

# A1 in Northumberland: Morpeth to Ellingham

**Scheme Number: TR010059**

## **Air Quality Updated Assessment (Scheme Opening Year 2024)**

Rule 8(1)(c)

Planning Act 2008

Infrastructure Planning (Examination Procedure) Rules 2010

Planning Act 2008

**The Infrastructure Planning  
(Examination Procedure) Rules  
2010**

**The A1 in Northumberland: Morpeth to  
Ellingham**

Development Consent Order 20[xx]

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**Air Quality Updated Assessment (Scheme Opening Year 2024)**

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APPENDIX A

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# 1 AIR QUALITY

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## 1.1 INTRODUCTION

- 1.1.1. The likely significant effects of the A1 in Northumberland: Morpeth to Ellingham (the Scheme) on air quality were assessed in:
- 1.1.2. The Environmental Statement (ES) for human and ecological receptors:
  - a. Appendix 16.4: Air Quality Likely Significant Effects of the Scheme [APP-330]
- 1.1.3. The DMRB sensitivity testing for the LA105 approach to impacts on ecology:
  - a. Appendix F of Appendix 16.4: Air Quality Likely Significant Effects of the Scheme [APP-330] (DMRB Sensitivity Test).
- 1.1.4. The conclusion of both of the assessments mentioned above (hereafter collectively referred to as the Original Assessment) was that no significant air quality effects were likely as a result of the Scheme or its constituent parts (Part A: Morpeth to Felton (Part A) and Part B: Alnwick to Ellingham (Part B)).
- 1.1.5. This appendix (hereafter referred to as the Updated Assessment) presents the analysis of the sensitivity of the impacts and conclusions of the Original Assessment to:
  - a. A change in the Scheme opening year from 2023 to 2024; and
  - b. The release of updated air quality datasets.
- 1.1.6. **Section 1.2** sets out the changes in the assessment specification between the Updated Assessment and the Original Assessment.
- 1.1.7. **Sections 1.3** and **1.4** set out the changes in impacts to human and ecological receptors respectively, whilst **Section 1.5** presents the conclusions of the Updated Assessment in relation to likely significant effects.

## 1.2 UPDATED ASSESSMENT SPECIFICATION

- 1.2.1. **Table 1-1** sets out the key changes between this Updated Assessment and the Original Assessment. Further information is set out below.

**Table 1-1 - Key assessment specification updates**

<b>Parameter</b>	<b>Environmental Statement</b>	<b>DMRB Sensitivity Test</b>	<b>Updated Assessment</b>
Overarching Methodology	HA207/07	LA105	LA105
Traffic Data			
Scheme Opening Year	2023		2024
Air Quality Datasets			
Speed banded emissions	Based on Defra's EFT v8		Based on Defra's EFT v10
NO <sub>x</sub> to NO <sub>2</sub> calculator	v 6.1		V 8.1
Background concentrations	Defra mapping with 2015 Reference Year		Defra mapping with 2018 Reference Year

## OVERARCHING METHODOLOGY

- 1.2.2. This Updated Assessment follows DMRB guidance document LA105 (**Ref 5.1**). The key differences between the approach set out in LA105 and that set out in HA207/07 (**Ref 5.2**) were addressed in the DMRB Sensitivity Test. This considered impacts on ecological receptors only as the change in approach between HA207/07 and LA105 has only minimal implications for the detailed modelling of impacts on human receptors. For this Updated Assessment, therefore, modelled impacts for ecological receptors are compared to those presented in the DMRB Sensitivity Test, and modelled impacts for human receptors are compared to the impacts presented in the ES.

## SCHEME OPENING YEAR

- 1.2.3. Due to the postponement of the Scheme opening, the opening year for assessment purposes has also been put back from 2023 to 2024. This Updated Assessment has primarily been produced to validate the operational stage air quality assessment of the Scheme presented within **Chapter 16: Assessment of Cumulative Effects [APP-062]** for the revised opening year of the Scheme (2024).
- 1.2.4. A reassessment has been undertaken for operational air quality based on traffic data provided for an opening year of 2024.
- 1.2.5. The study area comprises a 200m boundary surrounding the affected road network (ARN), as set out in DMRB guidance document LA105 (**Ref 5.1**). The ARN is determined by the change in traffic data between Do Minimum and Do Something scenarios. The primary

change in the ARN as a result of the use of 2024 rather than 2023 as an opening year is an extension northwards of the ARN along the A1 by approximately 12.5km, from Buckton in the south (where the ES ARN ended) to Scremerston in the north. **Figure 1: 2024 Affected Road Network**, shows the updated ARN and details of the extension from the ES ARN.

- 1.2.6. While the extension to the ARN results in an extension to the study area used for the Original Assessment, this extension does not, however, necessitate the assessment of any additional receptors. There are no sensitive ecological receptors within 200m of the ARN extension and relatively few residential properties or other sensitive human receptors. Those human receptors that are present are all set further back from the roadside than existing selected receptors and, in the absence of significant sources of pollution other than the A1 itself, the previously selected receptors remain representative of worst case exposure for human receptors along the ARN.

### AIR QUALITY DATASETS

- 1.2.7. The updated air quality datasets comprise:
- a. Speed-banded vehicle emission rates, issued by Highways England on the basis of version 10 of Defra's EFT (**Ref 5.3**);
  - b. Mapped background concentrations, issued by Defra based on a 2018 reference year (**Ref 5.4**); and
  - c. NO<sub>x</sub>-to-NO<sub>2</sub> calculator - version 8.1 (**Ref 5.5**) issued by Defra and compatible with version 10 of the EFT and the latest background mapping.
- 1.2.8. These updates reflect the latest data released since the completion of the modelling undertaken for the ES.
- 1.2.9. The implications of updating these datasets are inherently interlinked in that, jointly with the change of opening year, they affect:
- a. Air quality dispersion model verification for 2015, the Modelled Baseline;
  - b. Modelled Baseline (2015) and Projected Baseline (2024 for this appendix) concentrations; and
  - c. Modelled Do Minimum and Do Something concentrations in the Opening Year (2024).

### Model Verification

- 1.2.10. The air quality model verification process for the ES was set out in **Appendix 5.3: Methodology and Verification Part A** of the ES [APP-200].
- 1.2.11. The same methodology and rationale have been adopted for this Updated Assessment, with three verification factors derived to account for local variations. **Table 1-2** sets out the change in verification factors resulting from the use of updated air quality datasets.

**Table 1-2 - Verification factor updates**

<b>Verification Group</b>	<b>Environmental Statement</b>	<b>DMRB Sensitivity Test</b>	<b>Updated Assessment</b>
Morpeth Town (Group 1)		3.0192	3.1206
Earsdon Moor (Group 2)		4.9493	5.0909
Other locations (Group 3)		1.3347	1.3580

1.2.12. The increase in all verification factors is a direct result of a decrease in emissions per vehicle between the speed-banded emissions datasets used for the ES and this Updated Assessment.

1.2.13. However, since there is no change to the monitoring data underpinning the verification process, the verified modelled Baseline 2015 concentrations are effectively unchanged (**Appendix A: Updated Assessment Appendices**), with no perceptible changes to verified concentrations/all changes in concentration less than  $0.4\mu\text{g}/\text{m}^3$ .

### **ASSUMPTIONS AND LIMITATIONS**

1.2.14. The overall assumptions and limitations presented in the ES also apply to this assessment.

1.2.15. Specific to this Updated Assessment, assumptions have been made in relation to the application of the latest emissions datasets to the traffic model baseline year of 2015 for the purposes of model verification. This is necessary because 2015 is the year for which validated traffic model outputs are available for the Scheme.

1.2.16. Defra's EFT v10 and associated NO<sub>x</sub> to NO<sub>2</sub> calculator v8.1 do not provide direct outputs or processing facilities for assessment years prior to 2018. This Updated Assessment has, therefore, used the following assumptions for the baseline (2015) year:

- a. Speed banded emissions for 2015 based on EFT v10, generated by Highways England, by merging the fleet technology mix for 2015 with the technology specific emissions from EFT v10; and
- b. NO<sub>x</sub> to NO<sub>2</sub> calculator v8.1 for 2018, with the proportion of primary nitrogen dioxide set to the values for 2015 in the latest version of the calculator that includes data for 2015 (v6.1).

1.2.17. Furthermore, Defra's background mapping with a reference year of 2018 does not provide data for years prior to 2018. For this Updated Assessment, data from Defra's mapping with a 2015 reference year were used for the baseline modelling. As set out below, these data are robust and compatible with the latest air quality datasets.

1.2.18. Defra's 2018 reference year mapping were back projected to 2015 using an equivalent methodology to that proposed by Defra for the annualisation of monitoring data in LAQM.TG (16) guidance (**Ref 5.6**) i.e. the mapped data is assumed to follow the trends seen in

monitoring data at the nearest background sites within the national monitoring network. The back projection of the 2018 reference year data was undertaken using monitoring sites at High Muffles, Eskdalemuir and Bush Estate. These sites recorded annual mean concentrations in 2015 that were just 2.3% higher than in 2018. The comparison of the back projected data for 2015 based on the 2018 reference year data with the equivalent data in Defra's mapping with a 2015 reference year (as used for the Environmental Statement) showed high correlation (correlation coefficient of 0.9294). As such, for the baseline year modelling including verification, the use of 2015 reference year background concentrations is robust and does not place a constraint on the assessment. For the opening year, the assessment uses the 2018 reference year background concentrations.

- 1.2.19. It should be noted that when used for the purpose of processing air quality model results, the contribution from nearby roads is removed from the mapped data in a process known as 'sector removal'. This avoids double counting of impacts that are directly modelled at the local level. Therefore, the above analysis relates to sector removed data.

### 1.3 POTENTIAL IMPACTS – HUMAN RECEPTORS

- 1.3.1. Results for annual mean NO<sub>2</sub> at human receptors for the ES and this Updated Assessment (with opening years 2023 and 2024 respectively) alongside a comment on the reason for the change in concentrations seen between the two assessments are presented in **Table 1-3**, below. Results for human receptors were not updated for the DMRB Sensitivity Testing, which considered ecological receptors only.
- 1.3.2. Overall, the changes in concentrations between the two datasets (2023 and 2024 opening years) are marginal for both the Do Minimum and Do Something scenarios.
- 1.3.3. At receptors alongside roads other than the A1, the updated opening year concentrations for 2024 are slightly lower than the previously modelled opening year concentrations for 2023 (comparing Do Minimum or Do Something scenarios in the two years). At these locations, the general increase in traffic flows between 2023 and 2024 only partially offsets the effects of decreasing emissions per vehicle over time.
- 1.3.4. However, at receptors within 200m of the A1, the air quality impact as a result of the growth in traffic between 2023 and 2024 scenarios is proportionately greater, including for Heavy Duty Vehicles (HDVs). At some receptors, e.g. R006, R007, and R009, this growth more than offsets the effects of improvements in vehicle emissions and impacts increase slightly in the 2024 opening year scenarios.
- 1.3.5. The net effect of these concentration changes is that the modelled impact of the Scheme (i.e. the difference between Do Something and Do Minimum scenarios in a given year) is insensitive to a change in the opening year from 2023 to 2024.
- 1.3.6. The only receptor at which the change in the impact of the Scheme is greater than 1% of the air quality objective is R022, to the east of both the present and proposed alignments of the A1 near Earsden Moor. At this location, there is a change in speed band from Free Flow to High Speed between Do Minimum and Do Something in the AM, Inter-Peak and PM



periods in 2024, whereas in 2023 both Do Minimum and Do Something scenarios fall into the High Speed band. As such, the Scheme NO<sub>2</sub> impact changes from a reduction of 12.7µg/m<sup>3</sup> in 2023 to 11.7µg/m<sup>3</sup> in 2024. However, total concentrations in all scenarios remain well below the air quality objective and no significant effects are likely.

**Table 1-3 - Predicted Annual Mean NO<sub>2</sub> Concentrations (µg/m<sup>3</sup>) for the ES and the Updated Assessment**

Receptor	ES NO <sub>2</sub> 2023 Concentrations			Updated Assessment NO <sub>2</sub> 2024 Concentrations			Comment
	DM	DS	Scheme impact 2023	DM	DS	Scheme Impact 2024	
R001	5.7	6.2	0.5	5.6	5.8	0.2	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R002	8.2	8.7	0.5	7.9	8.2	0.3	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R003	14.3	15.7	1.4	14.3	15.6	1.3	DS concentrations and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Change to Scheme impact partially offset by additional flow with the Scheme along the A1 in 2024 of 3,371 AADT (2,210 AADT in 2023).
R004	13	14.2	1.2	12.9	14.0	1.2	DM and DS concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Reduction in Scheme impact from emissions per vehicle improvements is offset by additional flow with the Scheme along the A1 in 2024 of 3,371 AADT (2,210 AADT in 2023).
R005	6	6.3	0.3	5.8	6.1	0.3	Both DM and DS concentrations lower in 2024. Reduction in Scheme impact from emissions per vehicle improvements is offset by additional flow with the Scheme along the A1 in 2024 of 6,285 AADT (5,004 AADT in 2023).
R006	9.1	10.2	1.1	8.9	10.2	1.3	DM concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Impact of Scheme increases due to additional flow along the A1 in 2024 of 9,061 AADT (7,456 AADT in 2023).
R007	5.4	5.8	0.4	5.1	5.6	0.5	DM and DS concentrations are lower due to reduction in vehicle emission rate from 2023 to 2024. Impact of Scheme increases due to additional flow along the A1 in 2024 of 9,010 AADT (7,248 AADT in 2023).
R008	10.9	10.6	-0.3	10.7	10.5	-0.2	DM and DS concentrations, and Scheme impact smaller in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R009	19.0	22.4	3.4	19.0	22.5	3.5	No change to DM concentrations in 2024. DS concentrations and Impact of Scheme increases due to additional flow along the A1 in 2024 of 8,590 AADT (7,083 AADT in 2023).
R010	8.4	8.6	0.2	7.9	8.1	0.1	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R011	6.4	6.5	0.1	6.2	6.3	0.1	DM and DS concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R012	11.8	12.7	0.9	11.4	12.3	0.9	DM and DS concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.

Receptor	ES NO <sub>2</sub> 2023 Concentrations			Updated Assessment NO <sub>2</sub> 2024 Concentrations			Comment
	DM	DS	Scheme impact 2023	DM	DS	Scheme Impact 2024	
R013	11.6	6.4	-5.2	11.4	6.6	-4.8	Vehicle emission rate reduction offset by additional flow along the A1 in 2024 of 6,227 AADT (4,945 AADT in 2023). DM lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Impact of Scheme offset in 2024 by a change in speed band from Free Flow to High Speed in AM and PM periods.
R014	9.7	10	0.3	9.4	9.7	0.2	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R015	6.7	7.1	0.4	6.6	6.9	0.2	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R016	5.6	6.5	0.9	5.5	6.3	0.8	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R017	9.8	8.5	-1.3	9.6	8.1	-1.4	DM and DS concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Increase in the Scheme impact in 2024 caused by additional rerouting of flow towards the A1, resulting in a greater reduction in flow on the A697 of -2,260 AADT in 2024 (-2,006 AADT in 2013).
R018	6.7	6.4	-0.3	6.5	6.1	-0.4	DM and DS concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Increase in the Scheme impact in 2024 caused by additional rerouting of flow towards the A1, resulting in a greater reduction in flow on Main Street, Felton of -1,927 AADT in 2024 (-1,742 AADT in 2013).
R019	15.2	8.3	-6.9	15.1	8.3	-6.8	DS concentrations are lower and Scheme impact smaller in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R020	4.5	5.3	0.8	4.4	5.0	0.7	DM and DS concentrations, and Scheme impact lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R021	4.7	5	0.3	4.5	4.8	0.3	DM and DS concentrations, and Scheme impact lower in 2024 (albeit the same at one decimal place) due to reduction in vehicle emission rate from 2023 to 2024.
R022	21.5	8.7	-12.7	20.7	9.0	-11.7	DM concentrations lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Impact of Scheme offset in 2024 by a change in speed band from Free Flow to High Speed in AM, Inter-Peak, and PM periods.
R023	10	8.2	-1.8	9.8	8.0	-1.8	DM and DS concentrations, and Scheme impact lower (albeit the same at one decimal place) in 2024 due to reduction in vehicle emission rate from 2023 to 2024.

Receptor	ES NO <sub>2</sub> 2023 Concentrations			Updated Assessment NO <sub>2</sub> 2024 Concentrations			Comment
	DM	DS	Scheme impact 2023	DM	DS	Scheme Impact 2024	
R024	6.1	5.4	-0.7	5.9	5.3	-0.7	DM and DS concentrations, and Scheme impact lower (albeit the same at one decimal place) in 2024 due to reduction in vehicle emission rate from 2023 to 2024.
R025	21.8	22.8	1.0	21.6	22.8	1.2	DM concentration lower in 2024 due to reduction in vehicle emission rate from 2023 to 2024. Impact of Scheme increases due to additional flow along the A192 through Morpeth in 2024 of 1,773 AADT (1,508 AADT in 2023).

Impacts on air quality >1% of the air quality objective have been highlighted for both opening years, with adverse changes in red and beneficial changes in green  
 DM = Do Minimum; DS = Do Something

## 1.4 POTENTIAL IMPACTS – ECOLOGICAL RECEPTORS

- 1.4.1. The overall impact of the change in opening year at ecological receptors follows the same broad pattern as for human receptors. That is, the changes in total pollutant concentrations and deposition between 2023 and 2024 are marginal in all locations, but with the specific change determined by the local balance between traffic growth and decreasing emissions per vehicle over time. For ecological receptors, the comparison is made between the DMRB Sensitivity Testing results and this Updated Assessment, since these assessments are both made with reference to the latest (LA105) guidance.
- 1.4.2. The impacts on nitrogen deposition at each designated habitat, as modelled for the DMRB Sensitivity Test and this Updated Assessment are summarised in **Table 1-4**.
- 1.4.3. The lower critical load is exceeded at all sites in all modelled scenarios, including the baseline, and opening year with and without the Scheme, irrespective of the opening year.
- 1.4.4. Further analysis of the impacts to nitrogen deposition and subsequent overall effects on ecological sites have been undertaken by the competent expert for Biodiversity and are presented in the Updated Biodiversity Air Quality DMRB Sensitivity Assessment (Document Reference 6.33).

**Table 1-4 - Changes to dry nitrogen deposition at designated habitats for the Original Assessment and Updated Assessment**

Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
<b>Designated Sites (National and International)</b>								
River Coquet and Coquet Valley Woodland SSSI (west of A1)	Eco1W	27.9 at 0m			27.9 at 0m	0		Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		25.5 at 10m	25.5 at 10m	0.1 at 10m	25.5 at 10m	25.7 at 10m	0.2 at 10m	
River Coquet and Coquet Valley Woodland SSSI (east of A1)	Eco1E	26.1 at 0m			26.1 at 0m			Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		24.7 at 25m	25.8 at 25m	1.1 at 25m	24.7 at 25m	26 at 25m	1.3 at 25m	
River Coquet and Coquet Valley Woodland SSSI (west of A697)	Eco9W	25.6	24.8	-0.8	25.5	24.7	-0.8	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
River Coquet and Coquet Valley Woodland SSSI (east of A697)	Eco9E	27.1	25.9	-1.2	27.0	25.7	-1.3	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
River Coquet and Coquet Valley Woodland SSSI (west of A1 Felton)	Eco12W	18.5	17.6	-0.9	18.4	17.5	-0.9	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
River Coquet and Coquet Valley Woodland SSSI (east of A1 Felton)	Eco12E	19.9	18.8	-1.1	20.0	18.8	-1.3	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
Longhorsley Moor SSSI	Eco2	16.5	16.1	-0.4	16.5	16.1	-0.4	No change in concentrations
<b>Ancient Woodland</b>								
Dukes Bank Wood (west of road)	Eco1W	27.9 at 0m			27.9 at 0m			Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		25.5 at 10m	25.5 at 10m	0.07 at 10m	25.5 at 10m	25.7 at 10m	0.2 at 10m	

Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
Dukes Bank Wood (east of road)	Eco1E	26.1 at 0m			26.1 at 0m			Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		24.7 at 25m	25.8 at 25m	1.1 at 25m	24.7 at 25m	26 at 25m	1.3 at 25m	
Park Wood/Bothal Bank	Eco3	17.3	17.4	0.1	17.0	17.1	0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
Cotting Wood	Eco4	17.4	17.5	0.1	17.4	17.5	0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
Davies Wood	Eco5	17.7	17.9	0.2	17.6	17.7	0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
Scotch Gill Wood	Eco6	17.7	17.7	0.0	17.7	17.8	0.1	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
Borough Wood (west of road)	Eco7W	23.2	23.8	0.6	23.2	23.9	0.7	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
Borough Wood (east of road)	Eco7E	26.3	27.1	0.8	26.4	27.3	1.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.

Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
Well Wood	Eco8	27.2	27.6	0.4	27.1	27.6	0.5	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 1,560 AADT to 1,915 AADT, within which the change in HDVs increases from 34 AADT to 240 AADT.
Weldon Wood	Eco11	16.4	16.2	-0.2	16.1	15.9	-0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
Stobswood	Eco13	15.6	15.6	0.0	15.6	15.6	-0.1	No change in concentrations
Dukes Bank Wood	Eco16	16.2	16.1	-0.1	16.2	16.1	-0.1	No change in concentrations
Burnie House Dean Wood	Eco14	15.7	15.7	0.0	15.7	15.7	0.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
<b>Local Nature Reserve</b>								
Carlisle Park	Eco15	17.7	17.7	0.0	17.7	17.7	0.0	No change in concentrations
Ulgham Meadow	Eco10	19.4	18.1	-1.3	19.4	18.0	-1.4	No change in concentrations
Borough Wood (east of road)	Eco7E	26.3	27.1	0.8	26.4	27.3	1.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
<b>Local Wildlife Sites</b>								
Bothal Burn and River Wansbeck	Eco3	17.3	17.4	0.1	17.0	17.1	0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.



Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
Wansbeck & Hartburn Woods (west of road)	Eco7W	23.2	23.8	0.6	23.2	23.9	0.7	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
Wansbeck & Hartburn Woods (east of road)	Eco7E	26.3	27.1	0.8	26.4	27.3	1.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,394 AADT to 2,797 AADT, within which the change in HDVs increases from 221 AADT to 438 AADT.
Coquet River Felton Park (west of road)	Eco1W	27.9 at 0m			27.9 at 0m			Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		25.5 at 10m	25.5 at 10m	0.07 at 10m	25.5 at 10m	25.7 at 10m	0.2 at 10m	
Coquet River Felton Park (east of road)	Eco1E	26.1 at 0m			26.1 at 0m			Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
		24.7 at 25m	25.8 at 25m	1.1 at 25m	24.7 at 25m	26 at 25m	1.3 at 25m	
Cocklaw Dene (west of road)	Eco17W	18.6	18.8	0.2	18.7	19.3	0.6	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 599 AADT to 1,827 AADT, within which the change in HDVs increases from 72 AADT to 374 AADT.
Cawledge Burn (west of road)	Eco18W	23.3	24	0.7	23.3	24.3	1.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,210 AADT to 3,371 AADT.
Cawledge Burn (east of road)	Eco18E	23.7	24.4	0.7	23.7	24.8	1.0	Transect affected by increase in flow along the A1 where overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 2,210 AADT to 3,371 AADT.

Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
Coney Garth Pond	Eco19	19.5	19.8	0.3	19.4	19.8	0.3	No change in concentrations
Longhorsley Moor	Eco2	16.5	16.1	-0.4	16.5	16.1	-0.4	No change in concentrations
Cotting Wood	Eco4	17.4	17.5	0.1	17.4	17.5	0.1	Site located away from the A1*, concentrations in both DS and DM for the 2024 update decrease due to improvements in vehicle technology, change with the Scheme remains the same.
<b>Ancient and Veteran Trees</b>								
Eco_VT3	-	23.5	23.4	-0.1	23.5	23.4	-0.1	No change in concentrations
Eco_VT4	-	21.1	21	-0.1	21.1	21.0	-0.1	No change in concentrations
Eco_VT5	-	23.2	23.3	0.1	23.2	23.3	0.1	No change in concentrations
Eco_VT6	-	22.4	22.5	0.1	22.4	22.5	0.1	No change in concentrations
Eco_VT7	-	21	21	0.0	21.0	21.0	0.1	No change in concentrations
Eco_VT8	-	24.3	24.3	0.0	24.3	24.3	-0.1	No change in concentrations
Eco_VT9	-	23.8	23.6	-0.2	23.8	23.6	-0.2	No change in concentrations
Eco_VT10	-	21	21.1	0.1	21.0	21.1	0.0	No change in concentrations
Eco_VT11	-	23.3	23.2	-0.1	23.3	23.2	-0.1	No change in concentrations
Eco_VT12	-	21	21	0.0	21.0	21.0	0.0	No change in concentrations
Eco_VT13	-	21	21.1	0.1	21.0	21.1	0.1	No change in concentrations
Eco_VT14	-	23.3	23.3	0.0	23.3	23.3	0.0	No change in concentrations
Eco_VT15	-	22.1	22	-0.1	22.1	22.0	-0.1	No change in concentrations
Eco_VT16	-	24.1	24.6	0.5	24.1	24.7	0.6	Overall traffic increase in DM and DS offsets the effect of improving vehicle technology. Impact of Scheme on traffic increases from 7,456AADT to 9,061 AADT.
Eco_VT17	-	21	21	0.0	21.0	21.0	0.0	No change in concentrations
Eco_VT18	-	23.8	24.2	0.4	23.8	24.2	0.4	No change in concentrations
Eco_VT19	-	26.2	26.2	0.0	26.2	26.2	0.0	No change in concentrations
Eco_VT20	-	24.7	24.9	0.2	24.7	24.9	0.3	No change in concentrations

Site ID	Transect	DMRB Sensitivity Test Results (kgN/ha/yr)			Updated Assessment Results (kgN/ha/yr)			Comment
		Do-Minimum	Do-Something	Change with Do-Something	Do-Minimum	Do-Something	Change with Do-Something	
Eco_VT23	-	22.7	23	0.3	22.7	22.9	0.2	No change in concentrations
Eco_VT24	-	23	23.4	0.4	23.0	23.5	0.4	No change in concentrations
Eco_VT25	-	22.7	23	0.3	22.7	23.0	0.2	No change in concentrations
Eco_VT27	-	23.7	24.2	0.5	23.7	24.3	0.6	No change in concentrations

\*Sites referred to as “Away from the A1” are those where the A1 is not the primary source of vehicle emissions.

## 1.5 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

### CONSTRUCTION

- 1.5.1. The change in opening year will not affect the findings of the DMRB sensitivity test or ES, including the mitigation measures that are reported in **Chapter 5: Air Quality Part A [APP-040]** and **Part B [APP-041]**.

### OPERATION

- 1.5.2. The change in opening year will not affect the findings of the Environmental Statement in relation to human receptors (**Appendix 16.4: Air Quality Likely Significant Effects of the Scheme [APP-330]**). There would be no likely significant effects on human health at any receptor, whether the opening year is 2023 or 2024.
- 1.5.3. The assessment of significance of the effects of nitrogen deposition for designated habitats is presented in the Updated Biodiversity Air Quality DMRB Sensitivity Assessment (Document Reference 6.33). Nitrogen deposition data listed above were provided to the competent expert for biodiversity who concluded that increases in nitrogen deposition from the operation of the Scheme would result in significant effects for the following designated habitats:
- a. Borough Woods LNR and ancient woodland (**Moderate** and **Very Large adverse**, respectively)
  - b. Well Wood ancient woodland (**Very Large adverse**)
  - c. Veteran tree T682 – Receptor ID Eco\_VT24 (**Very Large adverse**)
  - d. Veteran tree T701 – Receptor ID Eco\_VT27 (**Very Large adverse**)
- 1.5.4. The effects of the Scheme at all other designated habitats considered are not significant.
- 1.5.5. The assessment undertaken in Updated Biodiversity Air Quality DMRB Sensitivity Assessment (Document Reference 6.33) includes a review of the application of guidance used to determine the significance of the overall ecological effect as a result of the Scheme. The Updated Biodiversity Air Quality DMRB Sensitivity Assessment (Document Reference 6.33) considers the nitrogen deposition data for a Scheme opening year of 2024. This assessment supersedes that presented in **Appendix 16.7: Biodiversity DMRB Sensitivity Test: The Scheme** of the ES [APP-333] (and summarised in **Appendix F of Appendix 16.4: Air Quality Likely Significant Effects of the Scheme [APP-330]**).

### SUMMARY

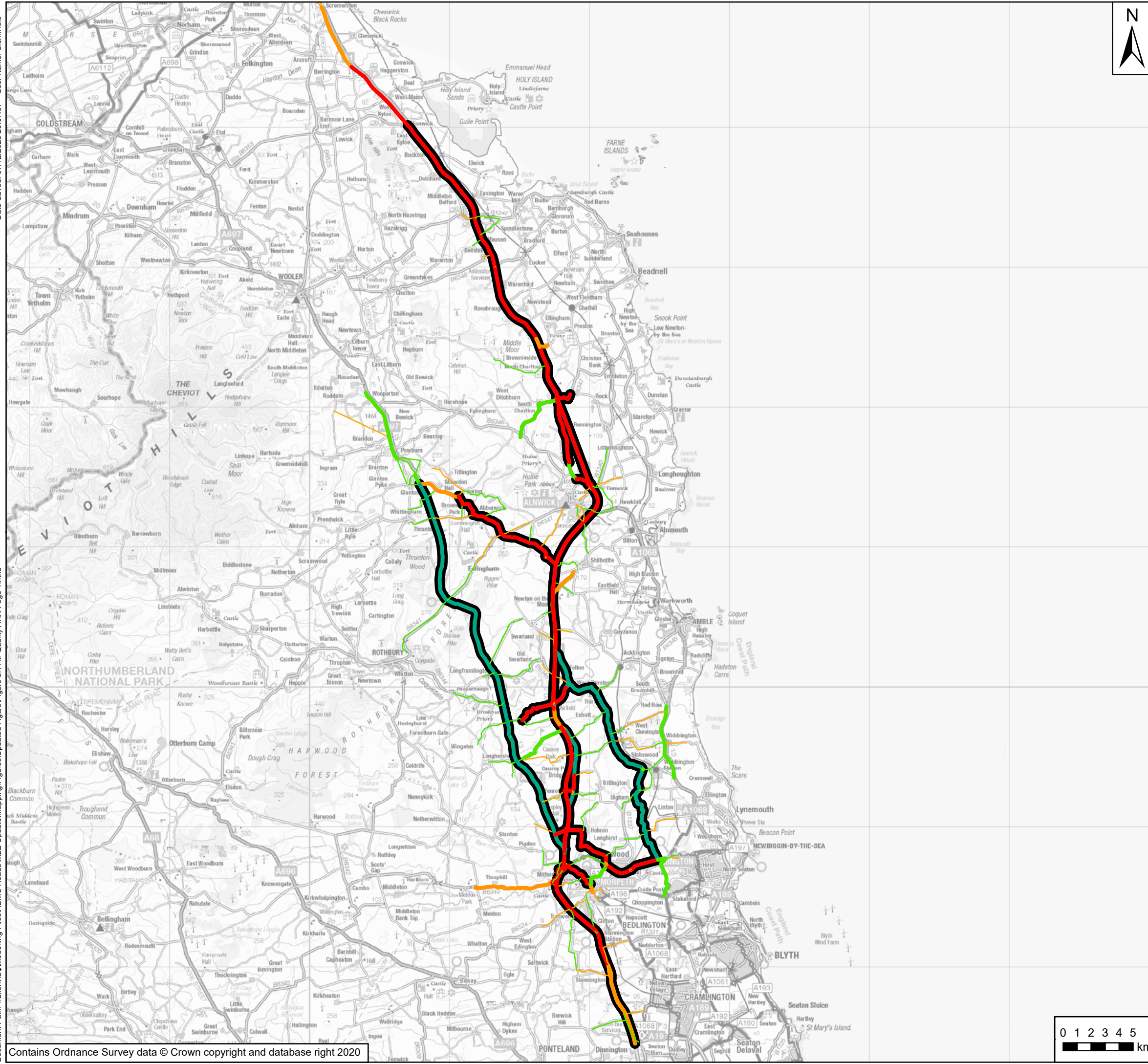
- 1.5.6. Overall, following the guidance on the evaluation of significant effects in LA 105 (**Ref. 5.1**), the effects of the Scheme on Human Health are not significant.
- 1.5.7. **Significant** ecological effects, resulting from Scheme changes to nitrogen deposition levels, have been identified at Borough Woods LNR, Well Wood Ancient Woodland and at Veteran Trees T682 – Receptor ID Eco\_VT24 and T701 – Receptor ID Eco\_VT27. At all other

designated habitats considered within the assessment, the effects of the Scheme are **not significant**.

## REFERENCES

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- 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/dmrb/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** - Department for Environment Food and Rural Affairs, Emission Factor Toolkit (v10) Available at: <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html> [Accessed December 2020]
- Ref 5.4** - Department for Environment Food and Rural Affairs. Background mapping for 2018 and 2015 reference years. Available at: <https://uk-air.defra.gov.uk/data/laqm-background-home> [Accessed December 2020]
- Ref 5.5** - Department for Environment Food and Rural Affairs. NO<sub>x</sub> to NO<sub>2</sub> calculator, v6.1 and v8.1. Available at: <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc> [Accessed December 2020]
- Ref 5.6** - Department for Environment Food and Rural Affairs, Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16. Available at: <https://laqm.defra.gov.uk/technical-guidance/>



**Key**

AADT Change with Scheme for 2024 Opening Year

- < -1000
- -1000 to -500
- -500 to 0
- 0 to 500
- 500 to 1000
- > 1000

**—** M2E Affected Road Network for 2023 Opening Year

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Rev	Date	Description	By	Chk'd	App'd

Client

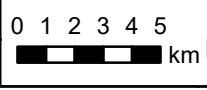
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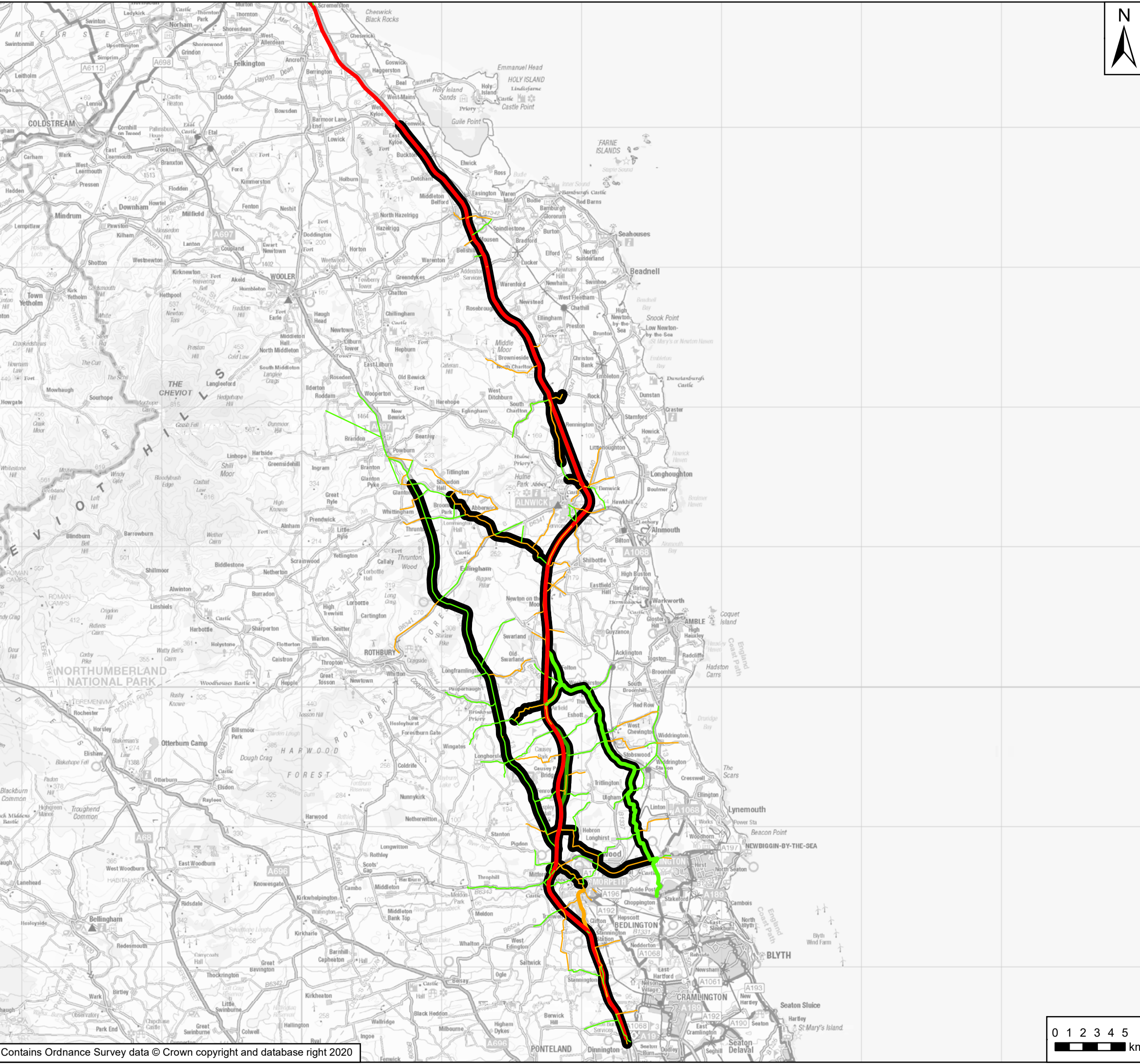
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Page 1 of 4

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Drawing Status: First Issue  
Suitability: S1

Drawing Number	HE551459	Project	M2F location	Originator	WSP	Volume		Project Ref. No.	
Revision	P01	Type		Role		Number			





**Key**

- HDV Change with Scheme for 2021 Opening Year
- █ < -200
- █ -200 to -100
- █ -100 to 0
- █ 0 to 100
- █ 100 to 200
- █ > 200
- M2E Affected Road Network for 2023 Opening Year

P01	February 2021	First Issue	SH	LP	BTJ
Rev	Date	Description	By	Chk'd	App'd

Client

Project Title  
A1 NORTHUMBERLAND, MORPETH TO ELLINGHAM

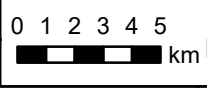
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Page 2 of 4

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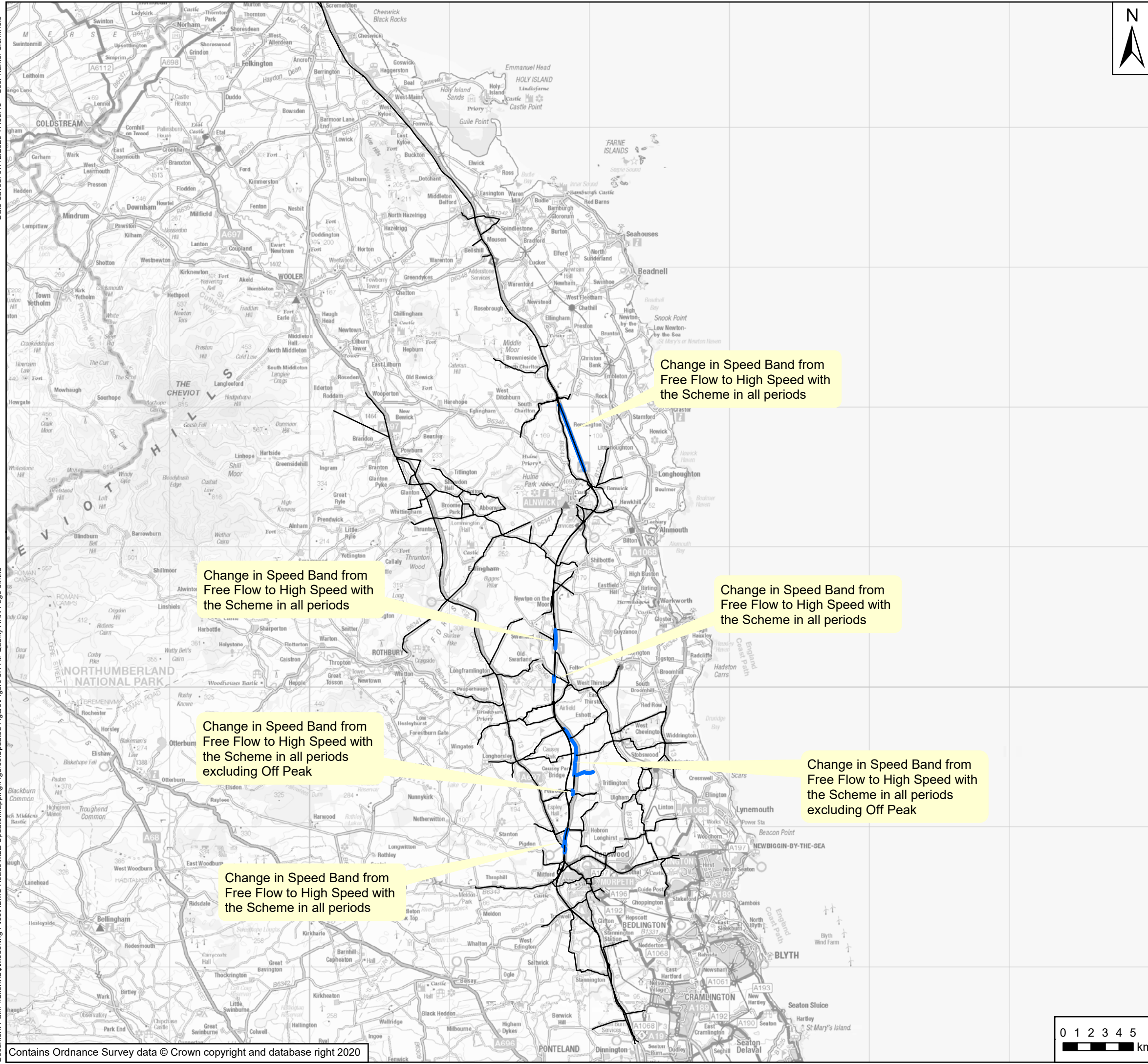
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First Issue

Suitability  
S1

Drawing Number	HE551459	Project	WSP	Originator	Volume	Project Ref. No.	Revision
M2F location	Type	Role	Number	P01			







Key Change in Speed Band for 2024 Opening Year

— Change in Speed Band

— No Change in Speed Band

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods excluding Off Peak

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods excluding Off Peak

Change in Speed Band from Free Flow to High Speed with the Scheme in all periods

P01	February 2021	First Issue	SH	LP	BTJ
Rev	Date	Description	By	Chk'd	App'd

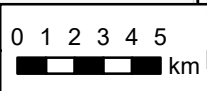
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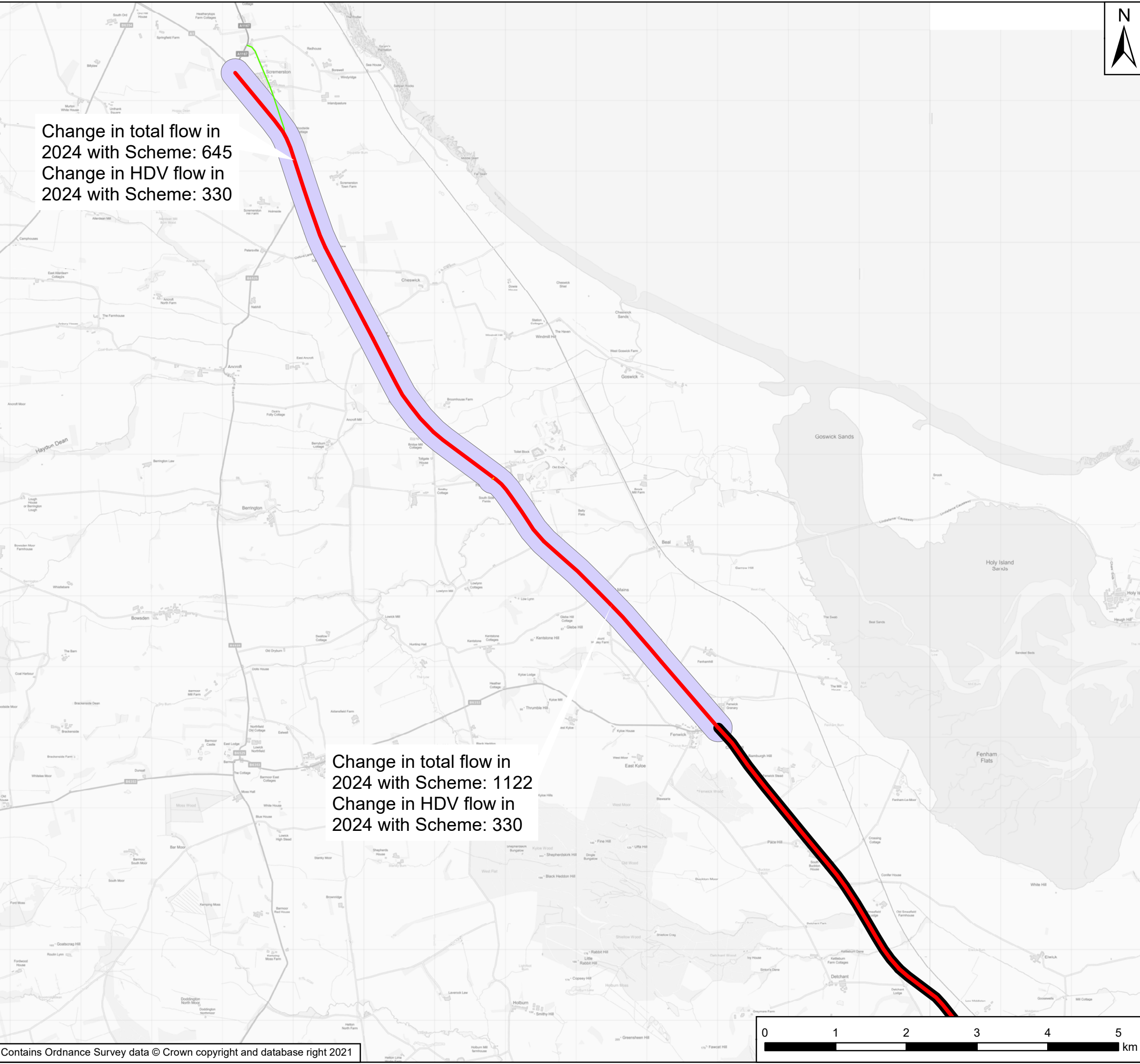
Project Title  
A1 NORTHUMBERLAND, MORPETH TO ELLINGHAM

Drawing Title  
Figure 1 2024 Affected Road Network  
Page 3 of 4

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Drawing Status	First Issue			Suitability	S1
Drawing Number	HE551459	Originator	WSP	Volume	Project Ref. No.
Project	M2F	Location	Type	Role	Number
					P01





**Key** HDV Change with Scheme for 2024 Opening Year

- < -200
- -200 to -100
- -100 to 0
- 0 to 100
- 100 to 200
- > 200
- M2E ARN for 2023 Opening Year
- ARN Extension

Change in total flow in 2024 with Scheme: 645  
Change in HDV flow in 2024 with Scheme: 330

Change in total flow in 2024 with Scheme: 1122  
Change in HDV flow in 2024 with Scheme: 330

Rev	Date	Description	By	Chk'd	App'd
P01	February 2020	First Issue	SH	LP	BTJ



Project Title  
A1 NORTHUMBERLAND, MORPETH TO ELLINGHAM

Drawing Title  
Figure 1 2024 Affected Road Network  
[Difference Between Original and Updated ARN]

Page 4 of 4

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Drawing Status  
First Issue

Suitability  
S1

Drawing Number  
Project  
HE551459

Originator  
WSP

Volume

Project Ref. No.

M2F  
Location

Type | Role | Number

Revision  
P01



# Appendix A

UPDATED ASSESSMENT  
APPENDICES

## UPDATED ASSESSMENT MODEL VERIFICATION

Verification of the dispersion modelling used to inform the Updated Assessment has been undertaken on the same basis as that set out in **Environmental Statement Appendix 5.3 – Methodology and Verification [APP-200 for Part A and APP-271 for Part B]**. **Figure 1-1** and **Figure 1-2**, below show the comparison of monitored and modelled annual mean NO<sub>x</sub> prior to verification, and annual mean NO<sub>2</sub> post verification respectively. **Table 1-1**, below, sets out the final verification factors and measures of uncertainty.

**Figure 1-1 - Model verification for the Updated Assessment showing raw modelled road NO<sub>x</sub> and monitored road NO<sub>x</sub>.**

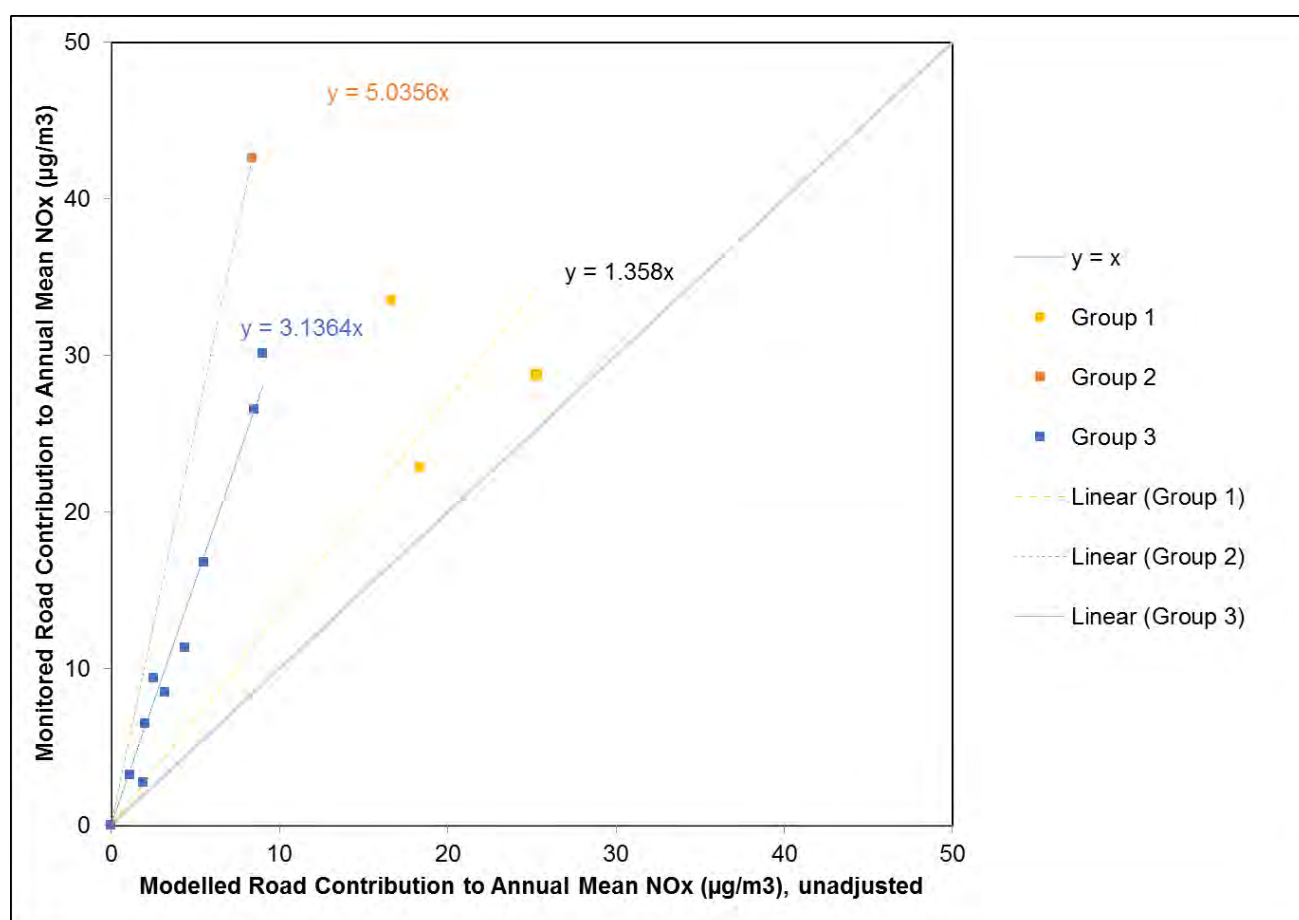
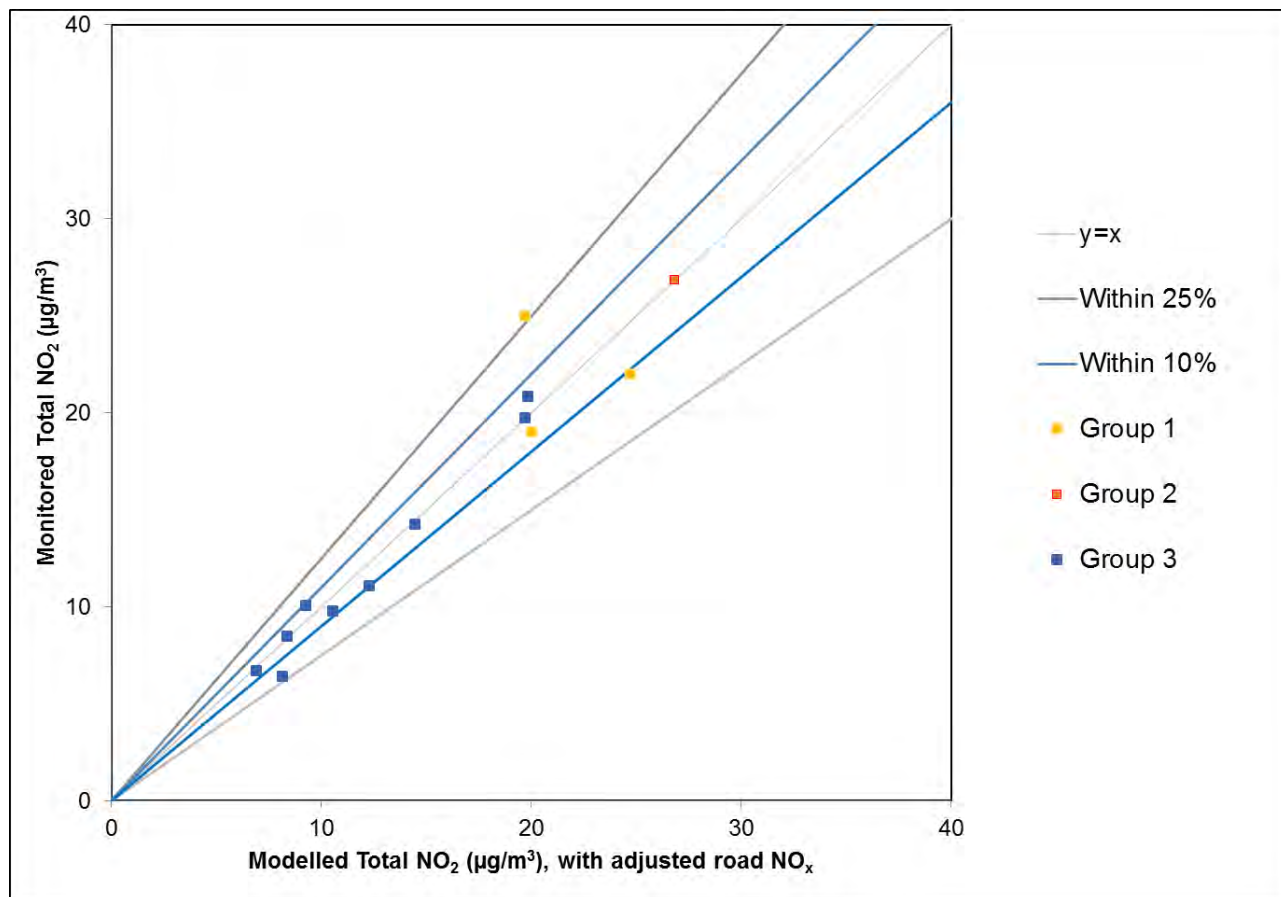


Figure 1-2 - Comparison of verified modelled NO<sub>2</sub> and monitored NO<sub>2</sub>



**Table 1-1 - Model Results**

<b>Metric</b>	<b>Value</b>
<b>Verification Factors</b>	
Group 1 Verification Factor	1.358
Group 2 Verification Factor	5.909
Group 3 Verification Factor	3.121
<b>Post Verification Analysis</b>	
Locations Within $\pm 10\%$	9
Locations Within $\pm 10$ to $\pm 25\%$	3
Locations Greater $\pm 25\%$	1
Locations Within $\pm 25\%$	12
Slope	1.0011
Root Mean Square Error	1.8
Fractional Bias	-0.003

## UPDATED ASSESSMENT MODEL RESULTS - HUMAN

**Table 1-2 - NO<sub>2</sub> concentrations at Human Receptors in 2024 without Gap Analysis.  
All concentrations presented in µg/m<sup>3</sup>.**

Receptor ID	Baseline 2015	Baseline 2024	Do Minimum 2024	Do Something 2024
R001	7.4	4.6	4.7	4.9
R002	10.3	5.7	6.0	6.2
R003	17.7	8.8	9.7	10.5
R004	15.9	7.9	8.7	9.4
R005	7.6	4.6	4.8	5.0
R006	11.5	6.1	6.5	7.4
R007	6.8	4.3	4.4	4.9
R008	13.8	7.1	7.5	7.3
R009	24.0	11.6	12.5	13.3
R010	10.3	5.9	6.2	6.2
R011	8.1	5.1	5.4	5.4
R012	13.6	7.7	8.8	9.5
R013	14.7	7.4	7.8	4.6
R014	12.2	6.7	7.1	7.3
R015	8.5	4.8	5.1	5.3
R016	7.2	4.5	4.7	5.4
R017	12.4	6.8	7.1	6.0
R018	8.5	5.0	5.3	4.9
R019	19.2	9.4	10.0	5.5
R020	5.9	4.0	4.0	4.6
R021	6.1	4.1	4.1	4.4

<b>Receptor ID</b>	<b>Baseline 2015</b>	<b>Baseline 2024</b>	<b>Do Minimum 2024</b>	<b>Do Something 2024</b>
R022	27.0	12.8	13.3	5.8
R023	12.9	6.9	7.1	5.8
R024	7.9	4.9	5.1	4.5
R025	32.7	16.0	14.4	15.2



**Table 1-3 - NO<sub>2</sub> concentrations at Human Receptors in 2024 with Gap Analysis.**  
**All concentrations presented in µg/m<sup>3</sup>**

<b>Receptor ID</b>	<b>Do Minimum 2024</b>	<b>Do Something 2024</b>	<b>Change with Scheme</b>
R001	5.6	5.8	0.2
R002	7.9	8.2	0.3
R003	14.3	15.6	1.3
R004	12.9	14.0	1.2
R005	5.8	6.1	0.3
R006	8.9	10.2	1.3
R007	5.1	5.6	0.5
R008	10.7	10.5	-0.2
R009	19.0	22.5	3.5
R010	7.9	8.1	0.1
R011	6.2	6.3	0.1
R012	11.4	12.3	0.9
R013	11.4	6.6	-4.8
R014	9.4	9.7	0.2
R015	6.6	6.9	0.2
R016	5.5	6.3	0.8
R017	9.6	8.1	-1.4
R018	6.5	6.1	-0.4
R019	15.1	8.3	-6.8
R020	4.4	5.0	0.7
R021	4.5	4.8	0.3
R022	20.7	9.0	-11.7

<b>Receptor ID</b>	<b>Do Minimum 2024</b>	<b>Do Something 2024</b>	<b>Change with Scheme</b>
R023	9.8	8.0	-1.8
R024	5.9	5.3	-0.7
R025	21.6	22.8	1.2

## UPDATED ASSESSMENT MODEL RESULTS - ECOLOGICAL

Table 1-4 - Summary of impacts at Ecological Receptors

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%
<b>Designated Sites (National and International)</b>							
River Coquet and Coquet Valley Woodland SSSI (west of A1)	Eco1W	DM - 0 DS - 10	15	27.9 at 0m 25.5 at 10m	25.7 at 10m	0.21	110
River Coquet and Coquet Valley Woodland SSSI (east of A1)	Eco1E	DM - 0 DS - 25	15	26.1 at 0m 24.7 at 25m	26 at 25m	1.3	>200
River Coquet and Coquet Valley Woodland SSSI (west of A697)	Eco9W	0	15	25.5	24.7	-0.8	25 (Reduction with Scheme)
River Coquet and Coquet Valley Woodland SSSI (east of A697)	Eco9E	0	15	27.0	25.7	-1.3	55 (Reduction with Scheme)
River Coquet and Coquet Valley Woodland SSSI	Eco12W	0	15	18.4	17.5	-0.9	40 (Reduction with Scheme)

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%
(west of A1 Felton)							
River Coquet and Coquet Valley Woodland SSSI (east of A1 Felton)	Eco12E	0	15	20.0	18.8	-1.3	45 (Reduction with Scheme)
Longhorsley Moor SSSI	Eco2	0	10	16.5	16.1	-0.4	15 (Reduction with Scheme)
<b>Ancient Woodland</b>							
Dukes Bank Wood (west of road)	Eco1W	DM - 0 DS - 10	15	27.9 at 0m 25.5 at 10m	25.7 at 10m	0.2	110
Dukes Bank Wood (east of road)	Eco1E	DM - 0 DS - 25	15	26.1 at 0m 24.7 at 25m	26 at 25m	1.3	>200
Park Wood/Bothal Bank	Eco3	45	10	17.0	17.1	0.1	<45

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-Somethin g (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
Cotting Wood	Eco4	125	15	17.4	17.5	0.1	<125
Davies Wood	Eco5	10	10	17.6	17.7	0.1	10
Scotch Gill Wood	Eco6	170	10	17.7	17.8	0.1	<170
Borough Wood (west of road)	Eco7W	0	10	23.2	23.9	0.7	60
Borough Wood (east of road)	Eco7E	0	10	26.4	27.3	1.0	130

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%
Well Wood	Eco8	0	10	27.1	27.6	0.5	80
Weldon Wood	Eco11	25	10	16.1	15.9	-0.1	50 (Reduction with Scheme)
Stobswood	Eco13	150	10	15.6	15.6	-0.1	<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
<b>Local Nature Reserve</b>							
Carlisle Park	Eco15	135	10	17.7	17.7	0.0	<135
Ulgham Meadow	Eco10	0	10	19.4	18.0	-1.4	90 (Reduction)

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-Somethin g (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
Borough Wood (east of road)	Eco7E	0	10	26.4	27.3	1.0	130
<b>Local Wildlife Sites</b>							
Bothal Burn and River Wansbeck	Eco3	45	10	17.0	17.1	0.1	<45
Wansbeck & Hartburn Woods (west of road)	Eco7W	0	10	23.2	23.9	0.7	60
Wansbeck & Hartburn Woods (east of road)	Eco7E	0	10	26.4	27.3	1.0	130
Coquet River Felton Park (west of road)	Eco1W	DM - 0	15	27.9 at 0m			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-Somethin g (Part A)*	Change with Do-Something (Part A)*	Distance (m) from road beyond which change <1%
		DS - 10		25.5 at 10m	25.7 at 10m	0.2	
Coquet River Felton Park (east of road)	Eco1E	DM - 0 DS - 15	15	26.1 at 0m 24.7 at 25m	26 at 25m	1.3	>200
Cocklaw Dene (west of road)	Eco17W	0	10	18.7	19.3	0.6	35
Cawledge Burn (west of road)	Eco18W	0	10	23.3	24.3	1.0	95
Cawledge Burn (east of road)	Eco18E	0	10	23.7	24.8	1.0	130
Coney Garth Pond	Eco19	0	5	19.4	19.8	0.3	40



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%
Longhorsley Moor	Eco2	0	10	16.5	16.1	-0.4	15 (Reduction with Scheme)
Cotting Wood	Eco4	125	15	17.4	17.5	0.1	<125
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	0.1	-
Eco_VT8	-	142	10	24.3	24.3	-0.1	-
Eco_VT9	-	5	10	23.8	23.6	-0.2	-
Eco_VT10	-	126	10	21.0	21.1	0.0	-
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	-

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_VT16	-	68	10	24.1	24.7	0.6	-
Eco_VT17	-	66	10	21.0	21.0	0.0	-
Eco_VT18	-	97	10	23.8	24.2	0.4	-
Eco_VT19	-	10	10	26.2	26.2	0.0	-
Eco_VT20	-	101	10	24.7	24.9	0.3	-
Eco_VT23	-	196	10	22.7	22.9	0.2	-
Eco_VT24	-	99	10	23.0	23.5	0.4	-
Eco_VT25	-	169	10	22.7	23.0	0.2	-
Eco_VT27	-	52	10	23.7	24.3	0.6	-

**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

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