

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.7 Environmental Statement – Appendix 5.8 Air Quality DMRB Sensitivity Test

Part A

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

June 2020

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms and
Procedure) Regulations 2009**

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Environmental Statement - Appendix

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5 AIR QUALITY DMRB SENSITIVITY TEST

5.1 INTRODUCTION

- 5.1.1. This appendix identifies the key changes in the assessment methodology and presents the assessment of the potential for additional likely significant environmental effects of Part A on air quality, as a result of the updated Design Manual for Roads and Bridges (DMRB) guidance LA 105 Air Quality (**Ref. 5.1**) released November 2019. This was undertaken as part of the DMRB sensitivity test, as detailed in **Chapter 5: Air Quality, Volume 2** of this Environmental Statement (ES) (**Application Document Reference: TR010041/APP/6.2**).
- 5.1.2. A full description of Part A is provided in **Chapter 2: The Scheme, Volume 1** of this ES (**Application Document Reference: TR010041/APP/6.1**).

5.2 ASSESSMENT METHODOLOGY

SCOPE OF ASSESSMENT

- 5.2.1. Both the DMRB HA 207/07 (**Ref. 5.2**) and LA 105 (**Ref. 5.1**) define scoping criteria to determine if air quality impacts are scoped in or out of the assessment. The criteria for changes in total and heavy-duty vehicle annual average daily traffic (AADT) flows and carriageway alignment are unchanged. LA 105 (**Ref. 5.1**) replaces the criteria for changes in average and peak hour speeds with a criterion for change in speed band. When defining the affected road network (ARN) using the DMRB HA 207/07 (**Ref. 5.2**) scoping criteria, changes in speed that met one or more of the criteria also tended to occur where changes in total AADT flow exceeded 1,000. With LA 105 (**Ref. 5.1**), change in speed band is also most likely where there is a change in AADT of 1,000 or more. The change to scoping criteria is unlikely to increase the extent of the ARN for Part A.
- 5.2.2. While both the DMRB HA 207/07 (**Ref. 5.2**) and LA 105 (**Ref. 5.1**) stipulate the assessment of air quality effects on ecological receptors, the term 'designated sites' has been replaced with 'designated habitats', and updated to include Local Nature Reserves (LNRs), Local Wildlife Sites (LWS), Nature Improvement Areas, ancient woodland and veteran trees. At the request of the Inspectorate, LNRs, LWSs and ancient woodlands were included in the original assessment. There are no Nature Improvement Areas within the Study Area.
- 5.2.3. The Woodland Trust classifies trees of special interest as 'ancient', 'veteran' and 'notable' (**Ref. 5.3**). Both ancient and veteran trees are considered of similar and high ecological importance and are irreplaceable (much the same as ancient woodland). As such, both ancient and veteran trees are scoped into the assessment under LA 105 (**Ref. 5.1**).
- 5.2.4. LA 105 (**Ref. 5.1**) provides refined guidance on the level of assessment required (simple or detailed) based on project risk potential and the receiving environment sensitivity. In the case of Part A, the project risk potential is 'high' due to the size of the scheme and receiving environment sensitivity is 'medium' due to receptors close to the ARN. According

to LA 105 (**Ref. 5.1**), the need for a detailed level of assessment, as undertaken for the original assessment and reported in **Chapter 5: Air Quality, Volume 2** of this ES (**Application Document Reference:TR010041/APP/6.2**) is supported.

- 5.2.5. LA 105 (**Ref. 5.1**) also provides refined guidance on assessing compliance with the Air Quality Directive (**Ref 5.5**). The original Part A assessment determined 'low risk' of affecting compliance according to IAN 175/13 (**Ref 5.6**). The PCM model links that coincide with the ARN have annual mean NO₂ concentrations at roadside that are less than 20 µg/m³. The modelled contribution from the Scheme would be less than 2 µg/m³. Therefore, there is no material change to the finding as a result of the updated guidance.

METHODOLOGY - CONSTRUCTION

- 5.2.6. The construction assessment in LA 105 (**Ref. 5.1**) introduces a 'dust risk potential' and 'sensitivity to construction dust' to assess required mitigation measures. This would not affect the findings of the original assessment including mitigation measures that are reported in **Chapter 5: Air Quality, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).
- 5.2.7. For construction traffic LA 105 (**Ref. 5.1**) advises that construction periods over two years duration should be considered for a quantitative assessment. The approach detailed in **Appendix 5.2 - Construction Traffic Assessment, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**) details the simple level assessment of the worse two construction years quantitatively, and therefore the outcomes of the original assessment do not change.

METHODOLOGY - OPERATION

- 5.2.8. In assessing the impacts at designated habitats, unlike DMRB HA 207/07 (**Ref. 5.2**), LA 105 (**Ref. 5.1**) does not require initial consideration of impacts in relation to the critical level for NO_x. Consequently, the impacts on nitrogen deposition at all designated habitats within 200 m of the ARN with nutrient nitrogen sensitive features must be assessed. For Part A all 24 designated habitats identified in **Chapter 5: Air Quality, Volume 2** of this ES (**Application Document Reference:TR010041/APP/6.2**) for Part A were assessed.
- 5.2.9. With LA 105 the calculation of nitrogen deposition, the assumption regarding nitrogen deposition rate has changed. Instead of assuming 1 µg/m³ of nitrogen dioxide (NO₂) equates to a deposition rate of 0.1 kg N/ha/Yr for all habitats, LA 105 applies different rates dependant on whether the habitat has low or tall vegetation. Whilst the assumption for 'grassland and similar habitats' (low vegetation) is a little different (1 µg/m³ of NO₂ = 0.14 kg N/ha/Yr) the assumption for 'forests and similar habitats' (tall vegetation) is almost three times higher (1 µg/m³ of NO₂ = 0.29 kg N/ha/Yr). The consequence of this change is that the calculated nitrogen deposition rates are higher and the impacts more pronounced, particularly in the case of woodland.

- 5.2.10. Apart from the changes identified above, the remainder of the methodology set out in LA 105 (**Ref. 5.1**) is as detailed in **Section 5.4 of Chapter 5: Air Quality of Part A, Volume 2** of this ES (**Application Document Reference:TR010041/APP/6.2**).

Selection of Ecological Receptors

- 5.2.11. In addition to the 24 designated habitats identified, a further 22 ancient and veteran trees were identified using the Woodland Trusts Ancient tree inventory (**Ref. 5.3**) as well as baseline information collected for Part A presented within **Appendix 7.5: Arboricultural Report, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**).

5.3 ASSUMPTIONS AND LIMITATIONS

- 5.3.1. The assumptions and limitations presented in **Section 5.5 of Chapter 5 Air Quality, Volume 2** of this ES (**Application Document Reference:TR010041/APP/6.2**) also apply to this sensitivity test.
- 5.3.2. In addition to the updated guidance the latest set of emission factors from Defra (EFT v9) (**Ref. 5.4**) have been issued. EFT v9.0 does not enable calculations of emission prior to 2017, and therefore it is not possible to update the 2015 baseline scenario for which the air quality model has been verified. The speed banded emissions factors used are considered to provide robust estimates of future emissions and in addition in predicting annual mean NO₂ concentrations a precautionary approach has been used by employing GAP analysed results.

5.4 STUDY AREA

- 5.4.1. The Study Area is defined as 200 m from the ARN as required under LA 105 Air Quality (**Ref. 5.1**) and presented in **Figure 5.1: Air Quality Affected Road Network, Volume 5** of this ES (**Application Document Reference: TR010041/APP/6.5**).

5.5 POTENTIAL IMPACTS

OPERATIONAL ASSESSMENT – DESIGNATED HABITATS

- 5.5.1. Based on LA 105 methodology (**Ref 5.1**) the impacts on nitrogen deposition at each designated habitat are summarised in **Table 5-1**.
- 5.5.2. There are 46 designated habitats with impacts. Of these there are 24 designated habitats, including the River Coquet and Coquet Valley Woodland SSSI, with change in nitrogen deposition greater than 1% of the lower critical load for the most sensitive feature.
- 5.5.3. For the 22 veteran and ancient trees included in the sensitivity test, seven experience an increase of greater than 1% of the lower critical load, and the remaining 15 do not experience a change in nitrogen deposition of greater than 1% of the lower critical load.

Table 5-1 – Summary of Potential Impacts on Nitrogen Deposition at Designated Habitats (LA 105 guidance).

Site ID	Transect	Distance of Habitat from road (m)	Lower Critical Load for Most Sensitive Feature	Nitrogen Deposition (kgN/ha/yr) at Closest Point within Site to Road			
				Do-Minimum (Part A)*	Do-Something (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
Designated Sites (National and International)							
River Coquet and Coquet Valley Woodland SSSI (west of A1)	Eco1W	DM - 0 DS - 10	15	27.9 at 0 m 25.5 at 10 m	25.5 at 10 m	0.07 at 10 m	70***
River Coquet and Coquet Valley Woodland SSSI (east of A1)	Eco1E	DM - 0 DS - 25	15	26.1 at 0 m 24.7 at 25 m	25.8 at 25 m	1.1 at 25 m	200
River Coquet and Coquet Valley Woodland SSSI (west of A697)	Eco9W	0	15	25.6	24.8	-0.8	0
River Coquet and Coquet Valley Woodland SSSI (east of A697)	Eco9E	0	15	27.1	25.9	-1.2	0
River Coquet and Coquet Valley Woodland SSSI (west of A1 Felton)	Eco12W	0	15	18.5	17.6	-0.9	0
River Coquet and Coquet Valley Woodland SSSI (east of A1 Felton)	Eco12E	0	15	19.9	18.8	-1.1	0
Longhorsley Moor SSSI	Eco2	0	10	16.5	16.1	-0.4	0
Ancient Woodland							
Dukes Bank Wood (west of road)	Eco1W	DM - 0 DS - 10	15	27.9 at 0 m 25.5 at 10 m	25.5 at 10 m	0.07 at 10 m	70***
Dukes Bank Wood (east of road)	Eco1E	DM - 0 DS - 25	15	26.1 at 0 m 24.7 at 25 m	25.8 at 25 m	1.1 at 25 m	200
Park Wood/Bothal Bank	Eco3	45	10	17.3	17.4	0.1	<45
Cotting Wood	Eco4	125	15	17.4	17.5	0.1	0
Davies Wood	Eco5	10	10	17.7	17.9	0.2	5
Scotch Gill Wood	Eco6	170	10	17.7	17.7	0.0	<170
Borough Wood (west of road)	Eco7W	0	10	23.2	23.8	0.6	50
Borough Wood (east of road)	Eco7E	0	10	26.3	27.1	0.8	110
Well Wood	Eco8	0	10	27.2	27.6	0.4	60
Weldon Wood	Eco11	25	10	16.4	16.2	-0.2	<25
Stobswood	Eco13	150	10	15.6	15.6	0.0	<150
Dukes Bank Wood	Eco16	25	15	16.2	16.1	-0.1	<25
Burnie House Dean Wood	Eco14	195	10	15.7	15.7	0.0	<195
Local Nature Reserve							
Carlisle Park	Eco15	135	10	17.7	17.7	0.0	<135
Ulgham Meadow	Eco10	0	10	19.4	18.1	-1.3	0
Borough Wood (east of road)	Eco7E	0	10	26.3	27.1	0.8	110

Site ID	Transect	Distance of Habitat from road (m)	Lower Critical Load for Most Sensitive Feature	Nitrogen Deposition (kgN/ha/yr) at Closest Point within Site to Road			
				Do-Minimum (Part A)*	Do-Something (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
Local Wildlife Sites							
Bothal Burn and River Wansbeck	Eco3	45	10	17.3	17.4	0.1	<45
Wansbeck & Hartburn Woods (west of road)	Eco7W	0	10	23.2	23.8	0.6	50
Wansbeck & Hartburn Woods (east of road)	Eco7E	0	10	26.3	27.1	0.8	110
Coquet River Felton Park (west of road)	Eco1W	DM - 0 DS - 10	15	27.9 at 0 m 25.5 at 10 m	25.5 at 10 m	0.0 at 10 m	70***
Coquet River Felton Park (east of road)	Eco1E	DM - 0 DS - 15	15	26.1 at 0 m 25.1 at 15 m	26.7 at 15 m	1.6 at 15 m	200
Cocklaw Dene (west of road)	Eco17W	0	10	18.6	18.8	0.2	10
Cawledge Burn (west of road)	Eco18W	0	10	23.3	24.0	0.7	60
Cawledge Burn (east of road)	Eco18E	0	10	23.7	24.4	0.7	75
Coney Garth Pond	Eco19	0	5	19.5	19.8	0.3	40
Longhorsley Moor	Eco2	0	10	16.5	16.1	-0.4	0
Cotting Wood	Eco4	125	15	17.4	17.5	0.1	0
Ancient and Veteran Trees							
Eco_VT3	-	11	10	23.5	23.4	-0.1	-
Eco_VT4	-	136	10	21.1	21.0	-0.1	-
Eco_VT5	-	195	10	23.2	23.3	0.1	-
Eco_VT6	-	191	10	22.4	22.5	0.1	-
Eco_VT7	-	58	10	21.0	21.0	0.0	-
Eco_VT8	-	142	10	24.3	24.3	0.0	-
Eco_VT9	-	5	10	23.8	23.6	-0.2	-
Eco_VT10	-	126	10	21.0	21.1	0.1	-
Eco_VT11	-	91	10	23.3	23.2	-0.1	-
Eco_VT12	-	72	10	21.0	21.0	0.0	-
Eco_VT13	-	50	10	21.0	21.1	0.1	-
Eco_VT14	-	31	10	23.3	23.3	0.0	-
Eco_VT15	-	124	10	22.1	22.0	-0.1	-
Eco_VT16	-	68	10	24.1	24.6	0.5	68**
Eco_VT17	-	66	10	21.0	21.0	0.0	-

Site ID	Transect	Distance of Habitat from road (m)	Lower Critical Load for Most Sensitive Feature	Nitrogen Deposition (kgN/ha/yr) at Closest Point within Site to Road			
				Do-Minimum (Part A)*	Do-Something (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
Eco_VT18	-	97	10	23.8	24.2	0.4	97**
Eco_VT19	-	10	10	26.2	26.2	0.0	-
Eco_VT20	-	101	10	24.7	24.9	0.2	101**
Eco_VT23	-	196	10	22.7	23.0	0.3	196**
Eco_VT24	-	99	10	23.0	23.4	0.4	99**
Eco_VT25	-	169	10	22.7	23.0	0.3	169**
Eco_VT27	-	52	10	23.7	24.2	0.5	52*

Notes:

* Due to vegetation clearance as a result of construction, the closest point on the transect differs between the Do-minimum and Do-Something scenario. Nitrogen deposition rates are shown at the first point within the habitat for the relevant scenario.

** value if impact at this single point is greater than 1% of the critical load.

*** From the roadside to 10 m predicted deposition rates are lower with the Scheme. This is because of the movement of southbound traffic to the new southbound carriageway further to the east. Beyond 10m deposition rates are higher with the Scheme. This is because the overall increase in traffic on both north and southbound carriageways overrides the effect of the shifting of the southbound carriageway to the east

5.6 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

CONSTRUCTION

- 5.6.1. The changes in LA 105 (**Ref. 5.1**) would not affect the findings of the original assessment including mitigation measures that are reported in **Chapter 5: Air Quality, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**).

OPERATION

- 5.6.2. There are 46 designated habitats that will experience impacts. Of these there are 25 designated habitats, including the River Coquet and Coquet Valley Woodland SSSI, with change in nitrogen deposition greater than 1% of the lower critical load for the most sensitive feature.
- 5.6.3. With reference to **Appendix 9.27: Biodiversity DMRB Sensitivity Test, Volume 7** of this ES (**Application Document Reference: TR010041/APP/6.7**), the impacts on nitrogen deposition would result in no significant effect at any of the designated habitats.

SUMMARY

- 5.6.4. Overall, following the guidance on the evaluation of significant effects in LA 105 (**Ref. 5.1**), the effects of Part A are **not significant** and therefore the conclusions of the original assessment remain unchanged.

REFERENCES

- Ref 5.1** - Highways Agency, Air Quality, Design Manual for Roads and Bridges LA 105 Air Quality, Revision 0, Sustainability & Environment Appraisal. Available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section3/LA%20105%20Air%20quality-web.pdf>
- Ref 5.2** - Highways Agency, Air Quality, Design Manual for Roads and Bridges HA 207/07, Volume 11, Section 3, Part 1 (May 2007).
- Ref 5.3** - Woodland Trust. Ancient Tree Inventory. <https://ati.woodlandtrust.org.uk/tree-search/> [Accessed March 2020].
- Ref 5.4** - Department for Environment Food and Rural Affairs, Emission Factor Toolkit (v9) Available at: <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html> [Accessed May 2020]
- Ref 5.5** - European Union (2008) Ambient Air Quality Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe. [online]. Available at: <https://eur-lex.europa.eu/eli/dir/2008/50/oj> [Accessed October 2019].
- Ref 5.6** - Highways England (2013) Interim Advice Note 175/13. Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality'. [online]. Available at: <http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian175.pdf> [Accessed October 2019].

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