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Welsh Government

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Review of strategic noise maps in Wales

October 2015

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1 Introduction

The Environmental Noise Directive (2002/49/EC) states that:

Member States shall adopt the measures necessary to ensure that no later than 30 June 2012, and thereafter every five years, strategic noise maps showing the situation in the preceding calendar year have been made and, where relevant, approved by the competent authorities¹ for all agglomerations and for all major roads and major railways within their territories.

Information from the strategic noise maps must be reported to the European Commission within six months of the dates by which they are required to be made.

The Directive also states that:

The strategic noise maps shall be reviewed, and revised if necessary, at least every five years after the date of their preparation.

The Welsh Government published strategic noise maps in 2012 for major roads, major railways and agglomerations, showing the situation in 2011².

The primary purpose of this report is to review the strategic noise maps, as required by the Directive, and determine which of them it is necessary to revise in order that they remain sufficiently representative of the situation in 2016 to support noise action planning and reporting to the European Commission in 2017.

The Environmental Noise (Wales) Regulations 2006 (as amended) also require the Welsh Government to publish maps in 2016 identifying agglomerations, major roads, major railways or major airports if it considers the most recently published maps of them to be no longer appropriate. A secondary outcome of publishing this report may therefore be to fulfil this regulatory requirement.

For the purposes of the Directive and the Regulations, there are no major airports in Wales.

¹ The Welsh Ministers.

² <http://data.wales.gov.uk/apps/noise>

2 General considerations

One important point to consider is that the noise maps to be reported in 2017, showing the situation in 2016, may be calculated using the same national methods that were used in 2011/12. It is expected, however, that the noise maps to be reported in 2022, showing the situation in 2021, will have to be made using new EU-wide calculation methods (CNOSSOS-EU)³. Because of this, it is likely that all the noise maps will have to be fully recalculated in 2021/22, regardless of whether the noise situation has significantly changed, and they will not be directly comparable with the earlier noise maps. In 2016/17, by contrast, the 2011/12 maps may be re-used provided that the noise situation has not significantly changed in the intervening years.

The 2016/17 round of noise mapping therefore represents a rare opportunity, both to avoid the unnecessary expense of re-mapping noise sources that have *not* significantly changed since the previous round, and to apply the same calculation method as previously to re-map sources that *have* significantly changed. In this way, the 2011/12 and 2016/17 noise maps may be directly comparable, with the only differences between the two sets of noise levels representing significant real-world changes that have taken effect in the intervening years.

Another point to note is that the UK census takes place every ten years. Data from the 2011 census was used to estimate population exposure statistics from the 2011/12 noise maps, and data from the 2021 census should hopefully be available to enable a full recalculation of the population exposure to environmental noise in 2022. This fits with a more limited “review-and-revise” approach being taken in relation to the 2016/17 round of noise maps.

3 Roads

The Directive requires noise mapping for major roads (those designated by the member state that have more than three million vehicle passages per year) and roads within agglomerations. The identification and ranking by highest residential noise level of priority areas⁴ based on the 2011/12 noise maps, together with records of road traffic noise complaints received by the Welsh Government, confirm that it is the major roads with the highest traffic flows, and those with noisy concrete surfaces, that are associated with the highest levels of noise exposure and/or annoyance at residential properties. For the purposes of action planning, the Welsh Government’s focus is therefore to review noise levels on those roads with more than three million vehicle passages per year, be they motorways, trunk roads or local authority roads.

Figures 1 and 2 below show the roads in Wales that would qualify as major roads for noise mapping purposes in 2010 and 2014 respectively, based on traffic flow statistics published by the Department for Transport. The total length of major road in both years is around 1,550 km.

³ http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:JOL_2015_168_R_0001

⁴ <http://gov.wales/topics/environmentcountryside/epq/noiseandnuisance/environmentalnoise/noisemonitoringmapping/priority-areas/?lang=en>

Figure 1 Major roads in Wales included in the 2011/12 noise mapping (based on 2010 traffic flow data)

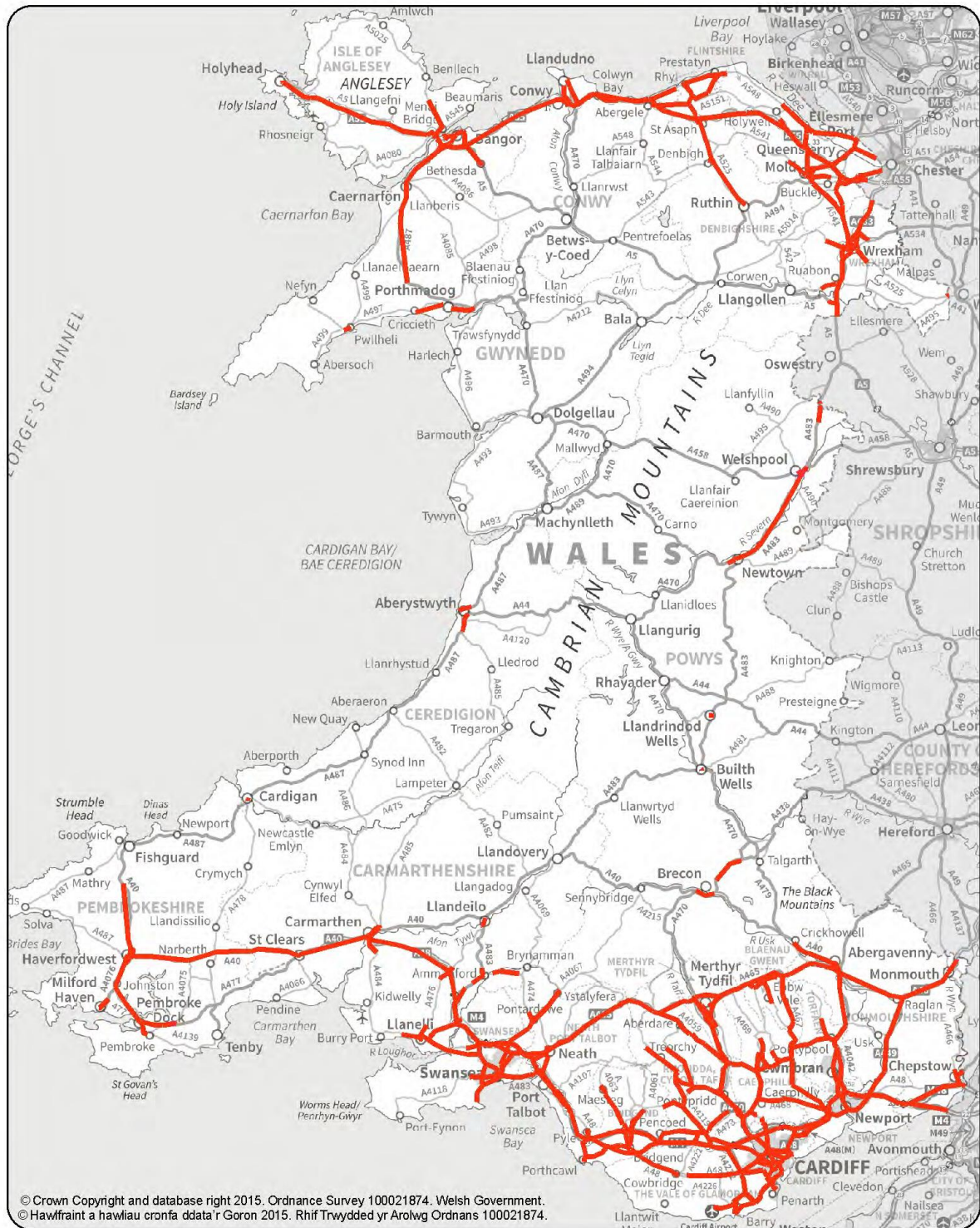
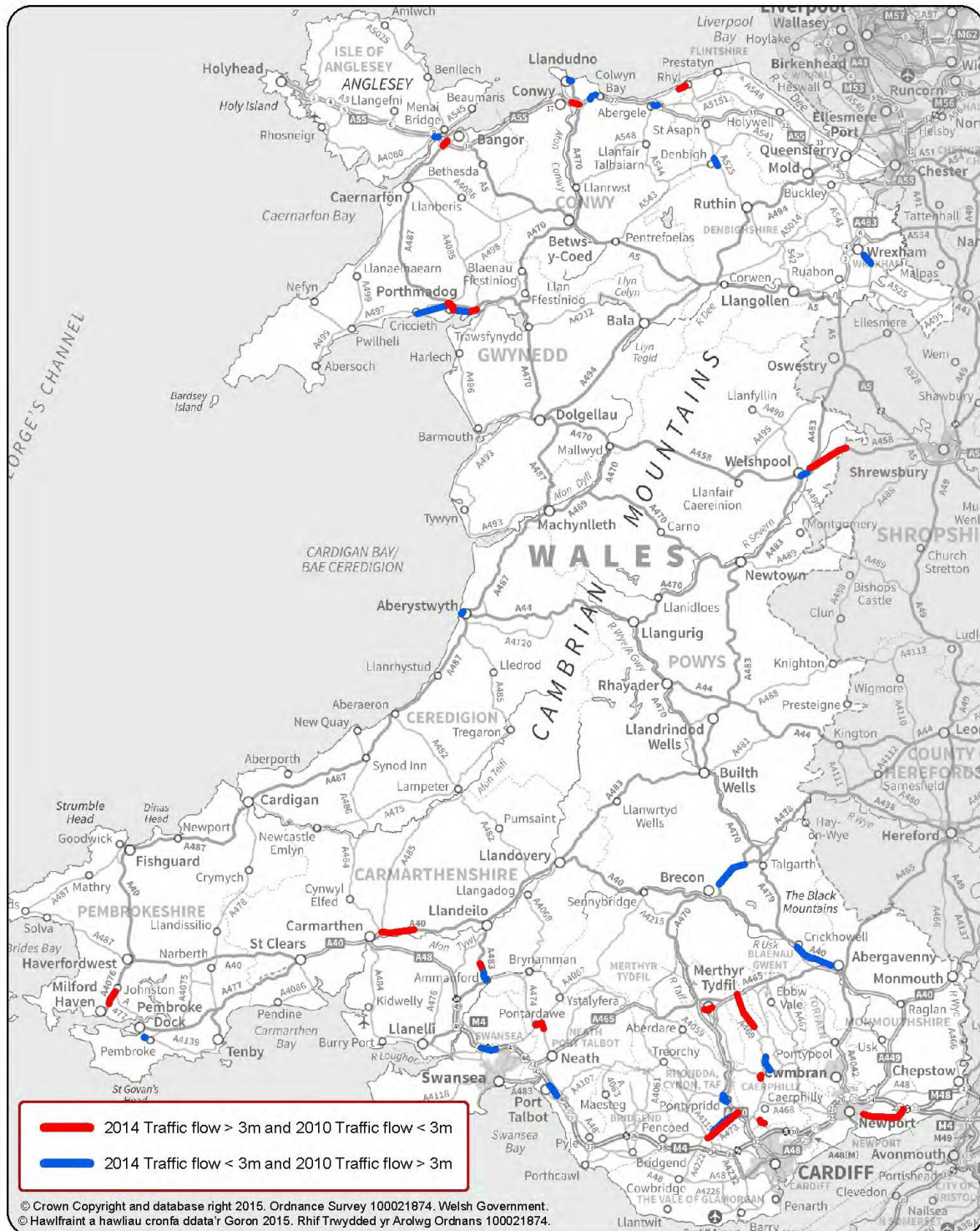


Figure 2 Major roads in Wales potentially to be included in the 2016/17 noise mapping (based on 2014 traffic flow data)



Figure 3 shows which roads newly qualified as major roads in 2014 (around 60 km in total length), and which previously major roads no longer qualified (again around 60 km in total length). Some of these roads might have crossed the threshold through very small changes in traffic flow that are not significant in noise terms, while others may be associated with more significant changes, including new or closed roads.

Figure 3 Changes to which roads meet the major road definition in terms of traffic flow between 2010 and 2014



To illustrate the more significant changes in traffic flows, Figure 4 below shows which major roads were subject to traffic flow increases of 40% or more (around 10 km of road), or decreases of 30% or more (around 20 km of road), between 2010 and 2014. This roughly equates to a change in noise level of 1.5 decibels or more, which may well be noticed by nearby residents.

Figure 4 Major roads whose traffic flow changed significantly⁵ between 2010 and 2014



Figure 5 below gives an indication of the spatial distribution of transport-related noise complaints logged by the Welsh Government under the current noise action plan. All but three of these complaints relate to noise from motorways or trunk roads.

⁵ If traffic mix and speed and road surface remain unaltered, an increase in traffic flow of 40% or a decrease of 30% roughly equates to an increase or decrease in sound emission of 1.5 decibels.

Figure 5 **Spatial distribution of transport-related noise complaints logged by the Welsh Government from April 2013 to September 2015**



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Considering the roads newly qualifying as major roads, those subject to significant changes in traffic flow and those associated with complaints, to which may be added those where engineering measures such as noise barriers have significantly altered noise exposure, the major road noise maps warrant a full update in 2016/17.

4 Railways

The Directive requires noise mapping for major railways (those designated by the member state that have more than 30,000 train passages per year) and railways within agglomerations. Not being the infrastructure owner, the Welsh Government does not itself currently hold the detailed rail traffic data that would be necessary for a full reassessment of noise levels on these lines, but it is not conscious of changes in train numbers between 2011 and 2015 that would be likely to significantly affect the extent of railways meeting the major railway definition⁶. Significant changes to the network, notably the arrival of electric locomotives, are however envisaged for the second half of the decade, ahead of the 2021/22 round of noise mapping.

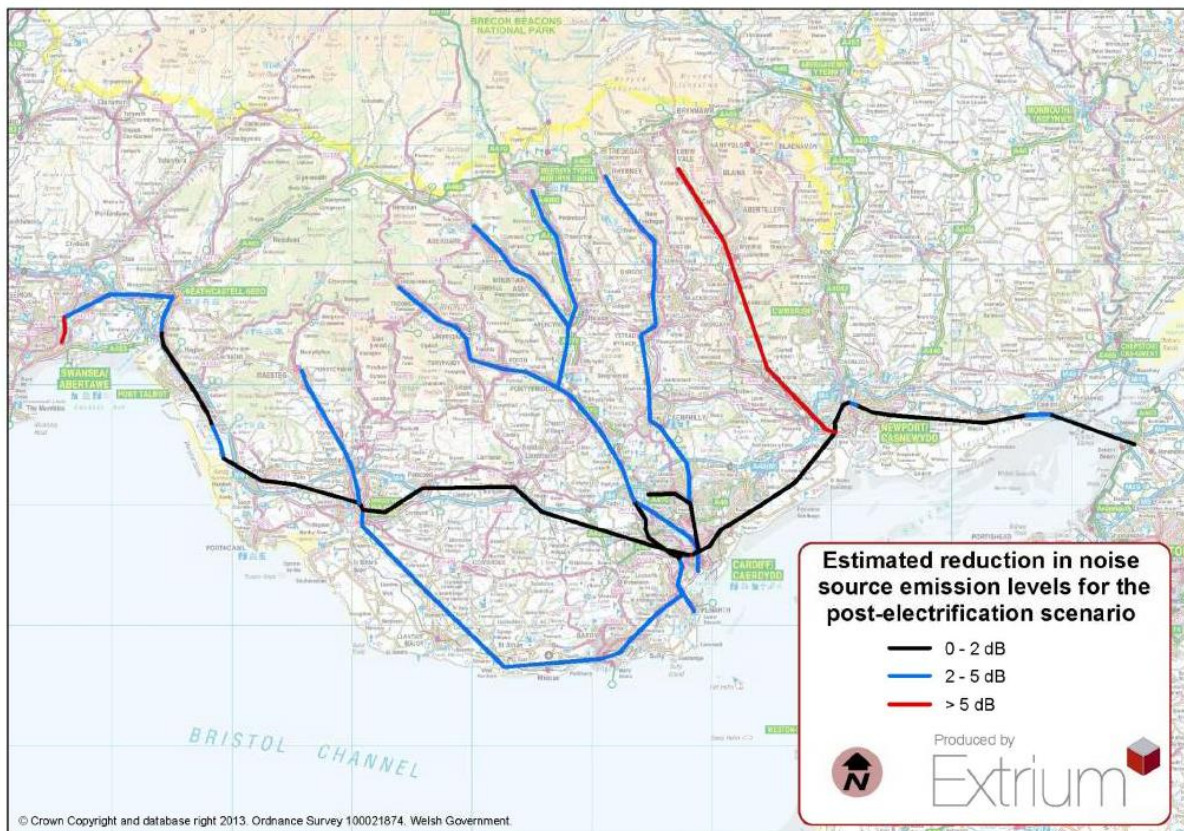
Figure 6 Major railways in Wales



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⁶ Officials' attention was drawn in the summer of 2015 to the doubling of a stretch of track between Wrexham and Chester as having the potential to result in a significant increase in rail traffic. However, an inspection of the current timetable showed that passenger services between those two stations amounted to less than 50% of the 30,000 train passages per year required to qualify as a major railway for noise mapping purposes. It was judged unlikely that additional passenger services plus freight would cause traffic on this line to exceed 30,000 train passages per year by 2016.

Figure 7 Results of an investigation carried out for the Welsh Government by Extrium Limited into the estimated changes in noise levels likely to come with electrification⁷



Electric locomotives are considerably quieter than the equivalent diesel locomotives, and electric freight locomotives would provide a particular benefit at night-time, as this is when freight movements often occur. Based on Network Rail projections at the time of writing, electric trains are expected to begin running from the Severn Tunnel to Cardiff in 2017, and from Cardiff to Swansea by the end of 2018. Most of the “priority areas” identified in the noise action plan for Wales 2013-2018 are along this line. The rest are on the Valley Lines, which are also due to be electrified. The initial assumption is that work to install the new infrastructure on the Valley Lines will be delivered between 2019 and 2024.

Furthermore, on 30 June 2015 the Minister for Economy, Science and Transport revealed that work towards an integrated Metro system, estimated to cost £500-600 million, to serve the growing public transportation needs of the Cardiff Capital City Region, would be an integral part of Welsh Government negotiations for an all-Wales passenger rail franchise. At this stage there are many options for modes of transport, including light rail, heavy rail, bus rapid transit and trams, but delivery work could begin as early as 2017.

⁷ These noise reductions assume a uniform 50% increase in passenger vehicles (through longer trains, more trains or a combination of the two) on all lines to be electrified, and that all passenger vehicles running are of an electrified type. This may well not be the case in the centre of Swansea, so reductions there may not be as high as suggested on this map. Where the increase in passenger services is not as high as 50%, greater noise reductions may be achieved.

Owing to the staged introduction of electric trains from 2017 on all the currently identified major railways in Wales (and some Valley Lines that are not currently designated as major railways but may be identified as such in due course), and work to deliver the Metro expected to begin on a similar timescale, any new noise maps produced in 2017 to show the situation in 2016 would be likely to be out of date almost as soon as they were published. On the other hand, the maps produced in 2011/12 are considered by government to be reasonably representative of the railway noise situation as it will be up until electrification and the coming of the Metro.

Views were sought by e-mail from the Welsh Government's noise contacts in the rail industry, in the summer of 2015, as to whether they considered a revision to the noise maps (to represent the situation in 2016) necessary for the purposes of the Environmental Noise Directive and noise action planning, or whether they considered the 2011/12 noise maps to remain sufficiently representative of the situation to not require updating until after electrification of the lines in question. The single view forthcoming was that there was a good case, as the Welsh Government had outlined, for deferring the production of further noise maps for Wales until the coming into force of the mandatory EU calculation methods.

It is therefore proposed to neither revise the major railway definitions nor recalculate railway noise levels until after the bulk of the planned electrification works have been completed, by which time new noise mapping using harmonised EU calculation methods will be called for. The railway noise maps produced in 2011/12 are considered fit to be retained in 2017 as showing the noise situation in 2016.

5 Industry

Officers in Natural Resources Wales (NRW) familiar with the major industry in and around the three Welsh agglomerations were asked in the summer of 2015 to visually inspect the 2011/12 noise maps and provide the Welsh Government with a view on whether there had been any significant changes to major industrial noise sources since 2011, or if any were currently under construction or expected to close down by 2016, thereby resulting in significant changes to the noise maps.

Out of 53 industrial sites in and around the three agglomerations, NRW identified 12 sites whose status had been or would be subject to significant change, including several sites closing completely and a large new incinerator becoming operational in Cardiff. On this basis, a recalculation of industrial noise levels in 2016/17 appears to be warranted. A comparison of the industrial noise maps generated in 2011/12 and 2016/17 should reflect real changes in industrial noise levels across Wales' largest towns and cities, as differences between the two sets of maps will be determined primarily by real world changes to the spatial distribution of active industrial sites.

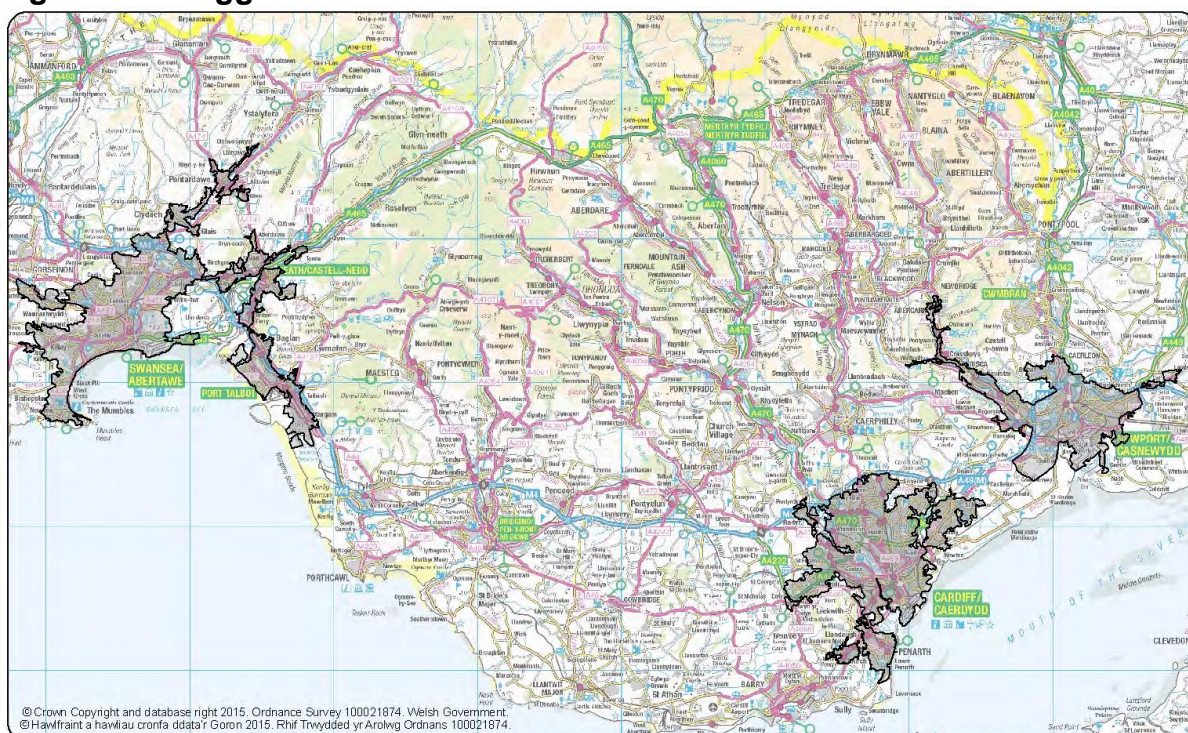
It should be noted, however, that strategic noise maps do not provide much useful information when it comes to assessing the likelihood of significant adverse impacts being felt by people living near to specific industrial sites. This will depend more on the characteristics of the specific sound sources that are audible off-site, the level of background masking sound and the overall context.

6 Agglomerations

We also looked at whether there was a case for revising the agglomeration boundaries used in 2011/12. Within agglomeration boundaries, noise levels from not only major roads and major railways but all roads, railways and major industrial sources are mapped.

The existing agglomeration boundaries were defined using 2001-census “urban settlements” data, with the addition of green spaces on the periphery of the settlements that local authorities indicated they wished to nominate as “quiet areas within agglomerations” under the Environmental Noise Directive.

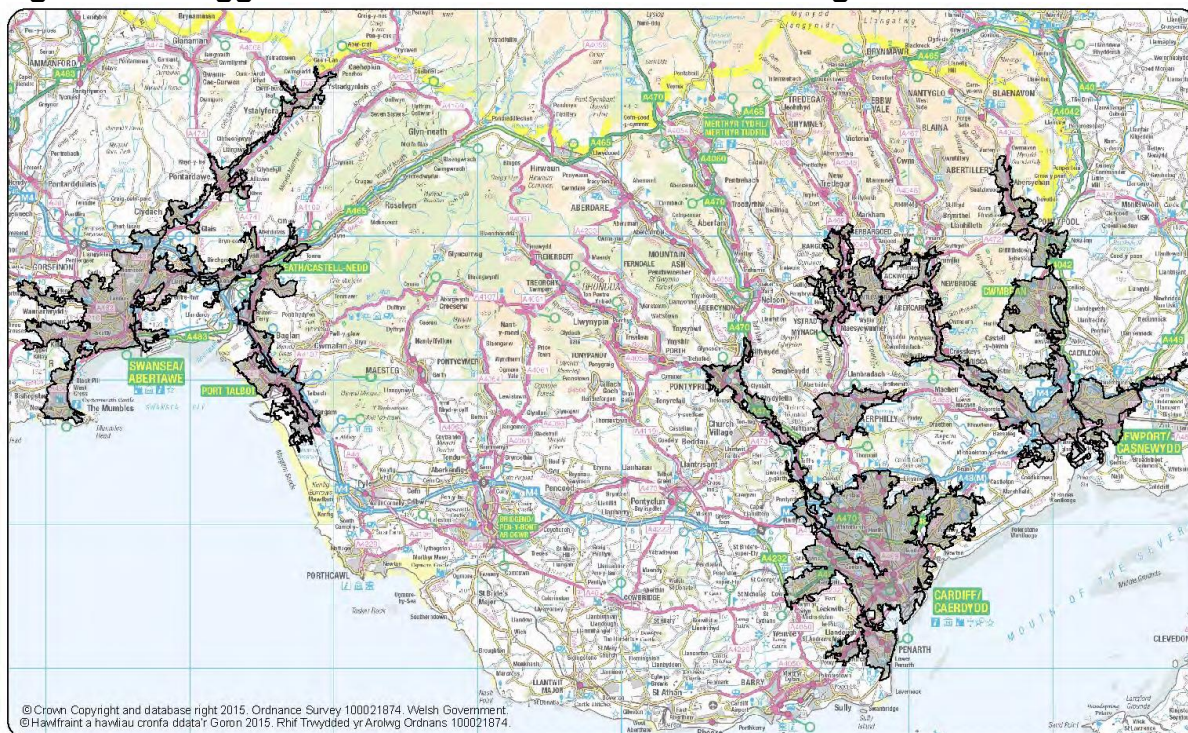
Figure 8 Agglomerations in Wales



We have considered whether urban expansion since 2001 warranted a new set of agglomeration boundaries being introduced for noise mapping purposes in 2015/16. These new boundaries could be defined using 2011-census “built-up area” data released in June 2013. However, it appears that the 2011-census “built-up areas” have been calculated in a different way from the 2001 “urban settlements”, and their adoption would introduce changes to the noise maps that are not solely the result of changes to the noise situation in the real world.

Significantly, either due to the change in definition method or small-scale developments occurring between existing settlements in the intervening years, towns such as Pontypridd, Caerphilly, Ystrad Mynach and Cwmbran would now be included in the agglomerations. These towns existed at the time of previous rounds of noise mapping, but sat outside the agglomerations. Mapping them as part of the agglomerations in 2016/17 would change the noise maps significantly in areas where the noise situation and population had not significantly changed, and so affect the population exposure statistics in a way that could be potentially misleading.

Figure 9 Agglomerations in Wales if redefined using 2011 data



Further points to bear in mind with regard to agglomeration noise mapping and action planning are the expectations that local authority boundaries will go through significant changes during the second half of this decade, and work on the Metro system will begin that will affect both road and rail use in and around the Cardiff and Penarth and Newport agglomerations.

Aiming to ensure that the only changes introduced to the noise maps in 2016/17 should reflect real-world changes to the noise situation since 2011, it is considered unhelpful to amend the agglomeration boundaries for noise mapping purposes at this time. Rather it is recommended that the agglomeration boundaries be revised based on the latest “built-up area” data ahead of the 2021/22 round of noise mapping, when all the noise levels will be recalculated using harmonised EU calculation methods.

Views were sought by e-mail from the Welsh Government’s noise contacts in the six local authorities currently covering the three agglomerations, as to whether they considered it necessary to recalculate the noise levels for their agglomerations in 2016/17, or whether the current noise maps remained sufficiently representative to last until the coming into force of the mandatory EU calculation methods. The only response received favoured retaining the current noise maps until 2021/22.

7 Conclusion

Having reviewed the noise maps, it is considered necessary to produce new maps in 2016/17 for major roads across Wales and industry in agglomerations. The 2011/12 maps for railways and for non-major roads in agglomerations may be retained as representative enough of the situation in 2016, with new maps required in 2021/22.