

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010041

6.4 Environmental Statement – Appendix 16.9 Climate Likely Significant Effects of The Scheme

APFP Regulation 5(2)(a)

Planning Act 2008

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

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Infrastructure Planning

Planning Act 2008

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

**The A1 in Northumberland: Morpeth to Ellingham
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Environmental Statement - Appendix

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CONTENTS

1	CLIMATE LIKELY SIGNIFICANT EFFECTS OF THE SCHEME	1
1.1	INTRODUCTION	1
1.2	ASSESSMENT METHODOLOGY	1
1.3	STUDY AREA	1
1.4	BASELINE CONDITIONS	2
1.5	POTENTIAL WITHIN TOPIC COMBINED IMPACTS	3
1.6	DESIGN MITIGATION AND ENHANCEMENT MEASURES	3
1.7	ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS	3
1.8	MONITORING	6
	REFERENCES	7

TABLES

Table 1-1 - End User GHG Emissions Data for the Traffic in the Region of the Scheme	2
Table 1-2 - End User GHG Emissions Data for the Traffic in the Region of the Scheme	4
Table 1-3 - Scheme Impacts on Carbon Budgets	4

1 CLIMATE LIKELY SIGNIFICANT EFFECTS OF THE SCHEME

1.1 INTRODUCTION

- 1.1.1. This appendix considers the Within Topic combined effects of the Scheme on climate, in particular the magnitude and mitigation of Greenhouse Gases (GHGs) emitted during construction and operation.
- 1.1.2. A full description of the Scheme is included in **Chapter 2: The Scheme, Volume 1** of this Environmental Statement (ES) (**Application Document Reference: TR010041/APP/6.1**).
- 1.1.3. Further details of competent expert evidence, legislative and policy framework, methodology and assessment assumption and limitations may also be found in Part A: Morpeth to Felton (Part A) **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and Part B: Alnwick to Ellingham (Part B) **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**).

1.2 ASSESSMENT METHODOLOGY

- 1.2.1. The methodology for the Within Topic combined assessment for end-user GHG emissions is unchanged from the methodology presented in Part A **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and Part B **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**). However, the analysis has been based on the Scheme traffic data that incorporates traffic movements from the Scheme. Refer to **Chapter 4 of the Case for the Scheme** (**Application Document Reference: TR010041/APP/7.1**) for further details on the traffic data.

1.3 STUDY AREA

- 1.3.1. The GHG emissions assessment is not restricted by geographical area but instead includes any increase or decrease in emissions as a result of the Scheme.
- 1.3.2. The Study Area, therefore, comprises:
 - a. Primary:**
 - i. Emissions relating to onsite construction activities (such as plant use on site).
 - ii. Operational emissions from site maintenance activities related to replacement (such as plant use on site).
 - b. Secondary:**
 - i. Operational end user traffic – a comparison has been made between GHG emissions between the Do-minimum (without the Scheme) and Do-something (with the Scheme) scenarios provided by a GHG assessment based on data from the traffic model and Transport Analysis Guidance: Unit A3 Environmental Impact Appraisal.

c. Tertiary:

- i. Construction emissions relating to the manufacturing, transport and disposal of materials, which may be some distance from the location of the Scheme (for example, emissions associated with the manufacture of cement and steel).
- ii. Operational emissions from the manufacturing, transport and disposal of replacement materials, which may be some distance from the location of the Scheme (for example, emissions associated with the manufacture of cement and steel).

1.4 BASELINE CONDITIONS

- 1.4.1. The baseline conditions set out in this section describe the current likely emissions sources from within the Order Limits of the Scheme. In the baseline scenario, GHG emissions occur constantly and widely as a result of human and natural activity including energy consumption (fuel, power), industrial processes, land use and land use change. The GHG assessment only considers where the Scheme results in additional or avoided emissions in comparison to the baseline scenario and its assumed evolution.
- 1.4.2. Construction phase baseline condition are described in Part A **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and Part B **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**).
- 1.4.3. In terms of end-user emissions from road traffic, the existing A1 has a large number of junctions and private accesses which result in traffic delays. Slow-moving traffic is also caused by a high proportion of heavy goods vehicles, agricultural vehicles and lack of overtaking opportunities.
- 1.4.4. The total end-user GHG emissions from traffic flows in the Do-minimum (baseline) scenario for the Scheme are presented in **Table 1-1** below. The total end-user traffic GHG emissions has been based on a 60-year operational lifespan. It is not considered proportionate to model GHG emissions beyond a 60-year lifespan due to a lack of certainty in GHG emissions beyond this timeframe. The average annual GHG emissions for the 60 year period is also provided.

Table 1-1 - End User GHG Emissions Data for the Traffic in the Region of the Scheme

Scenario	Total GHG emissions for all traffic in the traffic model area (thousand tonnes of carbon dioxide equivalent; ktCO _{2e})			
	2024	2039	Average per year (2024 – 2083)	Total (2024-2083)
Scheme Baseline (do minimum)	113	107	108	6,448

1.5 POTENTIAL WITHIN TOPIC COMBINED IMPACTS

- 1.5.1. The impacts of GHGs relate to their contribution to global warming and climate change. These impacts are global and cumulative in nature, with every tonne of GHG contributing to impacts upon natural and human systems.
- 1.5.2. GHGs are natural and man-made gases occurring in the atmosphere, which absorb and emit infrared radiation, thereby retaining the Sun's energy within the Earth's atmosphere. There is an overwhelming scientific consensus that the major increase in the concentration of GHGs from man-made sources is contributing to global warming and climate change.
- 1.5.3. Further details of the potential Within Topic combined impacts from GHG emissions are presented in within Part A **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and Part B **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**).

1.6 DESIGN MITIGATION AND ENHANCEMENT MEASURES

- 1.6.1. Design and mitigation measures to avoid and / or mitigate the generation of GHG emissions that have been committed to are identified within Part A **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**) and Part B **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) and included within the **Outline Construction Environmental Management Plan (Outline CEMP)** (**Application Document Reference: TR010041/APP/7.3**). These measures are specific to the parts of the Scheme and therefore have not been replicated in this appendix.

1.7 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

SUMMARY OF FINDINGS: EFFECT OF THE SCHEME ON CLIMATE CHANGE (GHG EMISSIONS)

- 1.7.1. The Scheme Do-minimum (baseline) and Do-something scenarios for total end user GHG emissions are presented in **Table 1-2** for the year 2024 (the first year of operation of the Scheme) and the year 2039 (the future modelled year). In addition, the average annual and total GHG emissions based on a 60-year operational period of 2024 to 2083 are presented. The baseline figures (Do-minimum scenario) are included for comparison.
- 1.7.2. The future traffic levels for the assessment of the Scheme are based upon an opening year predicted to be in 2023, the future year as 2038 and lifecycle year as 2082. Since the assessments reported in this ES were completed, the Scheme opening year has been put back to 2024. The assessment is based on traffic modelling for an opening year of 2023 and reported on that basis. However, as explained in **Section 4.1** in **Chapter 4: Environmental Assessment Methodology, Volume 1** of this ES (**Application Document Reference: TR010041/APP/6.1**) it is considered that the assessments remain valid for an opening year of 2024.
- 1.7.3. To model the GHG emissions, WebTAG data tables and data from the Department of Transport which take into account the proportions of the vehicle types, fuel type, forecast

fuel consumption parameters and emission factors were used for the new construction dates 2024 and 2039.

Table 1-2 - End User GHG Emissions Data for the Traffic in the Region of the Scheme

Scenario	Total GHG emissions for all traffic in the traffic model area (thousand tonnes of carbon dioxide equivalent; ktCO ₂ e)			
	2024	2039	Average per year (2024 – 2083)	Total (2024-2083)
Scheme Baseline (do minimum)	113	107	108	6,448
Scheme (do something)	147	148	148	8,883

1.7.4. In the Do-minimum (baseline) scenario, total GHG emissions are expected to decrease after 2024 (opening year) by 5% until the future year 2039 (design year). In the Do-something scenario for the Scheme, total GHG emissions are expected to increase marginally by 0.4%.

1.7.5. **Table 1-3** presents the Scheme GHG emissions, taking into account the construction of the Scheme, operational replacement, land use change and operational end-user traffic for the Scheme. The construction phase impacts have been calculated on the entirety of the Study Area and Order Limits by combining separate study information whereas the operational phase of the study has required re-modelling in order to ascertain the Scheme impacts on Carbon Budgets.

Table 1-3 - Scheme Impacts on Carbon Budgets

Stage / Timing	Total GHG emissions (thousand tonnes of carbon dioxide equivalent; kTCO ₂ e)
Construction phase (2021/23)	59
Operation phase (2024-2083)	2,428
Total for lifecycle (2021-2083)	2,487

Stage / Timing	Total GHG emissions (thousand tonnes of carbon dioxide equivalent; kTCO ₂ e)
Total during third Carbon Budget period* (2018-2022) [% of budget]	39 [0.00155%]
Total during fourth Carbon Budget 4 period (2023-2027) [% of budget]	161 [0.00824%]
Total during fifth Carbon Budget period (2028-2032) [% of budget]	185 [0.01074%]
Comparison of 1 Year Operational Scheme GHG Emissions against North East Total Road CO₂e Emissions for 2016 (Ref. 1)	
One year's emission's during the operational phase as a % of North East Total Road CO ₂ e emission estimate in 2016	0.93%

- 1.7.6. In the absence of agreed thresholds for what level of GHG emissions is considered significant in an Environmental Impact Assessment, professional judgement, based on schemes of a similar size and nature, has been used to assess the significance of effects. Furthermore, in line with Paragraph 5.17 of the NPS NN (2014) (**Ref. 3**) the Scheme GHG emissions have been provided against the UK National Carbon Budgets to provide context. As shown in **Table 1-3**, the impact of the Scheme against the National Carbon Budgets is less than 0.01%.
- 1.7.7. The GHG emissions from the construction and operation of the Scheme are likely to have an adverse impact. The magnitude of change in GHG emissions is considered to be minor, based on professional judgement of similar schemes.
- 1.7.8. Mitigation measures that would be implemented as part of the Scheme to reduce GHG emissions are provided **Chapter 14: Climate, Volume 2** of this ES (**Application Document Reference: TR010041/APP/6.2**), **Chapter 14: Climate, Volume 3** of this ES (**Application Document Reference: TR010041/APP/6.3**) and the **Outline CEMP (Application Document Reference: TR010041/APP/7.3)**.
- 1.7.9. It is anticipated there would be a **slight adverse** effect on climate during construction and operation of the Scheme. IEMA guidance (**Ref. 2**) suggests that all GHG emissions are significant in the absence of any significance criteria or defined threshold. However, given the mitigation measures for the Scheme, the magnitude of GHG emissions and the context of the Scheme, using professional judgement, it is considered that the **slight adverse** effect of the Scheme is **not significant**. Furthermore, as presented in **Table 1-3**, the GHG

impacts of the Scheme would not have a material impact on the Government meeting its carbon reduction targets.

1.8 MONITORING

- 1.8.1. As part of the monitoring activities, the Applicant's supply chain is responsible for providing monthly or quarterly carbon data returns using the Highways England Carbon Tool. As such, it is anticipated that during the construction stage, data would be collected for materials and fuel and electricity consumption, which would enable embedded GHG emissions and emissions from energy to be monitored. The actual GHG emissions of the Scheme (outturn data) can then be compared to the GHG emissions estimates at this ES stage (i.e. this appendix) and the Applicant can iteratively feedback into the environmental assessment process.
- 1.8.2. Any noteworthy increases in GHG emissions associated with the outturn data in comparison with the GHG emissions estimates at this stage would be managed and mitigated accordingly through measures set out in the **Outline CEMP (Application Document Reference: TR010041/APP/7.3)**.

REFERENCES

- Ref. 1** Department for Business, Energy & Industrial Strategy (2019) UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2017. [online] Available at <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2017>
- Ref. 2** Department for Transport (2014) National Policy Statement for National Networks, December 2014.
- Ref. 3** IEMA (2017) EIA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2017. [online] Available at: <https://www.iema.net/assets/newbuild/documents/IEMA%20GHG%20in%20EIA%20Guidance%20Document%20V4.pdf>

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