



Llywodraeth Cymru
Welsh Government

REPORT

Report on the A55 junction 14 and 15 improvements and the junction 16 and 16a improvements

The Panel's recommendation about the A55 junction 14 and 15 improvements and the junction 16 and 16a improvements.

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Summary

The objectives of the A55 J14-16 scheme are focussed on safety, journey times, journey reliability, and network resilience. The proposed grade-separated junctions, replacing two roundabout junctions, would create little absolute improvement to the collision record. They would change journey times in a marginal way. They would enhance journey time reliability, but only during the Summer periods of higher flow. The resilience of the network is more significantly influenced by adjacent highway features, including tunnels and the highway geometry around the headlands, than by the roundabouts that the scheme would replace.

While some of the scheme objectives are partially or modestly aligned with the Wales Transport Strategy, the aim of the scheme is not in alignment with the sustainable transport hierarchy, the mode share targets, or increasing the proportion of freight moved by sustainable modes. As a result of the potentially modest outcomes of the scheme in relation to safety, journey time reliability and network resilience, the contributions the scheme makes to the Wales Transport Strategy are limited.

The scheme will not assist the Welsh Government carbon reduction targets and budgets in the next 15 years. The scheme creates modest changes, with some benefits and disbenefits, for people and communities, and the environment. Under a low traffic growth scenario (the nearest of three modelled scenarios to the Net Zero Wales aim of reducing road traffic), the scheme costs more than the estimated value of the benefits.

There are considerable future uncertainties linked with resilience issues brought about by climate change, the long-term outcome of Brexit and Covid-19. The scheme would perform worse in a scenario in which travel by motor vehicle was lower as a result of existing policies and emerging plans. These suggest the robustness of the scheme to different futures is limited.

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Our recommendation is that the scheme should not be supported to go forward in its current form.

Although we do not recommend the scheme proceeds in its current form, we do consider that there is a case for intervention on the A55, in order to achieve the aims of the Wales Transport Strategy and Net Zero Wales. Our specific recommendations are set out in the concluding section.

Scheme description

The National Transport Plan of February 2011 identified improvements at Junctions 14 to 16A as a single scheme. Penmaenmawr Headland lies between Junction 15 and Junction 16. Following route selection stage, the schemes were developed separately because of the geographical division, but in this review all the elements are treated together.

The scheme involves the following (proceeding from west to east): improvements to the grade-separation at Junction 14; replacement of the at-grade roundabout at Junction 15 at Llanfairfechan with grade-separation; replacement of the at-grade roundabout at Junction 16 east of Penmaenmawr with westbound off- and on-slip roads; provision of a new off-line roundabout south of the existing Junction 16 roundabout; provision of link road parallel to the A55 between Junction 16 and Junction 16A; provision of full grade-separation at Junction 16A; improvements for cycling and walking principally at Llanfairfechan, Pendalar and Dwygyfylchi.

Scheme objectives

There are eleven objectives, with the final three being defined as technical objectives, as follows:

1. Improve access to regional, national and international markets and improve

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access to employment opportunities.

2. Improve road safety on the A55 from Junction 14 to Junction 16A.
3. Improve journey times and journey time reliability on the A55 from Junction 14 to Junction 16A.
4. Improve resilience on the A55 for strategic and local traffic.
5. Improve journey times, journey time reliability and safety for access onto the A55 from Llanfairfechan and Penmaenmawr.
6. Reduce severance with coastal areas for the Non-Motorised Users and enhance provision made for walkers and cyclists.
7. To take reasonable steps to build healthier communities and better environments.
8. Opportunities to provide integrated transport are increased.
9. Minimising technical departures from standards.
10. Minimising need to reduce speed limits.
11. Minimising disruption during construction.

Information reviewed

The following documents have been reviewed:

- WelTAG Stage 1: Strategic Outline Case (SOC) report (11/2018), the Public Consultation Report (11/2018), and the Environmental Appraisal Report (7/2018)
- WelTAG Stage 2: Outline Business Case (OBC) report (9/2020), and the Integrated Transport Technical Note (2/2020)
- WelTAG Stage 3: Scheme Assessment Report; Traffic Forecasting Report; Economic Assessment Report; Sustainable Development report; Statement to Inform Appropriate Assessment and Environmental Statement Non-Technical Summary (all 3/2021), Explanatory Statements and Statement of Reasons.
- A55 and A494 Network Resilience Study: WelTAG Stage 1 (10/2017) and WelTAG Stage 2 reports (6/2021).
- Responses to Panel queries: a) A55 Junctions 15 & 16 Roads Review Panel Q&A Draft Rev - 19.11.2021, b) A55 Junctions 15 16 Roads Review Panel QA Additional Data Requested 23.11.2021; c) 'A55 Junctions 15 & 16 Roads

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Review Panel Q&A Additional Data Requested 26.11.2021'; d) documents containing data extracted from the North and Mid Wales Trunk Road Agent incident management database.

A site visit took place on 22 October 2021. A meeting took place with the North Wales Metro team on 15 November 2021, and a meeting with the Sponsor took place on 19 November 2021.

Has the case for change been made?

The scheme is an on-line modification to an existing dual-carriageway, with associated side roads modifications. The Stage 1 Strategic Outline Case (SOC) describes the A55 as

“ ‘a key element of the UK and European strategic road network [that] provides the main economic artery for the whole of North Wales’. ”

Emphasis is placed on the two roundabouts being the only at-grade junctions between Hull and Holyhead on a designated Trans-European Network route known as Euroroute 22. While the two roundabouts do not have significant departures from current design standards, it is understood from the Sponsor that the North and Mid Wales Trunk Road Agent's (NMWTRA's) main concern relates to incidents where heavy goods vehicle (HGV) over-run the give way line and run into the roundabout circulatory carriageway.

As a consequence of being a modification to an existing road, the scheme has a focus on route management, and Objectives 2, 3, 4, 5 and 10 (encompassing safety, journey times and reliability, network resilience). The Sponsor states in the response to review panel queries data 19th November 2021 that two-way average daily flows for 2019 are as follows: January 31,000; neutral month 37,000; August 46,000. This variation in flow demonstrates considerable seasonality, and that the road approaches capacity in August. In addition, the scheme seeks to reduce severance and enhance provision for walkers and cyclists, take reasonable steps to build healthier communities, and increase

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opportunities to provide integrated transport (Objectives 6, 7 and 8).

As part of a separate study, the A55 A494 Network Resilience Stage 2 OBC indicates that traffic flows on the section of the A55 where J15 and J16 are located are within the capacity of the road (and less affected by capacity issues than other sections of the road). The OBC states that the route

“ ‘performs well with some localised congestion during peak traffic flows’, but is ‘vulnerable during incidents or significant road work events due to a combination of topographical and infrastructure constraints and lack of viable diversion routes’ (p102). ”

The A55 A494 Network Resilience SOC states that the eastbound Penmaenbach tunnel and the marine embankment (which lie to the east of Junction 16A) are the single largest resilience issue for the A55. The Sponsor reported that NMWTRA describes tunnel related incidents as low likelihood but high consequence. Additional concerns are:

- the bus gate at Pendalar east of Junction 15
- the access to the water treatment works at Darbisher’s Bridge (near Junction 16a)
- eastbound (wrong way) turning at the westbound entry to the A55 at Junction 16a
- the lack of hard shoulder or refuges
- resurfacing difficulties due to space constraints, and particularly at the roundabouts
- the need to undertake maintenance outside periods when in-carriageway works are embargoed for operational reasons (e.g. due to high flows)

The Sponsor defined an incident as anything that disrupts the flow of traffic, generally involving partial or full closure of one or both lanes of the carriageway. From incident management database data supplied by NMWTRA, the total number of recorded incidents on the route between Junction 14 and Junction 17 in the period between April 2013 and November 2021 is 6,524.

Between 9% and 11% of the incidents occur in each of the months of May, June,

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July, August and October, and hence there are more incidents in these months than the annual average (an even distribution would suggest 8% per month). Causes of incidents were provided for a slightly longer period covering 6,843 incidents.

The most frequent causes are breakdowns (47-50%, and 31% for the section J16A to J17), obstructions, debris and stationary vehicles. Together, these four causes create 80% of the incidents (74% for the section J16A to J17). Collisions are the next most frequent cause, at 4% of the incidents.

Congestion is reported as the cause for 10 out of the 6,843 incidents. Of incidents where delays are recorded (3,796, i.e. 55%), 75% cause no disruption, and 20% cause less than 15 minutes delay. The remaining 5%, or 190 incidents, caused more than 15 minutes of delay. In summary, there are just over 2 incidents a month that cause more than 15 minutes delay, and 5% of these are caused by collisions, and very few by congestion.

The Sponsor reported the following remaining issues if the scheme went ahead:

- Tunnel management including emergencies;
- Routine maintenance management (though this would be improved);
- Breakdown management (e.g. full-lift recovery of electric vehicles especially in the tunnels);
- Lack of hard shoulder;
- Adverse weather impacts on planned or emergency tunnel or headland closures.

In relation to Objective 5, local traffic access to the A55, the Sponsor noted that 'Journey Safety' was the most consistent theme mentioned by 70 members of the public at the December 2017 consultation. At the 2018 public consultation the roundabouts at J15 and J16 were again perceived as being dangerous, partly as a result of near-miss incidents, with some respondents stating this as the reason for not using J16. Respondents also noted concerns about multiple lane use by HGVs and caravans at the roundabouts. The OBC states that in the five-year period to 2016 there were no collisions reported at Junction 14 or 15A; at Junction 15 there were four slight injury accidents, one severe injury accident and no fatal injury accidents; at Junction 16, there were eight slight injury

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accidents, two severe injury accidents and no fatal injury accidents; at Junction 16A one slight injury accident. This collision record suggests little absolute improvement can be made in relation to collisions and injuries.

The scheme has a focus on route management including safety, journey times and reliability, and network resilience. Traffic incidents, especially during busy periods, can cause disruption and delays. It is not apparent that the roundabouts are the principal cause of the resilience issues.

Are the objectives of the scheme aligned with current policy?

The scheme is principally concerned with enhancing the ability to manage the highway network. As noted above, three objectives relate to walking, cycling and public transport. The appraisal documents do not forecast the change in sustainable transport mode share as a consequence of the interventions, which are discussed in more detail in the next section. The scheme in isolation will not help increase the proportion of freight moved by sustainable modes of transport.

The improvements for motor traffic are more significant than the improvements for other modes of travel, and the scheme does not align with the hierarchy of users in the Wales Transport Strategy (WTS) published in March 2021 and does not support a significant modal shift.

Did the scheme development process examine all appropriate options?

Three long list options at Stage 1 SOC included speed reduction, and one further option included enhanced speed enforcement. None of the options relating to speed reduction or speed enforcement were carried through to the short list. The reason given is that

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“ ‘Although the option would have the potential to improve safety, it does not perform well overall against the objectives’ (WelTAG Stage 2, p58). ”

Closure of access to the A55 at the roundabouts was considered, but dismissed as reducing access for local traffic. No non-transport options were considered.

Other transport options considered included an integrated transport package relating to public transport and active travel, and separately, two active travel options. They were not pursued because they would not fully satisfy the scheme objectives on their own. The subsequent Stage 2 Outline Business Case (OBC) recommended that reasonable steps should be taken to incorporate such measures within the scheme.

There are some improvements for walking and cycling as a result of the scheme. In particular, there is benefit in the removal of the right turn for cyclists across Penmaenmawr Road immediately south of the existing J15, the improvements to Mona Terrace in Pendalar, replacement of the Pendalar and the Puffin Café footbridges to make them disability access compliant, and the crossing of the A55 at J16A that would connect Dwygyfylchi to the National Cycle Network Route 5.

Bus route changes in Llanfairfechan will positively impact some passengers and negatively impact other users as a result of the bus stop re-positioning and the removal of the off-slip and bus gate at Pendalar. The North Wales Metro team particularly emphasised that the scheme will remove the eight-minute additional journey time for eastbound buses which currently have to join the A55 at Dwygyfylchi in a westbound direction and U-turn at the J16 roundabout to continue to Conwy.

The primary output of the scheme is the replacement of the at-grade roundabouts with grade-separation as a means of enhancing resilience against significant delay caused by incidents. There was no consideration of options that might improve resilience that also do not increase capacity. The scale of change of the scheme against its objectives is limited. It is predicted that traffic speeds will increase by about 6-11% (although the metric used to report this, the ‘annual average traffic speed’, is not a commonly accepted measure). The proposals will

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change overall journey times in a marginal way for most users. The proposals will change the collisions record, but in a modest way as a result of the good collision record. The proposals marginally reduce severance as a result of the additional A55 crossing at Dwygyfylchi, and the making of the Pendalar at Puffin Café footbridges disability access compliant.

The scheme helps maintain a 'high-grade freight and logistics network' (Wales Transport Strategy, WTS, p82), modestly supports the Road Safety Framework 2013 (but under revision in light of the WTS), and assists in "upgrad[ing], improv[ing] and future-proof[ing] our road network, addressing congestion pinch points and investing in schemes that support road safety, journey reliability, resilience" (WTS, p69). It is modestly aligned with "reduc[ing] decibels and increase healthier soundscapes, keep noise to an acceptable level in the design of new developments, adopt noise mitigation on motorways" (WTS, p25). As a result of the limited scale of change brought about by the scheme, any contribution to the WTS that the scheme would make is limited.

While there are some positive elements of the scheme for active travel and for buses, we cannot be confident that the scheme as a whole is what would have resulted from an appraisal process that had considered a wider range of options in line with the Sustainable Transport Hierarchy and started with objectives that were fully aligned with Welsh Government policies.

What is the effect on CO₂ emissions?

The initial construction of the scheme will result in additional emissions of circa 32,000 tonnes CO₂.

There will be an increase in emissions as a result of higher vehicle speeds: as noted above it is predicted that traffic speeds will increase by about 6-11%. Offsetting this, there will be CO₂ savings because vehicles will no longer need to negotiate the roundabouts, which would involve reducing speed on the approach to the junction and then accelerating away from the junction. In addition, fewer incidents may occur, hence resulting in fewer 'stop-start' driving conditions. In

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operation, the scheme is reported to generate CO₂ savings over its 60 year appraisal period of 4,000 tonnes.

The Stage 3 Economic Assessment Report indicates additional carbon costs compared to the Do-Minimum of £219,000 for Junction 15 and £199,000 for Junction 16. Note the carbon costs were estimated for the scheme prior to the increased costs of carbon published in September 2021.

The net effect is that 32,000 tonnes of near-term emissions will be offset by savings over the life of the scheme of 4,000 tonnes, creating a net increase of 28,000 tonnes of CO₂.

Will the scheme be good for people and communities?

The Stage 1 SOC suggests the scheme on its own would not solve any problems relating to access to employment, local services and leisure. The Stage 2 OBC suggests there will be no change with respect to equality. The OBC states that air quality has not been identified as a major concern with NO₂ concentrations in Llanfairfechan well below the national objective level.

The scheme brings about little change in air quality. The SOC suggests there are some negligible increases and decreases in noise levels for different receptors within the area. After expressions of local concern, the preferred option at J15 was mitigated to reduce the level of demolition to just two properties at Penmaen View. There is marginal reduction in severance. In the consultations, safety, especially near-miss incidents, were often mentioned, but the scheme's contribution towards zero road deaths is limited.

The scheme will create little change for people and the community. However, as noted above, there are some positive elements of the scheme for active travel and for bus travel, and in relation to marginal reductions in severance.

Will the scheme be good for the environment?

Landscape and visual impact of the proposals within Snowdonia National Park would not be significant. There is no significant impact on the water environment. A single bat roost would be lost as a result of buildings on Shore Road East being demolished. As well as a bat roosting box, mitigation proposed includes planting and seeding, including a green corridor along the link road at Junction 16 to 16A.

In relation to sea level rise and coastal flooding, the Sponsor notes that Natural Resources Wales (NRW) has no objections. The majority of the length of the scheme is protected from the sea by either Welsh Government defences, Conwy

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County Borough Council defences or Network Rail defences. The Penmaenbach headland is vulnerable to wave splash, which impacts on pedestrians, cyclists and the railway. The underpass at Ship Cottages (between the J16A water treatment works and Penmaenbach headland) will be more susceptible to the existing rare issue of beach cobbles being washed through the structure. The scheme includes a flood compensation area adjacent to the new westbound on-slip embankment at Junction 15 to cater for the combination of both tidal and fluvial flooding.

In summary, the scheme would have no significant effect on landscape, maintain biodiversity and mitigate against currently experienced effects of flooding.

Will the scheme be good for places and the economy?

Traffic estimates used in the value for money analysis are based on a 2016 base year, a 2022 year of opening, a design year of 2037 and a horizon year of 2051. The low growth scenario assumes growth between 2022 and 2037 of 32% in light goods traffic, and 19% in heavy goods vehicle traffic. These low growth forecasts are not aligned with the aim in Net Zero Wales (NZW) Carbon Budget 2 (2021 to 2025) of reducing the number of car miles travelled per person by 10% by 2030.

Including all types of benefit (wider economic benefit, accident benefits, travel time benefits, vehicle operating costs, carbon emission disbenefits, indirect tax benefits and construction delays), the Benefit to Cost Ratios (BCRs) suggest the scheme is low or poor value for money. The most relevant BCRs (given that Welsh Government policy is aiming to reduce traffic volumes) are those for the Low Traffic Growth Scenario. In this scenario, the BCRs are 0.6 for J15 and 0.8 for J16, suggesting the costs are more than the benefits.

The WelTAG appraisal suggests that 'wider economic benefits' (i.e. related to employment, productivity and induced investment) for the J15 and J16 schemes

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are worth £2.1 million over 60 years. Making it easier for local residents to commute to work outside the immediate area could be either a benefit or a disbenefit to the local economy, but either way, the effect of this particular scheme is likely to be marginal. The scheme has no significant effect on national economic wellbeing.

In summary, as well as having costs which are higher than the benefits for a 'low' future forecast level of traffic, which is itself higher than a level that would comply with stated policy, these monetary estimates are sensitive to construction delay, travel time, vehicle operating costs, carbon emissions and the effect of seasonality.

Will the scheme be good for culture and the Welsh language?

The Sponsor has complied with the Welsh Language (Wales) Measure 2011. The scheme is likely to have little impact on the use of the Welsh language, and people travelling sustainably for arts, sports, recreation and cultural activities. The scheme will have no significant effects on the nearby Creuddyn and Arllechwedd historic landscape.

Overall, there will be little impact on culture and the Welsh language.

How robust is the case for the scheme to different futures?

The Sponsor said that their climate change resilience assessment demonstrated that the scheme is not vulnerable to the effects of Climate Change. It is challenging to predict the consequences of Brexit in relation to Irish-UK trade and tourism. It is also challenging to predict the consequences of Covid-19.

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The scheme would perform worse under a scenario in which travel by private motor vehicle was lower. This would come about with greater working at home (the Welsh Government's target is 30%), the North Wales Metro scheme plans to significantly enhance public transport and active travel options, and Snowdonia National Park's initiatives in relation to sustainable tourist travel and parking.

The scheme proposes a number of additional structures associated with the grade-separation and these will create future maintenance liabilities which are larger than current liabilities. This is potentially problematic given the pressure on maintenance budgets for the strategic road network.

In summary, the scheme is not robust to different futures.

Conclusion

The scheme objectives focus on safety, journey times and journey reliability, and network resilience. Providing replacement grade-separated junctions for both roundabout junctions would create little absolute improvement to the collision record. They would change journey times in a marginal way, but would enhance journey time reliability, but only during the Summer periods of higher flow. The resilience of the network is more significantly influenced by adjacent highway features including the tunnels and the highway geometry around the headlands than the roundabouts.

While some of the scheme objectives are partially or modestly aligned with the Wales Transport Strategy, the aim of the scheme is not in alignment with the sustainable transport hierarchy, the mode share targets, or increasing the proportion of freight moved by sustainable modes. As a result of the potentially modest outcomes of the scheme in relation to safety, journey time reliability and network resilience, the contributions the scheme makes to the Wales Transport Strategy are limited.

The scheme will not assist the Welsh Government carbon reduction targets and

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budgets in the next 15 years. The scheme creates modest changes with some benefits and disbenefits for people and communities, and the environment. The low traffic growth estimates are not aligned with Net Zero Wales strategy of reducing road traffic, and against this low growth scenario the scheme costs more than the estimated value of the benefits.

There are considerable future uncertainties linked with resilience issues brought about by climate change, the long-term outcome of Brexit and Covid-19. The scheme would perform worse in a scenario in which travel by motor vehicle was lower as a result of existing policies and emerging plans. These suggest the robustness of the scheme to different futures is limited.

In conclusion the recommendation is that the scheme should not be supported to go forward in its current form.

Although we do not recommend the scheme proceeds in its current form, we do consider that there is a case for intervention on the A55, in order to achieve the aims of the Wales Transport Strategy and Net Zero Wales. Such an intervention would be significantly different to the proposed scheme, and will therefore necessitate going back to a WeITAG Stage 1 (or the proposed WeITAG Stage 0), focussing on the new WTS and NZW priorities to achieve modal shift and a reduction in car travel. There would need to be an emphasis on innovative solutions suitable for the rural nature of many of the communities served by the North Wales corridor, as well as a focus on continuing priorities with regard to road safety and the environment.

It would sensibly consider the whole North Wales corridor, as recommended in the Union Connectivity Review final report. It may take an approach similar to that adopted by the Burns Delivery Board in South East Wales.

It will require collaborative working between the Welsh Government roads team and the Transport for Wales North Wales Metro team on a multimodal approach, with both teams playing an important role working with local authorities, key stakeholders, including Snowdonia National Park, and the supply chain.

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Recommendation 1

The scheme objectives should be reconsidered so they are aligned with the Wales Transport Strategy, the Net Zero Wales Carbon Budget 2 and the North Wales Metro programme. Options to improve provision for active travel and public transport should be re-examined. These options should be at least as good as those included in the current scheme, and should be designed to support modal shift to active travel and public transport for both short and longer journeys along and across the A55 corridor.

In addition, we have considered the issues of enhancing network resilience and safety. The speed limit in each direction between Junction 14 and Junction 17 is 70 mph, apart from a 30 mph limit in the eastbound direction around Penmaenbach headland. A number of discrete 50mph advisory limits have been used in the past at each of the tunnels and headlands, but this confused drivers particularly at the Conwy Tunnel.

The summary of the Trunk Road Safety review for sections of the A55 between Junction 14 and Junction 17 states

“ Existing speed limit to be retained and road to be monitored for the need for safety improvements.” ”

As context, there are permanent 50 mph speed limits on other sections of the A55 which do not comply with rural road design standards (e.g. through Colwyn Bay).

The Wales Transport Strategy notes the use of technology to regulate traffic speeds to reduce emissions. Lowering the speed limit through the entire section from east of Penmaenbach tunnel to the west of Junction 14 would result in lower emissions, less noise, and lower probability and severity of collisions. Lower speeds would also assist maintaining capacity at periods of high flow, and may assist in reducing the number of incidents.

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Recommendation 2

Proposals should be investigated to introduce a 50 mph speed limit over the whole length covered by the Junction 14 to Junction 16A scheme, and also the Penmaenbach and Conwy tunnels.

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