

# Technical note

<b>Project:</b>	Newgale WelTAG Stage 1	<b>To:</b>	Neil Carpenter
<b>Subject:</b>	Noise Input	<b>From:</b>	Adam Lawrence
<b>Date:</b>	3 Jan 2017	<b>cc:</b>	

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N.B. The text within this Technical Note will be inputted into a multi-discipline WelTAG assessment prior to issue to the client and will be subject to further change/review.

## 1. Environment Impacts

### 1.1. Noise

#### 1.1.1. Introduction

This section describes a Welsh Transport Planning and Appraisal Guidance (WelTAG) Stage 1 assessment of the expected noise impacts of four different Newgale A487 scheme options. The noise assessment is based on the likely changes in noise along roads in the area of the scheme options, considering the geographic extent of those impacts.

All noise data given in this report is expressed in terms of  $L_{A10, 18hr}$  index as specified in Calculation of Road Traffic Noise (Department of Transport, 1988) (CRTN) which is the standard index for noise assessment in the UK. The  $L_{A10, 18hr}$  index represents the A-weighted noise level exceeded for 10% of the time between the hours of 06:00 and 00:00 and has been shown to have a reasonable correlation with community response. In this report, the term Roadside Noise Level indicates the expected noise level at a distance 10m from the kerb of the road.

#### 1.1.2. Existing conditions

Existing noise within the Scheme locality is predominantly associated with traffic noise from the existing road network. Noise from the airport, industrial estates, farms and other local businesses may affect particular properties at particular times, these however are excluded from this assessment.

Based on our experiences in this type of area noise levels are not expected to fall below 40dB, and the calculations of impact take this into account.

From the baseline traffic data provided it is possible to obtain the roadside noise levels for the existing road network. The roadside noise level in the study area is generally between 63 and 66dB, except for Roch Hill and Welsh Road where traffic flows are too low to make a reliable estimate of noise levels.

The majority of noise sensitive receptors are residential properties located near to the roads in Roch with some properties in Penycwm and on Newgale Hill near the seafront. There is also a number of isolated properties in the study area, some of which are more than 300m away from the existing roads but are within 300m from some of the proposed options.

The total number of noise sensitive receptors in the study area has been estimated as 264 utilizing OS Open Data, satellite imagery (Google and Bing maps) and Google Street View.

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## 1.1.3. Method

The Proposed Scheme options have been assessed following the guidance in the Design Manual for Roads and Bridges Volume 11 Section 3 Part 7, 2011 (DMRB 11:3:7, referred to as DMRB) which incorporates the calculation and prediction methodology from CRTN, and in general accordance with the process described in WeITAG.

For a DMRB assessment, the Design Year is normally taken to be 15 years after the Opening Year of the proposed scheme. Traffic flows, speeds and the proportion of heavy vehicles have been supplied for the base year 2016, expected opening year of 2022 and a design year of 2037 for a do-minimum scenario and the four options assessed.

The DMRB provides threshold values against which changes in noise due to the project should be compared, and assessed, in both the short-term (on scheme opening) and in the long-term (over the design period, typically 15 years after scheme opening). The threshold criteria are either a change of at least 1dB  $L_{A10, 18hr}$  in the short-term, or at least 3dB  $L_{A10,18hr}$  in the long-term.

The CRTN method has been used to predict the roadside  $L_{A10,18hr}$  noise level based on the traffic data. Changes in traffic between the options would give rise to changes in noise affecting the properties near to the section of road in question.

The changes in roadside noise level would be experienced at the facades of properties which face the road. The changes in noise would be smaller at properties further from the road as the noise level at these locations would be influenced by noise from other roads and other sources which would not change as a result of the option. A qualitative assessment of the population affected has been made.

Tables 3.1 and 3.2 in the DMRB provide the following classification for the magnitude of noise impacts, recognizing that it may not be applicable in all circumstances:

**Table 1-1 Classification of Magnitude of Noise Impacts**

Noise Change, $L_{A10,18h}$	Magnitude of impact (short term)	Magnitude of impact (long term)
0	No change	No change
0.1-0.9	Negligible	Negligible
1-2.9	Minor	Negligible
3-4.9	Moderate	Minor
5-9.9	Major	Moderate
10+	Major	Major

From this classification, 'minor', 'moderate' and 'major' changes in noise are perceptible. 'Negligible' changes in noise are not perceptible. For this assessment changes in noise that are 'moderate' or 'major' are regarded as significant.

The usual practice for a road scheme is to investigate mitigation options for significant impacts. However, in this area the existing noise levels at some receptors are understood to be well below the level at which community annoyance starts, and mitigation would only be planned where moderate adverse impacts or worse are shown and where noise levels are above the thresholds for community annoyance.

For guidance on onset of community annoyance effects, reference is made to the World Health Organisation (WHO) document 'Community Noise' (WHO, 1999). This document provides guideline values based on the precautionary principle. It states: 'To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB  $L_{Aeq}$  on balconies, terraces and in outdoor living areas. To protect

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the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L<sub>Aeq</sub>.’

This stage of the WelTAG assessment includes:

- an assessment of the predicted change in noise for each option in the opening year, compared with the Do Minimum situation;
- an assessment of the predicted change in noise in the design year for each option and the do minimum situation, compared with the do minimum situation; and
- estimates of the number of receptors experiencing those changes in noise.

The study area is defined within 300m of the route of the physical works associated with the road project, as well as any roads being bypassed or improved by the schemes. For the purposes of this assessment, the wider area was not considered. The assessment does not account for individual screening measures, topography, structures or soft ground corrections, and therefore the noise levels are indicative.

## 1.1.4. Impact

It is understood that the local traffic will continue to use the existing A487 and the long distance traffic would use the scheme route. Around year 2036 the existing A487 will be closed at Newgale and all traffic, including local, will be directed on to the scheme route. Local traffic will still be able to access Newgale via southern and northern stubs.

Additionally, access along Welsh Road will be implemented with each option.

### 1.1.4.1. Do Minimum

If the scheme is not built there would be no significant changes in noise expected. Traffic growth over the design period is expected to increase noise on certain roads by the design year, giving rise to negligible increases in noise. Decreases in noise are not expected.

### 1.1.4.2. Option 3

#### 1.1.4.2.1. Scheme Opening

When the scheme opens, noise levels would rise by 1.4dB on the new section of the A487 when compared to the levels on the existing levels seafront road. Properties nearby would receive minor or moderate increases in noise. On all other roads the changes in noise would be negligible.

It is unlikely that mitigation would be needed for this option as significant impacts are limited.

#### 1.1.4.2.2. By the Design Year

It is likely that noise increases by the design year would be negligible, due to the way that changes in noise are perceived in the long term. On most of the roads in the study area no change would be expected although there are some negligible decreases in noise.

### 1.1.4.3. Option 7

#### 1.1.4.3.1. Scheme Opening

When the scheme opens, noise levels would be expected to increase near the proposed road, particularly at the closest properties to the route on and near Penycwm and Erw Lon road. Increases in noise are expected to be moderate or major, potentially resulting in a significant impact.

Noise levels would decrease by 6dB on the existing A487 between the Church Road and Penycwm which is regarded as a moderate reduction in noise. On all other roads changes in noise would be negligible.

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As the scheme has the potential to introduce significant effects, noise mitigation may need to be considered, particularly near Penycwm.

## 1.1.4.3.2. By the Design Year

It is likely that the situation in the design year would be similar to the opening year. Noise levels near the proposed scheme are likely to be higher than baseline levels resulting in long term adverse noise impacts, potentially significant. The noise levels on the existing A487 between the scheme south junction and Penycwm would remain lower than the do-minimum levels, resulting in moderate to major reductions in noise. On all other roads changes in noise are expected to be negligible.

## 1.1.4.4. Option J

### 1.1.4.4.1. Scheme Opening

Similarly to Option 7, when the scheme opens noise levels would increase near the proposed road at the properties on A487 Newgale Hill close to Penycwm and on Wood hill where the southern part of the scheme will merge with the A487. The change in noise levels would be moderate to major, resulting in potentially significant impacts at these properties.

Noise levels would decrease by 6dB on the existing A487, west of the scheme resulting in a major reduction in noise.

On all other roads changes in noise would be negligible.

As the scheme has the potential to introduce significant effects, noise mitigation may need to be considered, particularly near Penycwm.

### 1.1.4.4.2. By the design year

It is likely that the situation in the design year would be similar to the opening year. Noise levels near the proposed scheme would be higher than baseline, resulting in moderate increase in noise at the properties affected during the scheme opening. A further decrease in noise would be expected on the existing A487 resulting in moderate to major reduction in noise. The remaining roads would have a negligible change in noise.

## 1.1.4.5. Option 11

### 1.1.4.5.1. Scheme Opening

When the scheme opens noise levels would increase significantly on Roch Hill between the A487 and Penycwm, resulting in major increases in noise which have the potential to be significant. Decreases would be expected on the existing A487 resulting in major reduction noise between the Church road junction and Penycwm.

On all other roads changes in noise would be negligible.

As the proposed scheme is a part of the existing road network, most of the significant impacts would be expected to occur at the properties near the existing roads, with vehicular access to these properties giving limitations on potential mitigation options.

### 1.1.4.5.2. By the design year

It is likely that the situation in the design year would be similar to the opening year. The noise levels on the proposed scheme are likely to be much higher than baseline levels resulting in long term adverse noise impacts, potentially significant. Similarly to the opening year, the decreases would be expected on the existing A487 resulting in moderate to major reduction in noise levels.

On all other roads change in noise would be negligible.

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## 1.1.4.6. Impacts at the noise sensitive receptors

Due to the traffic changes on existing links, as well as introducing new option routes for the A487, traffic redirection in the opening and design year, there is potential for increases in noise levels within the study area. The summary of the noise assessment is shown in the following tables, which give estimates of the potential impacts for each option.

**Table 1-2 Change in noise levels at noise sensitive receptors, Opening Year**

Change in noise level (dB) (Short term)		Option 3	Option 7	Option J	Option 11
Increase:	>5	0	16	2	59
	3-5	4	6	11	0
	1-3	14	6	28	0
	<1	12	4	11	0
No change:	0	233	162	176	114
Decrease:	<1	0	1	1	0
	1-3	0	6	1	0
	3-5	0	3	0	0
	>5	1	60	34	91

**Table 1-3 Change in noise levels at noise sensitive receptors, Design Year**

Change in noise level (dB) (Long term)		Do Minimum	Option 3	Option 7	Option J	Option 11
Increase:	>10	0	0	10	0	59
	5-10	0	0	10	6	0
	3-5	0	6	6	27	0
	<3	236	229	149	167	113
No change:	0	28	28	20	28	0
Decrease:	<3	0	0	5	1	0
	3-5	0	0	24	3	30
	5-10	0	0	38	30	60
	>10	0	1	2	2	2

## 1.1.4.7. Summary

The impacts are summarised in the following tables;

**Table 1-4 Number of perceptible and significant change in noise levels on opening**

Change in noise levels	Option 3	Option 7	Option J	Option 11
Short Term Increase	18	28	41	59
of which Significant	4	22	13	59
Short term Decrease	1	69	35	91
of which Significant	1	63	34	91

**Table 1-5 Number of perceptible and significant change in noise levels by the design year**

Change in noise levels	Option 3	Option 7	Option J	Option 11
Long Term Increase	6	26	33	59
of which Significant	0	20	6	59

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Change in noise levels	Option 3	Option 7	Option J	Option 11
Long term Decrease	1	64	35	92
of which Significant	1	40	32	62

If the scheme were built, there would be a range of increases and decreases in noise. People living near the existing A487 and other roads would experience potentially significant decreases in noise. People living close to the proposed scheme alignments would experience potentially significant increases in noise.

The impacts vary with the options. For options 3 and J it is likely that the number of properties receiving a decrease in noise would generally be smaller than the number of properties receiving an increase in noise, whereas for option 7 and 11 the number of properties receiving a decrease in noise would generally be greater than the number of properties receiving an increase in noise.

For options J and 7, it is considered likely that the number of properties experiencing the most significant adverse impacts would be able to be minimised through the introduction of noise mitigation measures. Mitigation is unlikely to be required for Option 3 and is likely to be difficult for the significant impacts shown in Option 11.

Overall, the noise results show that Option 3 would result in the noise climate most similar to existing. Options J and 7 result in more noise benefits than dis-benefits and it is considered likely that the number of adverse impacts could be reduced through the use of noise mitigation for these options.

The overall significance for each option has been assessed by comparing the number of potentially significant increases and decreases in noise by the design year. A benefit is shown when there are more decreases in noise than increase in noise and a disbenefit is shown when there are more increases in noise than decreases in in noise. The scheme is neutral when the numbers are similar.

Option	Significant Decreases	Significant Increases	Significance
Option 3	1	0	Neutral
Option 7	40	20	Minor benefit
Option J	32	6	Minor benefit
Option 11	62	59	Neutral

## 1.2. Conclusions

The noise results show that Option 3 would result in the noise climate most similar to existing. Options J and 7 result in more noise benefits than dis-benefits and it is considered likely that the number of adverse impacts for these options could be reduced through the use of noise mitigation. Option 11 introduces the greatest number of impacts and is most difficult to provide mitigation for.