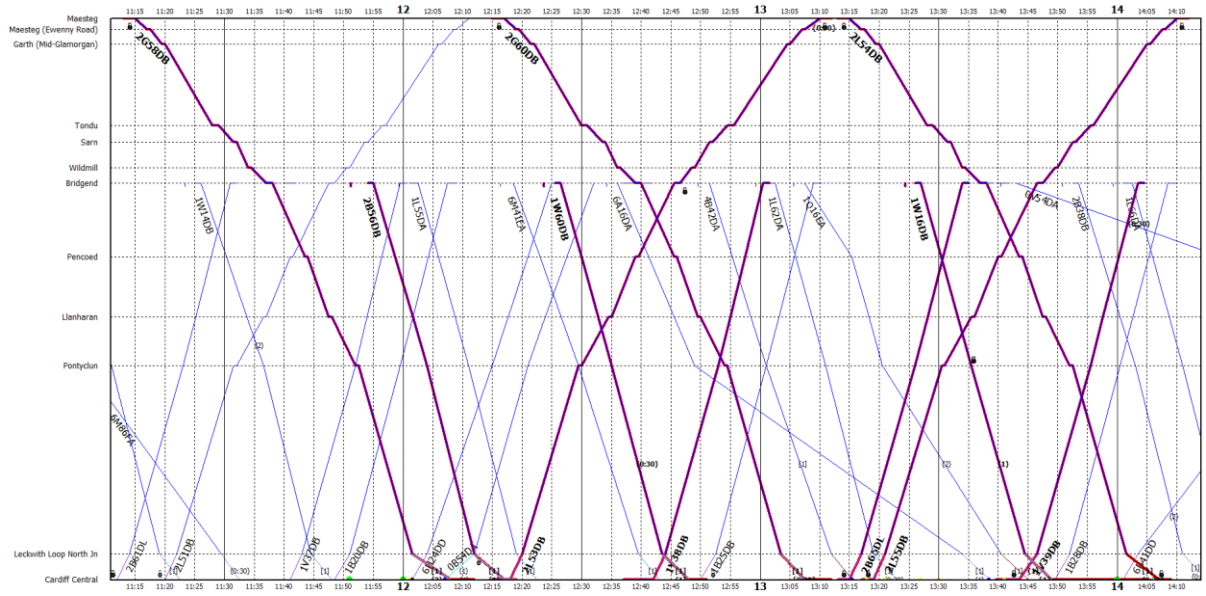


Figure 11. Existing Off-Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted.

Eleven TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Cardiff Central, Carmarthen, Cheltenham Spa, Gloucester, Maesteg, Manchester Piccadilly, Milford Haven and Swansea).

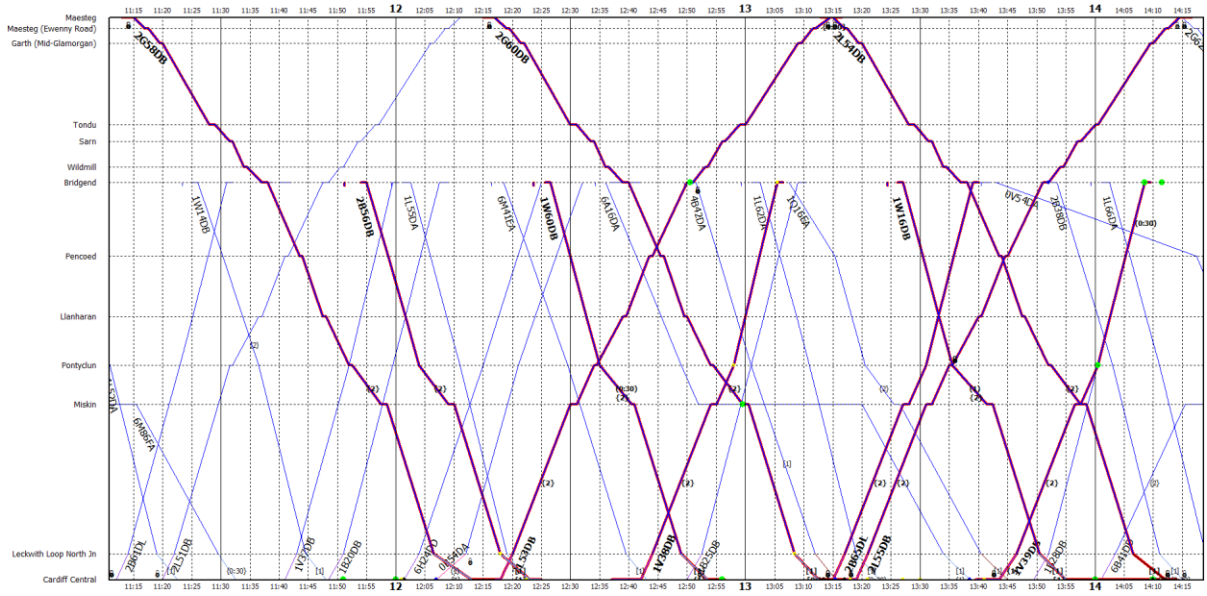


Figure 12. Amended Off-Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call (avoiding a later presentation time at Bridgend which may cause a junction margin conflict against the opposing service at the junction) and to reach Maesteg in time to form the return working. It should be noted that the current timetable only allows for a five minute turnround (on average) at Maesteg which is tight. Although it would be possible to slightly compress this turnround, it would not be advisable to do so by more than one minute. This suggests

that a combination of an earlier departure from Cardiff and a later presentation time at Maesteg would be required.

2B56 (11:10 Swansea – Cardiff Central) would need to run earlier from Swansea or could wait at Vale Parkway for 1L55 (11:29 Swansea – London Paddington) to pass and then run later to Cardiff Central.

1W60 (11:03 Carmarthen – Manchester Piccadilly) would need to run earlier from Carmarthen or later to Manchester Piccadilly.

1W38 (09:31 Manchester Piccadilly – Carmarthen) would need to depart Cardiff earlier to avoid delaying 1B25 (10:45 London Paddington – Swansea).

6A16DA 09:34 Haverfordwest FD – Didcot TC would be require retiming to avoid using Miskin Loop, where it currently sits for 28 minutes.

1V39 (10:31 Manchester Piccadilly – Milford Haven) would need to depart earlier from Cardiff to give minimum delay to 1B28 (11:45 London Paddington – Swansea) or both services run later to Swansea.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. This would this be insufficient to cover all the additional time needed for the station additional call in most cases.

PM Peak (16:00 – 18:00)

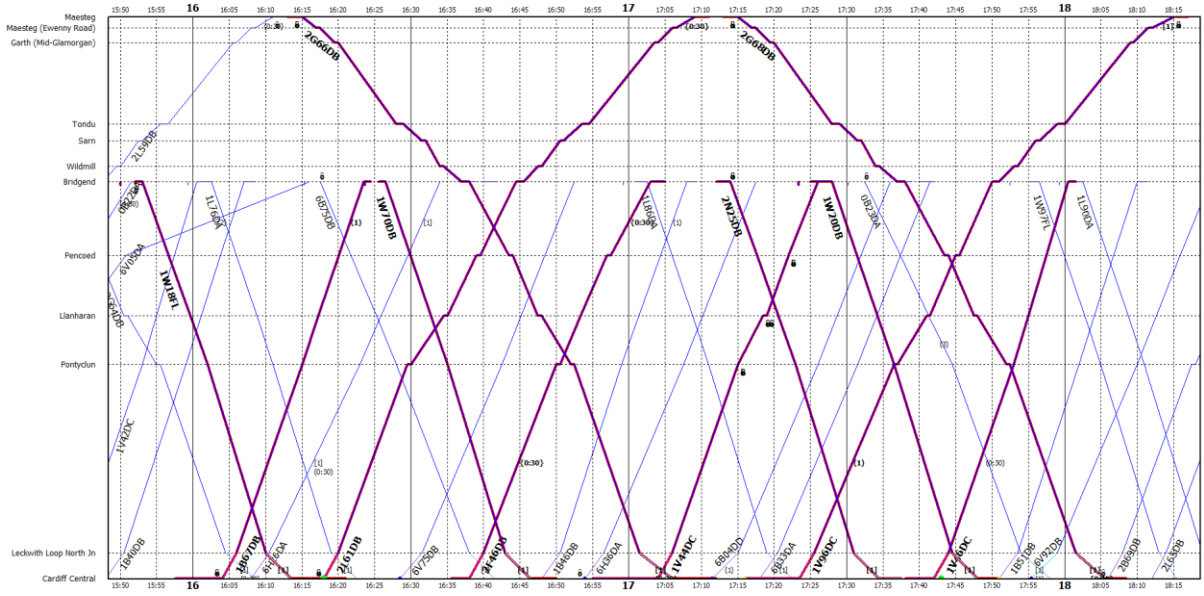


Figure 13. Existing PM Peak timetable with all TfW services that could potentially call at Vale of Glamorgan Gateway services highlighted.

Eleven TfW services had an additional call added at the proposed new station. These services had a variety of origins and destinations (Bridgend, Cardiff Central, Carmarthen, Cheltenham Spa, Chester, Ebbw Vale Town, Fishguard Harbour, Gloucester, Holyhead, Maesteg, Manchester Piccadilly, Milford haven, Tenby and Swansea).

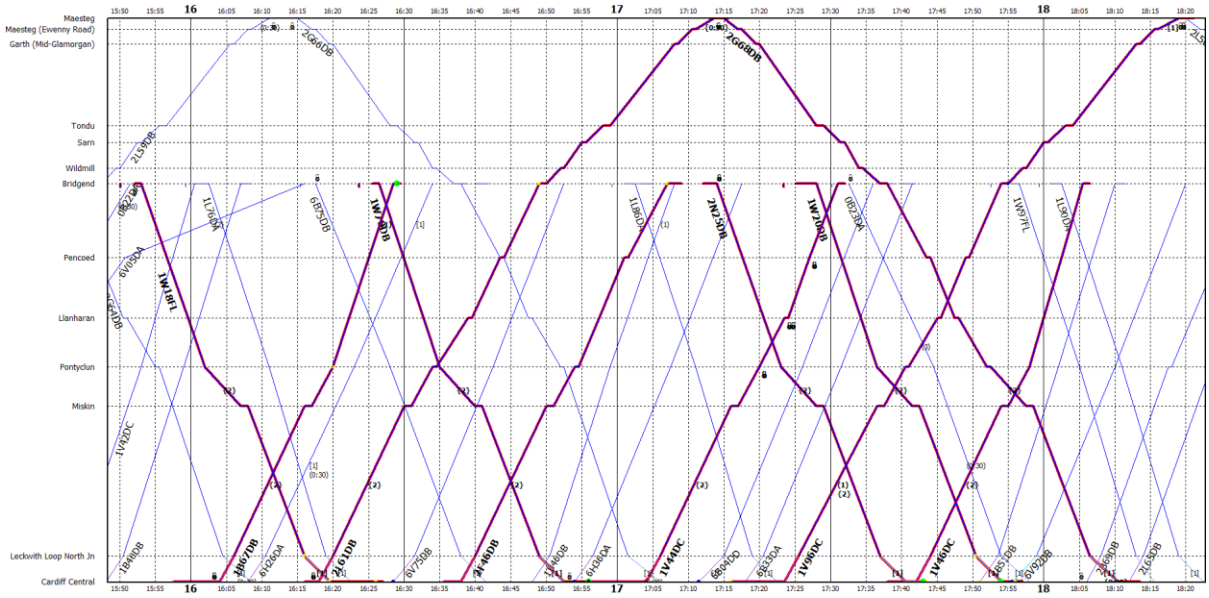


Figure 14. Amended PM Peak timetable with all TfW services calling at Vale of Glamorgan Gateway highlighted.

For services running *to* Maesteg, an earlier departure from Cardiff Central would be required in order to allow for the additional call and to reach Maesteg in time to form the return working. It should be noted that the current timetable allows for around a five minute turnround at Maesteg which is tight. It would not be feasible to compress this by any more than one minute.

For the services *from* Maesteg, it is unlikely that an earlier departure would be possible since the turnround is so tight. This would mean that the additional time required to call at the new station would result in a later presentation at Cardiff Central. For the Up direction services, this would not appear be an issue as far as Cardiff Central but would likely result in the re-timing of the schedule East of Cardiff (which is outside of the scope of this report).

1B67 (14:48 Gloucester – Fishguard Harbour) would need to depart earlier from Cardiff Central to avoid conflict with 6H26 (15:23 Llanwern – Margam T.C.) and 6C93 (10:39 Cwmbargoed Opencast – Port Talbot Grange Sidings).

1W70 (15:02 Carmarthen – Manchester Piccadilly) would need to run later or depart earlier to depart Cardiff Central at booked time.

2F46 (15:37 Ebbw Vale Town – Bridgend) would need retiming to avoid delaying 1B46 (14:45 London Paddington – Swansea) at Bridgend and to make its return working at 2N52 (17:14 Bridgend - Ebbw Vale Town) which does not call at Pontyclun.

1V96 (12:32 Holyhead – Maesteg) would need to depart Cardiff Central earlier to avoid conflict at Bridgend with 1W97 (16:45 Llanelli – Chester). 6B33 (13:20 Theale – Robeston) may also need re-timing.

1W20 (15:08 Milford Haven – Manchester Piccadilly) would need to either run earlier to Bridgend or later to Manchester Piccadilly.

Some services have an extended station dwell at Cardiff Central and this may be used to recover some of the time required for the additional station call. In most cases this would this be insufficient to cover all the additional time needed for the station additional call.

Freight occupancy of Miskin Loop for the whole day (WO), where this may impact upon the proposed service.

Only a few freight services would appear likely to cause an issue with the enhanced service using Miskin Loop.

Two uses of the loops are for light engine movements. This could require retiming to use either Pencoed or Tremains Loop. Those freight services with a longer dwell that would be likely to cause an issue are:

- 6V54DA 05:35 Chirk Kronospan – Baglan Bay
- 6B13DC 05:00 Robeston Siding – Westerleigh Puma
- 6A16DA 09:34 Haverfordwest FD GBRf – Didcot TC

These services are all likely to require re-timing as they occupy Miskin Loop for between 14 and 45½ minutes.

The Appendix section of this report contains a list of all the May 2019 WTT freight services using Miskin Loop. As the freight provision changes throughout the week, these services will need re-timing accordingly.

4. Conclusion and Recommendations

This initial assessment shows that whilst there is capacity for a new station, located in Miskin Loop with a provision of 20 calls in each direction using existing services, the existing timetable will need to be amended. The existing planning margins and turnrounds cannot absorb the additional time required for a new station call and extensive re-timings will therefore be required. These re-timings are likely to apply outside of the geographical scope of this study.

The current multitude of origins and destinations would require further study to ensure that a robust timetable is produced. This is particularly important due to the number of single line sections of railway (Ebbw Vale branch, Maesteg branch and services beyond Carmarthen to West Wales) and long distance services that would be affected.

The time penalty for an additional call is currently estimated, and may be over or under the actual time required. The amount of time required could be reduced by increasing the line speed over the switches into and out of Miskin Loop. Increasing the line speed within the loop itself may also provide some time benefit, all of which would mitigate the impact of the new station on the May 2019 timetable.

The impact of freight services also needs to be considered going forward to ensure adequate provision for services displaced from Miskin Loop.

5. Appendix

5.1 Extracts from Network Rail's Timetable Planning Rules (Version 4.3 2019)

GW900 PILNING TO FISHGUARD HARBOUR			
TIMING POINT	**DOWN**	**UP**	**NOTES**
Pilning to Severn Tunnel East	4	4	
Severn Tunnel East to Severn Tunnel West	5 6a 7b	5 6a 7b	a) following a preceding freight b) following a preceding freight that has left or will enter Pilning loop or has left Severn Tunnel Up Goods loop
Severn Tunnel West to Severn Tunnel Jn	4	4	
Severn Tunnel Jn to Newport	4 Main 5 Relief	4 Main 5 Relief	
Newport to Cardiff	4 Main 4 Relief	4 Main 4 Relief	
Cardiff Central to Court Sart Junction	4	4	

Figure 15. Required headways between services between Cardiff and Bridgend is highlighted.

Leckwith Loop North Junction			
Adjustments to Sectional Running Times (shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Passing Leckwith Loop North Junction coming from Line E	Slower Speed from Line E	All Passenger	{½}
Passing Leckwith Loop North Junction coming from Line E	Slower Speed from Line E	All Freight	{1}
Adjustments to Sectional Running Times (shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Up Main to Leckwith Loop	Approach Control	All	{1½}
Junction Margin			
First Movement	**Second Movement**		**Value**
Passenger train from Up Main to Leckwith Loop	Train passing on the Down Main		2½
Freight train from Up Main to Leckwith Loop	Train passing on the Down Main		3
Passenger train passing on the Down Main	Train passing Up Main to Leckwith Loop		2
Freight train passing on the Down Main	Train passing Up Main to Leckwith Loop		2½

Miskin Up and Down Goods Loops			
Adjustments to Sectional Running Times (allowance to be shown approaching this location)			
Movement	**Reason**	**Timing Load**	**Value**
From Up and Down main	Slow speed at loop entry (15 mph)	All traffic	+{2}

Figure 16. Train planning rules for Leckwith North Junction and Miskin Up and Down Goods Loops.

Cardiff Central			
Adjustments to Sectional Running Times (allowance to be shown after this location)			
Movement	**Reason**	**Timing Load**	**Value**
Departure in the Up direction from Platform 0	*Longer distance to travel*	*Passenger*	*{½}*
Adjustments to Sectional Running Times (allowance to be shown approaching this location)			
Movement	**Reason**	**Timing Load**	**Value**
Arriving into an occupied platform	*Approach Control*	*All*	*{1}*
Connectional Allowance	7		
Dwell Time			
HST/LH/22x	3 Saturday & Sunday excepted 2 Saturday & Sunday only		
14x to 175	3		
Cardiff Valley 14x ~~and 150~~ /150/153	1½		

Figure 17. Train planning rules for Cardiff Central showing minimum dwell time required

5.2 Network Rail Sectional Appendix Extract

LOR	Seq.	Line of Route Description	ELR	Route	Last Updated
GW900	013	Pilning to Fishguard Harbour	SWM2	Wales	29/12/2016

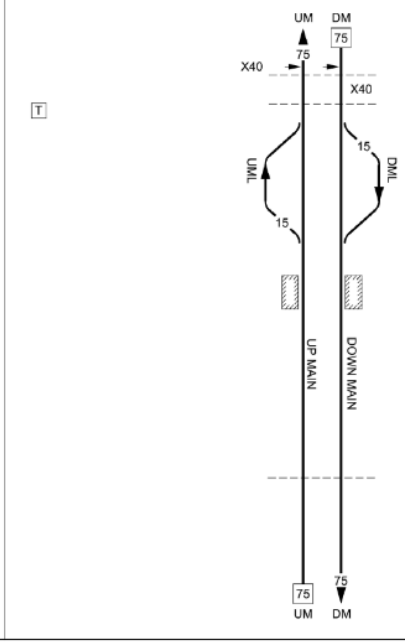
Location	Mileage M Ch	Running lines & speed restrictions	Signalling & Remarks
			TCB Wales Railway Operating Centre RA8 Vale of Glamorgan Workstation GSM-R
Pontsam HABD Pontsam LC (AHBC) - X	178 39 178 39		Axle counter area
Maindy Bach LC (UWC)	178 65	T	
Up/Dn Miskin loop	179 02		DML - Down Miskin Loop UML - Up Miskin Loop
Miskin			DML - 774m UML - 774m
Up/Dn Miskin loop	179 52		
PONTYCLUN	181 40		Down and Up platforms - 102m, 112yds
Llantrisant West LC (CCTV)	181 76		

Figure 18. Network Rail Section Appendix for Miskin Loop showing distances, line speeds and line descriptions.

5.3 High Level Freight Analysis for the Entire Week

The data has been cut for all days and w/c June 10th 2019 has been analysed.

The intention of this exercise is to perform a high-level analysis of freight throughout the week. As part of the main exercise, we are only considering WO. This appendix looks at all days of the week and reduces the risk of us missing significant issues on other operating days (for example, there may be a higher freight provision on ThO or SuO).

MONDAY

- 6V55 is in the Down loop from 05:55 – 06:10
- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 0B22 is in the Down loop from 15:21h – 15:32
- 6E11 is in the Up loop from 17:08h – 18:43h
- 6V66 is in the Down loop from 23:46h – 00:03

Tuesday

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 6M51 is in the Up loop from 18:31 – 18:42
- 1Q15 is in the Down loop from 18:32h – 18:40h
- 0L33 is in the Down loop from 19:10h – 19:17

Wednesday

- 6V58 is in the Down loop from 07:21h – 07:29
- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 0L33 is in the Down loop from 19:10h – 19:17
- 6V66 is in the Down loop from 23:46h – 00:03

Thursday

- 6V58 is in the Down loop from 07:21h – 07:29

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 0B22 is in the Down loop from 15:21h – 15:32
- 6M51 is in the Up loop from 18:31 – 18:42
- 0L33 is in the Down loop from 19:10h – 19:17

Friday

- 6V54 is in the Down loop from 08:54h – 09:40
- 6B13 is in the Up loop from 09:07 – 09:21
- 0B21 is in the Up loop from 09:25 – 10:25
- 6M86 is in the Up loop from 11:09h – 11:15h
- 6A16 is in the Up loop from 12:52 – 13:20
- 6B41 is in the Down loop from 14:15h – 14:23h
- 0B22 is in the Down loop from 15:21h – 15:32
- 6V66 is in the Down loop from 23:46h – 00:03

Saturday

- 6V40 is in the Down loop from 04:45h – 04:53h
- 6B13 is in the Up loop from 09:05 – 09:44h

Sunday

No booked freights into the loop.

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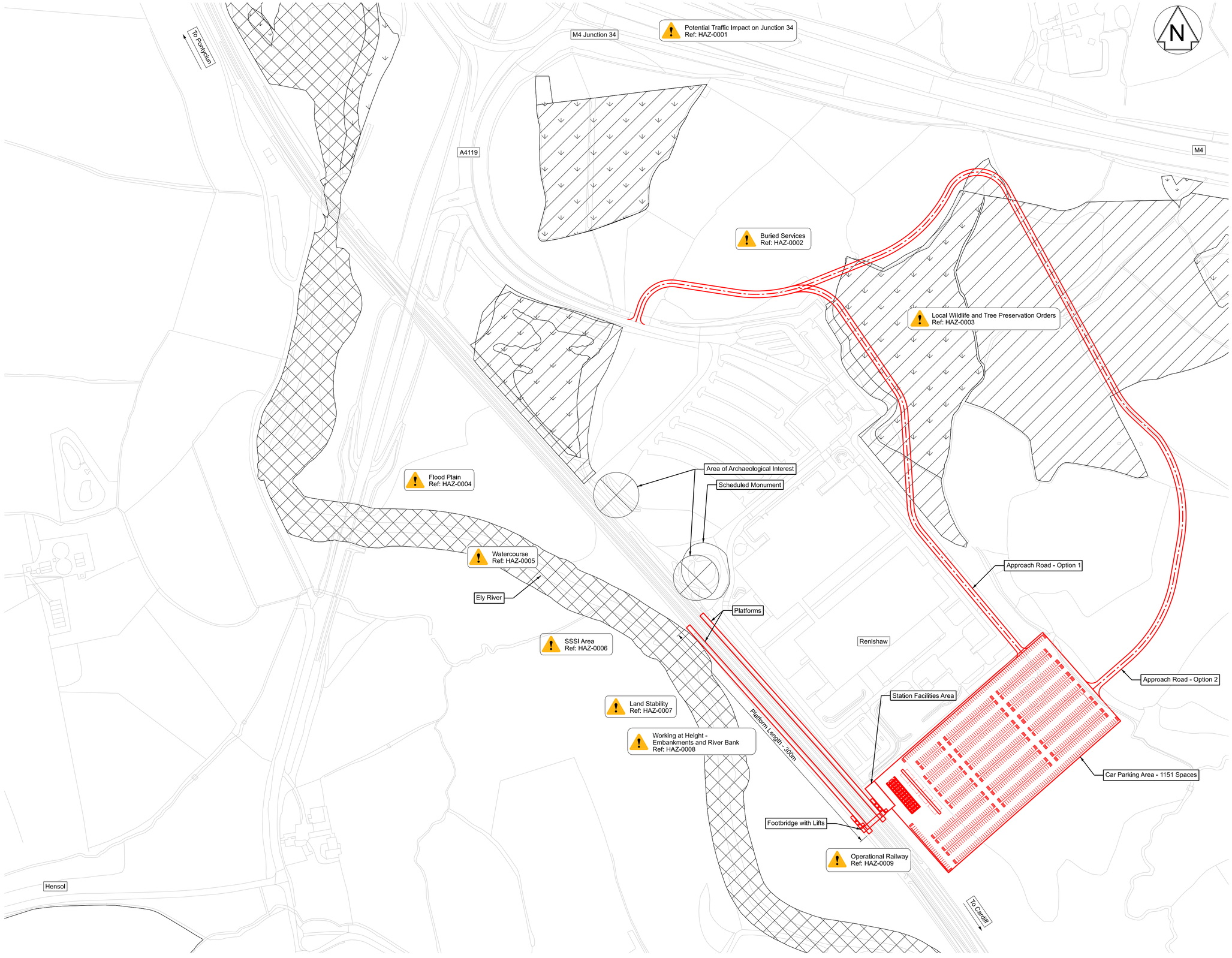
APPENDIX F

Station General Arrangement Drawings



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NOTES:

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1. All dimensions are in millimetres unless stated otherwise.
2. Background mapping is based on OS Tiles, the accuracy is assumed to be +/- 10m.
3. Renishaw, owns the land to the north of the railway in this area. Renishaw are developing plans to develop the land into a business/industrial park in line with the Vale of Glamorgan County Councils Employment Zoning.

LEGEND:

KEY	
	Proposed
	Existing
	Local Wildlife Site
	Tree Preservation Orders
	Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

VALE of GLAMORGAN
BRO MORGANNWG

PROJECT:
Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site
Vale of Glamorgan Gateway Station
Hensol/M4 Junction 34

Client
Vale of Glamorgan Council
Civic offices
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Barry, CF63 4RU

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TITLE:
Vale of Glamorgan
Gateway Station
Feasibility General Arranagement
Location 1

Designed	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Drawn	Z.Shi	Signed: Electronically Signed	Date: 06/12/19
Checked	J.Owen	Signed: Electronically Signed	Date: 09/12/19
Approved	J.Owen	Signed: Electronically Signed	Date: 09/12/19
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Original Size:	A1	Grid:	---
ELR:		Mileage:	
Suitability Code:	S3	Project Number:	10028657

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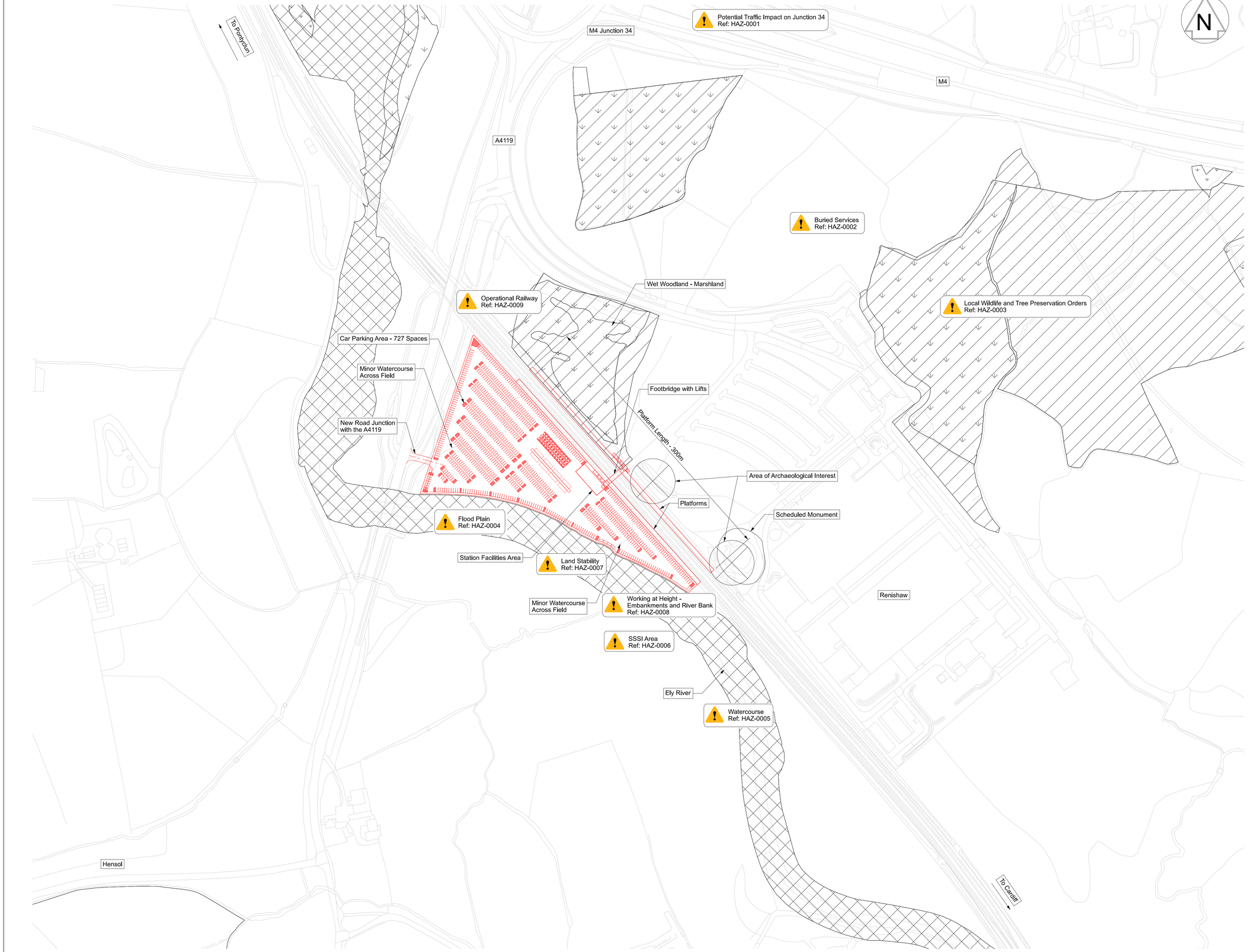

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LEGEND:

KEY

- Proposed
- Existing
- Local Wildlife Site
- Tree Preservation Orders
- Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

Client

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PROJECT:
Vale of Glamorgan Gateway Station
GRIP 1-2 Feasibility Study
Tfw Stage A

Site
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Hensol/M4 Junction 34

Client
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Checked	J.Owen	Signed Electronically Signed	Date 09/12/19
Approved	J.Owen	Signed Electronically Signed	Date 09/12/19
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Original Size:	A1	Grid:	---
ELR:		Mileage:	
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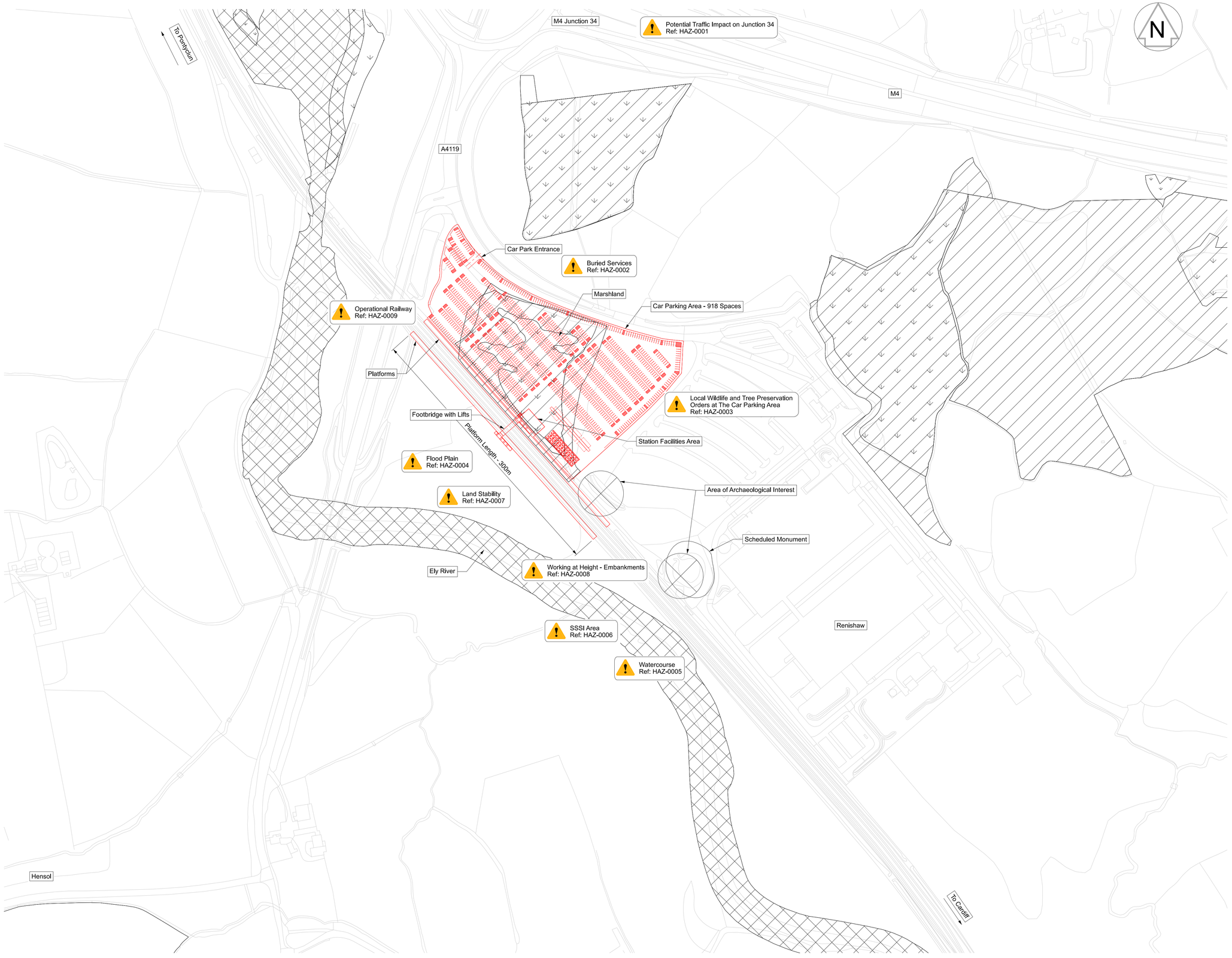

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LEGEND:

KEY

- Proposed
- Existing
- Local Wildlife Site
- Tree Preservation Orders
- Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
P01	20/03/19	Draft	ZS	JO	JO
P02	09/12/19	For Review	ZS	JO	JO

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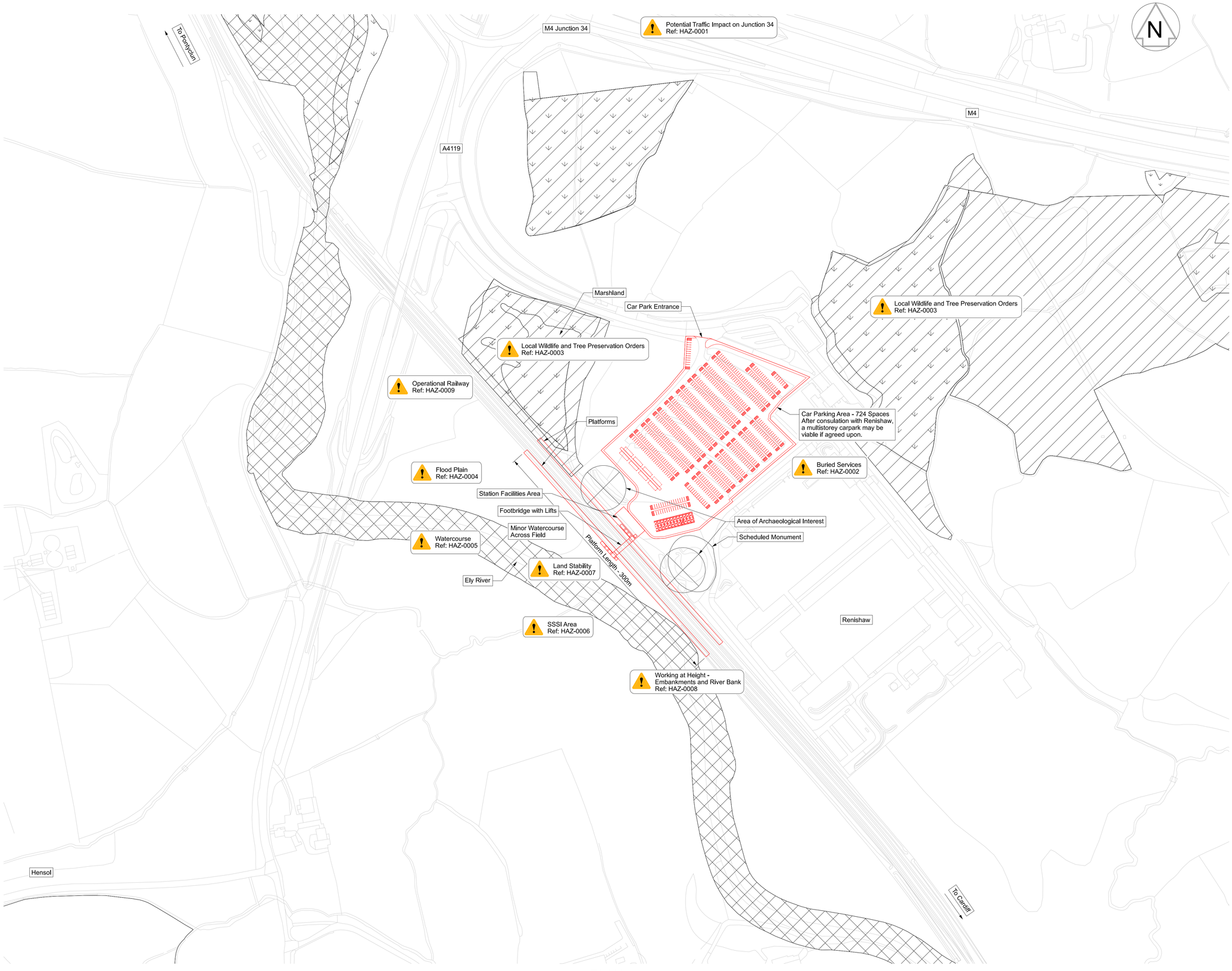

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KEY	
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	Existing
	Local Wildlife Site
	Tree Preservation Orders
	Site of Scientific Interest

Rev	Date	Description	Drawn	Check	Approv
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P02	09/12/19	For Review	ZS	JO	JO

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Tfw Stage A

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ELR:		Mileage:	
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Suitability Description:
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APPENDIX G

Hazard Log

10028657-ARC-00-XX-RG-HS-00001-P01

ARCADIS	**Designer's Hazard Identification & Risk Analysis (for Complex Projects)**
Project Name:	Vale of Glamorgan Gateway Station - Feasibility Study
Arcadis Project Number:	10028657
Revision:	P01
Revision Date:	06/12/2019
Prepared By:	Zhan Shi
Approved by:	Jason Owen

Designer’s Hazard Identification & Risk Analysis

Project Name: Vale of Glamorgan Gateway Station - Feasibility Study

Item Ref No	Hazard Description - design activity or element giving rise to hazard or constraint	Location	Population at Risk from Hazard (eg construction workers, public, users, operators, maintainers, demolition workers etc)	Risks - potential initial risks and challenges	Initial Risk Rating High/ Medium/ Low	Hazard Mitigation - Design stage action taken to eliminate/ reduce hazard Designer to provide details of action undertaken - including alteration of design, survey work undertaken to obtain information, consideration of design for operation, maintenance	Phase affected by Hazard, eg construction/use /maintenance & cleaning/demolition & dismantling	Action Required By: (Designer/ Contractor/ Maintainer/ Client/ Other)	Action by date	Residual Risk Rating High/ Medium/ Low	Is Residual Risk significant and required to be shown on drawings: Yes/No	Information about the risks that cannot be designed out (i.e. Residual Risks) and that require controls to be developed and implemented by others. Designer to provide location of relevant information.	Action Owner
HAZ-0001	Traffic impact on M4 Junction 34	M4 Junction 34	Public	The new station, along with the Renishaw development will increase traffic on the roads. The existing roads will not be able to handle the additional traffic of both developments. Congestion may cause queue on the motorway junction.	High	Additional traffic modelling to be carried out. The motor junction should be reviewed. The junction may need upgrading.	All	All	On going	Low	Yes	Mitigation measures will be by others, outside of this project. Coordination will be required.	All
HAZ-0002	Buried services	Proposed site	All	Explosion Electrical Hazard Electrocution Asset damage Hazardous materials	High	Buried Services study is required in accordance with PAS 128.	All	All	On going	Low	Yes	Buried services must be reviewed in accordance with PAS128.	All
HAZ-0003	Local wildlife and tree preservation orders	Proposed site	All	Ecosystem affected or damaged by construction activities and the proposed development.	High	The design should have a net benefit to the area. Suitable surveys will be required and mitigation. Designs can be rated on negative impact on the ecosystem.	All	All	On going	Medium	Yes	Ecology Studies to identify current constraints and mitigations required. The project should result in a net benefit to the area.	All
HAZ-0004	Flood Plain	Proposed site	All	Flood risk & damage Infrastructure damage Risk of injury or death	High	Flood mitigation measures can reduce changes of the new station and facilities flooding, however the scheme must not cause flooding elsewhere and may require flood compensation to accommodate the volume mitigated against.	All	All	On going	Medium	Yes	Dependent on selected option, to be reviewed at next design stage	All
HAZ-0005	River - Open water / watercourses	River Ely and adjacent watercourses	All	Drowning Pollution	Medium	Suitable safe system of work to be implemented for construction works. Suitable barriers to be installed for the public. Suitable construction materials and pollution controls to be implemented for construction.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All
HAZ-0006	SSSI Area	River Ely	All	Impact to the conservation areas and species	Medium	Design to accommodate SSSI	All	All	On going	Low	Yes	Dependent on selected site. To be reviewed at next design stage.	All
HAZ-0007	Land stability	Proposed site	All	Land instability Earthwork/embankment collapse	High	Suitable Ground investigation to be undertaken before any site work. Temporary structure or special measures may be required	All	All	On going	Medium	Yes	Geological investigations will be required to identify geological features of the selected site.	All
HAZ-0008	Working at height - platforms, embankments and river bank	Station	All	Slips, trips and falls Slope instability	Medium	Suitable safe system of work required.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All
HAZ-0009	Operational railway	Railway	All	Impact with train (machinery, structures, people)	High	Suitable safe system of work required.	All	All	On going	Low	Yes	To be reviewed at next design stage.	All

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