MOTT MACDONALD

Magor and Undy Station: Strategic Outline Business Case

20 July 2018

Mott MacDonald
Fitzalan House
Fitzalan Road
Cardiff CF24 0EL
United Kingdom

T +44 (0)29 2046 7800
F +44 (0)29 2047 1888
mottmac.com

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	30/04/18	MH	PC		Draft for client review
B	20/07/18	MH	PC	GB	Completed SOBC

Document reference: 382289 | SOBC | B

Information class: Standard

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Executive summary

Introduction

This Strategic Outline Business Case (SOBC) is for a new rail station on the South Wales Main Line (SWML) relief lines at Magor and Undy, Monmouthshire. The purpose of an SOBC is to set out the need for intervention, provide suggested or preferred solutions, and present evidence for a decision to be made on whether to continue to progress a scheme.

This document has been prepared in line with Welsh Government (WelTAG Stage 1 – Strategic Outline Case) and Department for Transport (SOBC and WebTAG) requirements associated with the first stage of business case development. The document is structured around the five case model for transport business cases – Strategic, Transport (Economic), Financial, Commercial, and Management.

A considerable amount of technical work has been undertaken to explore the feasibility and cost of a new station. Scheme concept designs and cost estimates have been developed to a standard equivalent to GRIP Stage 2 (technical feasibility) in Network Rail's governance process for investment projects. Further design, costing and environmental assessment work is continuing to progress the scheme to GRIP Stage 3 (option selection).

Strategic Case

The Strategic Case demonstrates the 'case for change' based on an understanding of existing transport-related problems that could be addressed, and opportunities and aspirations that could be realised through investment in transport projects.

Transport-related problems affecting Magor and Undy are:

- A high reliance on car use for journeys to work, with car having an 80% mode share (compared to 74% across Monmouthshire and Wales as a whole). Direct public transport alternatives are limited.
- An increasing demand for travel between Magor and Undy and employment centres, including Newport, Cardiff and Bristol. Car commuting trips to Bristol are expected to increase following Severn toll removal at the end of 2018, placing greater pressure on the road network.
- High levels of driving to Severn Tunnel Junction (the nearest station, 2.5 miles away) from Magor and Undy. Approximately 25% of Severn Tunnel Junction users live in Magor or Undy, the majority of whom arrive by car.
- Parking capacity issues at Severn Tunnel Junction, with overspill parking onto nearby residential streets in Rogiet.

The local community have invested heavily in a campaign to secure improvements to local public transport provision, establishing MAGOR (Magor Action Group on Rail). Key aspirations of the community are to maximise the use of sustainable and active travel modes, improve connectivity with nearby cities, to build strong local businesses, and to develop the tourism potential of the area.

There are a range of opportunities that Magor and Undy could capitalise on to enhance transport provision, including being a compact community with short local travel distances and proximity to the SWML.

Any investment in transport infrastructure must align with national, regional, and local policy and strategy. In particular, transport investment for Magor and Undy has the potential to contribute to each of the seven well-being goals in the Well-being of Future Generations (Wales) Act, especially a prosperous Wales, a healthier Wales, a more equal Wales and a Wales of cohesive communities. Magor is identified as a potential new station site in the National Transport Finance Plan 2015, the Monmouthshire Local Development Plan and Monmouthshire Local Transport Plan.

A set of scheme objectives has been established to guide option assessment for improving transport options in Magor and Undy. The scheme will need to:

1. Cater for the travel needs of an increasing population in Magor and Undy, without putting undue pressure on the surrounding road network, including the B4245 and Station Road in Rogiet.
2. Improve public transport connectivity between Magor/Undy, the cities of Newport, Cardiff and Bristol, and the national rail network, to enhance access to employment and services.
3. Promote use of sustainable transport options among residents of Magor and Undy.
4. Promote active travel among residents of Magor and Undy.
5. Support the development of local businesses, community development projects and tourism potential.
6. Reduce pressure on car parking capacity at Severn Tunnel Junction.

A range of transport options, including local bus service enhancements, new pedestrian/cycling routes, organised car-sharing, and increased parking at Severn Tunnel Junction have been assessed against the objectives. The options have also been assessed for deliverability risk, financial affordability, and stakeholder acceptability. The preferred transport option is a new station for Magor and Undy.

In terms of wider economic impacts, a new station will help to sustain and increase income levels in the Magor and Undy area by improving access to employment opportunities. In particular, access to the rail network will make commuting to Bristol easier, helping to spread economic prosperity into South Wales.

The proposal for a new station is supported by Magor with Undy Community Council and Railfuture Wales.

Transport (Economic) Case

The Transport (Economic) Case demonstrates that the preferred scheme (a new station at Magor and Undy) offers value for money in the widest sense, bringing economic, socio-cultural, and environmental benefits. At the Strategic Outline Business Case stage the assessments contained within the Transport Case are expected to be at a high level only. Assessments have been undertaken against the standard set of WelTAG / WebTAG impact criteria.

A gravity model has been used to forecast passenger demand and monetised benefits, as advised in the rail industry's Passenger Demand Forecasting Handbook (PDFH). The forecasts are based on a realistic set of assumptions in relation to population and rail services.

Magor and Undy is assumed to be served by two trains per hour per direction, with two trains per hour serving Newport and Cardiff to the west, and one train per hour to each of Bristol and Gloucester to the east. Another key assumption is that there will be no parking provision at the new station. Taking all assumptions into consideration, at least 200,000 passengers per year are forecast to be using the new station by 2026.

Monetised benefits of over £11.8 million (2010 prices discounted to 2010) are forecast over the appraisal period. Approximately 82% of the total monetised benefit is expected to arise from journey time and cost savings, with 45% for commuters, 11% for business journeys and 26% for other journeys.

Magor and Undy station is expected to offer **medium value for money**, based on a BCR of 1.7, non-monetised socio-cultural benefits, and wider economic benefits. The Present Value of Benefits is estimated at £7.2 million (2010 prices discounted to 2010), with the most significant monetised benefits expected to accrue to non-business users (commuters and 'other users').

The non-monetised benefits are expected to relate mainly to improved access to employment opportunities, access to services, encouraging physical activity, journey quality, option values (the value associated with a new travel option being available to residents) and improved journey time reliability for trips that transfer from private car to rail.

The scheme has very little environmental impact, although there will be some benefit from a reduction in car use.

Financial Case

At SOBC stage the Financial Case sets out anticipated expenditure and potential funding sources. The estimated cost of the scheme, based on GRIP Stage 2 high level estimates, is £7 million (Q2 2016 prices), excluding inflation and optimism bias.

Ongoing operation and maintenance costs are likely to include:

- Station operating and maintenance costs, borne by the train operating company (TOC) for the Wales and Borders franchise and offset by additional passenger fare revenues
- Magor and Undy residential parking scheme set-up and monitoring costs, borne by Monmouthshire County Council

Potential funding sources for the new station will continue to be investigated.

Commercial Case

At SOBC stage, the Commercial Case should demonstrate that there are appropriate ways in which the scheme can be procured. The following points are noted:

- Scheme procurement is considered to be commercially viable, as this is a conventional rail station and infrastructure project.
- A preliminary specification has been produced. A more detailed output-based specification will need to be presented with the Outline Business Case.
- Initial proposals for infrastructure procurement are for Network Rail to follow its own procurement processes to deliver works within the existing operational rail boundary and for Monmouthshire County Council to procure non-rail works.
- Two trains per hour per direction will need to serve Magor and Undy. TOCs might make a commercial decision to serve the station, or could be requested to serve the station by Welsh Government subject to agreements in relation to service subsidies or premium payments.

Management Case

The Management Case for Magor and Undy station is preliminary in nature and based on information currently available (July 2018). It is therefore subject to review and amendment as the scheme is progressed.

Key points from the preliminary Management Case are:

- Over the last 15 years Welsh Government, local authorities, and the rail industry, as well as the Department for Transport, have worked together to deliver 13 new rail stations in Wales.
- The delivery programme for Magor and Undy needs to combine business case requirements with Network Rail's GRIP process. The earliest anticipated station opening date is 2021.
- Magor and Undy station is linked to other projects that are currently being developed. The new station will require rolling stock with increased capacity to be operating on services that become scheduled to call at the station.
- Scheme design will need to continue to be linked to the South Wales Main Line electrification project, relief line speed upgrades, and the new Intercity Express Programme timetables.
- The scheme will require planning approval through the Local Planning Authority, Monmouthshire County Council.
- A governance structure will need to be established for progressing the scheme through the remaining GRIP stages.
- The Magor Action Group on Rail (MAGOR) has undertaken considerable engagement with stakeholders over the last five years. A Communications and Stakeholder Management Plan will need to be developed as part of the next business case stage.
- A risk assessment was undertaken for the GRIP Stage 2 study and will be updated as part of GRIP Stage 3.

1 Introduction

This document presents the Strategic Outline Business Case for a new rail station to serve the communities of Magor and Undy.

1.1 Context

Magor and Undy

The neighbouring villages of Magor and Undy (referred to in this document collectively as Magor and Undy) form a small but growing community situated between Newport and Chepstow, in south east Wales. In the 2011 census the villages had a combined population of 6,100. Together they are considered as a key settlement in the Monmouthshire Local Transport Plan.

Magor and Undy is positioned within commuting distance of Newport, Cardiff and Bristol. While Magor village centre has local facilities including a supermarket, shops, pubs and a post office, the community is largely dependent on travel to larger settlements for employment. Census data (2011) shows that approximately 78% of working residents commute out of Magor and Undy for work. This creates the challenge of providing for increasing demand for travel in a sustainable way.

Magor and Undy is closer to Bristol city centre than to Cardiff city centre and residents frequently cross into England for employment, education and health services. Increasingly, residents of Bristol are relocating to Monmouthshire because of the lower housing cost and are then commuting daily to work. The removal of the Severn Bridge toll by the end of 2018 is expected to accelerate this trend.

Existing Transport Provision

Magor and Undy has good road connections, being just a mile from the M4 junction 23A, and a high level of reliance on car use.

At present Magor and Undy is served by one bus per hour per direction, the X74/74 Newport to Chepstow service. At peak times, the service takes 41 minutes from Magor to Chepstow Bus Station and 30 minutes from Magor to Newport Bus Station. Either journey could take as little as 15 to 20 minutes by car, depending on traffic (estimates taken from online journey planners).

There is also a daily Severn Express Bristol-Chepstow-Newport service, which can be used on weekdays to travel to Bristol city centre in the morning and return in the evening. The service takes 1 hour 14 minutes, arriving in Bristol at 08:11 and returning at 17:15 (April 2018 timetable).

The nearest rail station to Magor and Undy is Severn Tunnel Junction (STJ), approximately 2.5 miles to the east. From here there are approximately two trains per hour during peak periods to each of Bristol and Cardiff, reducing to approximately hourly during off-peak periods. A 2013 survey by the action group MAGOR found that travel to Cardiff made up just under half of rail journeys on weekdays and 59% on weekends. Bristol accounted for a third of weekday journeys and 11% of Saturday journeys. Very few rail journeys were made to Newport.

1.2 Scope of this Strategic Outline Business Case (SOBC)

This Strategic Outline Business Case (SOBC) is for a new rail station on the South Wales Main Line relief lines at Magor and Undy. The purpose of an SOBC is to set out the need for intervention, provide suggested or preferred solutions, and present evidence for a decision to be made on whether to continue to proceed with a scheme[1].

This document has been prepared in line with Welsh Government (WelTAG Stage 1 – Strategic Outline Case) and Department for Transport (SOBC) requirements associated with the first stage of business case development. It therefore:

- Defines the scope of the proposed scheme
- Makes the case for change (the Strategic Case), confirming how the scheme fits with national, regional and local objectives
- Identifies clear objectives for the scheme
- Outlines options and carries out an initial sift
- Presents evidence on expected impacts, stating the assumptions made (the Transport / Economic Case)
- Outlines the likely costs, governance structures, delivery programme, and key stakeholders for the scheme (in the Financial, Commercial, and Management Cases)

In common with most SOBCs, and reflecting the early stage of scheme development, the primary focus of this document is on the Strategic and Economic Cases.

1.3 The Preferred Scheme

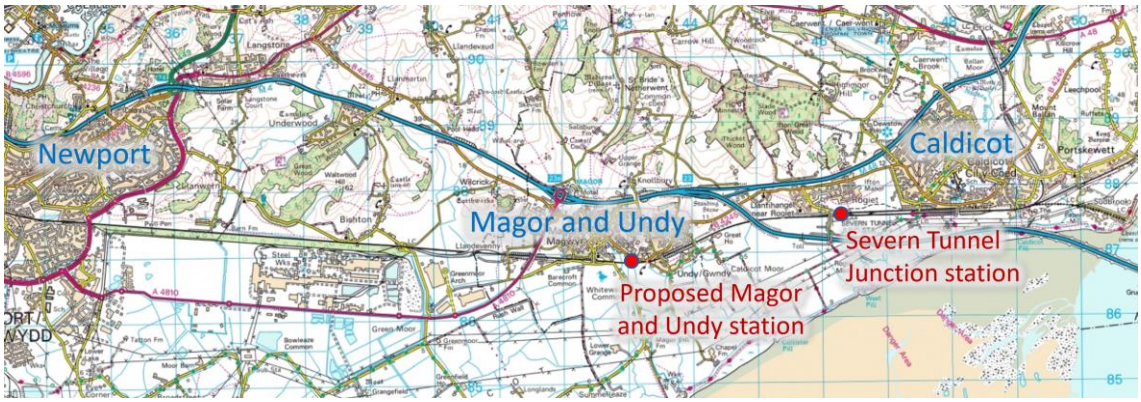
Magor and Undy Station is expected to be located on the South Wales Main Line relief lines, with a platform either side of the rail lines. Access will be via an existing footbridge and subway, with improvement work to improve accessibility through the subway. Minor amendments to pavements and crossing facilities on the B4245 are also proposed to make pedestrian access safer. The station will have minimal facilities other than covered waiting areas for passengers. Car parking will not be provided and some form of parking control will be needed to ensure that there is no on-street parking for rail users within an acceptable walking distance of the station. Provision will be made for passengers to be dropped off by car.

The scheme has been promoted by the local action group ‘MAGOR’ as a “Walkway station” and it is the intention that local residents will walk or cycle to the station. The proposed station location is shown in Figure 1.

A considerable amount of technical work has been undertaken to explore the feasibility and cost of a new station in this location. Scheme concept designs and cost estimates have been developed to a standard equivalent to GRIP Stage 2 (technical feasibility) in Network Rail’s governance process for investment projects. Further design, costing and environmental assessment work is continuing to progress the scheme to GRIP Stage 3 (option selection).

[1] The Transport Business Cases, Department for Transport, January 2013.

Figure 1: Location of proposed Magor and Undy station



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Other, non-rail transport solutions, including bus services, walking and cycling improvements, car share and parking provision, have been considered, and will continue to be considered, for Magor and Undy. However, as demonstrated in this SOBC, a new rail station is judged to be the option that will have the greatest impact in meeting the objectives set and in solving the transport problems present in the area.

1.4 Document Structure

The remainder of this SOBC is structured around the five case model for transport business cases:

- Section 2 presents the **Strategic Case**, considering the 'case for change', including commentary on the key transport-related issues, policy context, scheme objectives, discussion of alternative options, and key influences on the scheme
- Section 3 sets out the **Transport (Economic) Case**, identifying the range of economic, environmental, social, and public accounts impacts that are expected to arise from the scheme, and therefore the scheme's anticipated value for money
- Section 4 presents the initial **Financial Case**, including anticipated expenditure and potential funding sources
- Section 5 contains an outline of the **Commercial Case** for procuring the scheme and the passenger services that could serve Magor and Undy
- Section 6 contains the **Management Case**, including an indicative programme, and commentary on governance, communications, and risk management

2 Strategic Case

The purpose of the Strategic Case is to demonstrate the need for the scheme. It considers the 'case for change', including the key transport-related issues affecting the area, the policy context, scheme objectives, constraints and interdependencies. It discusses a range of options to meet the objectives, and key influences on the preferred scheme option.

2.1 The Case for Change

The 'case for change' is based on an understanding of existing transport-related problems that could be addressed, and opportunities and aspirations that could be realised, through an investment in transport infrastructure in Magor and Undy. Aspirations, opportunities and problems are set out in this section.

2.1.1 Aspirations

Magor with Undy Community Council has the Mission Statement: "To conserve and improve Magor with Undy as an attractive and sustainable place in which to live, visit and do business". Furthermore, the local community have invested heavily in a campaign to secure improvements to local public transport provision.

Some key aspirations for Magor and Undy are:

- To improve the sustainability of Magor and Undy, including maximising the use of sustainable and active travel modes among residents of and visitors to Magor and Undy
- Maintain and improve connectivity with nearby cities so that the growing population can access services, education and employment opportunities that are not available within Magor and Undy
- To thrive as a community and build strong local businesses, supported through effective transport links
- To develop the tourism potential of the area, which will require maintaining a pleasant village environment and enabling access for visitors

2.1.2 Opportunities

Opportunities that Magor and Undy could capitalise on to enhance transport provision are discussed below. They include:

- A compact community with short local travel distances
- Proximity to Severn Tunnel Junction station
- Proximity to the rail line
- Potential for greater public transport use for westbound travel
- A growing economy in Newport
- Development of the Magor and Undy Community Hub

Compact community

As small settlements, active travel could be used for a large proportion of local journeys within Magor and Undy. Promotion of walking and cycling, possibly combined with infrastructure improvements within the villages, could help to create a walking and cycling culture within the community.

Because of the need to travel to larger settlements, such as Newport, Cardiff and Bristol, for employment and to access services, walking and cycling will need to be combined with other modes for longer journeys.

Severn Tunnel Junction Station

A rail station is available at Severn Tunnel Junction, 2.5 miles to the east of Magor and Undy. There may be potential to increase rail use by improving the connections between the villages and Severn Tunnel Junction.

Proximity to the Rail Line

Magor and Undy are positioned adjacent to the South Wales Main Line and each historically had a station. There is an opportunity to achieve direct access to the rail network by reinstating a station for the community.

Westbound Travel

Magor and Undy residents would be likely to make much greater use of the rail network for westbound travel if they could board a train at Magor/Undy. At present the need to travel east to Severn Tunnel Junction station is counterintuitive for westbound journeys and increases the journey time and cost for all rail journeys.

Growing Economy in Newport

The city of Newport is undergoing regeneration and attracting major employers, while the new Friars Walk shopping centre improves the offer for shopping and leisure. The needs of Magor and Undy residents can increasingly be met relatively locally in Newport, reducing the need to travel further.

A survey by MAGOR found that few rail trips were made from Magor and Undy to Newport, despite Newport being one of the most popular destinations for residents to commute to work.

Magor and Undy Community Hub

There is an opportunity to link a new station with a planned Magor and Undy Community Centre on an adjacent site. The Community Hub is a parallel proposal to Magor and Undy Station, with considerable community support. The centre could provide a heated waiting area and toilets, and sell rail tickets and refreshments. The centre would enhance the quality of the station but the station would not be dependent on its delivery.

2.1.3 Problems

The transport-related problems that have been identified in Magor and Undy are:

- A high reliance on car use in Magor and Undy, with car having an 80% mode share
- An increasing demand for travel between Magor and Undy and employment centres, including Bristol
- High levels of driving to Severn Tunnel Junction from Magor and Undy
- Parking capacity issues at Severn Tunnel Junction station

Reliance on car use

Analysis of 2011 census travel to work data shows that car has an above average mode share of approximately 80% in Magor and Undy. For Monmouthshire overall, car use accounts for 74% of commuting, the same figure as for Wales as a whole.

High levels of car use contribute to traffic congestion, which in the longer term will make it increasingly difficult to travel around the area. It has a negative effect on environmental quality and on people's health. A culture of car use discourages the development of public transport services, disadvantaging those who do not drive or have access to a car.

The current alternatives to car use are to access the rail network at Severn Tunnel Junction or to use the hourly X74/74 Newport to Chepstow bus service. At peak times, the service takes 41 minutes to reach Chepstow Bus Station from Magor. Peak time buses reach Newport Bus Station in 30 minutes. Either journey could take as little as 15 to 20 minutes by car, depending on traffic (car journey time estimates taken from online journey planners).

The Severn Express Bristol-Chepstow-Newport service leaves Magor at 06.57. It reaches Chepstow after 29 minutes and Bristol Bus Station after 1 hour 14 minutes. This service leaves Bristol bus station at 17.15 in the evening, which may be too early for many commuters. For those who commute to the North Fringe of Bristol, including Filton, train services are a better option.

Increasing Demand for Travel

The demand for travel between Magor and Undy and employment centres is increasing at an unsustainable rate because of the pressure it puts on the local road network. Almost all road traffic in and out of Magor and Undy uses the B4245. The most common destinations for commuters include Newport, Caldicot and Chepstow. Many residents also commute to Cardiff and Bristol.

The removal of the Severn Bridge toll by the end of 2018 is expected to increase the demand for homes, the pressure to build and ultimately the volume of people making trips from the Magor and Undy area to Bristol, as well as Newport and Cardiff. It is important that attractive, sustainable transport options are available for those commuting out of the area, or who may travel into Magor and Undy to work. While those who move from Bristol are likely to be car users initially, as congestion increases, easy access to a station will encourage them to switch to rail.

The Monmouthshire Local Development Plan (2011-2021) allocates two strategic housing sites in Magor/Undy, at Rockfield Farm and Vinegar Hill. These will provide approximately 550 new dwellings on land between Undy and the M4. There is also to be approximately 5,575 square metres of employment space, which may increase the demand for inwards travel to Magor/Undy. Further land allocations for strategic housing are likely to be needed in the Magor area for the post--2021 period, to deal with increased demand for housing following Severn Bridge toll removal.

Magor and Undy Residents Driving to Severn Tunnel Junction

Although the residents of Magor and Undy live very close to the railway line, the nearest station is Severn Tunnel Junction, which is approximately 2.5 miles from Magor village centre.

A survey undertaken by the action group MAGOR revealed that approximately 25% of users of Severn Tunnel Junction live in either Magor or Undy[2]. Based on ORR station usage estimates for 2016-2017, this equates to approximately 31,740 return trips[3] per year by Magor and Undy residents. 11% of the total Severn Tunnel Junction passengers (14,965 return trips per year) drive from Magor or Undy. 10% of Severn Tunnel Junction passengers are from Magor or Undy

[2] 'Magor Station What If?' 2013 survey data – weekday. 24.7% of Severn Tunnel Junction users are from Magor / Undy and 45% of these users drive and park at Severn Tunnel Junction. Differences exist for the weekends.

[3] Total entries and exit estimate for Severn Tunnel Junction was 253,918 in 2016/2017. Magor and Undy residents account for 25% of this. Of these 63,479.5 trips, 50% are assumed to be entries and 50% exits, giving 31,740 return trips.

and are dropped off by car (12,696 return trips per year). While it is not known whether these trips are combined with other purposes, dropping of a passenger potentially creates two return car journeys to the station per day. If these passengers are able to more easily access a public transport service directly from Magor to their destination, car journeys could be eliminated or shortened. In particular, traffic in the vicinity of Severn Tunnel Junction station and along the B4245 would be reduced.

To walk or cycle to Severn Tunnel Junction, residents must use the B4245 and Station Road in Rogiet. The B4245 is a busy, rural road with no footway and without continuous street lighting. As such it is not suitable for pedestrians and for many people it is not an attractive route to cycle.

By bus, the journey from Magor takes 7 minutes to Rogiet and passengers must walk the final half a mile to the station. Depending on their destination, they will then wait between 25 to 45 minutes for a train. Understandably, driving to Severn Tunnel Junction is therefore the most attractive option for the majority of those travelling to the station from Magor and Undy.

Parking capacity issues at Severn Tunnel Junction

As the closest rail station, many Magor and Undy residents use Severn Tunnel Junction station. Severn Tunnel Junction has 112 car park spaces, including 6 accessible spaces. There is a £4 per day parking charge at the station. Overflow parking exists at Rogiet Countryside Park and passengers may also use the playing fields car park for £2 per day.

Some rail users are known to avoid the parking charges at the station by parking for free on residential streets in Rogiet. Overspill parking, when the station car parks are full, also occurs on residential streets. This is perceived by local residents as a nuisance. On street parking also has safety implications and increases congestion in the vicinity of the station and surrounding Rogiet Primary School.

An analysis of entry and exit data at Severn Tunnel Junction over the past five years shows an annual percentage increase of between 1.9% and 10.8% each year. This trend is expected to continue. The Local Development Plans propose at least 1000 new dwellings in southern Monmouthshire and the nearby Forest of Dean District in England. The increasing trend to live in South Wales and commute to Bristol is expected to place increasing pressure on car parking at Severn Tunnel Junction. Removing car trips to the station from nearby Magor and Undy would make available approximately 40 to 50 spaces each day[4], considerably reducing this pressure.

2.1.4 Impact of Not Changing

The population of Magor and Undy as well as other settlements in south-east Wales is expected to increase. In particular, there is likely to be an increase in residents who commute to work in Bristol, following the removal of Severn Bridge tolls at the end of 2018. The impact of not changing the transport provision for those living in Magor and Undy will include:

- Continued reliance on car use by Magor and Undy residents.
- Further increase in Magor and Undy residents travelling by car to access the rail network at Severn Tunnel Junction. This will cause increasing congestion and safety concerns as well as reduced environmental quality in Magor and Undy, on the B4245 and on residential roads

[4] Assuming that Magor and Undy residents make a total of 14,965 return trips per year from Severn Tunnel Junction, as previously identified and these are spread evenly across Monday to Saturdays.

through Rogiet. Traffic and emissions levels will discourage residents from cycling to Severn Tunnel Junction.

- As the journey time and perceived difficulty in accessing Severn Tunnel Junction increases, more residents may opt to make their entire journey by car.
- Greater environmental impact of car use, on local air quality and greenhouse gas emissions. There may also be an increase in road accidents.
- A significant opportunity to promote active and sustainable travel options will be missed, along with the health and environmental benefits from this that Magor and Undy residents could have enjoyed.
- An opportunity to partner with the community, and to use facilities at the planned Magor and Undy Community Hub, will be missed.
- Public transport, especially rail, will remain particularly underutilised for westbound journeys, despite the increasing opportunities available in Newport. The situation will worsen as congestion increases on the route to Severn Tunnel Junction.
- The parking problems at Severn Tunnel Junction station and in the village of Rogiet will increase.

Appropriate investment in transport infrastructure at this time will help meet the aspirations of Magor and Undy while capitalising on the opportunities present and avoiding increasing problems.

2.2 Policy Context

Any investment in transport infrastructure in Magor and Undy must align with national, regional, and local policy and strategy. This sub-section sets out the key policy documents and relevant points identified from each. The policy context will inform the objectives set for investment. In some cases potential transport improvement schemes have been identified in policy and strategy documents. Table 1 presents policy documents with their implications for this scheme.

Well-being of Future Generations (Wales) Act 2015

The Well-being of Future Generations Act is central to Welsh Government policy. It requires public bodies in Wales to proceed in a sustainable way, in every decision they make, considering the long term impact on future generations. The Well-being of Future Generations Act contains seven well-being goals for:

- A prosperous Wales – innovative, productive and low carbon society, with an economy that generates wealth and employment opportunities
- A resilient Wales – maintaining and enhancing a biodiverse natural environment, and supporting social, economic, and ecological resilience
- A healthier Wales – maximising people's physical and mental well-being
- A more equal Wales – enabling people to fulfil their potential
- A Wales of cohesive communities – attractive, viable, safe, and well-connected communities
- A Wales of vibrant culture and thriving Welsh Language
- A globally responsible Wales.

Transport investment for Magor and Undy has the potential to contribute to each of the seven well-being goals, particularly a prosperous Wales, a healthier Wales, a more equal Wales and a Wales of cohesive communities.

Active Travel (Wales) Act 2013

Magor and Undy villages are within an area covered by the Active Travel (Wales) Act. This Act makes it a legal requirement for local authorities in Wales to plan for, improve, and promote suitable walking and cycling routes within designated built-up areas. By connecting key sites such as workplaces, rail stations, schools and shopping areas with active travel routes, the intention of the Act is to encourage people to rely less on their cars when making short journeys.

Monmouthshire Local Development Plan (LDP) 2011-2021 and Local Transport Plan (LTP)

Magor and Undy fall within the Monmouthshire Local Planning Authority and as such any transport scheme will need to align with Monmouthshire County Council's LDP. The LDP emphasises improving opportunities for sustainable travel, particularly walking, cycling use of public transport and reducing reliance on the private car. It is supportive of strategic transport improvements.

The LTP sets out Monmouthshire's priorities for transport investment between 2015 and 2020.

Table 1: Policy Context for Transport Investment at Magor and Undy

Policy / Strategy / Plan	Scheme alignment
Well-Being of Future Generations (Wales) Act 2015	• Transport investment will help maximise the economic growth potential of the Magor and Undy area (prosperous Wales). • Will encourage increased walking and cycling as part of an overall public transport journey (healthier Wales). • Improves connectivity and public transport accessibility for residents of Magor and Undy to employment and education opportunities (more equal Wales) and to cultural events and opportunities (Wales of vibrant culture). • Enables Magor and Undy to continue developing as a well-connected and sustainable community (Wales of cohesive communities). • Encourages use of sustainable travel options and reduces reliance on private cars, with a positive impact on the environment both locally and globally through reduced carbon emissions (a resilient Wales, a globally responsible Wales).
Active Travel (Wales) Act 2013	• Magor and Undy is small enough for almost all journeys within the community to be undertaken by walking and cycling. • As the transport problems in Magor and Undy relate to the need for residents to travel outside of the community, active travel is likely to be as one stage of a longer journey.
Wales Transport Strategy (2008)	A scheme must: • Contribute to the long term social outcomes of improved access to healthcare, education, and leisure, as well as encouraging healthy lifestyles • Align with the long term economic outcomes of improving access to employment opportunities, improving connectivity, improving efficient / reliable / sustainable movement of people, and improving access to visitor attractions • Contribute to the long term environmental outcomes of reducing transport's contribution to greenhouse gas emissions and air pollution, and improving the impact of transport on the local environment
National Transport Finance Plan – NTFP (2015)	• NTFP recognises that an efficient, effective rail network has an important role to play in supporting the Welsh economy, enabling access across Wales and cross-border. A new station at Magor and Undy will have an important role to play in enabling people to access key services. • Magor is identified as a potential new station site for further consideration, including development of a strategic Park and Ride facility as part of the South Wales Metro (scheme reference RI10)
South Wales Metro, Stage 2 programme, Welsh Government	• Magor is listed as a potential new station in Metro Phase 2

Policy / Strategy / Plan	Scheme alignment
Network Rail Draft Wales Route Study	• The study references a new station at Magor/ Undy
Monmouthshire Council's Local Development Plan	• The LDP emphasises improving opportunities for sustainable travel, particularly walking, cycling use of public transport and reducing reliance on the private car. It is supportive of strategic transport improvements. Specific schemes proposed within the LDP include: • A Rogiet to Magor footway/cycleway, which was identified through the Active Travel Act mapping exercise and consultation. • A proposed "community walkway station" at Magor and Undy.
Monmouthshire Council's Local Transport Plan	Specific schemes proposed within the LDP include: • Magor and Undy Active Travel Network improvements, including a Rogiet to Magor footway/cycleway. • A proposed new walkway rail station at Magor and Undy.

Source: Mott MacDonald

Of particular note in policy and strategy documents are the references to a footway/cycleway from Magor to Rogiet and the proposed new station for Magor and Undy.

2.3 Objectives

2.3.1 Scheme Objectives

A set of scheme objectives has been established to guide option assessment for improving transport options in Magor and Undy. These have been distilled from the problems, opportunities and aspirations, and the policy context.

The scheme will need to:

1. Cater for the travel needs of an increasing population in Magor and Undy, without putting undue pressure on the surrounding road network, including the B4245 and Station Road in Rogiet.
2. Improve public transport connectivity between Magor/Undy, the cities of Newport, Cardiff and Bristol, and the national rail network, to enhance access to employment and services.
3. Promote use of sustainable transport options among residents of Magor and Undy.
4. Promote active travel among residents of Magor and Undy.
5. Support the development of local businesses, community development projects and tourism potential.
6. Reduce pressure on car parking capacity at Severn Tunnel Junction.

2.3.2 Measures for Success

For each objective at least one indicator is proposed to allow the success of the scheme that is delivered to be measured over time, as shown in Table 2. The first three indicators will require further survey data to be collected from rail users at Severn Tunnel Junction and Magor and Undy stations. Knowledge of community development projects that have been enabled by the rail station will come from community members, possibly those involved in the MAGOR action group.

Table 2: Proposed success indicators

Proposed indicator	Relating to objective
Reduction in Magor and Undy residents driving to Severn Tunnel Junction station.	1, 6
Increase in Magor and Undy residents walking or cycling as part of their journey	4
Increase in public transport mode share.	2,3
Number of community development projects directly enabled by the scheme	5

Source: Mott MacDonald

2.4 Option Assessment

2.4.1 Potential Options

A list of seven possible transport options has been developed for meeting the objectives set out in Section 2.3.1. The options are presented below. The community in Magor and Undy have previously identified a new rail station as their preferred scheme and so this is included as one option, however it is important is to ensure that the alternatives are fully considered.

1. A dedicated bus/minibus service between Magor, Undy and the railway station at Severn Tunnel Junction, with buses timed to meet the trains.
2. Changes to existing bus services so that buses serving Magor and Undy meet the trains at Severn Tunnel Junction.
3. General enhancements to local bus services to improve access to employment centres and transport interchanges.
4. A new pedestrian and cyclist route linking Magor and Undy to Severn Tunnel Junction Station.
5. An organised car share scheme among residents of Magor and Undy, to reduce the number of cars travelling to the station.
6. Open a new station to serve Magor and Undy.
7. Increase the car parking provision at Severn Tunnel Junction station.

Dedicated shuttle bus

A dedicated bus service would provide relatively easy access to Severn Tunnel Junction, avoiding car use, but this approach requires passengers to make an interchange between bus and rail at the station. Those wishing to travel westbound are particularly unlikely to take a bus eastbound to connect to the train if they have the option of driving.

In 2011, Grass Roots Community Transport began operating a community bus to provide transport to Severn Tunnel Junction at peak commuting times. This service is no longer operating, which suggests that there was insufficient demand.

Changes to existing bus services so that buses serving Magor and Undy meet the trains at Severn Tunnel Junction.

At present there is one bus per hour between Magor and Undy and Rogiet, which stops approximately half a mile from the station, on the B4245. After walking to the station, passengers must wait 25 to 45 minutes for their train.

To make bus a more convenient option, the route would need to be altered to call at the station and service frequencies increased to better integrate with rail services. Coordinating the bus timetables with the train services would require additional bus services and possibly inefficient

use of vehicles. These changes are unlikely to be commercially viable for bus operators and would require a financial incentive. The need to interchange at Severn Tunnel Junction may make this option less attractive to passengers.

General enhancements to local bus services to improve access to employment centres and transport interchanges.

Magor and Undy are currently served by one bus per hour in each direction as well as a daily return service to Bristol.

It is likely that if the demand for additional services made them commercially worthwhile, bus operators would have already increased service frequencies. Therefore it is assumed that a financial incentive would be required to secure additional services. Buses will remain a slower option than car and will be affected by increasing traffic congestion. They are also likely to be less attractive to passengers than a rail service.

Pedestrian and cycle route between Magor/Undy and Severn Tunnel Junction

From the centre of Magor, the route to Severn Tunnel Junction station is approximately 2.5 miles. Of this just over one mile is along the B4245. This is a heavily trafficked rural road with a 60mph speed limit in place between the outskirts of Undy and Llanfihangel Rogiet. There is no footway, except for very short sections, and the route does not have continuous street lighting.

A Rogiet to Magor footway/cycleway was identified by Monmouthshire County Council during their active travel mapping and consultation. It is mentioned in the Monmouthshire LDP. Support for pedestrian improvements to the B4245 has also been demonstrated by a recent petition on change.org, with approximately 725 signatures.

A shared use footway and cycleway could be provided alongside the B4245. Alternatively, a shorter route parallel to the railway may be possible. Either of these may encourage a greater number of people to cycle to Severn Tunnel Junction. However the distance is greater than many people would be willing to walk to access the station, especially if they are carrying luggage. The route alongside the busy B4245 might not be considered attractive by walkers. An alternative route parallel to the railway would also be longer than would be acceptable to access the station. Either route would require good lighting if they were to be used after dark, which would include most commuting trips during the winter.

An organised car share scheme among residents of Magor and Undy

With around 25% of users of Severn Tunnel Junction station travelling from Magor and Undy, car sharing is a logical way to reduce the number of car trips to the station.

While organised schemes can be effective in circumstances where potential car sharers may not otherwise identify each other, in this situation the benefit may be limited. Magor and Undy is a relatively small community where people are likely to know each other, and regular station users will soon recognise those who travel a similar route. The £4 per day parking charge provides an incentive for sharing. It is therefore likely that those residents who are open to car sharing are already doing so on an informal basis. Any formal scheme would require a designated co-ordinator.

New Magor and Undy Rail Station

A new station at Magor and Undy would reduce travel times and costs for residents of Magor and Undy to all destinations on the rail network. By providing access to the rail network within a convenient walking or cycling distance, this option would encourage maximum use of active and sustainable travel options by the local population. The site proposed by the action group

'MAGOR' is a central location within the community, maximising its accessibility. Estimated travel time savings are shown in Table 3.

Table 3: Daily journey time savings by using new Magor/Undy Station

New Journey	Previous Journey	Time Saving per Day (Return trip)
Walk to new Station	Drive to Severn Tunnel Junction	8 minutes
Cycle to new Station	Cycle to Severn Tunnel Junction	8 minutes
Walk to new Station	Bus to Severn Tunnel Junction	50 minutes

Source: MAGOR Action Group / Mott MacDonald

In addition to time savings, there will be an improvement in journey time reliability for those using the rail service instead of driving. Walking to Magor Station will save residents the cost of a 9km return car journey and £4 per day (2018 prices) parking charge at Severn Tunnel Junction, or £1.25 each way (2018 prices) in bus fares to Severn Tunnel Junction.

As well as the health benefits of active travel, by encouraging a mode shift away from car use, the new station would contribute to environmental benefits and accident reductions on the road network, including the M4. By increasing travel options, it would improve the resilience of the transport network as a whole, for example when weather-related M48 Seven Bridge closure incidents cause congestion at M4 Junction 23A.

There is also the opportunity for the station to contribute to community development by locating station facilities within the community centre. This could include sales of refreshments as well as ticketing.

A survey by MAGOR suggested that a new station would increase rail use by residents of Magor and Undy. The proportion of residents using the train for their daily commute would increase from 10% to 15%. The proportion using the train weekly for leisure journeys would increase from 8% to 29%. The proportion who never use the train would drop from 22% to 6%.

Increase the car parking provision at Severn Tunnel Junction.

The existing parking provision at Severn Tunnel Junction station is 112 spaces, including 6 bays for disabled badge holders. There are also 75 parking spaces available at the adjacent playing fields, where parking charges are lower than the main station. Passengers are also able to park at Rogiet Country Park.

Adding further parking provision would meet the increasing demand at Severn Tunnel Junction. To ensure that drivers use the spaces provided rather than parking on residential streets, any parking charges would need to be carefully considered.

While this option could alleviate parking problems at Severn Tunnel Junction, by facilitating car use it would have a negative impact on other elements of the transport system. Road traffic congestion would increase, especially close to Severn Tunnel Junction station.

Encouraging car use would discourage the use of public transport. Congestion close to Severn Tunnel Junction station may prompt mode shift away from rail as people drive directly to their destination. Those who continue to walk or cycle to the station, would find the journey less pleasant, with increased emissions and risks to safety.

2.4.2 Option Sifting

The seven options have been assessed using the seven point qualitative assessment scale required by WelTAG. This scores the expected effect of each option from large beneficial to large adverse, in terms of each of the objectives.

For each option the level of risk involved has been rated using a Red, Amber, Green rating in terms of the following factors:

- Deliverability: The technical feasibility of the option
- Financial affordability: The potential ongoing cost to the Local Authority or to Welsh Government to maintain the scheme
- Stakeholder acceptability: The acceptability of the scheme to local residents and the general public as well as the local authority, Welsh Government and any organisations involved in scheme delivery, such as bus operators or the rail industry.

Table 4: Option Scoring

Option	1) Cater for travel needs of an increasing population in Magor and Undy	2) Improve public transport connectivity	3) Promote use of sustainable transport options	4) Promote active travel	5) Support development of local businesses and community projects	6) Reduce pressure on parking capacity at Severn Tunnel Junction	Deliverability (risk level)	Financial affordability (risk level)	Stakeholder acceptability (risk level)
Option 1: Dedicated bus Magor/Undy to Severn Tunnel Junction	++	++	++	+	+	+	Low	High	Low
Option 2: Enhancements to local bus services Magor/Undy to Severn Tunnel Jn	++	++	++	+	+	+	Low	Medium	Medium
Option 3: General enhancements to local bus services	++	++	++	+	+	+	Low	Medium	Medium
Option 4: New pedestrian / cycling route to Severn Tunnel Jn	+	+	++	+++	+	+	Medium	Medium	Medium
Option 5: Organised car share for Magor/Undy residents	+	0	+	-	0	+	Medium	Medium	Medium
Option 6: New Magor and Undy station	+++	++	+++	++	++	+++	Medium	Medium	Low
Option 7: Increase Severn Tunnel Junction parking provision	-	-	--	--	0	+++	Medium	Low	Medium

Notes:

Qualitative assessment scale (WelTAG): large beneficial (+++), moderate beneficial (++), slight beneficial (+), neutral (0), slight adverse (-), moderate adverse (--), large adverse (---)

Source: Mott MacDonald

Key points to note from Table 4 are:

- All three bus based options have a slight or moderate beneficial impact on each of the objectives. They have no large beneficial impacts. The deliverability risks are low for these options, but the financial risks higher due to the requirement for ongoing subsidy.
- A new pedestrian and cycle link between Magor/Undy and Severn Tunnel Junction station is the only option with a large beneficial impact on promoting active travel, but in terms of the other objectives it is limited to a slight benefit.
- The only option to have an overall negative effect in terms of the objectives is increased parking at Severn Tunnel Junction.
- A new Magor and Undy station has the most beneficial impact overall, with a large beneficial effect on three objectives and a moderate benefit to the remaining three.
- A new station is the only option with a large beneficial impact in terms of catering for an increasing population and promoting the use of sustainable transport options.
- While a new station option is considered highly acceptable to stakeholders, there is greater risk involved in terms of deliverability compared to the other options.

2.4.3 Preferred Option

Based on the options assessment exercise presented in Table 4, the preferred option, with the highest overall rating, is a new station for Magor and Undy. A station would have a large beneficial effect in relation to three objectives: Catering for the travel needs of an increasing population; promotion of sustainable transport; and reducing pressure on parking capacity at Severn Tunnel Junction. It has a moderately beneficial effect in relation to all other objectives.

The scheme would have a medium level of risk associated with deliverability, because land purchase and construction is required, and medium financial affordability due to ongoing maintenance costs associated with a new station. However it appears to be well supported by stakeholders.

2.5 Geographic Scope

The geographic scope of works for the preferred option, a new station at Magor and Undy, extends over a short section of the rail line where the B4245 runs close to the line in the centre of Magor and Undy, and an area of land between the railway line and the B4245. A footbridge and subway across the railway are already in place at this location. Works will be required to construct two platforms, provide an access point from the B4245, provide a drop off area and possibly cycle parking, and implement any railway works that may be required, such as track realignment.

The benefits associated with the new station will primarily be within Magor and Undy, as residents are provided the option to walk to the station instead of using private cars. Visitors to Magor and Undy, for business, commuting or tourism and leisure will also benefit.

Significant benefits are also expected in Rogiet and at Severn Tunnel Junction station. Many Magor and Undy residents will no longer need to use Severn Tunnel Junction. This will reduce congestion in Rogiet and relieve pressure on parking spaces. The B4245 between Undy and Rogiet will also benefit from reduced traffic from Magor and Undy to Severn Tunnel Junction station.

Although less significant, there will be some positive impact over a much wider area, as Magor and Undy residents shift from car use to rail.

2.6 Wider Economic Impacts

By improving access to employment opportunities, the station will help to sustain and increase income levels in the Magor and Undy area. In particular, access to the rail network will make it easier for residents to commute to Bristol, helping to spread economic prosperity into South Wales.

Good transport infrastructure can support the viability or attractiveness of an area of land for development. The station will therefore support local economic growth through housing supply and to some extent job creation.

In addition to benefiting the immediate road network between Magor and Rogiet, by encouraging mode shift from car to rail, a new station will contribute to the alleviation of road congestion on the M4. The station will also help to support economic regeneration in Newport by making it easier for Magor and Undy residents to travel into Newport.

2.7 Strategic Influences

2.7.1 Constraints

Operational (rail service path) constraints will mean that the new station is usually limited to two trains per hour per direction. Analysis throughout this Outline Business Case is based on this assumption.

2.7.2 Interdependencies

The scheme will benefit from planned line speed upgrades to the South Wales Main Line relief lines. This will reduce the time penalty incurred by services that call at the new station.

The scheme is also expected to benefit from refurbished rolling stock, which is to be cascaded from other train operating companies over the next few years, as well as potentially new rolling stock through the Wales and Borders franchise. This will ensure that train sets are of sufficient capacity (length) when calling at Magor and Undy and are compliant for use by people of reduced mobility (PRM). Without lengthened or upgraded rolling stock then train capacity will be insufficient to add an additional station stop.

The scheme will need to be designed and implemented to take account of the following rail and road schemes and network changes:

- Electrification of the South Wales Main Line is due for completion in the Magor and Undy area during 2019/20. Stanchion locations and overhead line equipment on the Main Line will need to be factored in to the detailed design of the scheme.
- Line speed upgrades will have been delivered on the South Wales Main Line relief lines, minimising the time penalty incurred by passenger rail services calling at Magor and Undy.
- New Intercity Express Programme timetables and new Wales and Borders timetables are due to commence over the next 1-5 years. The stopping pattern for services at Magor and Undy will benefit from and need to fit around these timetable changes. In particular, an increase in the Cardiff – Cheltenham services from every two hours to hourly will be beneficial for serving Magor and Undy.
- Although the M4 Corridor around Newport proposals include a new motorway junction and access route to Severn Tunnel Junction, this is assumed not to be present for the appraisal.

2.7.3 Stakeholders

The key stakeholders for the proposed new station are:

- MAGOR (Magor Action Group on Rail): A local action group who have campaigned for a new station in Magor and Undy.
- Monmouthshire County Council: The Local Planning Authority for Magor and Undy.
- Network Rail: Responsible for rail infrastructure.
- Train Operating Companies (TOCs): Responsible for rail services that may call at Magor and Undy and expected to keep the revenue taken. The Wales and Borders TOC will also be responsible for station maintenance.
- Welsh Government / Transport for Wales: Responsible for the Wales and Borders Rail Franchise.

The proposal is supported by Magor with Undy Community Council and Railfuture Wales.

2.8 Strategic Case Summary

Magor and Undy Station is expected to perform well against the objectives set for the scheme. The qualitative assessments in Table 5 use the seven point scoring scale (from large beneficial to large adverse) as recommended in WelTAG.

Table 5: Strategic Case Assessment

Objective	Qualitative Assessment	Expected Impacts
Cater for the travel needs of an increasing population in Magor and Undy, without putting undue pressure on the surrounding road network, including the B4245 and Station Road in Rogiet.	+++	The scheme will reduce the need for Magor and Undy residents to drive to Severn Tunnel Junction Station, removing trips from the B4245 and Station Road. A higher proportion of residents are likely to use the rail network instead of the roads.
Improve public transport connectivity between Magor/Undy, the cities of Newport, Cardiff and Bristol, and the national rail network, to enhance access to employment and services.	++	Scheme will provide a direct rail link between the centre of Magor/Undy and the cities of Newport, Cardiff and Bristol.
Promote use of sustainable transport options among residents of Magor and Undy.	+++	The station provides easy access to the rail network on foot or by bicycle
Promote active travel among residents of Magor and Undy.	++	The station's location in the centre of Magor and will enable and encourage residents to walk or cycle to the station.
Support the development of local businesses, community development projects and tourism potential.	++	Provides easier access for visitors to Magor and Undy. Potential to directly contribute to community development if station facilities are located within community centre.
Reduce pressure on parking capacity at Severn Tunnel Junction.	+++	A significant proportion of passengers currently using Severn Tunnel Junction (Severn Tunnel Junction) live in Magor and Undy. These passengers will no longer need to use STJ station, freeing up parking spaces.

Notes: Qualitative assessment scale (WelTAG): large beneficial (+++), moderate beneficial (++), slight beneficial (+), neutral (0), slight adverse (-), moderate adverse (--), large adverse (---)

Source: Mott MacDonald

The scheme is expected to improve connectivity between Magor/Undy and key urban centres, relieve pressure on the local road network and Severn Tunnel Junction Station, and encourage uptake of sustainable and active travel options. The Transport Case (Section 3) contains further detail on expected scheme impacts.

3 Transport (Economic) Case

The Transport (Economic) Case demonstrates that the preferred scheme (a new station at Magor and Undy) offers value for money in the widest sense, bringing economic, socio-cultural, and environmental benefits. At the Strategic Outline Business Case stage the assessments contained within the Transport Case are expected to be at a high level only. More detailed assessments need to be undertaken at the next business case stage, Outline Business Case.

3.1 Overview

3.1.1 Options Appraised

A high level option assessment (section 2.4) has confirmed that a new rail station at Magor and Undy remains the most suitable option. This section assesses the range of impacts that are expected to arise from a new station.

3.1.2 Appraisal Assumptions

In appraising the scheme, a number of scheme-specific and wider area assumptions have been made. These assumptions are set out under the headings of appraisal period, time penalty / benefit, transport supply, car parking, station catchment, Severn Tunnel Junction, and travel demand.

Appraisal Period

- First year of appraisal period: proposed station opening year, 2021
- Interim forecast year: 15 years after station opening, 2036
- Benefits can continue to be monetised up to 60 years from scheme opening (i.e. the end of 2080), in line with Department for Transport online appraisal guidance (WebTAG)
- Rail passenger demand growth forecasts are capped at levels reached at the end of 2036 (20 years from now), in line with WebTAG[5]

Time Penalty / Benefit

- Rail services and passengers already on board services that call at the new station will incur a total journey time increase of 2.5 minutes[6].
- Passengers living in Magor or Undy, and who currently drive and park at Severn Tunnel Junction (11% of Severn Tunnel Junction passengers)[7], will realise the following savings if they decide to use the new station:
  - Time saving by walking to the new station estimated to be approximately 4 minutes in each direction (8 minutes per day).
  - Car operating cost saving over a 9km return journey.
  - No need to pay parking charges. The daily parking charge saved would be £3.24 (weighted average, 2017 prices)[8].

[5] WebTAG Unit A5.3, sec 2.3.1.

[6] The GRIP2 study and GRIP3 options study have estimated a maximum journey time increase of 3 minutes for existing services.

[7] 'Magor Station What If?' 2013 survey data – weekday. 24.7% of Severn Tunnel Junction users are from Magor / Undy and 45% of these users drive and park at Severn Tunnel Junction. Differences exist for the weekends.

[8] Assumes 50% buy a weekly parking ticket (equivalent to £2.88 per working day if used 5 days per week), 50% buy daily tickets at £3.60 per day. This assumes that, in future, all parking at Severn Tunnel Junction would be charged.

- Passengers living in Magor or Undy, and who are currently dropped off at Severn Tunnel Junction by someone else (10% of Severn Tunnel Junction passengers)[9], will realise the following savings if they decide to use the new station:
  - Time saving by walking to the new station estimated to be approximately 4 minutes in each direction (8 minutes per day).
  - Car operating cost saving over 2.4km (50%) or 18km (50%)[10].
- Passengers living in Magor or Undy and who currently cycle to Severn Tunnel Junction (1.2% of Severn Tunnel Junction passengers) will realise the following savings if they decide to use the new station:
  - Time saving by cycling to the new station estimated to be 8 minutes in each direction (16 minutes per day).
- Passengers living in Magor or Undy and who currently take the bus to Severn Tunnel Junction (2.5% of Severn Tunnel Junction passengers) will realise the following savings if they decide to use the new station:
  - Time saving by walking to the new station estimated to be 25 minutes in each direction (50 minutes per day).
  - No need to pay bus fare of £2.50 each day (2016 prices)[11].
- For those heading from Magor and Undy east towards Bristol, the time savings would be offset (but only in part) by a slight increase in rail journey time.

Transport Supply

For the purpose of a high level appraisal, Magor and Undy is assumed to be served by two trains per hour (tph) per direction. The passenger rail services that are assumed to call at Magor and Undy station are:

- 1tph per direction: Taunton – Weston-super-Mare – Bristol Temple Meads – Newport – Cardiff (the existing GWR service).
- 1 tph per direction: Cheltenham Spa – Gloucester – Chepstow – Newport – Cardiff (infilling the existing 0.5tph Arriva Trains Wales service)[12].

A sensitivity test scenario has been undertaken with two additional services per hour operating between Bristol and Cardiff, one of which would call at Magor and Undy. Under this scenario, the Taunton – Cardiff service would not call at Magor and Undy, thereby reducing passenger loadings (and associated time penalties) on services that call at the new station.

To allow for a fair appraisal of the new station, the 'Without Scheme' scenario also infills the Cheltenham – Cardiff service to one train per hour one direction. This ensures that the appraisal captures only the net benefits associated with the new station rather than service changes.

All additional rail passenger revenues are assumed to be retained by the private sector train operating companies.

[9] 'Magor Station What If?' 2013 survey data – weekday. 24.7% of Severn Tunnel Junction users are from Magor / Undy and 40% of these users are dropped off at Severn Tunnel Junction by someone else. Differences exist for the weekends.

[10] Assumes 50% of drop-offs are for trips that would pass nearby anyway, involving only a detour along Station Road from the B4245 (2 x 1.2km diversions). The other 50% of drop-offs are trips made specifically to the station to drop-off or collect someone (2 x 9km return journeys).

[11] Newport Bus fare table for route 74, £1.25 single fare between Magor/Undy and Rogiet. Return fares not offered.

[12] The future requirement for increased services between Cardiff and Gloucester is acknowledged in the Welsh Route Study, Network Rail, March 2016.

Car Parking

There will be no parking provision at the new station and no all day on-street parking within an acceptable walking distance. However, it will be possible to drop car passengers off at the station.

New Station Catchment

Given that no car parking will exist at the new station, the catchment area largely comprises residents living in (and a small number of commuters into) Magor and Undy. Residents will be able to walk / cycle to the station, or can be dropped off by another car driver (or potentially a community bus service).

Drivers from further afield will need to continue to use Severn Tunnel Junction station for parking.

Note that not all Severn Tunnel Junction users from Magor and Undy will choose to transfer. To some extent this will be dependent on their rail destination and the frequency of services to those destinations from either station.

Severn Tunnel Junction

Availability and cost of parking at Severn Tunnel Junction station will have an impact on the success or otherwise of a new Magor and Undy station. The following assumptions are made for Severn Tunnel Junction station, both with and without the new station:

- The current main 112-space charged car park has been reduced in size slightly to allow for creating a safer walking and cycling route into the station. Parking charges will remain at present levels (in real terms).
- The existing 75 free parking spaces at the playing fields adjacent to the station are to become charged spaces (at the same prices as the main car park).
- The existing 60 free parking spaces at Rogiet Country Park are to be removed. These will be replaced by a 200-space car park which will allow free short stay parking (2-3 hours) for Country Park users, with charges applying for longer stays (at the same prices as the main car park).
- Total parking capacity will therefore increase by approximately 45% but there is to be no free all-day parking available.

Travel Demand

New residential and employment developments will increase demand for rail services. The most significant development sites in Magor and Undy for the current Local Development Plan period are the proposed 550 dwellings across Rockfield Farm and Vinegar Hill, to the north of Undy and adjacent to the M4. New dwellings on these sites will be within the catchment area for the new station. Linear growth is assumed from no dwellings at these sites in 2016 to full build-out by 2026.

At least 1000 new dwellings are proposed in Local Development Plans for the southern part of Monmouthshire and Forest of Dean District areas. This means that any parking demand released at Severn Tunnel Junction (by users of the new station at Magor who used to drive and park at Severn Tunnel Junction) is likely to be backfilled by a combination of new residents and suppressed demand. It is assumed that the backfilled demand is from people who would otherwise have driven all the way to Bristol, Newport or Cardiff.

3.1.3 Approach to Appraisal

Appraisal Overview

The range of possible economic, environmental, socio-cultural, and public accounts impacts that could arise from a new station at Magor and Undy have been assessed against the standard set of WelTAG / WebTAG impact criteria. Environmental and socio-cultural impacts have been assessed at a high level, consistent with Strategic Outline Business Case requirements. Economic impacts, in particular those associated with journey times and passenger demand, have been assessed at a greater level of detail, as it is important to understand potential demand when appraising a new rail station.

Passenger Demand Forecasting Method

Demand forecasts for Magor and Undy have been made using a 'gravity' model method. Gravity models use existing rail demand data, service quality (frequency, destination, fare) information, competing mode data (for car and bus), and population and socio-economic data for areas around stations to forecast flows. The UK rail industry's Passenger Demand Forecasting Handbook (PDFH) suggests a gravity model approach for assessing proposed new stations on existing rail lines, where a range of possible destinations are being served. Services from Magor and Undy would be expected to serve Cardiff Central, Newport, Bristol Temple Meads, Gloucester, and Cheltenham directly, which makes a gravity model approach appropriate.

The demand forecasts have been translated into forecast benefits (Present Value of Benefits – PVB) using assumptions based on changes in passengers' end to end journey times, changes in parking charges or fares paid by passengers and received by transport operators (including bus operators), and the net change in vehicle-kilometres on the highway network due to modal shift. Changes in vehicle-kilometres lead to external impacts on levels of congestion and knock-on environmental (noise, greenhouse gas) impacts[13], as well as changes in the number of road accidents taking place. A combination of local data obtained by MAGOR and standard Department for Transport parameters (from WebTAG) have been used in estimating the PVB.

3.2 Scheme Performance

Passenger demand forecasts for the new station are presented in this section.

Passenger Demand Forecasts

Table 6 presents demand forecasts for Magor and Undy station, and identifies the percentage of this demand that is assumed to have transferred from Severn Tunnel Junction. Opening year (2021) demand is assumed to be 70% of full annual demand, to reflect the 'ramping up' effect as people's travel habits begin to change.

[13] External impacts assessment undertaken in line with WebTAG Unit A5.4 Marginal External Costs.

Table 6: Magor and Undy demand forecasts

Year	Passengers (annual) – total station entries and exits	Approx. % of new Magor passengers transferred from Severn Tunnel Junction
Core scenario		
2021	125,572	10%
2026	203,399	10%
2036	222,814	10%
Sensitivity test		
2021	132,353	10%
2026	214,168	10%
2036	234,309	11%

Source: Mott MacDonald

The 5% difference in forecast demand at Magor and Undy between the core scenario and the sensitivity test should not be seen as significant. The forecasts in Table 6 indicate that the increased relative attractiveness of Severn Tunnel Junction in Scenario 2 (in terms of rail service frequencies) does not appear to affect passenger numbers at Magor and Undy.

Table 7 provides a forecast of passenger destinations, based on the outputs of the gravity model. New demand for rail services at Magor and Undy is expected to be influenced particularly by people travelling to Newport and Cardiff, amounting to almost 60% of passenger throughput. Passenger numbers to Bristol are expected to be constrained because only one train per hour is assumed to be provided, compared to a minimum of two trains per hour from Severn Tunnel Junction. Higher levels of service to Bristol from Magor and Undy would lead to increased passenger numbers.

Table 7: Magor and Undy approximate passenger split by destination

Destination - Westbound	% split	Destination - Eastbound	% split
Newport	20%	Chepstow / Lydney / Gloucester / Cheltenham	24%
Cardiff & Vale of Glamorgan	39%	Bristol and Bath area	6%
S Wales valleys	1%	Other - England	3%
Marches line & N Wales	2%		
Other - West	5%	*Total (whole table)*	*100%*

Source: Mott MacDonald

To put the passenger number forecasts into perspective, Table 8 sets out 2016/17 passenger numbers and service levels at comparable stations in South Wales and in the nearby Forest of Dean District of Gloucestershire. The comparable stations have similar population and location characteristics, serving stand-alone settlements that are within 10 miles of another station that has higher service levels.

Table 8: Comparable stations actual passenger numbers

Station	Passengers (2016/17) – total entries / exits	Rail service level (tph = trains per hour)
Caldicot	104,438	West: Up to 1tph to Newport/Cardiff, East: Up to 1tph to Gloucester/Cheltenham
Rhoose CIA	140,000 (excludes airport trips)	East: 1tph to Cardiff and the Valleys West: 1tph to Bridgend
Llanharan	173,626	East: Approx. 1tph to Cardiff/Newport West: Approx. 1tph to Bridgend
Lydney	188,840	West: Approx. 1tph to Newport/Cardiff East: Approx. 1tph to Gloucester/Cheltenham (6 per day continue to Birmingham)
Eastbrook / Dinas Powys combined	271,312	East: 4tph to Cardiff and the Valleys, West: 3tph to Barry Island / 1tph to Bridgend

Source: Mott MacDonald, using station usage data published by the Office of Rail and Road (ORR)

Table 8 demonstrates the plausibility of the Magor and Undy forecasts (approximately 125,000 to 130,000 in 2021), given that it would be served by two trains per hour in each direction, including a direct service to Bristol. Other stations with lower service levels (such as Llanharan) manage to reach similar passenger numbers.

3.3 Impact Assessments

The impact assessments presented in this section have been structured around the WelTAG impact assessment criteria. For the socio-cultural and environmental impacts the scheme assessments are predominantly qualitative, using the seven point scoring scale (from large beneficial to large adverse) recommended in WelTAG. For greenhouse gas impacts and for all economic impacts the scheme assessments have also been monetised.

The standard WebTAG Appraisal Summary Table is in **Appendix A**.

3.3.1 Social and Cultural Impacts

Table 9 presents the expected socio-cultural impacts of a new Magor and Undy station.

Table 9: Expected socio-cultural impacts

WelTAG / WebTAG impact criteria	Commentary	Qualitative Assessment
Commuting and Other users	Travel to and from Magor and Undy will be quicker for all journey purposes, particularly compared to road journeys to Cardiff/Bristol. Journey times for commuting/other journeys starting or ending in Magor/Undy will reduce by up to 10 minutes per person per day (compared to driving to Severn Tunnel Junction station). Journey times for those previously cycling to Severn Tunnel Junction will reduce by approximately 15 minutes per person per day, and for those previously catching a bus they will reduce by up to 50 minutes per person per day. Rail passengers who currently drive and park at Severn Tunnel Junction would also save on parking costs of up to £4 per day and potentially also vehicle operating costs. Rail users at Severn Tunnel Junction station or commuters / other journeys on the local road network will also benefit from reduced congestion and pressure on car parking.	++
Reliability impact on Commuting and Other users	Commuters / other users switching to rail will benefit from improved journey time reliability compared to equivalent journeys by car, which suffer from high (and varying) levels of congestion to either Cardiff or Bristol. Users previously parking at Severn Tunnel Junction will also be able to remove the journey time uncertainty associated with finding and paying for a parking space.	++
Physical activity	The 'Walkway' station is within walking distance of most residents of Magor and Undy and no car parking is provided. There is likely to be an increase in residents walking or cycling to the station, instead of driving to Severn Tunnel Junction station, or driving direct to their destination. Reduced walking and cycling for a small number of Magor/Undy residents who would otherwise walk or cycle to Severn Tunnel Junction.	++
Journey quality	Passengers who previously drove to Severn Tunnel Junction station will experience improved journey quality through the removal of the uncertain driving and parking aspect of their journey. Those who shift from car journeys or bus to rail are also likely to experience increased journey quality. The additional passengers using the train to or from Magor and Undy may increase loading and increased potential for crowding on trains.	++
Accidents	Slight reduction in accidents possible due to removal of car trips from the B4245 between Magor/Undy and Rogiet. Potential accident reductions across the wider network due to mode shift from car to rail. Potential safety issues close to the new station entrance must be considered during the detailed scheme design. Risks may be presented by increased pedestrian/cyclist traffic and vehicles dropping off or picking up passengers.	+
Security	The sense of personal security for station users must be considered during the design of the station, ensuring measures such as visibility, lighting and CCTV are provided as appropriate.	0
Access to services	Improved access to services in Newport, Cardiff and Bristol, especially for those who do not drive. For those who switch from car to rail, or cease driving to Severn Tunnel Junction, journey times and costs will be reduced and the journey made easier.	++
Affordability	Cost savings for passengers currently paying parking charges or bus fares to Severn Tunnel Junction. Switching from driving to rail for other journeys may also reduce costs, especially to destinations where car parking is expensive.	+
Severance	Likely no impact. There is a possible positive impact if a footpath to Whitewall is created to link to the station footbridge.	0
Option and non-use values	Positive impact within Magor and Undy as residents will have access to the rail network within walking distance.	++

Notes:

Qualitative assessment scale (WelTAG): large beneficial (+++), moderate beneficial (++), slight beneficial (+), neutral (0), slight adverse (-), moderate adverse (--), large adverse (---)

Source: Mott MacDonald

Key points to note from Table 9 are:

- Of the ten criteria, six are rated as expecting a moderate beneficial impact. These are commuting and other users (journey times), reliability impact on commuting and other users, physical activity, journey quality, access to services and option values
- Two factors: accidents and affordability, are assessed as expecting a slightly beneficial impact
- Neither security nor severance will be affected by the scheme
- There are no negative socio-cultural impacts anticipated

3.3.2 Environmental Impacts

Table 10 presents the expected environmental impacts of a new Magor and Undy station.

Table 10: Expected environmental impacts

WelTAG / WebTAG impact criteria	Commentary	Qualitative Assessment
Noise	Varied noise impacts. Frequency of trains passing through the villages will remain unchanged, although stopping trains may lead to increased noise from braking and acceleration. Slight increase in noise due to vehicles dropping off passengers close to the station entrance might also affect a small number of residential properties. However, expected reduction in vehicle-kms along the B4245 and through Rogiet, and reduced noise associated with overspill on-street parking in Rogiet, as Magor/Undy residents will not need to drive to Severn Tunnel Junction. Short term noise increase during construction.	0
Local air quality	Slight negative impact on air quality at the station due to trains stopping / accelerating. This will be countered by a reduction in vehicle-kms along the B4245 and on Station Road in Rogiet. Short term impact of construction.	0
Greenhouse gases	Slight reduction in greenhouse gas emissions due to reduced vehicle-kms on the road network overall.	+
Landscape	The station is not expected to have a landscape impact as new platform structures are lower than the existing footbridge and new overhead electrical stanchions and wiring.	0
Townscape	The station is not expected to impact on the townscape of Magor or Undy, as new structures are less intrusive than the existing footbridge and stanchion / wiring structures.	0
Historic environment	No historic landscape/environment features or archaeological remains have been identified by Cadw within 2km of the site. The site is located within the Caldicot Level, which is valued as a cultural resource of exceptional importance. There may be some impact from local interest in the Ancient Orchard on Three Fields Site, which will be lost.	-
Biodiversity	Works will take place within the Gwent Levels SSSI. There is potential for disturbance of habitats during construction and trees considered to have bat roost potential will be lost. Habitat surveys are required to establish whether any protected species are present.	-
Water environment	The proposed station and associated works bound Magor Marsh/Gwent Levels, which comprise a complex reen system. The station is unlikely to affect the flow or quality of these watercourses. The scheme must be designed to avoid discharge into reens and ensure drainage is managed appropriately.	0

Notes:

Qualitative assessment scale (WelTAG): large beneficial (+++), moderate beneficial (++), slight beneficial (+), neutral (0), slight adverse (-), moderate adverse (--), large adverse (---)

Source: Mott MacDonald

Key points to note from Table 10 are:

- The new station is considered to have no impact on the majority of environmental criteria.
- There will be a slight beneficial impact on greenhouse gas emissions, resulting from a reduction in vehicle kilometres on the road network.
- There may be a slight negative impact on the historic environment and biodiversity due to local interest in the Ancient Orchard on the Three Fields Site and disturbance of habitats in the Gwent Levels SSSI during construction.

3.3.3 Economic Impacts

Table 11 presents the expected economic impacts of a new Magor and Undy station.

Table 11: Expected economic impacts

WelTAG / WebTAG impact criteria	Commentary	Qualitative Assessment
Business users & transport providers	Travel to and from Magor and Undy will be quicker for all journey purposes, particularly compared to road journeys to Cardiff/Bristol. Journey times for business journeys starting or ending in Magor/Undy will reduce by up to 10 minutes per person per day (compared to driving to Severn Tunnel Junction station). Business users who currently drive and park at Severn Tunnel Junction would also save on parking costs of up to £4 per day and potentially also vehicle operating costs. Business users at Severn Tunnel Junction station or using the local road network will also benefit from reduced congestion and pressure on car parking. For train operating companies, a minor increase in train operating costs (due to the additional stop) will be compensated for by an increase in passenger numbers. For bus operators, slight revenue reduction associated with services along the B4245, as some passengers shift to rail.	+
Reliability impact on Business users	Business users switching to rail will benefit from improved journey time reliability compared to equivalent journeys by car, which suffer from high (and varying) levels of congestion into either Cardiff or Bristol. Business users previously parking at Severn Tunnel Junction will also be able to remove the journey time uncertainty associated with finding a parking space. High level of benefit affecting a relatively small number of individuals.	+
Regeneration	The improvement in connectivity will contribute to addressing regional economic objectives. The station will support regeneration efforts in Newport by encouraging Magor and Undy residents to travel to Newport for employment, education and shopping.	+
Wider Impacts	New station will improve the attractiveness of Magor/Undy for investment by employers in the nearby business parks. It will also improve the attractiveness of the village centre for locating business, as both customers and staff would be able to travel by rail (improved access to markets / labour market).	+

Notes:

Qualitative assessment scale (WelTAG): large beneficial (+++), moderate beneficial (++), slight beneficial (+), neutral (0), slight adverse (-), moderate adverse (--), large adverse (---)

Source: Mott MacDonald

A slight beneficial impact is expected for all four economic impact criteria: business users and transport providers, reliability impact on business users, regeneration and wider impacts.

3.3.4 Impact on Public Accounts

This section summarises the expected impact of the scheme on public accounts. For appraisal purposes, and in line with WebTAG/WelTAG, the costs are presented in present values and at a 2010 price base. Further details on scheme costs in 2016 prices are presented in the Financial Case.

The scheme has an estimated Present Value of Costs (PVC) of £7.2 million (2010 prices discounted to 2010). This includes the total capital cost of the scheme (based on the GRIP Stage 2 cost estimate), ongoing maintenance, capital renewals, risk and optimism bias at 25%.

The loss of indirect tax revenues is estimated to be £4.3 million, due to reduced vehicle-kilometres and reduced fuel sales, resulting from mode shift to rail.

3.3.5 Monetised Assessments

The relationship between the costs and monetised benefits of the scheme are assessed using the Present Value of Benefits (PVB) divided by the Present Value of Costs (PVC) to produce a Benefit to Cost Ratio (BCR).

Present Value of Benefits (PVB)

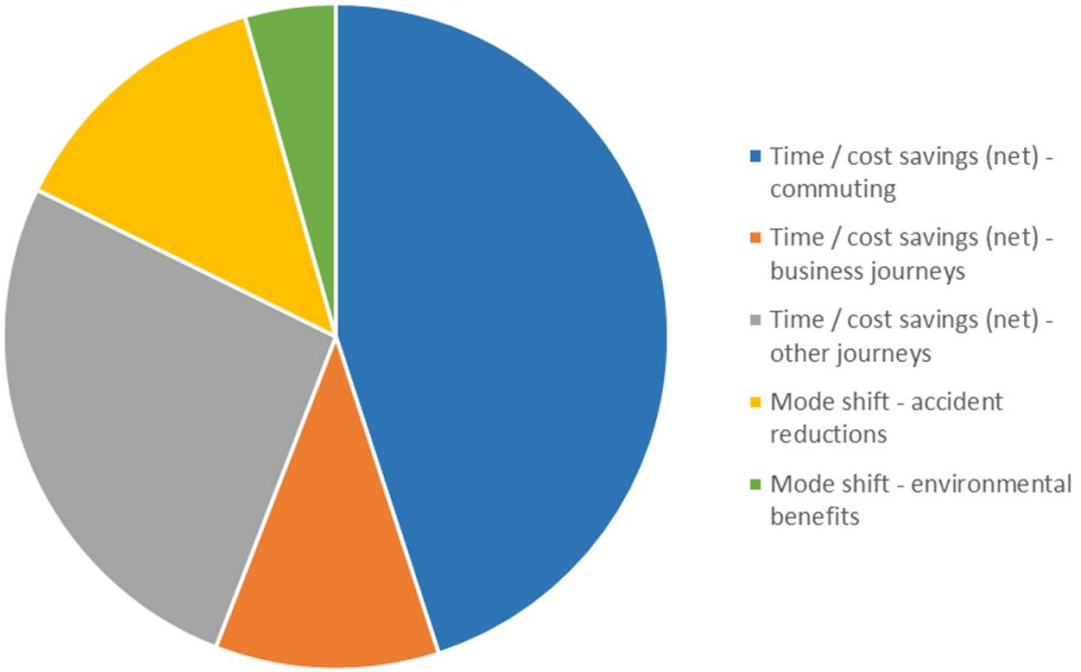
The PVB is a standard indicator used in economic appraisal to represent the expected current value of a future stream of benefits arising from a scheme, reported in a specified price base and with discounting in line with HM Treasury guidance to a specified price base. The higher the PVB, the more beneficial the scheme is expected to be. The Magor and Undy station core scenario is estimated to have a PVB of £11.8 million (2010 prices discounted to 2010).

The estimated PVB for the sensitivity test is £14.3 million (2010 prices discounted to 2010), approximately £2.5 million higher than for the core scenario. The sensitivity test has an increased Cardiff-Bristol rail service frequency, which means that a smaller proportion of 'through passengers' between Cardiff / Newport and Bristol would experience an increased journey time as a result of their train calling additionally at Magor and Undy.

The PVB has been estimated by summing the full range of net monetised benefits. The proportional breakdown by benefit type for the Core scenario is shown in Figure 2. The largest benefit (40-45% of the total PVB) is expected to arise from time and cost savings for commuter journeys.

Due to the reduced level of time disbenefits for 'through passengers', net time and cost benefits for business journeys are doubled in the sensitivity test.

Figure 2: PVB breakdown for Core scenario



Source: Mott MacDonald

Present Value of Costs

The PVC is a standard indicator that represents the expected current value of a future stream of costs arising from a scheme, reported in a specified price base and with discounting in line with HM Treasury guidance. The higher the PVC, the more costly the scheme and the greater the benefits that will be required to make the scheme good value for money. The Magor and Undy station scheme has a PVC of £7.2 million (2010 prices discounted to 2010).

The PVC includes the cost of all works associated with station construction, including all preparatory and design costs, as well as allowances for ongoing operation and maintenance that are borne by the public sector. Ongoing operation and maintenance costs that are borne by the private sector (train operating companies) are excluded from the PVC and instead removed from the PVB.

In line with WebTAG, allowances for risk and optimism bias are included within the PVC. At present a risk layer of 30% has been included within the scheme capital cost estimate (further detail is provided in the Financial Case) in lieu of a formal quantified risk assessment. An additional 25% Optimism Bias adjustment[14] has also been included on the capital costs, including future capital renewals, to account for the observed tendency for scheme promoters to underestimate project costs.

The following ongoing costs have been assumed as part of the PVC:

- Ongoing station operating costs of £50,000 per annum (2016 prices) over the full 60-year appraisal period, borne by the train operating company for the Wales and Borders franchise[15];
- Capital renewal costs equivalent to 20% of the total implementation cost over the full appraisal period[16];
- Parking scheme set-up and monitoring costs of up to £10,000 per annum on average, to cover the area within walking distance of Magor and Undy station.

Benefit to Cost Ratio (BCR)

In estimating the PVB and therefore the BCR, the working assumption for fare revenues is that the train operating companies (TOCs) would break even – the additional revenues gained would cover their additional costs, with no additional profit gained or additional subsidy requirement. However, based on the demand forecasts in section 3.2, the TOCs are expected to make a revenue surplus on the new station, which would strengthen the overall business case.

Table 12 shows the standard WebTAG Analysis of Monetised Costs and Benefits table, populated with forecasts for Magor and Undy station. Values are shown for both the core scenario and the sensitivity test.

[14] WebTAG Unit A1.2, Scheme Costs, recommends a 51% Optimism Bias uplift for station projects at GRIP Stage 1, reducing to a 4% uplift at GRIP Stage 5. The Magor and Undy scheme is currently between GRIP Stages 2 and 3. For conventional rail projects, a 64% uplift is recommended at GRIP Stage 1, reducing to 18% at GRIP Stage 3.

[15] Assuming that the Wales and Borders train operating company would operate the station then these costs would need to be offset by fare revenues. Passenger demand forecasts for Magor and Undy suggest that the £50,000 per annum assumed in this note is unlikely to be a major cause of concern.

[16] The GRIP2 report indicated that direct construction works are estimated at approximately 40% of the total implementation cost. A 20% capital renewal assumption is therefore based on replacing half of the value of direct construction works over the appraisal period.

Table 12: Analysis of Monetised Costs and Benefits

Impact	Core Scenario Monetised Assessment (£ 2010 prices discounted)	Sensitivity Test Monetised Assessment (£ 2010 prices discounted)
Noise	129,347	131,909
Local air quality	*not monetised*	*not monetised*
Greenhouse gases	580,557	591,784
Journey quality	*not monetised*	*not monetised*
Physical activity	*not monetised*	*not monetised*
Accidents	2,144,251	2,186,180
Economic efficiency: consumer users (commuting)	7,242,883	7,679,655
Economic efficiency: consumer users (other)	4,246,726	4,874,314
Economic efficiency: business users and providers	1,751,120	3,530,995
Wider public finances (indirect taxation revenues)	-4,267,377	-4,723,432
Present Value of Benefits (PVB)	**11,827,507**	**14,271,405**
Broad transport budget	7,175,885	7,175,885
Present Value of Costs (PVC)	**7,175,885**	**7,175,885**
OVERALL IMPACTS		
Net Present Value (NPV)	4,654,622	7,095,520
Benefit to Cost Ratio (BCR)	**1.65**	**1.99**

Source: Mott MacDonald

The core scenario produces a BCR of approximately 1.7 which is considered to represent **medium value for money**, while the sensitivity test has a BCR close to 2.0 which would represent high value for money. This demonstrates that minimising delays to existing 'through passengers' is important for improving the economic performance of the scheme.

3.4 Value for Money Statement – Transport (Economic) Case Summary

The Transport Case for Magor and Undy station has been prepared in a manner which is proportionate to the investment cost and the range of expected impacts. A gravity model has been used to forecast passenger demand and monetised benefits, as advised in the rail industry's Passenger Demand Forecasting Handbook (PDFH). The forecasts are based on a realistic set of assumptions in relation to population and rail services.

Monetised benefits of over £11.8 million (2010 prices discounted to 2010) are forecast over the appraisal period. Approximately 82% of this value is expected to arise from journey time and cost savings, with 45% for commuters, 11% for business journeys and 26% for other journeys.

Magor and Undy station is expected to offer medium value for money, based on a BCR of 1.7, non-monetised socio-cultural benefits, and wider economic benefits. The Present Value of Benefits is estimated at £7.2 million (2010 prices discounted to 2010), with the most significant monetised benefits expected to accrue to non-business users (commuters and 'other users').

The non-monetised benefits are expected to relate mainly to improved access to employment opportunities, access to services, encouraging physical activity, journey quality, option values (the value associated with a new travel option being available to residents) and improved journey time reliability for trips that transfer from the private car to rail.

The scheme has minimal environmental impact, with some benefit from a reduction in car use.

4 Financial Case

At SOBC stage the Financial Case sets out anticipated expenditure and potential funding sources. More detailed cost estimates and further information on funding sources would need to be confirmed at GRIP 3 (option selection) and as part of the next business case stage, Outline Business Case.

4.1 Introduction

Department for Transport business case guidance identifies the expected level of detail for each of the five cases (Strategic, Economic, Financial, Commercial, Management) at each business case stage. At the SOBC stage, two requirements are identified for the Financial Case:

- Outline the approach being taken to assess affordability
- Outline the budget and funding cover for the project

Detailed cost estimates are required as part of the next stage, the Outline Business Case, along with confirmed funding sources.

4.2 Scheme Affordability

The current understanding of scheme affordability is based on scheme concept designs and cost estimates that have been developed to a standard equivalent to GRIP Stage 2 (technical feasibility). Further design, costing and environmental assessment work is continuing to progress the scheme to GRIP Stage 3 (option selection), at which point scheme affordability can be reassessed.

4.3 Scheme Costs

4.3.1 Investment Cost Summary

High level cost estimates for introducing a new station at Magor and Undy are presented in Table 13. This is the GRIP Stage 2 cost estimate, in Q2 2016 prices (excluding inflation and optimism bias) and is based on the following key assumptions:

- Pending a formal Quantitative Risk Analysis (QRA) an allowance of 30% has been included to cover project risks and cost and scope uncertainty
- Possession working has been included in the rates where required and train/freight operating company (TOC/FOC) compensation costs have been included within the estimate as 5% of direct costs and contractor preliminaries
- New signalling and changes to existing signalling layouts are assumed not to be required as there are no issues with signal sighting
- Existing line side cables will need to be relocated to allow for new platform construction
- Overhead line electrification structures in the vicinity of the station will need to be relocated
- A new station Distribution Network Operator (DNO) connection will need to be installed for electric power
- Tracks will need to be lifted, shifted and re-cant through the platform area to optimise alignment
- Track drainage will need to be diverted through the platform footprint

- Telecommunications equipment will be provided at the station, including a public address system, customer help points on each platform, customer information system on each platform and at station entrance, and CCTV
- Modular platforms will be provided with two waiting shelters on each, ticket vending machines, lighting, drainage, and perimeter fencing
- Cycle parking and disabled parking will be provided, but there would be no standard car parking
- Improvements will be made to the existing subway and it will be modified to provide step free access via new passenger ramps
- Minor amendments will be required to the footway, layby, bus stops and crossing refuges on the B4245 outside the new station

Further detail on cost estimate assumptions is provided in the GRIP Stage 2 report[17].

Table 13: High level cost estimate

Cost category	Total cost (£), Q2 2016 prices
Direct construction works	
Railway control systems	74,024
Train power systems	264,941
Electric power and plant	66,150
Permanent way	143,606
Telecommunications systems	224,331
Buildings and property	1,694,370
Civil engineering	515,685
Enabling works	58,734
Direct construction works costs	**3,041,841**
Preliminaries, overheads and profit	
Preliminaries	1,025,615
Contractor overheads and profit	331,498
Indirect construction works costs subtotal	**1,357,113**
CONSTRUCTION COST	**4,398,954**
Project / design team fees and other project development costs	
Design team fees	488,907
Project team fees / other project development costs	502,137
Employer indirect costs subtotal	**991,044**
POINT ESTIMATE construction and development cost	**5,389,998**
Risk	
Risk	1,616,999
Anticipated Final Cost – AFC **TOTAL COST LIMIT**	**7,006,997**

Source: GRIP Stage 2 – Technical Feasibility, April 2016, Mott MacDonald

The estimated cost, as presented in Table 13 will also be affected by inflation including any changing trends in construction prices. Cost estimates will therefore need to be reassessed as the scheme is developed.

[17] Magor and Undy Walkway Station: GRIP Stage 2 – Technical Feasibility, April 2016, Mott MacDonald

4.3.2 Ongoing Operating and Maintenance Costs

Ongoing operating and maintenance costs associated with a new station at Magor and Undy will need to be estimated in more detail at the next business case stage. However, for economic appraisal purposes, the following assumptions have been made:

- Ongoing station operating and maintenance costs of £50,000 per annum (2016 prices) over the full 60-year appraisal period, borne by the train operating company for the Wales and Borders franchise. It is expected that these costs would be more than offset by increased rail fare revenues.
- Capital renewal costs equivalent to 20% of the total implementation cost over the full appraisal period[18]
- Residential parking scheme set-up and monitoring costs of up to £10,000 per annum on average, to cover the area within walking distance of Magor and Undy station

At this stage of scheme development the impact on train operating costs is unknown, although impacts are expected to be minimal because the additional time taken to call at Magor and Undy is not expected to impact on the number of train sets required. Furthermore, refurbished rolling stock, which is to be cascaded from other train operating companies over the next few years, as well as new rolling stock through the Wales and Borders Rail Service Contract will ensure that train sets are of sufficient capacity (length) when calling at Magor and Undy. Assuming that sufficient capacity rolling stock is brought into service then additional rolling stock would not need to be leased as a direct result of the new station.

4.4 Funding Sources

Development work for Magor and Undy station is ongoing so that the scheme can be progressed more rapidly when a funding source is identified. Potential funding sources for delivering the scheme include:

- Further rounds of the Department for Transport's New Stations Fund
- Direct funding by Welsh Government
- Third party (developer) funding

Funding sources for ongoing station maintenance and operating costs will continue to be investigated.

4.5 Financial Case Summary

The estimated cost of the scheme, based on GRIP Stage 2 high level estimates, is £7 million (Q2 2016 prices), excluding inflation and optimism bias.

Ongoing operation and maintenance costs are likely to include:

- Station operating and maintenance costs, borne by the TOC for the Wales and Borders franchise and offset by additional passenger fare revenues
- Magor and Undy residential parking scheme set-up and monitoring costs, borne by Monmouthshire County Council

Potential funding sources for the new station will continue to be investigated.

[18] The GRIP2 report indicated that direct construction works are estimated at approximately 40% of the total implementation cost. A 20% capital renewal assumption is therefore based on replacing half of the value of direct construction works over the appraisal period.

5 Commercial Case

At SOBC stage, the Commercial Case should demonstrate that there are appropriate ways in which the scheme can be procured. This includes the likelihood of existing rail services being scheduled to serve a new Magor and Undy station.

5.1 Introduction

The scheme to be procured is a conventional rail station and infrastructure project, for which the construction industry is capable of delivering within a competitive procurement environment if required. Scheme procurement is therefore considered to be commercially viable.

The procurement approach proposed in this section, for infrastructure and passenger rail services, is subject to review. Contractual and tendering routes are to be determined.

5.2 Outline Output-based Specification

The following outputs will be required:

- A new station at Magor and Undy with two platforms located on the South Wales Main Line relief lines, suitable and compliant means of pedestrian access from the B4245 and for crossing between platforms, two waiting shelters on each platform, ticket vending machines, lighting, CCTV
- Suitable pedestrian and cyclist crossing facilities on the B4245 close to the new station, drop-off layby for car/taxi passengers, cycle parking, and disabled parking
- Service level of at least two trains per hour in each direction, with at least two trains per hour to Newport and Cardiff Central, and at least one train per hour to Filton Abbey Wood and Bristol Temple Meads

The above specification is high level and preliminary. A more detailed output-based specification will need to be presented with the Outline Business Case.

5.3 Procurement Options

5.3.1 Infrastructure

A potential procurement approach for infrastructure delivery is set out in Table 14.

Table 14: Potential procurement approach

Scheme element	Procurement approach
Works within the Network Rail operational boundary, including new platforms, some platform access routes, track amendments, and overhead line equipment relocation	Network Rail would apply its own procurement procedures to deliver these elements, based on drawings and cost plans agreed with MAGOR, Monmouthshire County Council and Transport for Wales.
Station communications, security, and ticketing systems	Construction/installation as part of Network Rail works above, with handover to TOC for operation.
Non-rail works, including amendments to local road layout and disabled parking	Nominally delivered by Monmouthshire County Council, potentially appointing a contractor through standard procurement routes.
Preparatory (up to planning application)	Preparatory work is ongoing, commissioned by MAGOR and Monmouthshire County Council, with early design options complete at GRIP2. GRIP3 designs are underway with engagement with MAGOR, Monmouthshire County Council and Network Rail.

Source: Mott MacDonald

The procurement approach for infrastructure works will need to be finalised at the next business case stage, Outline Business Case.

Regardless of the procurement approach adopted, it is assumed that the Wales and Borders rail franchise operator would be designated as the Station Facility Operator (SFO).

5.3.2 Passenger Rail Services

Approximately 12 passenger trains per hour (six per hour per direction) pass along the South Wales Main Line which runs through the proposed Magor and Undy station site. All of these services call at Newport and Cardiff Central.

A minimum of two trains per hour in each direction will need to call at Magor and Undy in order to provide a reasonable service offering for station users. The Cheltenham to Cardiff service, which will be under the direct control of Welsh Government from 2018, could be specified to call at the new station. The most likely service to be able to provide the second train per hour is the hourly Taunton – Cardiff service[19], currently operated by Great Western Railway.

Train operating companies (TOCs) might make a commercial decision to serve Magor and Undy, without the need for any discussions or requests, if they consider that the potential additional revenues are likely to outweigh the time penalty. In any request or decision to serve the new station, TOCs would need to ensure that the time penalty incurred would not lead to a need for increased rolling stock and crew. TOCs would also need to confirm that service timing amendments would not impact on other locations elsewhere in the journey, and that timetable planning rules and margins would be maintained.

If by stopping at Magor and Undy a TOC (other than the Wales and Borders operator) requires an increase to their service subsidy, or a reduction to their premium payment profile, then this would represent a franchise change and would need to be accepted by the Department for Transport.

Revenue allocation between operators calling at the station would need to be agreed in advance via the existing ORCATS[20] revenue allocation matrix, or as a percentage split of fares agreed between all parties and overseen by Transport for Wales.

5.4 Allocation of Revenue Risks

The current assumption is that the TOCs will assume the revenue risk associated with passenger fare revenues, calling at Magor and Undy station on a commercial basis given the relatively healthy passenger number forecasts.

5.5 Commercial Case Summary

The following key points are raised in this high level Commercial Case:

- Scheme procurement is considered to be commercially viable, as this is a conventional rail station and infrastructure project
- A preliminary specification has been produced. A more detailed output-based specification will need to be presented with the Outline Business Case

[19] The GRIP3 Options study has estimated that this is viable, with a journey time increase of 3 minutes incurred by the existing service.

[20] Operational Research Computerised Allocation of Tickets to Services

- Initial proposals for infrastructure procurement are for Network Rail to follow its own procurement processes to deliver works within the existing operational rail boundary and for Monmouthshire County Council to procure non-rail works
- Two trains per hour per direction will need to serve Magor and Undy. TOCs might make a commercial decision to serve the station, or could be requested to serve the station by Welsh Government subject to agreements in relation to service subsidies or premium payments.

6 Management Case

At SOBC stage the Management Case includes an indicative programme and commentary on governance, communications, and risk management.

6.1 Introduction

This Management Case is preliminary in nature and will need to be developed as the scheme is progressed through the business case and Network Rail GRIP stages. It sets out:

- Examples of similar projects that have been successful
- An indicative project programme
- Delivery dependencies
- Legal requirements for project delivery
- Proposed governance arrangements
- Communications and stakeholder management arrangements
- Key risks and the approach being taken to manage risk

6.2 Evidence of Similar Projects

Thirteen new rail stations have been delivered in Wales over the last 15 years and two rail lines (Vale of Glamorgan line in 2005 and Ebbw Valley line in 2008) have been re-opened. Together these stations were used by more than 1.5 million passengers in the 2016-17 financial year. This demonstrates the ability of Welsh Government, Welsh local authorities, and the rail industry in Wales, as well as the UK Department for Transport, to work together to deliver improvements for rail passengers in Wales.

Four of the thirteen new rail stations were delivered on existing rail lines and needed to be constructed in a manner which minimised disruption to passenger services – Pye Corner on the Ebbw Valley line (2014), Energlyn & Churchill Park on the Rhymney Valley line (2013), Fishguard & Goodwick on the West Wales Line (2012), and Llanharan on the South Wales Main Line (2007).

6.3 Project Programme

6.3.1 Milestones

An indicative programme from SOBC submission through to station opening is provided in Table 15. The programme combines the three stage business case requirements in Wales and England with Network Rail's GRIP process.

The next business case stage, Outline Business Case, can only be completed once GRIP Stage 3 has been completed. GRIP Stage 3 culminates in a single engineering solution being selected. The final business case stage, Full Business Case, requires GRIP Stage 5 to be complete, with a robust engineering design and definitive time, cost, resource and risk estimates.

Procurement stages are not included in Table 15 at this stage, as the timescales depend on the procurement options selected.

Subject to identifying a suitable funding source, the earliest anticipated opening year for Magor and Undy station is 2021.

Table 15: Indicative Programme

Milestone	Indicative date
GRIP 1-2 development (output definition / feasibility)	*Completed*
Strategic Outline Business Case (SOBC) completion	*Completed*
GRIP 3 (option selection)	Mid 2018
Outline Business Case (OBC) completion	Early 2019
GRIP 4 (single option development) completion	Mid 2019
GRIP 5 (design development) completion	End 2019
Full Business Case (FBC) completion	Early 2020
Construction commences	Early-mid 2020
Substantial completion	Mid 2021
GRIP 6-7 (construction / test / commission, and handback)	Mid-late 2021
Station open	End 2021
GRIP 8 (project close-out)	2022

Source: Mott MacDonald

6.3.2 Programme Dependencies

Magor and Undy station delivery is linked to other projects that are currently being developed. To guarantee successful delivery, the scheme will require:

- Successful identification of funding sources to continue scheme development
- Rolling stock with increased capacity to be operating on services that become scheduled to call at Magor and Undy, whether operated as part of the Wales and Borders franchise or the Great Western franchise

Scheme success will also depend on securing a minimum of two trains per hour per direction to call at the new station. Further detail is provided in section 5.3.

Scheme design is linked to three projects:

- South Wales Main Line electrification is due for completion in the Magor and Undy area during 2019. Stanchion locations and overhead line equipment relocation on the South Wales Main Line will need to be factored in to the detailed design of the scheme
- Line speed upgrades on the South Wales Main Line relief lines will help to minimise the time penalty incurred by passenger rail services calling at Magor and Undy
- New Intercity Express Programme timetables and new Wales and Borders Rail service timetables are due to commence over the next 1-2 years. The stopping pattern for services at Magor and Undy will need to fit around these timetable changes. In particular, an increase in the Cardiff – Cheltenham services from every two hours to hourly will be beneficial for serving Magor and Undy

6.4 Legal Requirements

Magor and Undy station will require planning approval. A planning application will be made through the Local Planning Authority (Monmouthshire County Council), under the Town and Country Planning Act 1990. Pre-application advice will need to be sought from Monmouthshire County Council to determine the exact requirements of the application. The application is

expected to require scheme drawings, an environmental statement (including Transport Assessment), and a design and access statement.

The scheme will also need to address specific environmental and technical requirements:

- Network Rail's eight stage GRIP process will need to be followed as the scheme develops
- Early consultation with Natural Resources Wales (NRW) in relation to flood risk matters, given that the station would be located in an area that is protected by flood defences

6.5 Governance Arrangements and Quality Assurance

GRIP Stages 1-3, along with the SOBC, are being led by the Magor Action Group on Rail (MAGOR) in conjunction with Monmouthshire County Council which is currently acting as scheme promoter.

In advance of the next business case stage, Outline Business Case, a governance structure will need to be established for progressing the scheme through the remaining GRIP stages. The governance structure will depend on the scheme promoter, funding arrangements and procurement approaches to be adopted. The structure will therefore evolve as the scheme is developed.

Beyond station opening, and subject to further discussions, the following organisations are likely to be responsible for managing the new station asset:

- Network Rail will own the station asset and will continue to be responsible for the rail lines that pass through the stations
- The Wales and Borders TOC will manage and maintain the station under lease from Network Rail

Quality will be assured by adherence to Network Rail's GRIP process.

6.6 Communications and Stakeholder Management

Communications and stakeholder management involves three key groups – those local to the area including future passengers (users), those linked to the specifically to the rail industry (suppliers and regulators), and those who are able to provide or influence scheme funding.

MAGOR has undertaken considerable engagement with all three key groups over the last five years. They have successfully raised the profile of the scheme and, in particular, have worked closely with the local community to gain support. Records of meetings, copies of reports and letters are publicly available on the MAGOR website, http://magorstation.co.uk.

Further technical engagement with rail industry suppliers and regulators has been undertaken as part of the GRIP Stage 2 study. Discussions have been held with Network Rail in relation to land ownership and line electrification, and with the current Wales and Borders train operating company (Arriva Trains Wales) in relation to high level station design parameters.

A Communications and Stakeholder Management Plan will need to be developed as part of the next business case stage, Outline Business Case, to ensure that all stakeholder groups are engaged in the scheme.

6.7 Risk Management

A risk assessment was undertaken for the GRIP Stage 2 study and is being updated through the GRIP 3 Options study, which identified the key risks to delivering a new station at Magor and Undy:

- Availability of funding given competing schemes to be funded across Wales
- Unfavourable patronage and revenue forecasts for the new station – this SOBC has demonstrated a favourable economic case for the station, reducing this risk
- Securing a minimum of two trains per hour to serve Magor and Undy, including a service to Bristol (for which services are operated by Great Western Railway and will therefore not be under the direct control of Welsh Government)
- Existence of new overhead line equipment will increase scheme design complexity – equipment relocation is included in the high level scheme cost estimate

The risk assessment will be updated throughout scheme development, with a view to managing risks to avoid unnecessary cost or timescale increases.

6.8 Management Case Summary

The Management Case for Magor and Undy station is preliminary in nature and based on information currently available (July 2018). It is therefore subject to review and amendment as the scheme is progressed.

Key points from the preliminary Management Case are:

- Over the last 15 years Welsh Government, local authorities, and the rail industry, as well as the Department for Transport, have worked together to deliver 13 new rail stations in Wales.
- The programme needs to combine business case requirements with Network Rail's GRIP process. The earliest anticipated station opening date is 2021.
- Magor and Undy station is linked to other projects that are currently being developed. The new station will require rolling stock with increased capacity to be operating on services that become scheduled to call at the station.
- Scheme design will need to continue to be linked to the South Wales Main Line electrification project, relief line speed upgrades, and the new Intercity Express Programme timetables.
- The scheme will require planning approval through the Local Planning Authority, Monmouthshire County Council.
- A governance structure will need to be established for progressing the scheme through the remaining GRIP stages.
- The Magor Action Group on Rail (MAGOR) has undertaken considerable engagement with stakeholders over the last five years. A Communications and Stakeholder Management Plan will need to be developed as part of the next business case stage.
- A risk assessment was undertaken for the GRIP Stage 2 study and will be updated as part of GRIP Stage 3.

Appendices

A. Appraisal Summary Table

A. Appraisal Summary Table

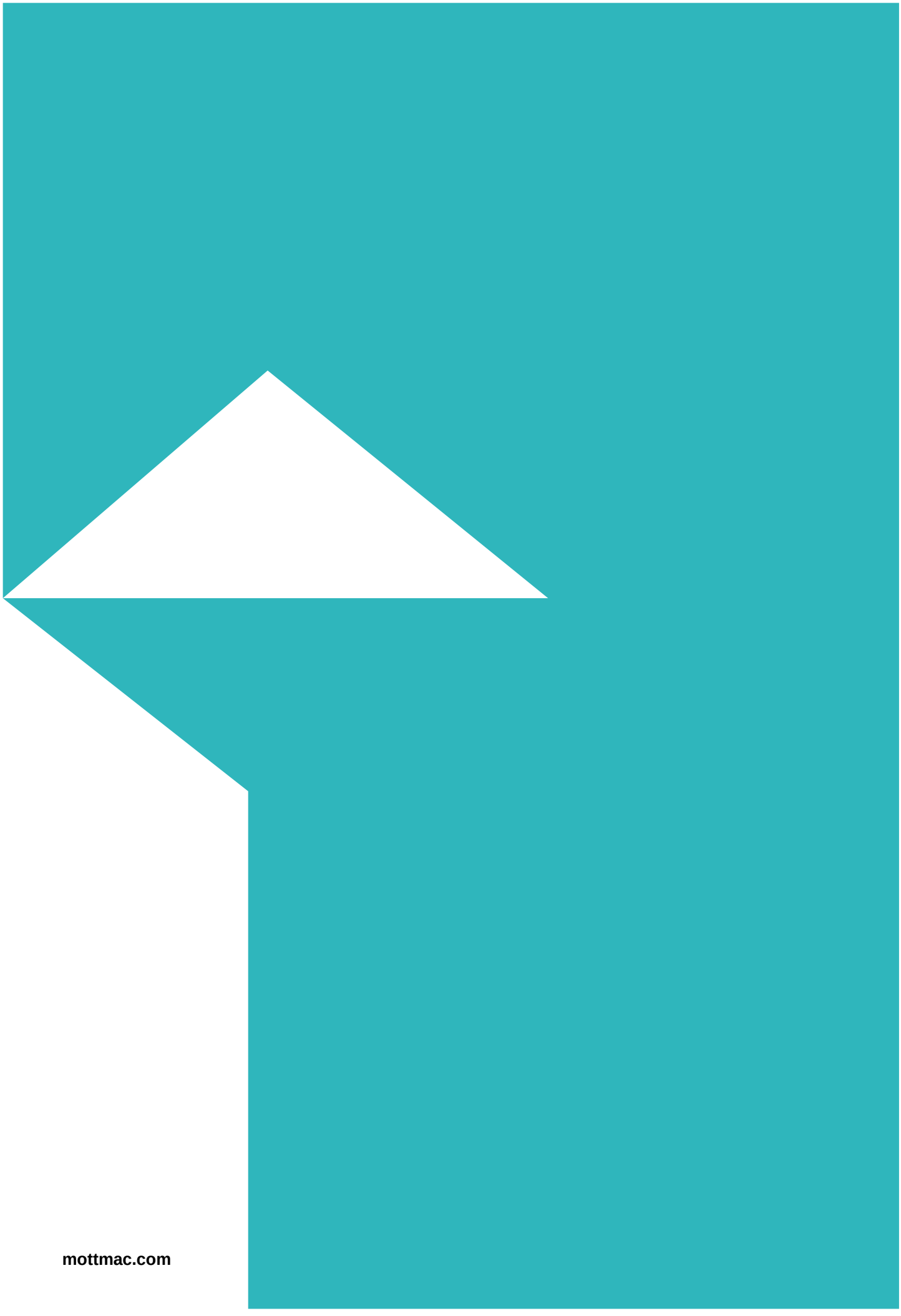
Appraisal Summary Table

Date produced:	27 April 2018

Contact:	
Name	
Organisation	
Role	Promoter/Official

Name of scheme:	Magor and Undy Station
Description of scheme:	To construct a new station on the South Wales Mainline relief lines at Magor and Undy. It is expected that there would be 2 tph per direction, with services to Newport, Cardiff and Bristol, possibly extending to Taunton and Cheltenham. The station would consist of a platform either side of the railway line connected by the existing footbridge and underpass, with the latter lowered to improve access. Station facilities will be minimual, likely limited to basic seating and a ticket machine, although additional services may be provided by the adjacent community centre. No car parking is to be provided but drivers will be able to drop off passengers.

Impacts		Summary of key impacts	Assessment: Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Travel to and from Magor and Undy will be quicker for all journey purposes, particularly compared to road journeys to Cardiff/Bristol. Journey times for business journeys starting or ending in Magor/Undy will reduce by up to 10 minutes per person per day (compared to driving to Severn Tunnel Junction station). Business users who currently drive and park at Severn Tunnel Junction would also save on parking costs of up to £4 per day and potentially also vehicle operating costs. Business users at Severn Tunnel Junction station or using the local road network will also benefit from reduced congestion, pressure on car parking. For train operating companies, a minor increase in train operating costs (due to the additional stop) will be compensated for by an increase in passenger numbers. For bus operators, slight revenue reduction associated with services along the B4245, as some passengers shift to rail.	Value of journey time changes(£): £2.3m Net journey time changes (£): 0 to 2min: Not assessed; 2 to 5min: Not assessed; > 5min: Not assessed	N/A	£1.8million	Not assessed
	Reliability impact on Business users	Business users switching to rail will benefit from improved journey time reliability compared to equivalent journeys by car, which suffer from high levels (and varying levels) of congestion into either Cardiff or Bristol. Business users previously parking at Severn Tunnel Junction will also be able to remove the journey time uncertainty associated with finding a parking space. High level of benefit affecting a relatively small number of individuals.	Benefits to approximately 60 trips per day (30 individuals per day) in the opening year	Slight Beneficial	Not monetised	
	Regeneration	The improvement in connectivity will contribute to addressing regional economic objectives. The station will support regeneration efforts in Newport by encouraging Magor and Undy residents to travel to Newport for employment, education and shopping.	Not assessed	Slight Beneficial	Not monetised	
	Wider Impacts	New station will improve the attractiveness of Magor/Undy for investment by employers in the nearby business parks. It will also improve the attractiveness of the village centre for locating business, as both customers and staff would be able to travel by rail (improved access to markets / labour market).	Not assessed	Slight Beneficial	Not monetised	
Environmental	Noise	Varied noise impacts. Frequency of trains passing through the villages will remain unchanged, although stopping trains may lead to increased noise from braking and acceleration. Increased noise due to vehicles dropping off passengers close to the station entrance might also affect a small number of residential properties. Expected reduction in veh-kms along the B4245 and through Rogiet, as Magor/Undy residents will not need to drive to Severn Tunnel Junction. Short term noise increase during construction.	Not assessed	Neutral	£0.1 million (benefit from reduced veh-kms)	Not assessed
	Air Quality	Slight negative impact on air quality at the station due to trains stopping / accelerating. This will be countered by a reduction in veh-kms along the B4245 and on Station Road in Rogiet. Short term impact of construction.	Not assessed	Neutral	Not monetised	Not assessed
	Greenhouse gases	Slight reduction in greenhouse gas emissions due to reduced veh-kms on the road network overall.	Change in non-traded carbon over 60y (CO2e): - Change in traded carbon over 60y (CO2e): -	Slight Beneficial	£0.6 million	
	Landscape	The station is not expected to have a landscape impact as new platform structures are lower than the existing footbridge and new overhead electrical stanchions and wiring.	N/A	Neutral	N/A	
	Townscape	The station is not expected to impact on the townscape of Magor or Undy, as new structures are less intrusive than the existing footbridge and stanchion / wiring structures.	N/A	Neutral	N/A	
	Historic Environment	No historic landscape/environment features or archaeological remains have been identified by Cadw within 2km of the site. The site is located within the Caldicot Level, which is valued as a cultural resource of exceptional importance. There may be some impact from local interest in the Ancient Orchard on Three Fields Site, which will be lost.	N/A	Slight adverse	N/A	
	Biodiversity	Works will take place within the Gwent Levels SSSI. There is potential for disturbance of habitats during construction and trees considered to have bat roost potential will be lost. Habitat surveys are required to establish whether any protected species are present.	N/A	Slight Adverse	N/A	
	Water Environment	The proposed station and associated works bound Magor Marsh/Gwent Levels, which comprise a complex reen system. The station is unlikely to affect the flow or quality of these watercourses. The scheme must be designed to avoid discharge into reens and ensure drainage is managed appropriately.	N/A	Neutral	N/A	
Social	Commuting and Other users	Travel to and from Magor and Undy will be quicker for all journey purposes, particularly compared to road journeys to Cardiff/Bristol. Journey times for commuting/other journeys starting or ending in Magor/Undy will reduce by up to 10 minutes per person per day (compared to driving to Severn Tunnel Junction station). Journey times for those previously cycling to Severn Tunnel Junction will reduce by approximately 15 minutes per person per day, and for those previously catching a bus they will reduce by up to 50 minutes per person per day. Rail passengers who currently drive and park at Severn Tunnel Junction would also save on parking costs of up to £4 per day and potentially also vehicle operating costs. Rail users at Severn Tunnel Junction station or commuters / other journeys on the local road network will also benefit from reduced congestion and pressure on car parking.	Value of journey time changes(£): £11.5m Net journey time changes (£): 0 to 2min: Not assessed; 2 to 5min: Not assessed; > 5min: Not assessed	N/A	£11.5million	Not assessed
	Reliability impact on Commuting and Other users	Commuters / other users switching to rail will benefit from improved journey time reliability compared to equivalent journeys by car, which suffer from high levels (and varying levels) of congestion into either Cardiff or Bristol. Users previously parking at Severn Tunnel Junction will also be able to remove the journey time uncertainty associated with finding a parking space.	Benefits to approximately 360 trips per day (180 individuals per day) in the opening year	Moderate Beneficial	Not monetised	
	Physical activity	The 'Walkway' station is within walking distance of most residents of Magor and Undy and no car parking is provided. There is likely to be an increase in residents walking or cycling to the station as part of their journey, instead of driving to Severn Tunnel Junction station, or driving direct to their destination. Reduced walking and cycling for a small number of Magor/Undy residents who would otherwise walk or cycle to Severn Tunnel Junction.	Potential benefit to approx. 200 individuals per day	Moderate Beneficial	Not monetised	
	Journey quality	Passengers who previously drove to Severn Tunnel Junction station will experience an increase in journey quality through the removal of the uncertain driving and parking aspect of their journey. Those who shift from car journeys or bus to rail are also likely to experience increased journey quality. The additional passengers using the train to or from Magor & Undy may increased loading and increased potential for crowding on trains.	Potential benefit to approx. 200 individuals per day	Moderate Beneficial	Not monetised	
	Accidents	Slight reduction in accidents possible due to removal of car trips from the B4245 between Magor/Undy and Rogiet. Potential accident reductions across the wider network due to mode shift from car to rail. Potential safety issues close to the new station entrance must be considered during the detailed scheme design. Risks may be presented by the increased pedestrian and cyclist traffic as well as vehicles dropping off or picking up passengers.	Approximately 9.5million veh-kms per year removed from the road network.	Slight Beneficial	£2.1million (benefit from reduced veh-kms)	Not assessed
	Security	The sense of personal security for station users must be considered during the design of the station, ensuring measures such as visibility, lighting and CCTV are provided as appropriate.	N/A	Neutral	N/A	Not assessed
	Access to services	Improved access to services in Newport, Cardiff and Bristol, especially for those who do not drive. For those who switch from car to rail, or cease driving to Severn Tunnel Junction, journey times and costs will be reduced and the journey made easier.	N/A	Moderate Beneficial	N/A	Not assessed
	Affordability	Cost savings for passengers who currently pay parking charges or bus fares to Severn Tunnel Junction station. Switching from driving to rail for other journeys may also reduce costs, especially to destinations where car parking is expensive.	N/A	Slight Beneficial	N/A	Not assessed
	Severance	Likely no impact. There is a possible positive impact if a footpath to Whitewall is created to link to the station footbridge.	N/A	Neutral	N/A	Not assessed
	Option and non-use values	Positive impact within Magor and Undy as residents will have access to the rail network within walking distance.	More than 6,000 residents will benefit from access to a new rail station.	Moderate Beneficial	Not monetised	
Public Accounts	Cost to Broad Transport Budget	PVC: £7.2m (taking account of capital expenditure, ongoing maintenance, capital renewals, optimism bias at 25%)	PVC: £7.2m BCR: 1.6	N/A	PVC: £7.2m	
	Indirect Tax Revenues	Loss of indirect tax revenues due to reduced vehicle-kms and reduced fuel sales (resulting from mode shift to rail)	Loss of indirect tax revenue: £4.3 million	N/A	- £4.3 million	



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