A38 Derby Junctions

TR010022

8.75 Updated Air Quality Compliance Risk Assessment

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Updated Air Quality Compliance Risk Assessment

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Introduction

In November 2019, Highways England (HE) released revised air quality guidance entitled: LA105 Air quality. The new air quality guidance was discussed at the A38 Derby Junctions (referred to herein as "the Scheme") Issue Specific Hearing on 11th December 2019 [REP3-015, Question 17a] and its implications for the Scheme's air quality assessment considered in response to two written questions [REP 4 – 024, Questions 3.1 and 3.5]. Further questions were raised for the Issue Specific Hearing (ISH4) on 19th February 2020 [EV-014 item 5] as to whether applying the revised guidance would affect the potential for significant air quality effects.

HE responded to the second round of written questions that application of the new guidance was not anticipated to trigger a significant air quality effect or affect reported compliance with the Ambient Air Quality Directive (2008/50/EC) [REP 4 – 024, Questions 3.1 and 3.5].

This note sets out:

- Highways England's approach to the updated compliance risk assessment in line with LA105; and
- Updates the information previously provided to this examination relating to Derby City Council (Appendix B), although this is not a requirement of LA105.

Updated Air Quality Compliance Risk Assessment (LA 105)

The new LA105 guidance requires the assessment to be made at "qualifying features" within 15m of the running lane and the assessment to be based on local modelled results. The Defra/DfT Joint Air Quality Unit (JAQU) requires qualifying features to be next to a Pollution Climate Mapping (PCM) link as defined by JAQU, these include residential properties, schools and footpaths running parallel to a carriageway. Qualifying features do not include pedestrian crossings or areas within 25m of junctions.

Road links in Defra's PCM model within the A38 Derby Junctions air quality study area have been identified for this compliance assessment as these roads are assessed for compliance by Defra. These roads include the A38, A601 Inner Ring Road, A52 Ashbourne Road, A516 Uttoxeter New Road and A6 Duffield Road. These roads are the focus of this LA105 compliance risk assessment.

Scheme Compliance Assessment

The LA105 guidance requires compliance to be assessed at qualifying features which includes footpaths. This was not a requirement of the previous compliance guidance (Interim Advice Note 175/13) and therefore footpaths adjacent to roads were not considered in the original compliance assessment for the A38 Derby Junctions scheme.

There are footpaths located adjacent to the A38 carriageway near Markeaton junction and across the air quality study area.

Qualifying features within 15m of the running lane were identified for 24 PCM links covered by the affected road network for this Scheme. Receptors representing the nearest qualifying feature for all PCM links included in the study have been assessed. The footpaths alongside the A38 have been repositioned for the purposes of the assessment where they would be realigned as part of the Scheme. Annual mean NO_2 concentrations were modelled at the qualifying features for the opening year of the Scheme (2024) presented in Table 1 and for the three construction scenarios (Scenarios 0, 2 and 4) in 2021 alongside the A38 only. A figure illustrating the PCM links considered in this assessment is provided in Appendix A.

Update to Model Verification

As footpaths had not been considered prior to the release of LA105, monitoring data from around the study area has been reviewed to identify whether there was any additional monitoring data for footpaths. Monitoring by DCiC had commenced at a location close to a footpath next to the A38, located approximately 200m south of Markeaton junction in 2016 (Site DT34 as included in Appendix 5.1: Air Quality Monitoring Data, Table 2 [APP-170]) and shown on ES Figure 5.4 [APP-074]).

NO_2 concentrations have been measured above the annual mean EU limit value at this site with measurements of 60 µg/m^3 in 2016 and 2017. Measured concentrations at this site were higher than at other locations near the A38, for example a kerbside site (DJ032) on the western side of the A38 which measured 45 µg/m^3 in 2015. Site DT34 was not included in the study wide model verification.

There are a number of monitoring locations around the A38 and they have been reviewed to see whether a more local verification factor would be more appropriate to describe qualifying features within 15m of the PCM links (e.g. footpaths) in this locality or whether the general verification developed for the modelling to date was still representative. With the exception of DT34, the previous model verification factor provided a reasonable representation of modelled concentrations alongside the A38. However, the model continued to under-predict the annual mean NO_2 concentrations at DT34, representative of the footpath on the eastern side of the A38.

As the long term monitored annual mean NO_2 concentrations are above the EU limit value and the diffusion tube managed by DCiC is located at a site representative of the local footpath to the east of the A38 it has been used to develop a local verification factor for this footpath. A local model verification adjustment factor of 3.83 has been calculated to cover this section of footpath alongside the A38. This was to ensure that the absolute concentrations predicted at a qualifying feature were not under-predicted.

Modelled Results

Table 1: Predicted NO_2 Concentrations in Opening Year 2024 at Qualifying Features

PCM Link ID	2024 Do-Minimum (µg/m³)	2024 Do-Something (µg/m³)	Change (µg/m³)
6167	26.3	26.4	0.1
7702	27.8	28	0.2
7877	33	33.1	0.1
16361 (1)	23.1	32.6	9.5
16361 (2)	31.2	15.8	-15.4
16361 (3)	22.2	20.3	-1.9
16520	29.5	29.8	0.3
28014	26.3	26	-0.3
37288 (1)	25.1	24.5	-0.6
37288 (2)	26.5	25.6	-0.9
37288 (3)	26.5	25.6	-0.9
37405	23.4	22.7	-0.7
37967	32.5	32.1	-0.4
38236 (1)	27.5	27.6	0.1
38236 (2)	30.6	30.3	-0.3
46394	18.8	15.5	-3.3
46556 (1)	27.7	27.6	-0.1
46556 (2)	27.7	27.6	-0.1
47986	35.5	35.2	-0.3
56162	21.5	23	1.5
56563	19.3	21.4	2.1
57767 (1)	28.7	20.7	-8
57767 (2)	32.2	20.4	-11.8
57767 (3)	37.5	22.2	-15.3
57767 (4)	33.9	34.1	0.2
57767 (5)	37.3	31.6	-5.7
57767 (6)	27.1	23.5	-3.6
73359	28.5	28.3	-0.2
74456	22.9	23.9	1
75410	25.5	25.8	0.3
75411	24	23.9	-0.1
81247	31.3	31.2	-0.1
83044	35.1	34.1	-1
89268	27.1	25.5	-1.6

27766 (1)	21.6	21.7	0.1
27766 (2)	19	20.8	1.8
Notes: (1) Individual sections along PCM links with modelled differences in concentrations associated with changes in traffic flows or re-alignment of the A38.			

Discussion

As presented in Table 1 the modelled annual mean NO_2 concentrations at qualifying features for all PCM links with the Do-Minimum and Do-Something scenarios in 2024 were below the annual mean limit value near the A38 and across Derby and are therefore compliant for the requirements of the Air Quality Directive.

Concentrations at fixed locations such as residential buildings are shown in ES Chapter 5: Air Quality [APP-043] and Appendix 5.3 [APP-172] and are below the annual mean NO_2 EU limit value in all instances.

The updated air quality assessment has been considered against the published requirements of the National Policy Statement on National Networks (NPS NN) in particular paragraphs 5.12 and 5.13 advice for Decision Makers. The NPS NN states

'5.12. The Secretary of State must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to a significant air quality impact in relation to EIA and / or where they lead to a deterioration in air quality in a zone / agglomeration.

'5.13 The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the Scheme will:

- *Result in a zone /agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant; or*
- *Affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision.'*

The A38 Scheme is within the East Midlands zone which is currently non-compliant and so the second bullet point of 5.13 is relevant to this Scheme.

Having carried out further work involving detailed modelling for the compliance risk assessment in-line with the LA105 guidance, the conclusion remains the same as given in response to Q5.26 of the first written questions [REP1-005]. The Scheme is not expected to delay the East Midlands zone achieving compliance.

Updated Information for Derby City Council

DCiC has modelled NO_2 concentrations across the city in line with the guidance issued by JAQU to local authorities to support delivery of the Government's National Air Quality Plan. Nitrogen dioxide (NO_2) concentrations were predicted in 2016 and 2020 by DCiC and these have been provided to HE. These concentrations were modelled at 4m from the road. In DCiC's air quality modelling report (AQ3)[1] submitted to JAQU, they acknowledge monitored exceedances alongside the A38. The following is an extract from DCiC's AQ3 report,

"DT34 A38 Kingsway – showing levels between 49 and 51 µg/m³ for all scenarios except the 2025 reference case. Again, this is of little concern with respect to direct health implications as there is no relevant exposure under LAQM standards. This is part of Highways England's strategic road network, rather than Derby City Council's local road network and will be strongly influenced by the proposed A38 improvements with compliance shown in 2025 when this scheme is completed. As such Derby City Council are committed to sharing the outcome of this study and working with Highways England to consider this as appropriate in association with the planned A38 work."

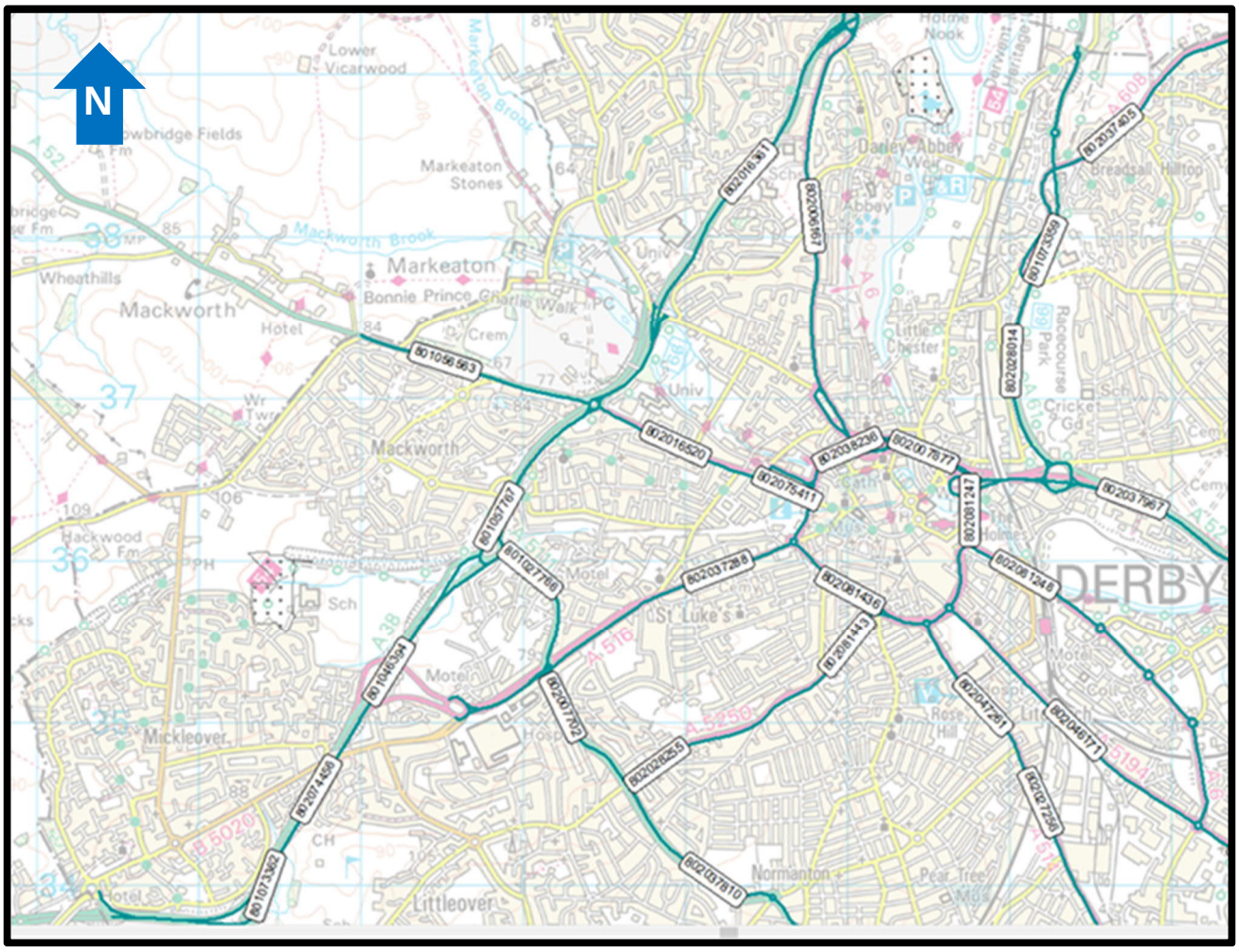
This note considers the likely impacts of assessment of footpaths as qualifying features alongside the A38 and the implications for compliance with the Air Quality Directive in the shortest timescales possible. It is not directly comparable with DCiC's results which were based on modelling at 4m from the road only.

As agreed with DCiC [REP3-019] annual mean NO_2 concentrations in the earliest Scheme construction year (2021) and Scheme opening year (2024) have been modelled, and are provided in Appendix B for information only as they are not a requirement of LA105.

As shown in Appendix B the assessment illustrates that there is a predicted exceedance of the EU Limit Value at DCiC receptor FID1553 in the Do-Something construction scenario SC0. However, as the increase is short term for this construction scenario (which lasts approximately 8 months), the impacts of the construction activities on ambient air quality would not delay compliance as there would be an exceedance on this PCM Link regardless of construction of the scheme. As the construction progresses through the various phases there is subsequently an improvement on PCM links alongside the A38 (PCM Link ID 57767, Appendix A) as the footpaths are realigned as a result of the scheme. This demonstrates that construction will not impact on achievement of compliance in the shortest timescales possible.

1 https://www.derby.gov.uk/media/derbycitycouncil/contentassets/documents/transport/airqualityplan/finalbusinesscase/AQ3%20Derby%20Air%20Quality%20Modelling%20Report%20March%202019.pdf

Appendix A: Map of PCM Links Included in the Compliance Risk Assessment



Appendix B: Compliance at DCiC receptors

Table B1: Predicted NO_2 Concentrations in the Opening Year (2024) at DCiC Compliance Receptors (4m point from the edge of the running lane)

DCiC Receptor	Location	DCiC Model	Scheme Model (µg/m^3)		
		Do-Minimum	Do-Minimum	Do-Something	Change
FID370	A38 in between A516 merges	32.5	22.9	23.9	1.0
FID1051	A38 north of A516 and south of Kingsway junction	25.7	20.8	22.3	1.5
FID1159	A38 north of Kingsway junction and south of Markeaton junction	30.3	24.2	22.6	-1.6
FID1621	A38 north of Markeaton junction and south of Kedleston Rd	28.0	24.4	23.1	-1.3
FID1988	A38 north of Kedleston Rd and south of A6	27.5	22.5	24.5	2.0
FID1416	A601 / King St	32.4	29.3	29.2	-0.1
FID1248	St Alkmunds Way / Eastgate	32.2	29.9	29.9	0.1
FID1072	A601 Traffic St	30.8	32.6	32.4	-0.2
FID1451	A601 St Alkmunds Way / Agard St	32.1	27.8	27.6	-0.3
FID1257	A601 St Alkmund's Way / Alice St	31.1	29.9	30.0	0.1
FID1454	A601 Stafford St	<35.5	35.1	34.1	-1.0
Near Markeaton junction					
FID1553	A38 south east of junction	27.6	32.2	19.8	-12.4
FID1575	A38 south west of junction	24.1	31.9	21.0	-10.9
FID1604	A38 north west of junction	26.3	27.3	17.6	-9.7
FID1623	A38 north east of junction	28.9	28.0	22.0	-6.0

Table B2: Predicted NO_2 Concentrations in 2021 with Construction Scenario 0 at DCiC Compliance Receptors (4m point from the edge of the running lane)

DCiC Receptor	Location	DCiC Model	Scheme Model (µg/m^3)		
		Do-Minimum	Do-Minimum	Do-Something	Change
FID2107	A38 south of A516	35.8	25.7	25.7	0.0
FID370	A38 in between A516 merges	37.8	28.8	28.8	0.0
FID1051	A38 north of A516 and south of Kingsway junction	30.5	25.8	25.7	-0.1
FID1159	A38 north of Kingsway junction and south of Markeaton junction	35.7	30.6	30.6	0.0
FID1621	A38 north of Markeaton junction and south of Kedleston Rd	34.1	31.2	31.4	0.2
FID1988	A38 north of Kedleston Rd and south of A6	33.7	28.4	28.4	0.0
FID1416	A601 / King St	36.4	35.2	35.2	0.0
FID1248	St Alkmunds Way / Eastgate	36.2	36.0	36.0	0.0
FID1072	A601 Traffic St	36.2	38.0	38.0	0.0
FID1451	A601 St Alkmunds Way / Agard St	35.6	32.6	32.6	0.0
FID1257	A601 St Alkmund's Way / Alice St	35.3	36.3	36.3	0.0
FID1454	A601 Stafford St	<35.5	38.6	38.7	0.1
Near Markeaton junction					
FID1553	A38 south east of junction	32.4	**40.2**	**40.5**	0.3
FID1575	A38 south west of junction	28.5	39.4	39.8	0.4
FID1604	A38 north west of junction	31.4	34.4	34.7	0.3
FID1623	A38 north east of junction	34.1	35.1	35.5	0.4

Bold denotes location exceeds the annual mean NO_2 limit value

Table B3: Predicted NO_2 Concentrations in 2021 with Construction Scenario 2 at DCiC Compliance Receptors (4m point from the edge of the running lane)

DCiC Receptor	Location	DCiC Model	Scheme Model (µg/m^3)		
		Do-Minimum	Do-Minimum	Do-Something	Change
FID2107	A38 south of A516	35.8	25.7	25.8	0.1
FID370	A38 inbetween A516 merges	37.8	28.8	29.1	0.3
FID1051	A38 north of A516 and south of Kingsway junction	30.5	25.8	26.0	0.3
FID1159	A38 north of Kingsway junction and south of Markeaton junction	35.7	30.6	32.3	1.7
FID1621	A38 north of Markeaton junction and south of Kedleston Rd	34.1	31.2	27.7	-3.5
FID1988	A38 north of Kedleston Rd and south of A6	33.7	28.4	28.6	0.2
FID1416	A601 / King St	36.4	35.2	35.6	0.4
FID1248	St Alkmunds Way / Eastgate	36.2	36.0	35.9	-0.1
FID1072	A601 Traffic St	36.2	38.0	37.9	-0.1
FID1451	A601 St Alkmunds Way / Agard St	35.6	32.6	32.3	-0.3
FID1257	A601 St Alkmund's Way / Alice St	35.3	36.3	36.4	0.1
FID1454	A601 Stafford St	<35.5	38.6	38.5	-0.1
Near Markeaton junction					
FID1553	A38 south east of junction	32.4	**40.2**	33.0	-7.2
FID1575	A38 south west of junction	28.5	39.4	38.9	-0.5
FID1604	A38 north west of junction	31.4	34.4	30.8	-3.6
FID1623	A38 north east of junction	34.1	35.1	39.6	+4.5

Bold denotes location exceeds the annual mean NO_2 limit value

Table B4: Predicted NO_2 Concentrations in 2021 with Construction Scenario 4 at DCiC Compliance Receptors (4m point from the edge of the running lane)

DCiC Receptor	Location	DCiC Model	Scheme Model (µg/m^3)		
		Do-Minimum	Do-Minimum	Do-Something	Change
FID2107	A38 south of A516	35.8	25.7	25.5	-0.2
FID370	A38 inbetween A516 merges	37.8	28.8	28.4	-0.4
FID1051	A38 north of A516 and south of Kingsway junction	30.5	25.8	25.7	-0.1
FID1159	A38 north of Kingsway junction and south of Markeaton junction	35.7	30.6	28.6	-2.0
FID1621	A38 north of Markeaton junction and south of Kedleston Rd	34.1	31.2	26.7	-4.5
FID1988	A38 north of Kedleston Rd and south of A6	33.7	28.4	27.9	-0.5
FID1416	A601 / King St	36.4	35.2	35.6	0.4
FID1248	St Alkmunds Way / Eastgate	36.2	36.0	36.1	0.1
FID1072	A601 Traffic St	36.2	38.0	38.0	0.1
FID1451	A601 St Alkmunds Way / Agard St	35.6	32.6	32.5	-0.1
FID1257	A601 St Alkmund's Way / Alice St	35.3	36.3	36.4	0.1
FID1454	A601 Stafford St	<35.5	38.6	38.1	-0.5
Near Markeaton junction					
FID1553	A38 south east of junction	32.4	**40.2**	31.1	-9.1
FID1575	A38 south west of junction	28.5	39.4	38.9	-0.5
FID1604	A38 north west of junction	31.4	34.4	30.8	-3.6
FID1623	A38 north east of junction	34.1	35.1	39.6	+4.5

Bold denotes location exceeds the annual mean NO_2 limit value