highways england

Smart Motorways Programme

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M6 J13-15 Smart Motorway: Revised Noise Assessment based on Surfacing Lanes 1 & 4 only

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Working on behalf of highways england

Notice

This document and its contents have been prepared and are intended solely for Highways England's information and use in relation to the Smart Motorways Programme.

Document history

Jacobs Atkins assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

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1. Introduction

1.1.1. In April 2016, Highways England commissioned a Jacobs Atkins Joint Venture (JAJV) to design and assess a proposed Smart Motorway (SM) All Lane Running (ALR) scheme on the M6 between Junction 13 (J13) and Junction 15 (J15). The previously issued report, '*M6 J13 – 15 Smart Motorway: Environmental Study Report*', dated April 2016, includes full details of the environmental study conducted, including a chapter on noise and vibration.

1.1.2. Following on from the 2016 assessment, Highways England have requested a further noise assessment be conducted to assess the change in noise levels based on an alternative re-surfacing scheme involving lanes 1 and 4 only for the opening year of the road, that being 2020.

2. Noise Assessment

2.1. Scope of Assessment

2.1.1. To determine the effect of the revised surfacing scope, the changes in noise between the DM and DS scenarios in the 2016 assessment will be compared with an updated 2019 assessment.

2.2. Road Surfacing Assumptions

2.2.1. The road surface assumptions for the Do-minimum 2020 (DM2020) and Do-something 2020 (DS2020) for both the original 2016, and the revised 2019 assessments are summarised in Table 2-1 below.

Table 2-1 2016 and 2019 DM2020 and DS2020 road surfacing assumptions

Scenario	Assessment Year	
	2016 Assessment	2019 Assessment
DM2020	Road surface based on assumption of all lanes old LNS(1)	Road surface based on 2018 HAPMS(2) and core sample data
DS2020	All lanes new LNS(1)	Lanes 1 and 4 LNS(1), lanes 2 and 3 based on 2018 HAPMS(2) and core sample data.

(1) Low noise surfacing
(2) Highways England Pavement Management System

2.2.2. Since the 2016 assessment was conducted, a new method for calculating the surface correction of a road with more than one lane comprising different surfacing types has been developed through the Peer to Peer network. The do minimum surface corrections used in the 2016 assessment were old LNS based on information available at that time. The do minimum and do something surface corrections used in the 2019 assessment are based on the Smart Motorway Tool and use 2018 data from HAPMS and from surface type data recorded in road surface core samples taken throughout the scheme area.

2.2.3. Appendix A shows the surface correction assumptions for the DM2020 scenario for the 2016 and 2019 assessments. The 2016 assessment had an M6 surface correction of -2.5dB (shown in dark blue), while the 2019 assessment has an M6 surface correction ranging between -2.8dB and +0.7dB. The figures in the appendix also show the texture depth of 1.5mm (in red) for all other roads, which are assumed to have an HRA surface.

2.2.4. Apart from the M6 surfacing changes detailed in Table 2-1, all other aspects of the noise model remain the same as the 2016 assessment, which are detailed in the previously issued report.

2.2.5. No alternative surfacing programme is proposed for the design year (2035), therefore this assessment considers the opening year only (2020).

2.3. Magnitude of impact

2.3.1. In line with DMRB HD 213/11, and the 2016 noise assessment, this assessment evaluates the magnitude of impact by comparing the increase or decrease in noise levels between scenarios. The magnitudes of noise impacts associated with road traffic noise are presented in Table 2-2 for the short term. Changes in noise level can be either an increase (adverse) or a decrease (beneficial).

Table 2-2 Classification of magnitude of noise impacts in the short term

Noise change $L_{A10,18h}$ (dB)	Magnitude of impact
0	No change
0.1 – 0.9	Negligible
1 – 2.9	Minor
3 – 4.9	Moderate
5 +	Major

Source: DMRB HD 213/11 Table 3.1.

2.4. Proposed Scheme noise changes with included mitigation

2.4.1. Detailed predictions have been carried out for a total of 5,851 residential receptors within the study area; together with 45 non-residential noise sensitive receptors, including schools, health, community and leisure facilities.

2.4.2. The calculated noise levels from the 2016 DM opening year assessment at first floor level are presented in Table 2-3 with the proposed new noise barriers at Stafford and J14.

2.4.3. Table 2-3 shows the noise changes for all modelled receptors within the detailed calculation area in the short term for the 2016 assessment categorised into the noise change bands following the DMRB magnitude impact ratings as provided in Table 2-2.

Table 2-3 Short-term traffic noise changes 2016 assessment (DMRB Table A1.1)

Change in noise level		Number of dwellings	Number of other sensitive receptors
Increase in noise level, $L_{A10,18h}$	0.1 - 0.9	18	4
	1 - 2.9	0	0
	3 - 4.9	0	0
	>=5	0	0
No change	= 0	254	2
Decrease in noise level, $L_{A10,18h}$	0.1 - 0.9	2,070	16
	1 - 2.9	3,082	21
	3 - 4.9	283	0
	>=5	144	2

2.4.4. In summary, the 2016 assessment shows in the short-term that there are 18 receptors that are expected to experience a negligible increase in noise level. The majority of receptors are expected to experience a decrease in noise level; 3,532 of these being at least minor decreases. Noise decreases in the opening year are generally due to the inclusion of low noise surfacing with the Proposed Scheme across all lanes together with the concrete central reserve barrier and proposed new noise barriers at Stafford and J14.

2.4.5. The calculated noise levels from the revised 2019 opening year assessment at first floor level are presented in Table 2-4 with the concrete central reserve barrier and proposed new noise barrier at Stafford and J14. Values in brackets indicate the change in property numbers from the 2016 opening year assessment.

Table 2-4 Short-term traffic noise changes 2019 assessment (DMRB Table A1.1)

Change in noise level		Number of dwellings	Number of other sensitive receptors
Increase in noise level, $L_{A10,18h}$	0.1 - 0.9	7 (-11)	5 (+1)
	1 - 2.9	0	0
	3 - 4.9	0	0
	>=5	0	0
No change	= 0	65 (-189)	1 (-1)
Decrease in noise level, $L_{A10,18h}$	0.1 - 0.9	1539 (-531)	11 (-5)
	1 - 2.9	3764 (+683)	26 (+5)
	3 - 4.9	308 (+25)	0
	>=5	168 (+20)	2 (=)

2.4.6. In summary, in the short-term seven receptors are expected to experience a negligible increase in noise level. The majority of receptors are expected to experience a decrease in noise level; 4,268 of these being at least minor decreases. Noise decreases in the opening year in the 2019 assessment are different due to the use of the Smart Motorway Tool which has allowed for a more accurate method of determining surface corrections of multi-surface carriageways.

2.5. Noise Insulation

2.5.1. In the 2016 assessment one property was shown as potentially qualifying for noise insulation. However, in the 2019 assessment the do-minimum noise levels are higher and no properties are now shown to potentially qualify. The 2019 assessment is considered more accurate.

3. Summary

3.1.1. The 2016 noise assessment predicted that in the opening year (2020) 18 receptors were expected to experience a negligible increase in noise level and the majority of receptors are expected to experience a decrease in noise level; 3,532 of these being at least minor decreases. The 2016 assessment assumed the M6 road surface for the baseline scenario to be old LNS, which had a surface correction of -2.5dB, and presented a worst case.

3.1.2. The 2019 noise assessment updated the DM and DS scenarios to reflect the current surfacing and the revised surfacing proposals. The updated assessment predicts that in the opening year (2020) seven receptors are expected to experience a negligible increase in noise level, while the majority of receptors are expected to experience a decrease in noise level; 4,268 of these being at least minor decreases. The 2019 assessment used the Smart Motorway Tool to determine the surface correction of the M6 in the updated assessment. The Smart Motorway Tool method had not been developed at the time of the 2016 assessment, and is considered a more accurate method for determining road surface corrections. The road surface correction for the DM scenario is based on 2018 HAPMS data and core sample data, and has an M6 surface correction ranging between -2.8dB and +0.7dB.

3.1.3. The 2019 assessment predicts a higher number of receptors with perceptible decreases in noise level when compared with the 2016 assessment. In the 2016 assessment one property potentially qualified for noise insulation, however, in the 2019 assessment no properties are shown to qualify.

3.1.4. Updating the noise model shows that the revised surfacing scope does not result in more adverse noise effects than shown in 2016. Therefore, should new surfacing be limited to lanes 1 and 4 no changes would be required to the proposed noise mitigation measures.

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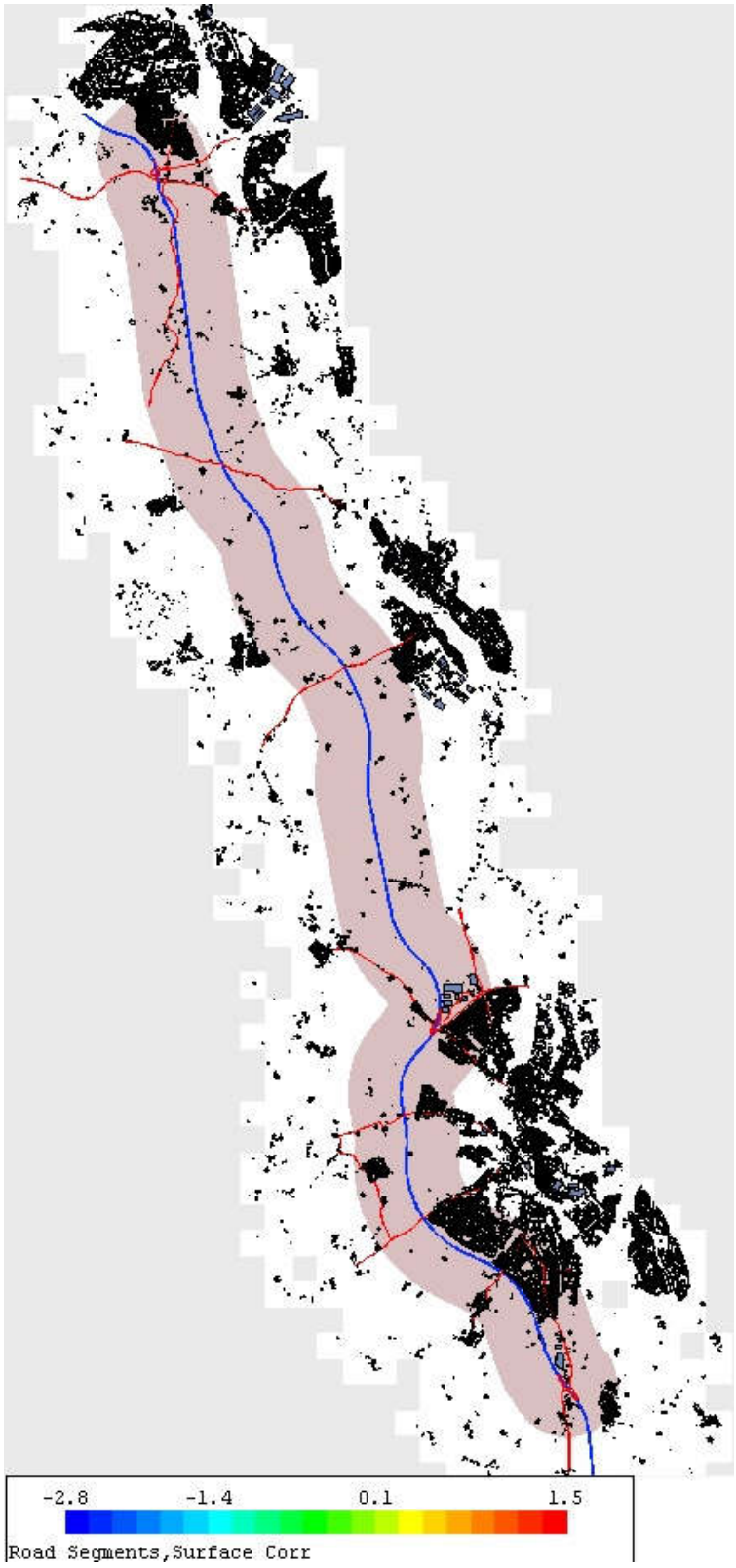
Appendix A. 2016 and 2019 surfacing corrections

A.1. 2016 Assessment



A.2. 2019 Assessment