In Parliament – Session 2021 - 2022

HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix AQ-001-OR002

Air quality

Off-route works: Carlisle Station

Air quality report

M57

HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix AQ-001-OR002

Air quality

Off-route works: Carlisle Station

Air quality report

M57

Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

High Speed Two (HS2) Limited
Two Snowhill
Snow Hill Queensway
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

A report prepared for High Speed Two (HS2) Limited:

ARUP+ ERM | FOSTER + PARTNERS | JACOBS
RAMBOLL | TYPSA | COSTAIN

MWJV
Mott MacDonald | WSP

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.

recycle

Printed in Great Britain on paper containing at least 75% recycled fibre.

Contents

Tables

1 Introduction

1.1.1 This report is an appendix to the air quality assessment for the Proposed Scheme off-route works in relation to the Carlisle Station area.

1.1.2 This appendix comprises:

- baseline air quality data; and
- construction dust assessment.

1.1.3 This appendix should be read in conjunction with Volume 4, Off-route effects.

1.1.4 Additional data used for the air quality assessment are set out in Background Information and Data (BID) (BID AQ-002-OR002)[1].

1.1.5 The assessment scope, key assumptions and limitations, and the methodology for determining significance of effects for air quality are set out in Volume 1, Introduction and methodology, Section 3 and the Environmental Impact Assessment Scope and Methodology Report (SMR) (see Volume 5: Appendix CT-001-00001).

1.1.6 The air quality standards relevant to this assessment are:

- 40µg/m^3 as an annual mean for nitrogen dioxide (NO_2) and fine particulate matter (PM_{10});
- 200µg/m^3 one-hour mean for NO_2 not to be exceeded more than 18 times a year (equivalent to the 99.8th percentile of the one-hour mean);
- 50µg/m^3 24-hour mean for PM_{10} not to be exceeded more than 35 times a year (equivalent to the 90.4th percentile of the 24-hour mean); and
- 25µg/m^3 as an annual mean for fine particulate matter ($PM_{2.5}$).

[1] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, Additional data used in the air quality assessment*, BID AQ-002-OR002. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

2 Baseline air quality data

2.1 Existing air quality

Local authority review and assessment information

2.1.1 The Carlisle Station area lies within the administrative area of Carlisle City Council (CaCC). All councils review air quality throughout the area following the local air quality management (LAQM) regime from the Department for Environment, Food and Rural Affairs (Defra)[2].

2.1.2 There are five air quality management areas (AQMA) within the Carlisle Station area, all of which have been designated for risk of exceedances of the annual mean NO_2 standard.

2.1.3 The Carlisle AQMA No.2 covers an area encompassing Currock Street and the properties immediately to the west of it, between the junction with James Street/Water Street and Crown Street. This AQMA was declared in January 2007. The Carlisle AQMA No.4 covers an area along the north side of the A595 at Bridge Street, northbound from the junction with Shaddongate, and was declared in August 2008.

2.1.4 The Carlisle AQMA No.5 covers an area encompassing the junction of Dalston Road and Junction Street and was declared in August 2008. The Carlisle AQMA No.6 covers an area encompassing part of the A6 London Road and properties on either side near the junction with Blake Street, and was declared in August 2008. The Carlisle A7 AQMA covers an area encompassing the A7, between Hardwicke Circus and junction 44 of the M6, and a section of Brampton Road (100m along the road from the Stanwix Bank junction). This AQMA was declared in December 2005.

Local air quality monitoring data

2.1.5 The following sections provide a summary of the recorded pollutant concentrations at monitoring sites in this area. Further details on monitoring data are presented in BID (BID AQ-002-OR002)[1].

Continuous monitoring

2.1.6 There is one continuous air quality monitoring site in this area. This is located at the corner of A595 Bridge Street and Shaddongate. Measurements of NO_2, PM_{10} and $PM_{2.5}$ were within the air quality standard for 2018.

[2] Department for Environment, Food and Rural Affairs (Defra) (2021), *Defra Background Pollutant Concentration Maps*. Available online at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

Diffusion tubes

2.1.7 The local authorities in this area undertake air quality monitoring with the use of passive diffusion tubes as part of their LAQM process. There are 15 diffusion tube sites in this area.

2.1.8 Measurements of NO_2 were within the air quality standard at all sites except Bridge Street in 2018.

Background pollutant concentrations

2.1.9 Estimates of background air quality were obtained from the Defra maps[2]. Background pollutant concentrations are within the air quality standards throughout the study area. Table 1 presents the range of background pollutant concentrations in this area for the existing and future baseline.

2.1.10 Background pollutant concentrations for the operational year of 2038 have been taken from the Defra background maps for 2030, which is the latest available year of data. The 2030 background maps have been used as representative of the future baseline conditions during operation of the Proposed Scheme.

Table 1: Range of background pollutant concentrations

Pollutant	Background concentrations (µg/m³)		
	2018	2025	2038
Annual mean NOx	3.8µg/m³ to 17.4µg/m³	2.9µg/m³ to 13.8µg/m³	2.8µg/m³ to 13.1µg/m³
Annual mean NO_2	3.1µg/m³ to 12.8µg/m³	2.4µg/m³ to 10.4µg/m³	2.3µg/m³ to 9.9µg/m³
Annual mean PM_{10}	7.0µg/m³ to 11.9µg/m³	6.4µg/m³ to 11.4µg/m³	6.3µg/m³ to 11.5µg/m³
Annual mean $PM_{2.5}$	4.9µg/m³ to 7.3µg/m³	4.4µg/m³ to 6.8µg/m³	4.3µg/m³ to 6.8µg/m³

3 Construction dust assessment

3.1.1 This section provides details of the assessment of dust emissions during construction of the Proposed Scheme.

3.2 Dust soiling, human health and ecological effects

Assessed receptors and sensitivity of the area

3.2.1 The assessment of dust soiling, human health and ecological effects has been undertaken for the area around Carlisle Station:

- there are no earthworks activities in the area. Residential dwellings are located within 20m of construction and trackout[3] activities and within 50m of demolition activities; and
- the River Eden Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) is located within 20m of trackout activities. There are no demolition, construction or earthworks activities within 50m of this ecological receptor.

3.2.2 Table 2 presents the sensitivity to dust soiling, human health and ecological effects.

Table 2: Sensitivity of area to dust soiling, human health and ecological effects

Effect	Demolition	Earthworks	Construction	Trackout
Carlisle Station area				
Dust soiling	High	Not applicable	High	High
Human health	Low	Not applicable	Medium	Low
Ecological effects	Not applicable	Not applicable	Not applicable	High

Dust emission magnitude

3.2.3 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 3.

Table 3: Dust emission magnitude for dust soiling, human health and ecological effects

Area	Demolition	Earthworks	Construction	Trackout
Dust soiling and human health	Small	Not applicable	Small	Medium
Ecological effects	Not applicable	Not applicable	Not applicable	Medium

[3] Trackout refers to the transport of dust and dirt from the construction site(s) onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

Risk of impacts

3.2.4 Taking into consideration the dust emission magnitude of each activity and the sensitivity of the area, the risk of dust effects has been defined as shown in Table 4.

Table 4: Risk of dust soiling and human health effects

Effect	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium risk	Not applicable	Low risk	Medium risk
Human health	Negligible risk	Not applicable	Low risk	Low risk
Ecological effects	Not applicable	Not applicable	Not applicable	Medium risk

3.3 Summary of risks

3.3.1 The summary of risks identified within the Carlisle Station area are shown in Table 5.

Table 5: Summary of risks for construction dust assessment

Activity	Dust soiling	Human health	Ecological effects
Demolition	Medium	Negligible	Not applicable
Earthworks	Not applicable	Not applicable	Not applicable
Construction	Low	Low	Not applicable
Trackout	Medium	Low	Medium

4 Assessment of construction traffic emissions

4.1.1 For the assessment of traffic on the highway network, data for the year 2025 was used as the first construction year of the Proposed Scheme. Following review of the traffic data, no roads have been identified for further assessment in this area. Therefore, no significant effects are anticipated for air quality during construction of the Proposed Scheme.

hs2.org.uk

High Speed Two (HS2) Limited
Two Snowhill
Snow Hill Queensway
Birmingham B4 6GA
Freephone: 08081 434 434
Minicom: 08081 456 472
Email: HS2enquiries@hs2.org.uk