

Air Quality Annual Report 2021



Department for Transport

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Contents

1	Introduction	1
1.1	Background and Introduction	1
1.2	Management of Air Quality	2
1.3	Purpose of this report	3
1.4	Summary of significant effects identified in the Environmental Statement	4
2	Air Quality monitoring data and comparison with the Air Quality Objectives and National Compliance	5
2.1	Pollutants	5
2.2	Summary of relevant legislation	6
2.3	Summary of monitoring undertaken by HS2	7
2.4	Summary of NO ₂ monitoring methodology	7
2.5	HS2 NO ₂ survey monitoring results	9
2.6	Particulate Matter monitoring results	10
3	Comparison to predictions in the Environmental Statement	11
3.1	Phase One	11
3.2	Phase 2a	13
4	Actions to improve air quality	14
4.1	Proposed actions	14
4.2	Phase One progress and impact of measures to address Air Quality	14

List of figures

Figure 1 - 10: Maps of HS2 monitoring survey locations and 2021 results	61
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List of tables

Table 1: Relevant air quality standards	6
Table 2: Construction Vehicle Emission Targets and Requirements	15
Table 3: NRMM Emission Requirements	15
Table 4: Vehicle Emission Targets and Requirements	16
Table 5: Summary of number of receptors modelled in the ES with adverse and beneficial significant effects for Greater London area	18
Table 6: Details of HS2 Phase One air quality NO ₂ diffusion tube monitoring survey locations	20
Table 7: Details of HS2 Phase 2a air quality NO ₂ diffusion tube monitoring survey locations	25
Table 8: Annualisation and bias adjustment factors applied to each monitoring site across Phase One	26
Table 9: Annualisation and bias adjustment factors applied to each monitoring site across Phase 2a	30
Table 10: Annual mean Phase One NO ₂ monitoring results for 2021	31
Table 11: Annual mean Phase 2a NO ₂ monitoring results for 2021	35
Table 12: Full monthly raw Phase One NO ₂ monitoring results for 2021 (prior to annualisation and bias adjustment)	36
Table 13: Full monthly raw Phase 2a NO ₂ monitoring results for 2021 (prior to annualisation and bias adjustment)	44
Table 14: Comparison of the Phase One 2021 annual mean NO ₂ diffusion tube results and the predicted 2012 and 2017 NO ₂ annual mean concentrations from the ES	45
Table 15: Comparison of the Phase One annual mean NO ₂ diffusion tube monitoring results (2016 – 2021)	55
Table 16: Comparison of the Phase 2a annual mean NO ₂ diffusion tube monitoring results (2019 – 2021)	60

Non-Technical Summary

This 2021 Annual Air Quality Report focusses on the air quality monitoring undertaken in the 2021 calendar year across HS2. The report details the monitoring undertaken during the construction works on Phase One and details of the monitoring survey commissioned to provide information on the baseline situation on Phase 2a before construction works begin.

The High Speed Two project (HS2) is the Government's proposal for a new, high speed, north-south railway. HS2 Phase One will connect London with Birmingham and the West Midlands; Phase Two will extend the route to Manchester and beyond.

In November 2013, HS2 deposited a Hybrid Bill with Parliament to seek powers for the construction and operation of Phase One of HS2 (referred to as 'the Proposed Scheme'). The results of the Environmental Impact Assessment were reported in an Environmental Statement which was submitted alongside the Bill. On 23 February 2017 Royal Assent was granted for HS2 Phase One, creating the High Speed Rail (London – West Midlands) Act 2017.

In February 2019, the Supplementary Environmental Statement 2 and Additional Provisions 2 Environmental Statement (SES2 and AP2 ES) was submitted to Parliament in support of the High Speed Rail (West Midlands – Crewe) Bill (Phase 2a). AP2 ES reports any likely significant environmental effects of the proposed amendments made to the scheme having taken into account the environmental information in the main ES as updated by SES1 and SES2, where appropriate. On 11 February 2021 Royal Assent was granted for HS2 Phase 2a, creating the High Speed Rail (West Midlands - Crewe) Act 2021.

The HS2 Air Quality Strategy and HS2 Air Quality Information Papers, summarise the air quality effects identified in the Environmental Statement, as amended, and set out HS2's approach for managing air quality, which includes the publication of an annual review of air quality.

The first two annual reports published in 2018 (revised in 2019) focused on reporting monitoring data for air quality around highways and covered the 2016 period, based on 6 months of monitoring data and 2017 calendar year. These reports reviewed baseline conditions prior to the full commencement of construction works.

The third, fourth and the fifth annual report focused on reporting monitoring data for air quality around highways, covering the 2018, 2019 and 2020 calendar years respectively during the early stages of construction activities. This sixth report for the 2021 calendar year, includes the construction activities in Phase One and baseline conditions prior to the full commencement of construction works in Phase 2a. This report makes reference to the air pollutants and areas where significant effects were identified within the Environmental Statements, as amended. These significant effects along Phase One, for the pollutants nitrogen dioxide and particulate matter, are confined to a limited number of roads in the Greater London area. Potential significant effects in Phase 2a as a result of increase in nitrogen dioxide concentrations were identified at sensitive receptors close to the M6. Therefore, the

monitoring data discussed in this report covers the Greater London area for the pollutants nitrogen dioxide and particulate matter and locations close to the M6 for the pollutant nitrogen dioxide.

HS2 commenced a Phase One and Phase 2a baseline air quality survey at the end of June 2016 and January 2019 respectively. These surveys use diffusion tubes to monitor nitrogen dioxide. The monitoring and reporting of these surveys have been undertaken following the Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management best practice guidance. The results from this survey for 2021 are presented in table format in Appendix D and shown on maps, with monitoring sites colour coded based on the measured concentration, in Appendix G. Particulate matter monitoring around highways is available from sites operated by Defra or local authorities and a reference to the relevant reports, where this data is available, is provided. HS2 undertakes indicative monitoring of particulate matter for the purposes ensuring mitigations are effectively controlling dust emissions at high and medium risk construction sites, across the route.

The HS2 air quality monitoring survey is intended to supplement air quality monitoring that is being undertaken by other parties such as Defra, local authorities and in some areas, communities and academic institutions. Data from air quality monitoring surveys undertaken by other parties is not reproduced within this report.

This report provides a summary of the significant effects identified in the Environmental Statement, as amended, and a comparison of 2021 monitoring data with the predictions from the air quality modelling undertaken for the Environmental Statement.

During 2021 Phase One was in construction, and minimal early environmental works had commenced along Phase 2a. HS2 have already made commitments for measures to reduce emissions generated by construction activities. The measures include:

- Construction vehicle emission standards and methods to manage their use via traffic management plans;
- Non-Road Mobile Machinery emission standards; and
- Dust mitigation measures.

The HS2 Information Papers for Air Quality (E31 for Phase One and E14 for Phase 2a) set out the HS2 emission standards for construction vehicles and Non-Road Mobile Machinery. The construction vehicle emission standards came into effect on 14 September 2017 with the commencement of early works, including ground investigation surveys, land preparation works, ecological surveys, etc. across Phase One.

Progress and a summary of the impact of these measures to improve air quality during 2021 in Phase One are set out in Section 4.2 and will therefore be reported across Phases in future annual reports.

The impacts of Covid-19 national lockdowns, through the beginning of 2021, would have created lower traffic scenarios. As lockdown restrictions were lifted, it was expected that air pollution concentrations would increase in line with that experienced in previous years.

HS2 continues to monitor air quality in line with the Local Air Quality Management requirements as set out in the HS2 Phase One Code of Construction Practice. HS2 has also been liaising with relevant local authorities that are introducing Ultra-Low Emission and Clean Air Zones. Furthermore, HS2 has published an Air Quality Action Plan outlining the commitments made, and progress thereof in the management of the significant effects identified in the Environmental Statement, as amended.

1 Introduction

1.1 Background and Introduction

1.1.1 High Speed Two (HS2) is the Government's proposal for a new, high speed national railway. HS2 Phase One will connect London with Birmingham and the West Midlands; with Phase 2 planned to extend the route to Manchester, Leeds and beyond.

1.1.2 The High Speed railway project is divided into 3 phases:

- Phase One linking London and the West Midlands;
- Phase 2a linking the West Midlands and the North via Crewe; and
- Phase 2b completing the railway to Manchester, the East Midlands and the North.

1.1.3 In November 2013, HS2 deposited a Hybrid Bill with Parliament to seek powers for the construction and operation of Phase One of HS2. Royal Assent was granted for Phase One in February 2017. The results of the Environmental Impact Assessment (EIA) were reported in an Environmental Statement (ES), as amended, which was submitted alongside the Bill, which resulted in the Secretary of State publishing the Environmental Minimum Requirements (EMRs), including the Code of Construction Practise (CoCP), which set out the environmental and sustainability commitments that will be observed in the construction of the Proposed Scheme.

1.1.4 The ES, as amended, prepared as part of the Bill included an assessment of the impacts of the Proposed Scheme on air quality during both construction and operation. The HS2 Air Quality Strategy and HS2 Air Quality Information Papers ¹ summarise the impacts identified in the ES, as amended.

1.1.5 The High Speed Rail (West Midlands - Crewe) Bill ('the Bill') was submitted to Parliament together with an ES ('the main ES') in July 2017. If enacted by Parliament, the Bill will provide the powers to construct, operate and maintain Phase 2a of HS2. Following the deposit of the Bill, the need for a number of amendments to the scheme (i.e., changes that require amendments to the Bill) was identified. These amendments were promoted in Parliament in March 2018 through an Additional Provision (referred to hereafter as 'AP1'), together with an ES ('the AP1 ES'). The AP1 ES was accompanied by a Supplementary ES ('the SES1'), which reported changes to the design which do not require amendments to the Bill, changes to construction assumptions, new environmental baseline information and corrections to the main ES.

¹ HS2 Phase One Information Paper E31: Air Quality https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/672406/E31_-_Air_Quality_v1.5.pdf and HS2 Phase 2a Information Paper E14: Air Quality https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828982/E14_Air_Quality_v1.2.pdf

- 1.1.6 In February 2019, the Supplementary Environmental Statement 2 and Additional Provisions 2 Environmental Statement (SES2 and AP2 ES) was submitted to Parliament in support of the Bill (Phase 2a). AP2 ES reports any likely significant environmental effects of the proposed amendments made to the scheme having taken into account the environmental information in the main ES as updated by SES1 and SES2, where appropriate. On 11 February 2021 Royal Assent was granted for HS2 Phase 2a, creating the High Speed Rail (West Midlands - Crewe) Act 2021.
- 1.1.7 This 2021 Annual Air Quality Report focusses on monitoring undertaken in the 2021 calendar year during Phase One construction works and Phase 2a baseline survey.
- 1.1.8 One of the key impacts of Phase One, identified in the ES, as amended, were the impacts from construction traffic and highway interventions. These impacts were predicted to result in temporary significant effects, along a limited number of roads within the Greater London Area, on local air quality. These effects are mostly from changes in nitrogen dioxide (NO₂) concentrations, and to a much less extent from variations in particulate matter less than 10 micrometres (µm) in diameter (PM₁₀).
- 1.1.9 Potential significant effects in Phase 2a, identified in the SES and AP2 ES, as a result of increased in NO₂ concentrations were identified at sensitive receptors close to the M6. Potential significant effects were predicted across the following local authority areas:
- Stafford seven (8) locations;
 - Newcastle-under-Lyme one (1) location; and
 - Cheshire East one (1) location.
- 1.1.10 NO₂ concentrations in these areas were predicted to exceed the air quality standard even without the Proposed Scheme.
- 1.1.11 The identified significant effects are largely as a result of the existing concentrations of air pollutants within the Greater London and M6 area already being above government air quality standards.

1.2 Management of Air Quality

- 1.2.1 The HS2 Air Quality Strategy and HS2 Air Quality Information Papers, summarise the air quality effects identified in the Environmental Statement, as amended, and set out HS2's approach for managing air quality, which includes the publication of an annual review of air quality.
- 1.2.2 In order to manage significant impacts related to highway traffic changes and interventions, HS2 committed to putting in place a process to manage those impacts through measurement and regular assessments of air quality during the construction of

the Proposed Scheme. Where significant effects are predicted, action plans will be put in place with the objective of removing those significant effects.

- 1.2.3 The HS2 Air Quality Action Plan (published in June 2019), is the first report that presents all the measures HS2 has committed to provide in relation to air quality, forming the baseline against which performance is compared in future years of construction and operation.
- 1.2.4 The management process is modelled on Defra's Local Air Quality Management (for which the statutory duties of local authorities and London boroughs are set out in Part IV of the Environment Act 1995), and the periodic reviews and action plans are envisaged as being similar to those produced in that process.
- 1.2.5 The management process comprises of measure – review – action plan. Baseline (pre-works) air quality monitoring is being undertaken in locations where potential significant effects have been predicted. Forecast baseline and 'with HS2 construction' traffic numbers used in the air quality modelling for the ES will be reviewed and updated in these locations, if necessary.
- 1.2.6 The baseline measurements will be reviewed, and an air quality assessment produced at appropriate stages of construction to determine whether significant effects are still predicted. Where significant effects are still predicted, the air quality monitoring will be continued, and an air quality action plan be developed, with the objective of removing the significant effects as soon and as far as practicable.

1.3 Purpose of this report

- 1.3.1 The first two annual reports published in 2018 (revised in 2019) focused on reporting monitoring data for air quality around highways and covered the 2016 period, based on 6 months of monitoring data and 2017 calendar year. These reports reviewed baseline conditions prior to the commencement of construction works².
- 1.3.2 The third, fourth and the fifth annual report focused on reporting monitoring data for air quality around highways, covering the 2018, 2019 and 2020 calendar years respectively, during the early stages of construction activity. This sixth report covers the 2021 calendar year, during construction activities in Phase One and baseline conditions prior to the full commencement of works in Phase 2a. This report provides a comparison with the information previously presented in the main ES air quality chapters.
- 1.3.3 This annual report is focused on reporting monitoring data for air quality around highways. The air pollutants considered in this report are NO₂ and particulate matter (PM). The area of focus is where significant effects were identified within the ES. These areas

² In some areas, survey work and ground investigation works were undertaken during 2016/2017. In addition, in the London Borough of Camden construction of housing to replace that which will be lost due to land required by HS2 was under construction during 2016/2017.

were within Greater London in Phase One and at sensitive receptors along the M6 in Phase 2a, as such the reporting of monitoring data is for these areas only. For other areas along the route, data from Defra and local authority monitoring surveys provides an indication of baseline. This data is not reproduced in this report and reference should be made to the relevant Defra and local authority publications and websites.

1.3.4 The impacts of Covid-19 national lockdowns, through the beginning of 2021, would have created lower traffic scenarios. As lockdown restrictions were lifted, it was expected that air pollution concentrations would increase in line with that experienced in previous years.

1.4 Summary of significant effects identified in the Environmental Statement

1.4.1 For the ES, calculations of changes in concentrations of NO₂ and PM₁₀ were calculated. Concentrations of particulate matter with a diameter of less than 2.5 µm (PM_{2.5}) were considered. The ES predicted that changes in traffic emissions during construction of the Proposed Scheme would give rise to significant effects from changes in annual mean NO₂ concentrations around certain construction traffic routes in the Greater London area in Phase One, and along the M6 in Phase 2a. Significant effects from changes in the 24-hour daily mean PM₁₀ concentrations were predicted, but this were limited to the area in the immediate vicinity of Euston Road in London.

1.4.2 For the ES, best practice guidance published by the Institute of Air Quality Management (IAQM) was used to determine if there were significant impacts anticipated for air quality. This guidance determines the significant effect based on the change in pollutant concentration due to the Proposed Scheme relative to pollutant concentration for the baseline situation. Where the existing air quality is already above government air quality standards, a relatively smaller change in pollution concentration is considered to be a significant effect, than where existing air quality is below government air quality standards.

1.4.3 Where an effect on air quality is described as significant at a particular location, with respect to the air quality legislation, this does not denote a significant effect on human health. Much larger changes in air quality than what is predicted as a consequence of the Proposed Scheme would be needed to cause significant impacts on health at the level of an individual person.

1.4.4 A summary of the number of receptors with significant effects predicted in the Phase One and Phase 2a ES are presented in Appendix A.

2 Air Quality monitoring data and comparison with the Air Quality Objectives and National Compliance

2.1 Pollutants

2.1.1 The main pollutants of concern for local air quality in relation to road traffic emissions are NO₂ and particulate matter (PM). Further details of each of these pollutants is given below.

Nitrogen dioxide (NO₂)

2.1.2 Nitrogen dioxide (NO₂) is a secondary pollutant produced by the oxidation of nitric oxide (NO). NO and NO₂ are collectively termed nitrogen oxides (NO_x). Almost a third of the UK NO_x emissions are from road transport. The majority of NO_x emitted from vehicles is in the form of NO, which oxidises rapidly in the presence of ozone (O₃) to form NO₂. In high concentrations, NO₂ can affect the respiratory system and can also enhance the response to allergens in sensitive individuals, whereas NO does not have any observable effect on human health at the range of concentrations found in ambient air. Elevated concentrations of NO_x can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from NO_x emissions contribute to acidification and/or eutrophication of sensitive habitats.

Particulate Matter (PM)

2.1.3 The principal sources of particles in the UK are combustion processes, which include traffic and industry. PM in vehicle exhaust gases consists of carbon nuclei onto which a wide range of compounds are absorbed. These particles have an effective aerodynamic diameter of less than 10 µm. Particles in this size range are referred to as PM₁₀. Finer size fractions are referred to as PM_{2.5}. These particles have an effective aerodynamic diameter of less than 2.5µm. Diesel engines produce the majority of particulate emissions from the vehicle fleets. Approximately an eighth of primary PM₁₀ emissions in the UK are derived from road transport³. PM is associated with a range of symptoms of ill health including effects on the respiratory and cardiovascular systems, on asthma and on mortality.

³ National Atmospheric Emissions Inventory (NAEI), BEIS (2019) <https://naei.beis.gov.uk/>

2.2 Summary of relevant legislation

2.2.1 Air quality monitoring data has been compared against limit values and objectives set out in the following legislation:

- The Air Quality (England) Regulations 2000⁴, Air Quality (England) (Amendment) Regulations 2002⁵, the Air Quality Standards Regulations 2010⁶ and the Air Quality Standards (Amendment) Regulations 2016⁷; and
- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe⁸.

2.2.2 Air quality limit values and objectives are quality standards that have been set for clean air and to protect human health. Some pollutants have standards expressed as annual average concentrations and others have standards expressed as 24-hour, 1-hour or 15-minute average concentrations. Some pollutants have standards expressed in terms of both long-term and short-term concentrations.

2.2.3 Table 1 sets out the EU air quality limit values and UK national air quality objectives for the pollutants NO₂ and PM₁₀ for which significant effects were identified. PM_{2.5} is also included for completeness. Within this report, the term ‘air quality standards’ refers to both the English air quality objectives and the air quality limit values introduced in the UK based on EU Directives.

Table 1: Relevant air quality standards

Pollutant	Averaging Period	Air Quality Standards
Nitrogen dioxide (NO ₂)	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual mean	40 µg/m ³
PM ₁₀	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual mean	40 µg/m ³
PM _{2.5}	Annual mean	25 µg/m ³ to be achieved by 2020
	3-year mean	Target of 15% reduction in concentration at urban background locations to be achieved between 2010 and 2020.

⁴ Department for Environment, Food and Rural Affairs, 2000, The Air Quality (England) Regulations 2000, The Stationery Office

⁵ Department for Environment, Food and Rural Affairs, 2002, The Air Quality (England) (Amendment) Regulations 2002, The Stationery Office

⁶ Department for Environment, Food and Rural Affairs, 2010, The Air Quality Standards Regulations 2010, The Stationery Office

Department for Environment, Food and Rural Affairs, 2016, The Air Quality Standards (Amendment) Regulations 2016, The Stationery Office

⁷ Department for Environment, Food and Rural Affairs, 2016, The Air Quality Standards (Amendment) Regulations 2016, The Stationery Office

⁸ Official Journal of the European Union, 2008, Directive 2008/50/EC of the European Parliament and of the Council of the 21 May 2008 on ambient air quality and cleaner air for Europe, EU

2.3 Summary of monitoring undertaken by HS2

- 2.3.1 All HS2 air quality monitoring surveys are intended to supplement air quality monitoring that is being undertaken by other parties such as Defra, local authorities and in some areas communities and academic institutions. Data from surveys undertaken by other parties is not reproduced within this report.
- 2.3.2 HS2 commenced a Phase One and Phase 2a baseline air quality survey at the end of June 2016 and January 2019 respectively in locations where there were predicted to be significant effects on air quality around highways. This baseline air quality survey measured annual mean NO₂, for which potential significant effects were predicted around certain construction traffic routes in the Greater London area and certain locations adjacent to the M6. The Phase One survey has continued throughout the initial enabling works phase and will be continued into the main works construction. The Phase 2a baseline survey commenced in January 2019 and will continue through early environmental works and into main works construction.
- 2.3.3 In relation to where significant effects were identified for PM₁₀ for air quality around highways, supplementary surveys are not being undertaken as existing monitoring sites operated by Defra and/or local authorities are considered to give sufficient coverage⁹.

2.4 Summary of NO₂ monitoring methodology

- 2.4.1 A survey of NO₂ concentrations using diffusion tubes commenced at the end of June 2016 for locations within Greater London, and at the beginning of January 2019 for locations along the M6 along the Phase 2a route. The surveys were planned, installed and is operated in accordance with Defra Local Air Quality Management Technical Guidance 2016 (LAQM.TG(16))¹⁰.
- 2.4.2 The sites selected for inclusion in the survey comprise of:
- Locations where the ES predicted significant effects;
 - Co-located locations at pre-existing long-term continuous monitoring sites, operated to European Union reference method standards for bias adjustment; and
 - Background and roadside sites where significant effects were not predicted to provide control locations not expected to be affected by the Proposed Scheme.
- 2.4.3 Diffusion tubes are a passive monitoring method, that has the benefit of not requiring mains power and can be deployed over a large number of locations. In accordance with Defra LAQM.TG (16) guidance, diffusion tubes are exposed for a 4 or 5 week period depending on the length of the month. The diffusion tubes are then collected and

⁹ HS2 are undertaking surveys of indicative PM₁₀ for the purposes of management of construction dust

¹⁰ Department for Environment, Food and Rural Affairs, 2018, Local Air Quality Management Technical guidance. Available at: <https://laqm.defra.gov.uk/technical-guidance/>

returned to the laboratory for analysis at the end of each month and new diffusion tubes are deployed for the next month.

2.4.4 In accordance with Defra LAQM.TG (16) guidance, NO₂ diffusion tube surveys aim for a minimum data capture of 75% for each site for each year of the survey (i.e. there needs to be 9 out of 12 months with valid data at each site). This gives some allowance for the diffusion tube at a site to go missing or be damaged for a given month.

2.4.5 Where data capture over the year is less than 75% a process of annualisation can be applied in accordance with Defra LAQM.TG (16) guidance to calculate an annual mean equivalent for the site based on the comparison of the months with available data against a full dataset for a long term fixed continuous monitoring site operated by Defra or local authorities.

2.4.6 A process of bias adjustment is also undertaken each year. Triplicate sets of diffusion tubes are co-located at long term fixed continuous monitoring sites operated by Defra or local authorities. The average concentration from the triplicate diffusion tubes is compared to the concentrations measured at the long term fixed continuous monitoring site and a correction factor is applied to all sites in the survey to bring these into line with the long term fixed continuous monitoring site.

2.4.7 Details of the diffusion tube locations included in the HS2 air quality monitoring surveys are given in the table in Appendix B and maps in Appendix G.

2.4.8 The diffusion tubes used for the survey period between January and December 2021 in Phase One were supplied by SOCOTEC UK Limited and in Phase 2a were supplied by Gradko International Limited. The diffusion tube preparation used was 20% triethanolamine (TEA) in de-ionised water¹¹.

Calculation of the annual mean NO₂ concentration

2.4.9 Data collected with the diffusion tubes for the January to December 2021 period were annualised and bias adjusted in accordance with Defra LAQM.TG (16) guidance.

2.4.10 Continuous monitoring data, used to annualise and bias adjust diffusion tube data, were downloaded from www.londonair.org.uk and www.airqualityengland.co.uk.

¹¹ The Gradko 20% TEA in water diffusion tubes have a grey cap. The SOCOTEC diffusion tubes contain 20% TEA in de-ionised water and have a black cap.

- 2.4.11 Diffusion tube data for January to December 2021 for Phase One were annualised in line with Defra LAQM.TG (16) guidance. The background¹² continuous monitoring sites Camden – Bloomsbury and Kensington and Chelsea – North Kensington were used to derive an annualisation factor for the Phase One data set. For Phase 2a, no monitoring sites had a data capture less than 75%, therefore no results were annualised.
- 2.4.12 Phase One bias adjustment factors for background, roadside and kerbside locations were derived using Defra’s local bias adjustment factors spreadsheet¹³. Bias adjustment factors were derived using the data from diffusion tubes co-located with automatic monitoring sites. The background sites used were Camden – Bloomsbury and Kensington and Chelsea – North Kensington. The roadside sites used were, Camden – Euston Road, Ealing – Hanger Lane, Ealing – Western Avenue, and Hillingdon – South Ruislip. The kerbside sites used were Camden – Swiss Cottage and Westminster – Marylebone Road. Further details on the continuous monitoring sites are available at www.londonair.org.uk and at www.airqualityengland.co.uk. The precision of the tubes (the difference between the triplicate tubes at each location) was represented by calculating the coefficient of variation. It is considered that if the average coefficient of variation is below 10 percent, the survey is of good precision. All sites were found to have good precision and therefore all sites were used for bias adjustment.
- 2.4.13 As there were no local continuous monitors for co-location of diffusion tubes in Phase 2a, the national bias adjustment factor was used for this survey analysis. The national bias adjustment factor for the latest published year (2020) was 0.81; the annual concentrations for all sites were therefore adjusted by multiplying by this factor.
- 2.4.14 Full details of the annualisation and bias adjustment factors calculated are presented in Appendix C.

2.5 HS2 NO₂ survey monitoring results

- 2.5.1 Full monitoring results for the air quality NO₂ diffusion tube surveys are presented in the tables in Appendix D and maps in Appendix G.

¹² Site location type are defined in Defra LAQM.TG(16):

- Kerbside sites are within one metre of the kerb of a busy road.
- Roadside sites are typically within one to five metres of the kerb of a busy road (although distance can be up to 15 m from the kerb in some cases).
- Background sites in urban areas are distanced from sources and therefore broadly representative of city-wide background conditions, such as urban residential areas.

¹³ Department of Environment, Food and Rural Affairs, 2011, local bias adjustment factors spreadsheet version 04. Available at: <https://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html>

2.6 Particulate Matter monitoring results

- 2.6.1 HS2 has not undertaken supplementary surveys for particulate matter around highways, as existing monitoring sites operated by Defra and/or local authorities are considered to give sufficient coverage for the areas over which significant effects were identified. The most recent monitoring data from relevant Defra and local authority monitoring sites are presented in the London Air Quality Network Summary Report 2020¹⁴, available at www.londonair.org.uk. The relevant monitoring sites are Camden – Bloomsbury, Camden – Euston Road, Camden – Swiss Cottage, Ealing – Hanger Lane, Ealing – Western Avenue, Kensington and Chelsea – North Kensington, Westminster – Marylebone Road and Hillingdon – South Ruislip (data for this site can be viewed and downloaded from www.airqualityengland.co.uk).
- 2.6.2 Dust is measured at appropriate locations at the construction site boundary and/or at sensitive receptors using instruments that provide continuous measurement of particulate matter as PM₁₀. As a minimum standard of measurement uncertainty, these instruments are certified through MCERTS as being indicative ambient particulate monitors. Monitoring is only undertaken at High or Medium dust risk sites, as determined through the Institute of Air Quality Monitoring (IAQM) Guidance on the assessment of dust from demolition and construction¹⁵.
- 2.6.3 Where monitoring is undertaken, monthly summary reports are produced and published at <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2> providing commentary on visual inspections and relevant trigger levels, and summary statistics for each monitoring site including max, min, mean, number of exceedances of the trigger level and line charts of monthly data relevant to the trigger level. The trigger level is set in accordance with the IAQM Guidance on monitoring in the vicinity of demolition and construction sites¹⁶.

¹⁴ Imperial College London, 2021, London Air Quality Network Summary Report 2020, October 2021.

¹⁵ IAQM Guidance on the assessment of dust from demolition and construction (Version 1.1 - 2014) <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

¹⁶ IAQM Guidance on Monitoring in the Vicinity of Demolition and Construction Sites (Version 1.1 – 2018)

3 Comparison to predictions in the Environmental Statement

3.1 Phase One

3.1.1 Appendix E presents a comparison between the calculated 2021 results, the modelled prediction for peak NO₂ annual mean concentrations from the ES for the scenario without and with the Proposed Scheme respectively in place¹⁷. Appendix F presents a comparison between the Phase One 2021 and previous years' monitored results.

3.1.2 This is an indicative comparison rather than an absolute one. There may be differences in the characteristics of the individual diffusion tube locations and the nearest receptor location assessed in the ES. For instance, receptor locations assessed in the ES were typically at the facades of properties adjacent to roads affected by the Proposed Scheme. However, due to the need to be able to access the sites to mount the diffusion tubes on a monthly basis, they have typically been located on publicly accessible street furniture such as lampposts and signposts. The diffusion tube locations are intended to be representative of exposure locations along roads where significant effects were predicted during construction. In some instances, they are closer to roads than the locations where the public would typically be exposed.

3.1.3 Where comparisons of monitoring data and modelling prediction results are undertaken, Defra LAQM.TG (16) guidance suggests that if the difference is less than $\pm 25\%$ then the comparison can be considered acceptable.

3.1.4 The 2017 'without scheme' comparison of the monitored results indicates that:

- Of the 116 locations where monitoring was undertaken in 2021, monitored concentrations from 6 tubes were within $\pm 25\%$ of the modelled concentrations.
- Where the comparison has a difference of more than $\pm 25\%$:
 - Modelled concentrations were higher than the monitored concentrations for 84 sites (99% of the overall sites), which were typically associated with locations on side streets away from major roads.
 - A further 22 tubes are not located in proximity to modelled receptors and thus have not undergone a comparison.
 - Four (4) new tubes were only installed in September 2021 along Victoria Road in the London Borough of Ealing and thus have not undergone a comparison.

¹⁷ Modelled annual mean NO₂ results are from the SES2 and AP3 Environmental Statement for locations east of the Edgware Road and from the SES and AP2 Environmental Statement for all other sites (predictions without Proposed Scheme concentrations are identical for the SES and AP2 and the SES3 and AP4 Environmental Statements).

3.1.5 The 'with scheme' comparison of the data from the closest representative modelled scenario from the main ES indicates that:

- Of the 116 locations where monitoring was undertaken in 2021, monitored concentrations from 5 tubes were within $\pm 25\%$ of the modelled concentrations.
- Where comparison has a difference of more than $\pm 25\%$:
 - Modelled concentrations were higher than the monitored concentrations for 85 sites (98% of the overall sites), which were typically associated with locations on side streets away from major roads.
 - A further 22 tubes are not located in proximity to modelled receptors and thus have not undergone a comparison.
 - Four (4) new tubes were only installed in September 2021 along Victoria Road in the London Borough of Ealing and thus have not undergone a comparison.

3.1.6 The key reasons for differences in the 2021 monitored annual mean NO₂ concentrations and the modelled annual mean NO₂ concentrations are as follows:

- For the ES modelling there was a more limited number of air quality monitoring sites available for model verification at the time the air quality modelling for the ES was undertaken;
- These sites were typically adjacent to high traffic roads recording concentrations well in excess of air quality standards;
- During 2021, due to the Covid-19 national lockdown measures and restrictions implemented at the beginning of the year, there were reduced vehicle movements;
- Monitoring sites representative of areas away from high traffic roads were limited so model performance in these areas could not be determined;
- This resulted in over adjustment of the air quality model for the locations away from high traffic roads and therefore higher predicted concentrations;
- For areas adjacent to high traffic flow roads and subject to congestion, the air quality modelling undertaken for the ES was not able to fully reflect the impacts of congestion¹⁸; and
- Policy changes and public awareness around Air Quality issues and concerns (i.e., in preparation for the London Low Emission Zone which came into effect in April 2019 and the implementation of the Ultra-Low Emission Zone in October 2021).

3.1.7 The ES determined significance of the air quality impacts based on the change in concentration relative to the modelled without Proposed Scheme concentrations. This approach and the relevant parameters to apply are set out in the Institute of Air Quality Management guidance, Planning for Air Quality (2017).

¹⁸ Where there is congestion the real-world speeds of traffic are typically lower than those that are used in the air quality model. A very detailed level of modelling is required to reflect congestion in an air quality model, which was not possible for the ES due to the large geographic area over which the air quality assessment was undertaken.

- 3.1.8 For the locations away from major roads where the modelled concentrations are higher than those monitored, then the modelling required a smaller change in concentrations due to the Proposed Scheme to give a significant effect. On this basis the modelling for the ES gave a worst-case view of the significant effects due to the Proposed Scheme.
- 3.1.9 For locations adjacent to high traffic flow roads, where the monitored concentrations were higher than the modelled concentrations, the modelled concentrations were higher than air quality standards so the changes in concentrations required for a significant effect is already small. On this basis the modelling or the ES did not underestimate the significant effects due to the Proposed Scheme for these locations.
- 3.1.10 Of the 116 diffusion tube monitoring locations in 2021, 91 locations indicated a reduction in monitored concentrations between 2020 and 2021, with 21 locations indicating a slight increase in monitored concentrations, and 4 locations not included due to their deployed only being from September 2021. Increases between 2020 and 2021 may be linked to the significant reduction in traffic as a result of the Covid-19 national lockdown in 2020. The number of locations at which the monitored concentrations exceeded the Air Quality Objective decreased between 2020 and 2021. No additional locations are reporting an exceedance with the Air Quality Objective. Five (5) new locations noted compliance with the Air Quality Objective when compared to the 2020 monitoring results.

3.2 Phase 2a

- 3.2.1 Appendix F presents the Phase 2a 2021 monitored results. There were ten (10) monitoring sites installed across the three study areas close to the M6 in Stafford, Newcastle-under-Lyme and Cheshire East, including:
- South-west of Stafford: eight (8) sites;
 - Madeley Health: one (1) site; and
 - Oakhanger: one (1) site.
- 3.2.2 Measurements of NO₂ concentrations were obtained on a monthly basis in 2021 and analysis was undertaken to compare data collated against the annual mean air quality standard of 40µg/m³.
- 3.2.3 Measured NO₂ concentrations were well below the annual mean air quality standard of 40µg/m³ at all sites.
- 3.2.4 During 2021, due to the Covid-19 national lockdown measures and restrictions implemented at the beginning of the year, there were reduced vehicle movements.

4 Actions to improve air quality

4.1 Proposed actions

4.1.1 In developing an air quality action plan for the Proposed Scheme HS2 have already made commitments to measures to reduce emissions generated by construction activities. These measures are set out in the HS2 Phase 1 Code of Construction Practice (CoCP) and HS2 Air Quality Information Papers (E31: Phase One and E14: Phase 2a).

4.1.2 These measures include:

- Construction vehicle emission standards requirements and methods to manage their use via traffic management plans;
- Non-Road Mobile Machinery (NRMM) emission standard requirements; and
- Dust mitigation measures as set out in the CoCP.

4.2 Phase One progress and impact of measures to address Air Quality

4.2.1 Phase One is still currently in the construction period. The year 2016 is considered a baseline period. The year 2017 also provides further baseline data due to the limited number of construction activities occurring during the year. The years 2018 to 2020 are representative of the enabling works and therefore early construction.

4.2.2 Phase One Information Paper E31: Air Quality sets out the HS2 emission standards for construction vehicle emissions, NRMM and dust management. The construction vehicle standards in Phase One came into effect on 14 September 2017 with the commencement of early works, including ground investigation surveys, land preparation works, ecological surveys, etc.

4.2.3 As Phase 2a commences into early environmental works, emission standards for construction vehicle emissions, NRMM and dust management will similarly be applied as in Phase One. Phase 2a Information Paper E14: Air Quality sets out these HS2 emission standards applicable from the start of works.

Vehicle and NRMM Emission Compliance

4.2.4 The HS2 Phase One route is divided into 3 areas to show compliance, Area North, Central and South, where:

- Area North begins south of Long Itchington Wood tunnel (south of Warwick) and proceeds to the Birmingham Interchange and Curzon Street Stations, to Handsacre where it connects with the West Coast Main Line at Lichfield.

- Area Central extends from the Colne valley viaduct and Chiltern Tunnels, through to the North Portal Chiltern tunnels to Brackley, to the Itchington Green Tunnel, south portal area.
- Area South covers the Central Activity Zone (CAZ) (including Euston) and the Greater London Area.

4.2.5 The Phase One Area targets and requirements are presented in Table 2. Opportunities for Heavy Goods Vehicle (HGV) exemptions are made available to all contractors on the grounds of specialism, triviality or unforeseen circumstances. HS2 have committed to granting no more than 8% unique vehicle exemptions, across the Phase One route, on an annual basis.

Table 2: Construction Vehicle Emission Targets and Requirements

Vehicle Class & Minimum Vehicle Emission Standard	Area South	Rest of Route (Area Central and Area North)
Heavy Goods Vehicles (HGVs) <ul style="list-style-type: none"> • Euro VI 	Target – 100% from start of works	Target – 100% from start of works
	Requirement – 100% from start of works	Requirement – as far as reasonably practicable, 100%
Light Duty Vehicles (LDVs) <ul style="list-style-type: none"> • Euro 6 Diesel • Euro 4 Petrol 	Target – 100% from start of works	Target – 80% from start of works
	Requirement – 100% from 2021	Requirement – 100% from 2021
Exemptions	No more than 8% of unique vehicles on an annual basis	

4.2.6 Similar to HGV and LDVs, NRMM (of a net power between 37kW and 560kW) are categorised based on their emissions. HS2 committed to stricter requirements than the London Supplementary Planning Guidance (SPG) which includes requirements for NRMM used within Greater London and the Central Activity Zone to be of a certain standard, dependant on the year of use. The NRMM emission targets that HS2 has committed to are presented in Table 3.

Table 3: NRMM Emission Requirements

Area	London SPG Stage Requirements		HS2 Requirements	
	From 2015	From Sept 2020	From 2017	From 2020 (*)
Central Activity Zone (includes Euston)	Stage IIIB	Stage IV	Stage IV ^(1,2)	Stage V
Rest of Greater London	Stage IIIA	Stage IIIB	Stage IIIB ⁽²⁾	Stage IV ^(1,2)
Rest of Country	Not Applicable	Not Applicable	Stage IIIB ⁽²⁾	Stage IV ^(1,2)

4.2.7 The 2021 vehicle and NRMM emission compliance figures are presented in Table 4.

Table 4: Vehicle Emission Targets and Requirements

Area	Category	Requirement	Compliance Achieved
Area North	LDV	100%*	89.2%
	HGV	100%	99.8%
	NRMM	100%	100%
Area Central	LDV	100%*	92.7%
	HGV	100%	99.6%
	NRMM	100%	99.6%
Area South	LDV	100%*	97.3%
	HGV	100%	99.9%
	NRMM (CAZ)	100%	100%
	NRMM (Greater London)	100%	100%

** As a result of national Covid-19 lockdown measures and restrictions, staff used personal vehicles to move between sites and locations, following guidance to avoid the use of public transport. As lockdown restrictions have lifted, so too have LDV compliance rates.*

Innovations

- 4.2.8 Through 2021, HS2 has continued to work with key partners within the industry in considering innovative means to reducing air quality emissions associated with our works. Many of these projects are still ongoing, as key milestones are met these will be publicly shared¹⁹.
- 4.2.9 Some of these projects include:
- Construction Equipment Association Emissions Compliance Verification System;
 - NRMM emission reduction project and NRMM retrofit solutions;
 - Clean Air Gas Engine (CAGE) trials;
 - Alternative / Biofuel trials;
 - Continued deployment of low / zero emitting plant and;
 - Hydrogen focused opportunities.
- 4.2.10 HS2 has also demonstrated innovation through the continued deployment and use of construction equipment with either zero (0) or significantly lower NO_x emissions. Some aspects of construction have been undertaken using electric equipment and hybrid excavators, further reducing pollutant emissions from this site.
- 4.2.11 HS2 will continue to monitor air quality in line with the LAQM requirements as set out in the CoCP. In consideration of potential future local authority designated Clean Air Zones, HS2 has also been liaising with relevant local authorities and will consider these in future annual air quality reports. Furthermore, HS2 has published an Air Quality Action Plan to outline commitments made, and progress thereof in the management of the significant effects identified in the ES.

¹⁹ HS2 and Air Quality Webpage: <https://www.hs2.org.uk/in-your-area/managing-impacts-of-construction/hs2-and-air-quality/>

Appendix A – Summary of receptors with significant effects predicted in the ES

Phase One

The number of receptors with significant effects in Phase One is presented in Table 5. This has been calculated from the annual mean NO₂ modelling results presented in the ES, as amended. These calculations are a combination of results from the Supplementary Environmental Statement (SES) and Additional Provision (AP) 2, SES2 and AP3, SES3 and AP4. Air quality modelling was not undertaken for the SES4 and AP5 ES. The calculations use the latest reported modelling result for each receptor.

Table 5: Summary of number of receptors modelled in the ES with adverse and beneficial significant effects for Greater London area

Significant Effect	Air Quality Impact Descriptor	Number of Receptors
Significant adverse	Substantial adverse	227
Significant adverse	Moderate adverse	199
Not significant	Slight adverse	10
Not significant	Negligible	241
Not significant	Slight beneficial	10
Significant beneficial	Moderate beneficial	39
Significant beneficial	Substantial beneficial	31
Total number of receptors		757

Phase 2a

Significant effects in Phase 2a were predicted at 10 residential receptors for NO₂ concentrations near the M6. Potential significant effects were predicted across the following local authority areas:

- Stafford eight (8) locations;
- Newcastle-under-Lyme one (1) location; and
- Cheshire East one (1) location.

NO₂ concentrations in these areas were predicted to exceed the air quality standard even without the Proposed Scheme.

Appendix B – HS2 Air Quality monitoring survey locations

Tables 6 and 7 give details of the locations included in the HS2 NO₂ diffusion tube surveys during 2021 for Phase One and Phase 2a respectively. Appendix G presents maps of the locations, labelled with the site ID, colour coded based on the measured concentration.

Table 6: Details of HS2 Phase One air quality NO₂ diffusion tube monitoring survey locations

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Roadside	530436	182929	2.3	Predicted significant effect
HS2-000020BM7	Camden Council	Chalton Street	Roadside	529894	182702	2.3	Predicted significant effect
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Roadside	529737	182641	2.3	Predicted significant effect
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Roadside	529785	182529	2.4	Predicted significant effect
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Roadside	529429	182375	2.5	Predicted significant effect
HS2-000020BMB	Camden Council	Whitfield Street	Background	529273	182114	2.5	Predicted significant effect
HS2-000020BMC	Camden Council	Hampstead Road	Roadside	529232	182511	2.3	Predicted significant effect
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Roadside	528776	182170	2.3	Predicted significant effect
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Roadside	528901	182180	2.3	Predicted significant effect
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Background	529715	183123	2.5	Predicted significant effect
HS2-000020BMH	Camden Council	Nash Street	Background	528861	182717	2.5	Predicted significant effect
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Background	529080	182698	2.5	Predicted significant effect
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Roadside	529196	183546	2.5	Predicted significant effect
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Background	529093	183356	2.5	Predicted significant effect
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Roadside	529084	183722	2.5	Predicted significant effect
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Roadside	528850	183573	2.5	Predicted significant effect
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Roadside	528662	183604	2.5	Predicted significant effect
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Background	528548	183967	2.5	Predicted significant effect
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Roadside	528685	184188	2.5	Predicted significant effect
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Kerbside	529079	184043	2.3	Predicted significant effect
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Roadside	527783	185407	2.5	Predicted significant effect
HS2-000020BMV	Camden Council	Primrose Hill Road	Roadside	527538	184250	2.5	Predicted significant effect
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road	Roadside	526619	184081	2.3	Predicted significant effect
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Roadside	527206	182887	2.3	Predicted significant effect
HS2-000020BMY	Westminster City Council	Lamp post between Blomfield Road and Edgware Road	Roadside	526549	182226	2.3	Predicted significant effect
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Roadside	525102	186042	2.3	Predicted significant effect

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Roadside	523998	180160	2.5	Predicted significant effect
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Roadside	523092	181264	2.5	Predicted significant effect
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Roadside	522335	182955	2.5	Predicted significant effect
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Roadside	521625	180871	2.3	Predicted significant effect
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Roadside	521443	182477	2.3	Predicted significant effect
HS2-000020BN7	Ealing Council	The Approach street sign	Roadside	520959	181102	2.3	Predicted significant effect
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Roadside	527884	183980	2.5	Predicted significant effect
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Background	528528	183443	2.5	Predicted significant effect
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Kerbside	528276	182185	2.5	Predicted significant effect
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Roadside	523110	184055	2.5	Predicted significant effect
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Kerbside	528763	183720	2.5	Predicted significant effect
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Roadside	527359	182633	2.3	Predicted significant effect
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background	526914	182077	2.3	Background not affected by scheme
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background	530744	181308	2.5	Background not affected by scheme
HS2-000020BNQ	Camden Council	Camley Street	Background	529735	183737	2.3	Background not affected by scheme
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background	523481	179871	2.5	Background not affected by scheme
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background	522196	184448	2.5	Background not affected by scheme
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background	509678	187214	2.5	Background not affected by scheme
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside	505492	183926	2.5	Roadside not affected by scheme
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside	509439	187117	2.3	Roadside not affected by scheme
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside	507365	182687	2.5	Roadside not affected by scheme
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside	524839	185136	2.5	Roadside not affected by scheme
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside	528050	185508	2.5	Roadside not affected by scheme
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside	529708	184871	2.3	Roadside not affected by scheme
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside	528597	180942	2.3	Roadside not affected by scheme

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside	531149	181616	2.5	Roadside not affected by scheme
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Kerbside	528125	182016	2.5	Colocation kerbside
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Kerbside	526633	184392	3.0	Colocation kerbside
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Roadside	529895	182657	2.5	Colocation roadside
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Roadside	520430	181950	2.0	Colocation roadside
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyratory roadside automatic monitoring station	Roadside	518537	182708	2.0	Colocation roadside
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Roadside	510858	184916	2.5	Colocation roadside
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Background	530120	182034	2.5	Colocation background
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Background	524045	181752	2.5	Colocation background
HS2-000020BPB	Camden Council	Camden High Street	Roadside	528966	183735	2.3	Predicted significant effect
HS2-000020BPC	Camden Council	Castlehaven Road	Background	528788	184591	2.5	Predicted significant effect
HS2-000020BPD	Camden Council	Prince of Wales Road	Roadside	528571	184683	2.5	Predicted significant effect
HS2-000020BPE	Camden Council	Haverstock Hill	Roadside	527710	184749	2.5	Predicted significant effect
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Background	527549	184640	2.5	Predicted significant effect
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Roadside	527019	182748	2.3	Predicted significant effect
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Roadside	526818	183164	2.3	Predicted significant effect
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Roadside	506542	186037	2.2	Predicted significant effect
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Roadside	506240	185660	2.3	Predicted significant effect
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background	525222	183309	2.5	Background not affected by scheme
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Roadside	506767	186224	2.3	Predicted significant effect
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Roadside	523792	181066	2.5	Predicted significant effect

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Roadside	522378	182877	2.5	Predicted significant effect
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Roadside	523763	181172	2.5	Predicted significant effect
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbroke Grove, south of A404 Harrow Road	Roadside	523886	182358	2.5	Predicted significant effect
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Roadside	522478	182517	2.5	Predicted significant effect
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Roadside	529476	182267	2.5	Predicted significant effect
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Roadside	528939	183637	2.5	Predicted significant effect
HS2-000020BPX	Camden Council	Netley Street	Background	529177	182625	2.5	Predicted significant effect
HS2-000020BPY	Camden Council	Stanhope Street	Background	529060	182947	2.5	Predicted significant effect
HS2-000020BPZ	Camden Council	Albany Street	Roadside	528790	182923	2.5	Predicted significant effect
HS2-000020BQ0	Camden Council	Werrington Street	Background	529493	183113	2.3	Predicted significant effect
HS2-000020BQ1	Camden Council	Polygon Road	Background	529574	183045	2.5	Predicted significant effect
HS2-000020BQ2	Camden Council	Alexandra Place	Background	526320	183980	2.5	Predicted significant effect
HS2-000020BQ3	Camden Council	Harrington Square	Kerbside	529228	183172	2.5	Predicted significant effect
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Background	529290	182572	2.5	Predicted significant effect
HS2-000020BQ5	Camden Council	Adelaide Road	Roadside	527713	184392	2.7	Predicted significant effect
HS2-000020BQ6	Camden Council	Mornington Terrace	Background	528836	183474	2.5	Predicted significant effect
HS2-000020BQ7	Camden Council	Arlington Road	Background	529009	183479	2.5	Predicted significant effect
HS2-000020BQ8	Camden Council	Clarkson Row	Background	529024	183213	2.5	Predicted significant effect
HS2-000020BQ9	Camden Council	Park Village East	Background	528923	183121	2.5	Predicted significant effect
HS2-000020BQA	Camden Council	Eversholt Street	Kerbside	529386	183132	2.5	Predicted significant effect
HS2-000020BQB	Camden Council	Junction of Harrington Street and Varndell Street	Background	529147	182816	2.5	Predicted significant effect
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Kerbside	529199	182704	2.5	Predicted significant effect
HS2-000020BQD	Camden Council	Drummond Crescent	Background	529648	182856	2.5	Predicted significant effect
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Background	521996	181118	2.5	Predicted significant effect
HS2-000020BQF	Ealing Council	Conway Drive sign post	Roadside	520856	181733	2.5	Predicted significant effect

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
HS2-000020BQG	Ealing Council	Lamp post outside No 1. Wells House Road on Old Oak Common Lane	Roadside	521312	182033	2.5	Predicted significant effect
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Roadside	508451	186879	2.4	Predicted significant effect
HS2-000020BQJ	Camden Council	Grafton Way	Background	529380	182225	2.5	Predicted significant effect
HS2-000020BQL	Camden Council	Delancey Street	Roadside	528768	183581	2.4	Predicted significant effect
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Roadside	506176	185444	2.4	Predicted significant effect
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Roadside	507614	184663	2.1	Predicted significant effect
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbrooke Grove, near shops and bus stop at Trevorton Road junction	Kerbside	524036	182034	2.1	Predicted significant effect
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Background	528682	183505	2.4	Predicted significant effect
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Background	529670	182982	2.3	Predicted significant effect
HS2-000020BQT	Camden Council	Drummond Street	Background	529385	182581	2.2	Predicted significant effect
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Kerbside	527048	181731	2.2	Predicted significant effect
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Kerbside	523838	180606	2.4	Predicted significant effect
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road <i>(replaced HS2-000020BNA)</i>	Kerbside	522037	179209	2.2	Predicted significant effect
HS2-000020BQX	Camden Council	Lamp Post on Brunswick Square <i>(replaced HS2-000020BM6)</i>	Roadside	530344	182236	2.5	Predicted significant effect
HS2-000020BQY	Westminster City Council	Sign post on Ladbrooke Gove	Roadside	523867	182466	2.5	Predicted significant effect
HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Kerbside	521354	182425	2.2	Predicted significant effect
HS2-000029BR0	Ealing Council	Sign post on Shaftesbury Gardens	Roadside	521295	182354	2.2	Predicted significant effect
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Background	521263	182298	2.2	Predicted significant effect
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Roadside	520702	181844	2.2	Predicted significant effect

Table 7: Details of HS2 Phase 2a air quality NO₂ diffusion tube monitoring survey locations

Site ID	Local authority	Site location	Location type	X coordinate	Y coordinate	Height (m)	Site purpose
1	Staffordshire	South-west of Stafford (CA2) – Ashflats Lane	Roadside	392247	319432	2.0	Predicted significant effect
2	Staffordshire	South-west of Stafford (CA2) – Ash Rise	Suburban	392355	319784	2.0	Predicted significant effect
3	Staffordshire	South-west of Stafford (CA2) – Barn Bank Lane	Suburban	392217	319929	2.0	Predicted significant effect
4	Staffordshire	South-west of Stafford (CA2) – Southfields Close	Suburban	391894	320423	2.0	Predicted significant effect
5	Staffordshire	South-west of Stafford (CA2) – Devon Way	Suburban	391717	320592	2.0	Predicted significant effect
6	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road E	Roadside	391559	320699	2.1	Predicted significant effect
7	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road W	Kerbside	391539	320634	2.15	Predicted significant effect
8	Staffordshire	South-west of Stafford (CA2) – Crinan Grove	Suburban	391498	320799	2.0	Predicted significant effect
9	Newcastle under Lyme	Madeley Heath (CA4) – Newcastle Road	Roadside	378110	345523	2.15	Predicted significant effect
10	Cheshire East Council	Oakhanger (CA5) – Nursery Road	Rural	377035	355030	2.0	Predicted significant effect

Appendix C – Annualisation and bias adjustment of NO₂ diffusion tubes

Table 8: Annualisation and bias adjustment factors applied to each monitoring site across Phase One

Site ID	Local authority	Site location	Location type	2021 annualisation factor ²⁰	2021 bias adjustment factor
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Roadside	Not annualised	0.79
HS2-000020BM6	Camden Council	Brunswick Square	Roadside	Location replaced by HS2-000020BQX	
HS2-000020BM7	Camden Council	Chalton Street	Roadside	0.9837	0.79
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Roadside	Not Annualised	0.79
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Roadside	Not Annualised	0.79
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Roadside	Not Annualised	0.79
HS2-000020BMB	Camden Council	Whitfield Street	Background	Not Annualised	0.80
HS2-000020BMC	Camden Council	Hampstead Road	Roadside	Not Annualised	0.79
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Roadside	Not Annualised	0.79
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Roadside	Not Annualised	0.79
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Background	Not Annualised	0.80
HS2-000020BMH	Camden Council	Nash Street	Background	Not Annualised	0.80
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Background	Not Annualised	0.80
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Roadside	Not Annualised	0.79
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Background	Not Annualised	0.80
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Roadside	Not Annualised	0.79
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Roadside	Not Annualised	0.79
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Roadside	Not Annualised	0.79
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Background	Not Annualised	0.80
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Roadside	Not Annualised	0.79
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Kerbside	Not Annualised	0.77
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Roadside	Not Annualised	0.79
HS2-000020BMV	Camden Council	Primrose Hill Road	Roadside	Not Annualised	0.79
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road	Roadside	Not Annualised	0.79
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Roadside	Not Annualised	0.79
HS2-000020BMY	Westminster City Council	Lamp post between Blomfield Road and Edgware Road	Roadside	Not Annualised	0.79
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Roadside	Not Annualised	0.79
HS2-000020BN0	Westminster City Council	Lamp post on Ladbroke Grove	Roadside	Location replaced by HS2-000020BQZ	
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Roadside	Not Annualised	0.79

²⁰ Sites have not been annualised where there is greater than 75% or less than 25% data capture

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annualisation factor ²⁰	2021 bias adjustment factor
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Roadside	Not Annualised	0.79
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Roadside	Not Annualised	0.79
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Roadside	Not Annualised	0.79
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Roadside	Not Annualised	0.79
HS2-000020BN7	Ealing Council	The Approach street sign	Roadside	Not Annualised	0.79
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Roadside	Not Annualised	0.79
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Background	Not Annualised	0.80
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Kerbside	Not Annualised	0.77
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Roadside	Not Annualised	0.79
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Kerbside	Not Annualised	0.77
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Roadside	Not Annualised	0.79
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background	Not Annualised	0.80
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background	Not Annualised	0.80
HS2-000020BNQ	Camden Council	Camley Street	Background	0.9898	0.80
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background	Not Annualised	0.80
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background	Not Annualised	0.80
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background	Not Annualised	0.80
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside	Not Annualised	0.79
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside	1.0179	0.79
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside	Not Annualised	0.79
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside	Not Annualised	0.79
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside	Not Annualised	0.79
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside	Not Annualised	0.79
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside	Not Annualised	0.79
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside	Not Annualised	0.79
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Kerbside	Not Annualised	0.77
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Kerbside	1.1080	0.77
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Roadside	Not Annualised	0.79
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Roadside	Not Annualised	0.79
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyrotary roadside automatic monitoring station	Roadside	Not Annualised	0.79
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Roadside	Not Annualised	0.79

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annualisation factor ²⁰	2021 bias adjustment factor
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Background	Not Annualised	0.80
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Background	Not Annualised	0.80
HS2-000020BPB	Camden Council	Camden High Street	Roadside	Not Annualised	0.79
HS2-000020BPC	Camden Council	Castlehaven Road	Background	Not Annualised	0.8
HS2-000020BPD	Camden Council	Prince of Wales Road	Roadside	Not Annualised	0.79
HS2-000020BPE	Camden Council	Haverstock Hill	Roadside	Not Annualised	0.79
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Background	Not Annualised	0.80
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Roadside	Not Annualised	0.79
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Roadside	Not Annualised	0.79
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Roadside	Not Annualised	0.79
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Roadside	Not Annualised	0.79
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background	Not Annualised	0.80
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Roadside	Not Annualised	0.79
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Roadside	Not Annualised	0.79
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Roadside	Not Annualised	0.79
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Roadside	Not Annualised	0.79
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbroke Grove, south of A404 Harrow Road	Roadside	Not Annualised	0.79
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Roadside	Not Annualised	0.79
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Roadside	Not Annualised	0.79
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Roadside	Not Annualised	0.79
HS2-000020BPX	Camden Council	Netley Street	Background	Not Annualised	0.80
HS2-000020BPY	Camden Council	Stanhope Street	Background	Not Annualised	0.80
HS2-000020BPZ	Camden Council	Albany Street	Roadside	Not Annualised	0.79
HS2-000020BQ0	Camden Council	Werrington Street	Background	Not Annualised	0.80
HS2-000020BQ1	Camden Council	Polygon Road	Background	Not Annualised	0.80
HS2-000020BQ2	Camden Council	Alexandra Place	Background	Not Annualised	0.80
HS2-000020BQ3	Camden Council	Harrington Square	Kerbside	Not Annualised	0.77
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Background	Not Annualised	0.80
HS2-000020BQ5	Camden Council	Adelaide Road	Roadside	Not Annualised	0.79
HS2-000020BQ6	Camden Council	Mornington Terrace	Background	Not Annualised	0.80
HS2-000020BQ7	Camden Council	Arlington Road	Background	Not Annualised	0.80
HS2-000020BQ8	Camden Council	Clarkson Row	Background	Not Annualised	0.80
HS2-000020BQ9	Camden Council	Park Village East	Background	Not Annualised	0.80
HS2-000020BQA	Camden Council	Eversholt Street	Kerbside	Not Annualised	0.77

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annualisation factor ²⁰	2021 bias adjustment factor
HS2-000020BQB	Camden Council	Junction of Harrington Street and Varndell Street	Background	Not Annualised	0.8
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Kerbside	Not Annualised	0.77
HS2-000020BQD	Camden Council	Drummond Crescent	Background	Not Annualised	0.80
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Background	Not Annualised	0.80
HS2-000020BQF	Ealing Council	Conway Drive sign post	Roadside	Not Annualised	0.79
HS2-000020BQG	Ealing Council	Lamp post outside No 1. Wells House Road on Old Oak Common Lane	Roadside	Not Annualised	0.79
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Roadside	Not Annualised	0.79
HS2-000020BQJ	Camden Council	Grafton Way	Background	Not Annualised	0.80
HS2-000020BQL	Camden Council	Delancey Street	Roadside	Not Annualised	0.79
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Roadside	Not Annualised	0.79
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Roadside	Not Annualised	0.79
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbroke Grove, near shops and bus stop at Trevorton Road junction	Kerbside	Not Annualised	0.77
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Background	Not Annualised	0.80
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Background	Not Annualised	0.80
HS2-000020BQT	Camden Council	Drummond Street	Background	Not Annualised	0.80
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Kerbside	Not Annualised	0.77
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Kerbside	Not Annualised	0.77
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road <i>(replaced HS2-000020BNX)</i>	Kerbside	Not Annualised	0.77
HS2-000020BQX	Camden Council	Lamp Post on Brunswick Square <i>(replaced HS2-000020BM6)</i>	Roadside	Not Annualised	0.79
HS2-000020BQY	Westminster City Council	Sign post on Ladbroke Grove <i>(replaced HS2-000020BN0)</i>	Roadside	Not Annualised	0.79
HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Kerbside	0.9201	0.77
HS2-000029BR0	Ealing Council	Sign post on Shaftesbury Gardens	Roadside	0.9201	0.79
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Background	0.9201	0.80
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Roadside	0.9244	0.79

Table 9: Annualisation and bias adjustment factors applied to each monitoring site across Phase 2a

Site ID	Local authority	Site location	Site location type	2021 annualisation factor ²¹	2020 bias adjustment factor
1	Staffordshire	South-west of Stafford (CA2) – Ashflats Lane	Roadside	Not Annualised	0.81
2	Staffordshire	South-west of Stafford (CA2) – Ash Rise	Suburban	Not Annualised	0.81
3	Staffordshire	South-west of Stafford (CA2) – Barn Bank Lane	Suburban	Not Annualised	0.81
4	Staffordshire	South-west of Stafford (CA2) – Southfields Close	Suburban	Not Annualised	0.81
5	Staffordshire	South-west of Stafford (CA2) – Devon Way	Suburban	Not Annualised	0.81
6	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road E	Roadside	Not Annualised	0.81
7	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road W	Kerbside	Not Annualised	0.81
8	Staffordshire	South-west of Stafford (CA2) – Crinan Grove	Suburban	Not Annualised	0.81
9	Newcastle under Lyme	Madeley Heath (CA4) – Newcastle Road	Roadside	Not Annualised	0.81
10	Cheshire East Council	Oakhanger (CA5) – Nursery Road	Rural	Not Annualised	0.81

²¹ Sites have not been annualised where there is greater than 75% or less than 25% data capture

Appendix D – Air Quality Monitoring Results

HS2 NO₂ diffusion tube results

Table 10: Annual mean Phase One NO₂ monitoring results for 2021

Site ID	Local authority	Site location	Location type	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Roadside	31.3
HS2-000020BM6	Camden Council	Brunswick Square	Roadside	Site replaced by HS2-000020BQX
HS2-000020BM7	Camden Council	Chalton Street	Roadside	36.5
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Roadside	37.2
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Roadside	35.9
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Roadside	35.0
HS2-000020BMB	Camden Council	Whitfield Street	Background	27.3
HS2-000020BMC	Camden Council	Hampstead Road	Roadside	51.7
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Roadside	37.2
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Roadside	49.8
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Background	23.5
HS2-000020BMH	Camden Council	Nash Street	Background	23.6
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Background	27.3
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Roadside	35.2
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Background	23.9
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Roadside	38.6
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Roadside	24.8
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Roadside	32.8
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Background	25.4
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Roadside	32.6
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Kerbside	33.3
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Roadside	28.8
HS2-000020BMV	Camden Council	Primrose Hill Road	Roadside	25.9
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road32	Roadside	38.9
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Roadside	26.8
HS2-000020BMY	Westminster City Council	Lamp post54 between Blomfield Road and Edgware36 Road	Roadside	32.7
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Roadside	48.1

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)
HS2-000020BN0	Westminster City Council	Lamp post on Ladbroke Grove	Roadside	Site replaced by HS2-000020BQY
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Roadside	33.3
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Roadside	34.8
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Roadside	41.5
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Roadside	35.2
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Roadside	39.3
HS2-000020BN7	Ealing Council	The Approach street sign	Roadside	36.4
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Roadside	22.8
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Background	19.8
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Kerbside	22.5
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Roadside	28.9
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Kerbside	26.0
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Roadside	32.9
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background	24.4
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background	24.5
HS2-000020BNQ	Camden Council	Camley Street	Background	27.6
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background	27.3
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background	20.6
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background	21.0
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside	33.9
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside	29.9
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside	33.1
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside	29.2
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside	24.8
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside	39.4
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside	33.9
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside	27.5
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Kerbside	46.3
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Kerbside	42.3
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Roadside	46.7
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Roadside	35.9

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyrotory roadside automatic monitoring station	Roadside	48.6
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Roadside	26.5
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Background	24.4
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Background	21.6
HS2-000020BPB	Camden Council	Camden High Street	Roadside	45.1
HS2-000020BPC	Camden Council	Castlehaven Road	Background	24.3
HS2-000020BPD	Camden Council	Prince of Wales Road	Roadside	20.7
HS2-000020BPE	Camden Council	Haverstock Hill	Roadside	27.3
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Background	25.8
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Roadside	27.2
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Roadside	28.0
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Roadside	27.7
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Roadside	28.1
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background	20.5
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Roadside	25.8
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Roadside	26.5
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Roadside	34.6
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Roadside	26.8
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbrooke Grove, south of A404 Harrow Road	Roadside	32.4
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Roadside	32.6
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Roadside	31.2
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Roadside	29.0
HS2-000020BPX	Camden Council	Netley Street	Background	27.1
HS2-000020BPY	Camden Council	Stanhope Street	Background	24.0
HS2-000020BPZ	Camden Council	Albany Street	Roadside	24.1
HS2-000020BQ0	Camden Council	Werrington Street	Background	21.0
HS2-000020BQ1	Camden Council	Polygon Road	Background	21.4
HS2-000020BQ2	Camden Council	Alexandra Place	Background	22.2
HS2-000020BQ3	Camden Council	Harrington Square	Kerbside	33.1
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Background	27.0
HS2-000020BQ5	Camden Council	Adelaide Road	Roadside	25.3

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)
HS2-000020BQ6	Camden Council	Mornington Terrace	Background	22.0
HS2-000020BQ7	Camden Council	Arlington Road	Background	22.4
HS2-000020BQ8	Camden Council	Clarkson Row	Background	25.0
HS2-000020BQ9	Camden Council	Park Village East	Background	23.6
HS2-000020BQA	Camden Council	Eversholt Street	Kerbside	32.3
HS2-000020BQB	Camden Council	Junction of Harrington Street and Varndell Street	Background	23.2
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Kerbside	28.2
HS2-000020BQD	Camden Council	Drummond Crescent	Background	28.9
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Background	23.0
HS2-000020BQF	Ealing Council	Conway Drive sign post	Roadside	40.1
HS2-000020BQG	Ealing Council	Lamp post outside No 1. Wells House Road on Old Oak Common Lane	Roadside	31.5
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Roadside	30.8
HS2-000020BQJ	Camden Council	Grafton Way	Background	33.6
HS2-000020BQL	Camden Council	Delancey Street	Roadside	32.5
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Roadside	33.2
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Roadside	29.5
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbroke Grove, near shops and bus stop at Trevorton Road junction	Kerbside	31.2
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Background	23.8
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Background	22.8
HS2-000020BQT	Camden Council	Drummond Street	Background	27.4
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Kerbside	44.4
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Kerbside	30.1
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road <i>(replaced HS2-000020BNX)</i>	Kerbside	27.8
HS2-000020BQX	Camden Council	Lamp Post on Brunswick Square <i>(replaced HS2-000020BM6)</i>	Roadside	25.8
HS2-000020BQY	Westminster City Council	Sign post on Ladbroke Grove <i>(replaced HS2-000020BN0)</i>	Roadside	35.3
HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Kerbside	38.4
HS2-000029BR0	Ealing Council	Sign post on Shaftesbury Gardens	Roadside	27.8
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Background	26.9
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Roadside	38.9

Note:

- Exceedances of the NO₂ annual mean air quality standard of 40 µg/m³ are shown in bold.
- HS2-000020BQW replaces HS2-000020BNX as such ES scenario data for HS2-000020BNX6 is used for HS2-000020BQW.
- HS2-000020BQX replaces HS2-000020BM6 as such ES scenario data for HS2-000020BM6 is used for HS2-000020BQX.
- HS2-000020BQY replaced HS2000020BN0.

Table 11: Annual mean Phase 2a NO₂ monitoring results for 2021

Site ID	Local authority	Site location	Location type	2021 annual mean NO ₂ concentration, bias adjusted (µg/m ³)
1	Staffordshire	South-west of Stafford (CA2) – Ashflats Lane	Roadside	9.3
2	Staffordshire	South-west of Stafford (CA2) – Ash Rise	Suburban	12.8
3	Staffordshire	South-west of Stafford (CA2) – Barn Bank Lane	Suburban	19.4
4	Staffordshire	South-west of Stafford (CA2) – Southfields Close	Suburban	19.8
5	Staffordshire	South-west of Stafford (CA2) – Devon Way	Suburban	18.5
6	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road E	Roadside	14.9
7	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road W	Kerbside	15.1
8	Staffordshire	South-west of Stafford (CA2) – Crinan Grove	Suburban	15.6
9	Newcastle under Lyme	Madeley Heath (CA4) – Newcastle Road	Roadside	19.5
10	Cheshire East Council	Oakhanger (CA5) – Nursery Road	Rural	12.3

Table 12: Full monthly raw Phase One NO₂ monitoring results for 2021 (prior to annualisation and bias adjustment)

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Roadside	50	41	39	38	40	33	30	30	42	45	49	40	40	12
HS2-000020BM6	Camden Council	Brunswick Square	Roadside	Location moved – replaced with HS2-000020BQX													
HS2-000020BM7	Camden Council	Chalton Street	Roadside	53	57	48	Tube Missing		37	29	Tube Missing	50	Tube Missing		55	47	7
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Roadside	58	60	48	45	43	34	34	38	48	55	52	52	47	12
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Roadside	52	48	43	46	44	43	38	35	50	48	52	49	46	12
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Roadside	53	47	44	42	39	36	36	37	50	51	49	50	44	12
HS2-000020BMB	Camden Council	Whitfield Street	Background	44	45	37	39	30	26	Tube Missing	23	36	39	17	41	34	11
HS2-000020BMC	Camden Council	Hampstead Road	Roadside	68	73	65	67	66	64	61	57	84	71	51	60	66	12
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Roadside	48	55	40	53	48	44	30	36	63	48	51	51	47	12
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Roadside	61	68	56	66	64	66	Tube Missing	54	71	69	55	65	63	11
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Background	38	37	28	34	25	21	12	17	35	32	39	35	29	12
HS2-000020BMH	Camden Council	Nash Street	Background	39	38	30	30	30	23	23	21	35	35	21	Tube Missing	29	11
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Background	37	39	33	36	32	30	Tube Missing	24	35	36	38	35	34	11
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Roadside	50	51	44	47	43	37	Tube Missing	32	48	52	40	47	45	11
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Background	42	38	31	32	26	20	21	17	32	30	36	35	30	12
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Roadside	57	50	49	44	46	43	46	38	56	54	58	47	49	12

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Roadside	Tube Missing	38	38	34	32	26	21	26	34	38	20	37	31	11
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Roadside	46	47	41	47	42	35	41	33	49	46	40	34	42	12
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Background	39	33	36	32	Tube Missing	24	Tube Missing	19	34	32	35	33	32	10
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Roadside	50	43	40	42	42	40	Tube Missing	33	41	42	42	43	41	11
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Kerbside	50	49	49	50	37	34	35	41	46	48	44	42	43	12
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Roadside	40	38	36	37	36	36	32	31	41	39	36	Tube Missing	36	11
HS2-000020BMV	Camden Council	Primrose Hill Road	Roadside	41	37	30	31	30	23	27	23	39	Tube Missing	41	40	33	11
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road	Roadside	50	51	45	53	53	47	43	36	59	55	49	51	49	12
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Roadside	41	38	32	30	36	28	26	Tube Missing	39	41	27	36	34	11
HS2-000020BMY	Westminster City Council	Lamp post between Blomfield Road and Edgware Road	Roadside	52	45	41	41	39	36	Tube Missing	26	46	40	49	41	41	11
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Roadside	Tube Missing		50	64	62	63	57	51	72	61	Tube Missing	69	61	9
HS2-000020BN0	Westminster City Council	Lamp post on Ladbroke Grove	Roadside	Location moved – replaced with HS2-000020BQY													
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Roadside	44	47	47	42	43	33	37	28	50	45	48	42	42	12
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Roadside	52	49	46	42	45	Tube Missing	35	34	49	48	38	48	44	11
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Roadside	56	59	54	50	56	40	49	41	60	59	59	50	53	12
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Roadside	55	49	46.7	54	48	43	34	33	47	42	Tube Missing	39	45	11
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Roadside	57	47	Tube Missing	45	48	35	51	42	60	58	52	54	50	11

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BN7	Ealing Council	The Approach street sign	Roadside	56	47	45	41	49	38	29	38	55	57	55	Tube Missing	46	11
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Roadside	40	33	26	27	26	22	21	19	29	34	34	35	29	12
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Background	32	32	26	29	20	21	22	16	29	26	20	27	25	12
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Kerbside	39	38	29	25	27	19	Tube Missing	21	27	34	Tube Missing	36	29	10
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Roadside	47	43	41	34	Tube Missing	27	28	25	37	36	44	41	37	11
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Kerbside	42	36	Tube Missing	36	31	30	25	29	32	41	38	32	34	11
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Roadside	50	46	Tube Missing	39	Tube Missing	35	35	35	41	48	48	42	42	10
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background	34	36	31	29	28	24	25	21	Tube Missing	34	38	37	31	11
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background	38	33	29	28	Tube Missing	22	25	22	35	Tube Missing	38	37	31	10
HS2-000020BNQ	Camden Council	Camley Street	Background	Tube Missing	50	37	38	31	Tube Missing	25	Tube Missing	27	Tube Missing		36	35	7
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background	42	39	34	33	34	25	26	25	43	36	36	37	34	12
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background	35	34	28	27	19	17	Tube Missing	17	28	26	22	32	26	11
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background	30	30	24	23	20	16	Tube Missing	16	26	25	25	56	26	11
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside	45	46	44	38	45	Tube Missing	32	35	48	47	49	45	43	11
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside	Tube Missing	40	37	36	36	Tube Missing		31	40	42	Tube Missing		37	7
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside	40	48	39	46	43	Tube Missing		29	48	41	39	47	42	10

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data	
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean		
HS2-000020BNX	Hammersmith & Fulham Council	Signpost on A402 Goldhawk Road	Roadside	Location Moved – now HS2-000020BQW														
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside	48	43	39	44	34	30	20	28	43	38	38	38	37	12	
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside	38	37	29	29	29	23	26	25	29	37	34	39	31	12	
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside	52	56	50	45	Tube Missing	48	46	44	57	55	47	49	50	11	
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside	45	44	Tube Missing	42	40	30	Tube Missing	30	47	44	55	53	43	10	
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside	39	32	32	35	33	24	25	Tube Missing	40	44	41	41	35	11	
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Kerbside	62	68	56	57	66	49	Tube Missing	37	64	71	61	74	60	11	
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Kerbside	Tube Missing	52	Tube Missing		58	52	40	47	Tube Missing		49	51	50	7	
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Roadside	55	62	57	61	60	53	Tube Missing	55	66	68	56	Tube Missing	60	10	
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Roadside	51	51	46	41	48	37	41	32	54	52	48	44	45	12	
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyrotory roadside automatic monitoring station	Roadside	63	69	68	54	72	57	55	48	52	76	64	61	62	12	
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Roadside	39	40	33	33	32	27	Tube Missing	25	38	35	31	35	34	11	
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Background	38	36	36	32	30	22	20	21	28	32	36	36	30	12	

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Background	38	34	30	26	24	Tube Missing	18	13	28	29	27	31	27	11
HS2-000020BPB	Camden Council	Camden High Street	Roadside	69	Tube Missing	56	55	51	56	50	52	72	59	54	54	57	11
HS2-000020BPC	Camden Council	Castlehaven Road	Background	43	37	29	27	27	24	Tube Missing	14	31	33	36	35	30	11
HS2-000020BPD	Camden Council	Prince of Wales Road	Roadside	39	33	25	25	23	23	18	18	28	29	26	30	26	12
HS2-000020BPE	Camden Council	Haverstock Hill	Roadside	44	38	36	34	37	29	Tube Missing	26	35	Tube Missing	35	33	35	10
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Background	43	40	30	33	Tube Missing	31	20	20	33	32	37	35	32	11
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Roadside	41	42	33	36	33	30	22	26	41	35	38	38	34	12
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Roadside	46	38	32	29	31	28	24	Tube Missing	38	42	42	41	35	11
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Roadside	40	40	38	36	31	31	39	29	34	34	Tube Missing	34	35	11
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Roadside	Tube Missing	39	37	30	34	Tube Missing	27	27	40	42	42	38	36	10
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background	Tube Missing	33	29	27	24	18	21	20	25	28	31	26	26	11
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Roadside	36	38	32	32	32	27	Tube Missing	22	37	37	36	32	33	11
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Roadside	42	40	35	32	32	30	25	23	36	35	36	36	34	12
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Roadside	48	52	40	40	39	37	42	35	51	48	48	46	44	12
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Roadside	43	43	36	37	Tube Missing	31	34	23	36	39	15	38	34	11

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbroke Grove, south of A404 Harrow Road	Roadside	44	52	47	43	40	35	22	35	43	45	42	46	41	12
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Roadside	52	52	44	45	42	36	34	33	42	51	32	34	41	12
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Roadside	Tube Missing	43	39	38	35	32	43	27	47	Tube Missing	45	46	40	10
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Roadside	39	40	39	43	36	27	30	28	42	40	41	38	37	12
HS2-000020BPX	Camden Council	Netley Street	Background	44	40	34	38	29	25	34	21	35	36	35	36	34	12
HS2-000020BPY	Camden Council	Stanhope Street	Background	38	32	32	33	26	21	21	23	34	31	33	36	30	12
HS2-000020BPZ	Camden Council	Albany Street	Roadside	39	35	33	34	29	27	18	24	32	36	22	36	30	12
HS2-000020BQ0	Camden Council	Werrington Street	Background	38	34	28	25	25	19	17	18	30	33	15	35	26	12
HS2-000020BQ1	Camden Council	Polygon Road	Background	Tube Missing	Tube Missing	29	26	26	18	18	19	29	33	35	36	27	10
HS2-000020BQ2	Camden Council	Alexandra Place	Background	37	35	29	26	24	21	Tube Missing	17	Tube Missing	28	31	31	28	10
HS2-000020BQ3	Camden Council	Harrington Square	Kerbside	53	51	44	46	45	36	39	31	52	39	41	42	43	12
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Background	45	41	30	36	30	25	22	21	39	36	39	41	34	12
HS2-000020BQ5	Camden Council	Adelaide Road	Roadside	44	40	32	31	31	25	Tube Missing	21	33	33	Tube Missing		32	9
HS2-000020BQ6	Camden Council	Mornington Terrace	Background	38	33	27	27	25	15	Tube Missing	19	30	31	28	28	27	11
HS2-000020BQ7	Camden Council	Arlington Road	Background	35	35	29	29	22	20	Tube Missing	18	27	31	30	32	28	11
HS2-000020BQ8	Camden Council	Clarkson Row	Background	37	39	31	31	Tube Missing	20	25	21	33	37	37	33	31	11
HS2-000020BQ9	Camden Council	Park Village East	Background	37	37	31	31	27	22	24	21	28	Tube Missing	34	34	29	11
HS2-000020BQA	Camden Council	Eversholt Street	Kerbside	55	47	42	36	35	Tube Missing	26	32	48	49	48	45	42	11
HS2-000020BQB	Camden Council	Junction of Harrington Street and Vardell Street	Background	32	40	31	31	25	24	23	21	29	31	26	35	29	12

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Kerbside	47	49	38	40	32	26	Tube Missing	22	39	40	32	40	37	11
HS2-000020BQD	Camden Council	Drummond Crescent	Background	47	47	33	35	28	26	Tube Missing	25	37	39	38	42	36	11
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Background	38	33	33	29	27	19	21	19	32	30	31	33	29	12
HS2-000020BQF	Ealing Council	Conway Drive sign post	Roadside	58	53	49	53	51	46	42	40	63	54	49	52	51	12
HS2-000020BQG	Ealing Council	Lamp post outside No 1. Wells House Road on Old Oak Common Lane	Roadside	39	44	38	36	38	15	32	40	57	52	49	40	40	12
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Roadside	Tube Missing		42	42	41	38	31	Tube Missing	40	37	39	43	39	9
HS2-000020BQJ	Camden Council	Grafton Way	Background	47	46	41	38	40	36	43	28	48	49	45	46	42	12
HS2-000020BQL	Camden Council	Delancey Street	Roadside	46	46	42	48	42	28	34	31	49	43	40	46	41	12
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Roadside	40	52	31	42	47	36	Tube Missing	35	51	47	37	44	42	11
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Roadside	38	39	36	41	39	32	26	32	46	42	39	40	37	12
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbroke Grove, near shops and bus stop at Trevorton Road junction	Kerbside	52	47	45	49	Tube Missing	20	33	32	45	44	46	34	41	11
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Background	37	35	29	30	27	23	Tube Missing	18	26	32	36	35	30	11
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Background	42	42	30	28	26	22	18	19	24	33	30	28	28	12
HS2-000020BQT	Camden Council	Drummond Street	Background	40	44	37	38	33	26	26	22	33	39	38	36	34	12
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Kerbside	64	61	58	62	56	53	51	49	69	48	67	57	58	12
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Kerbside	45	Tube Missing			33	32	39	27	44	44	47	43	39	9
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road (replaced HS2-000020BNX)	Kerbside	44	44	39	36	35	34	26	27	40	40	27	42	36	12

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)													No. of months of data
				Jan21	Feb21	Mar21	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec21	Mean	
HS2-000020BQX	Camden Council	Lamp post on Brunswick Square <i>(replaced HS2-000020BM6)</i>	Roadside	45	40	36	25	28	23	24	23	34	38	42	35	33	12
HS2-000020BQY	Westminster City Council	Sign post on Ladbroke Grove <i>(replaced HS2-000020BN0)</i>	Roadside	48	51	44	53	47	36	Tube Missing	29	Tube Missing	46	47	46	45	10
HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Kerbside	Monitoring did not commence until September 2021								66	49	55	48	54	4
HS2-000029BR0	Ealing Council	Sign post on Shaftesbury Gardens	Roadside	Monitoring did not commence until September 2021								38	38	42	35	38	4
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Background	Monitoring did not commence until September 2021								37	35	41	33	37	4
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Roadside	Monitoring did not commence until September 2021								57	48	55	Tube Missing	53	3

Note:

- Table contains raw data as presented in laboratory reports. Mean concentrations have not been annualised or bias adjusted and are not directly comparable to the NO₂ annual mean air quality standard of 40µg/m³.
- HS2-000020BQW replaces HS2-000020BNX as such ES scenario data for HS2-000020BNX6 is used for HS2-000020BQW.
- HS2-000020BQX replaces HS2-000020BM6 as such ES scenario data for HS2-000020BM6 is used for HS2-000020BQX.
- HS2-000020BQY replaced HS2000020BN0

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Table 13: Full monthly raw Phase 2a NO₂ monitoring results for 2021 (prior to annualisation and bias adjustment)

Site ID	Local authority	Site location	Location type	NO ₂ concentration (µg/m ³)												No. of months of data	
				Jan21	Feb21	Mar21*	Apr21	May21	Jun21	Jul21	Aug21	Sep21	Oct21	Nov21	Dec20		Mean
1	Staffordshire	South-west of Stafford (CA2) – Ashflats Lane	Roadside	17.6	16.3	10.1	14.2	10.4	9.5	8.6	9.3	11.6	7.3	10.1	13.4	11.4	12
2	Staffordshire	South-west of Stafford (CA2) – Ash Rise	Suburban	21.4	17.6	16.6	15.5	14.4	11.8	12.9	11.4	17.4	13.6	19.1	17.6	15.6	12
3	Staffordshire	South-west of Stafford (CA2) – Barn Bank Lane	Suburban	28.7	23.2	25.9	19.9	22.8	19.1	21.4	19.5	25.4	26.2	30.1	25.8	23.8	12
4	Staffordshire	South-west of Stafford (CA2) – Southfields Close	Suburban	30.0	25.9	24.4	20.1	21.6	17.7	20.1	21.4	27.0	27.5	31.3	26.9	24.3	12
5	Staffordshire	South-west of Stafford (CA2) – Devon Way	Suburban	30.2	24.3	23.7	18.4	21.4	16.0	18.8	18.7	Tube Missing	25.0	27.8	26.8	22.4	11
6	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road E	Roadside	23.7	20.4	16.3	16.4	16.7	13.8	15.3	15.6	20.4	20.3	21.3	20.8	18.2	12
7	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road W	Kerbside	23.0	20.8	No Data	22.5	17.1	16.2	16.7	15.7	21.1	12.8	19.6	20.0	18.6	11
8	Staffordshire	South-west of Stafford (CA2) – Crinan Grove	Suburban	25.3	21.6	18.7	15.9	16.7	13.9	15.3	15.6	20.6	20.6	23.9	22.4	18.9	12
9	Newcastle under Lyme	Madeley Heath (CA4) – Newcastle Road	Roadside	32.0	24.0	26.6	21.9	23.8	19.3	21.0	20.0	22.5	22.7	29.1	26.1	23.9	12
10	Cheshire East Council	Oakhanger (CA5) – Nursery Road	Rural	19.7	22.1	12.6	16.9	13.6	13.4	12.2	12.9	17.3	12.1	13.1	16.5	15.1	12

Notes:

- Table contains raw data as presented in laboratory reports. Mean concentrations have not been annualised or bias adjusted and are not directly comparable to the NO₂ annual mean air quality standard of 40µg/m³.

Appendix E – Comparison of Phase One 2021 annual mean NO₂ diffusion tube results and the predicted NO₂ annual mean concentrations from the ES

Table 14 presents a comparison of the Phase One 2021 annual mean NO₂ diffusion tube results and the predicted 2012 and 2017 NO₂ annual mean concentrations from the ES for the scenario without the Proposed Scheme in place.

Table 14: Comparison of the Phase One 2021 annual mean NO₂ diffusion tube results and the predicted 2012 and 2017 NO₂ annual mean concentrations from the ES

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Predicted significant effect	31.3	1-204	86.4	75.6	76.1	5	-44.3	-58.6%	-44.8	-58.9%
HS2-000020BM6	Camden Council	Brunswick Square	Predicted significant effect	-	1-7	61.1	52.5	52.4	67	Site replaced with HS2-000020BQX			
HS2-000020BM7	Camden Council	Chalton Street	Predicted significant effect	36.5	1-1	104.8	90.1	91.9	14	-53.6	-59.5%	-55.4	-60.3%
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Predicted significant effect	37.2	1-178	91.7	81	82.5	29	-43.8	-54.1%	-45.3	-54.9%
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Predicted significant effect	35.9	1-47	93.6	82.3	83.3	16	-46.4	-56.4%	-47.4	-56.9%
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Predicted significant effect	35	1-170	99.3	80	82.1	0	-45.0	-56.3%	-47.1	-57.4%
HS2-000020BMB	Camden Council	Whitfield Street	Predicted significant effect	27.3	1-287	63.6	53.4	53.8	11	-26.1	-48.9%	-26.5	-49.3%
HS2-000020BMC	Camden Council	Hampstead Road	Predicted significant effect	51.7	1-165	83.1	66.6	67.5	9	-14.9	-22.4%	-15.8	-23.4%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Predicted significant effect	37.2	1-42	89.6	75.7	76.4	49	-38.5	-50.9%	-39.2	-51.3%
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Predicted significant effect	49.8	1-279	86.1	72.8	73.4	17	-23.0	-31.6%	-23.6	-32.2%
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Predicted significant effect	23.5	1-79	50.4	43.4	43.7	0	-19.9	-45.9%	-20.2	-46.2%
HS2-000020BMH	Camden Council	Nash Street	Predicted significant effect	23.6	1-261	54.5	46.4	46.8	7	-22.8	-49.1%	-23.2	-49.6%
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Predicted significant effect	27.3	1-257	58.6	50.1	51.0	24	-22.8	-45.5%	-23.7	-46.5%
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Predicted significant effect	35.2	1-298	61.4	53.5	53.5	9	-18.3	-34.2%	-18.3	-34.2%
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Predicted significant effect	23.9	1-9	52	45.8	44.3	2	-21.9	-47.8%	-20.4	-46.0%
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Predicted significant effect	38.6	2-72	69.4	57.2	57.0	6	-18.6	-32.5%	-18.4	-32.3%
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Predicted significant effect	24.8	1-246	55.8	46.7	48.7	4	-21.9	-46.9%	-23.9	-49.1%
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Predicted significant effect	32.8	2-103	70.5	58.4	56.9	22	-25.6	-43.8%	-24.1	-42.4%
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Predicted significant effect	25.4	2-98	45.5	39.1	39.3	7	-13.7	-35.0%	-13.9	-35.4%
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Predicted significant effect	32.6	2-8	64.3	53.2	53.7	5	-20.6	-38.7%	-21.1	-39.3%
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Predicted significant effect	33.3	2-38	79.3	63.4	62.3	21	-30.1	-47.5%	-29.0	-46.5%
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Predicted significant effect	28.8	3-153	52.4	46.3	46.3	14	-17.5	-37.8%	-17.5	-37.8%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BMV	Camden Council	Primrose Hill Road	Predicted significant effect	25.9	3-213	55.2	46.7	45.1	32	-20.8	-44.5%	-19.2	-42.6%
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road	Predicted significant effect	38.9	3-60	64.9	53.6	53.8	8	-14.7	-27.4%	-14.9	-27.7%
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Predicted significant effect	26.8	1-141	65.1	55.7	56.1	24	-28.9	-51.9%	-29.3	-52.2%
HS2-000020BMY	Westminster City Council	Lamp post between Blomfield Road and Edgware Road	Predicted significant effect	32.7	4-65	64.2	54.1	53.9	13	-21.4	-39.6%	-21.2	-39.3%
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Predicted significant effect	48.1	3-96	70.4	56.4	56.4	8	-8.3	-14.7%	-8.3	-14.7%
HS2-000020BN0	Westminster City Council	Lamp post on Ladbroke Grove	Predicted significant effect	-	4-225	77.1	66.2	66.3	14	Site replaced with HS2-000020BQY			
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Predicted significant effect	33.3	4-193	62.3	53.2	53.3	4	-19.9	-37.4%	-20.0	-37.5%
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Predicted significant effect	34.8	4-204	72.1	61.1	61.1	12	-26.3	-43.0%	-26.3	-43.0%
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Predicted significant effect	41.5	4-209	68.7	58.5	58.6	47	-17.0	-29.1%	-17.1	-29.2%
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Predicted significant effect	35.2	4-155	88.7	76	76.1	18	-40.8	-53.7%	-40.9	-53.7%
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Predicted significant effect	39.3	4-12	64.6	52.6	56.0	3	-13.3	-25.3%	-16.7	-29.8%
HS2-000020BN7	Ealing Council	The Approach street sign	Predicted significant effect	36.4	4-152	83.3	69.6	69.6	20	-33.2	-47.7%	-33.2	-47.7%
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Predicted significant effect	22.8	3-193	47.4	39.4	38.2	2	-16.6	-42.1%	-15.4	-40.3%
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Predicted significant effect	19.8	1-70	49.4	42.7	43.1	22	-22.9	-53.6%	-23.3	-54.1%
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Predicted significant effect	22.5	1-281	61.1	52	52.4	15	-29.5	-56.7%	-29.9	-57.1%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Predicted significant effect	28.9	4-120	53.7	46	46.1	14	-17.1	-37.2%	-17.2	-37.3%
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Predicted significant effect	26.0	2-85	61.6	51.3	51.0	18	-25.3	-49.3%	-25.0	-49.0%
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Predicted significant effect	32.9	1-242	69.7	57.4	58.2	10	-24.5	-42.7%	-25.3	-43.5%
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background not affected by scheme	24.4	No assessed receptor location nearby								
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background not affected by scheme	24.5	No assessed receptor location nearby								
HS2-000020BNQ	Camden Council	Camley Street	Background not affected by scheme	27.6	No assessed receptor location nearby								
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background not affected by scheme	27.3	No assessed receptor location nearby								
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background not affected by scheme	20.6	No assessed receptor location nearby								
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background not affected by scheme	21.0	No assessed receptor location nearby								
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside not affected by scheme	33.9	No assessed receptor location nearby								
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside not affected by scheme	29.9	No assessed receptor location nearby								
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside not affected by scheme	33.1	No assessed receptor location nearby								
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside not affected by scheme	29.2	No assessed receptor location nearby								

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside not affected by scheme	24.8	No assessed receptor location nearby								
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside not affected by scheme	39.4	No assessed receptor location nearby								
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside not affected by scheme	33.9	No assessed receptor location nearby								
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside not affected by scheme	27.5	No assessed receptor location nearby								
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Colocation kerbside	46.3	1-293	92	77.3	77.7	33	-31	-40.1%	-31.4	-40.4%
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Colocation kerbside	42.3	3-64	76.8	60.2	60.0	9	-17.9	-29.73%	-17.7	-29.5%
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Colocation roadside	46.7	1-1	104.8	90.1	91.9	32	-43.4	-48.2%	-45.2	-49.2%
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Colocation roadside	35.9	5-35	74.3	63.4	63.6	14	-27.5	-43.4%	-27.7	-43.6%
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyrotary roadside automatic monitoring station	Colocation roadside	48.6	5-49	89	76	76.0	102	-27.4	-36.1%	-27.4	-36.1%
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Colocation roadside	26.5	No assessed receptor location nearby								

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Colocation background	24.4	1-276	66.1	58.6	57.8	90	-34.2	-58.4%	-33.4	-57.8%
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Colocation background	21.6	4-121	59.6	50.8	50.8	84	-29.2	-57.5%	-29.2	-57.5%
HS2-000020BPB	Camden Council	Camden High Street	Predicted significant effect	45.1	2-63	62.1	50.7	50.6	68	-5.6	-11.0%	-5.5	-10.9%
HS2-000020BPC	Camden Council	Castlehaven Road	Predicted significant effect	24.3	2-93	48.8	42.3	42.7	29	-18.0	-42.6%	-18.4	-43.1%
HS2-000020BPD	Camden Council	Prince of Wales Road	Predicted significant effect	20.7	No assessed receptor location nearby								
HS2-000020BPE	Camden Council	Haverstock Hill	Predicted significant effect	27.3	3-41	50.5	42.7	42.7	-9.8	-15.4	-36.1%	-15.4	-36.1%
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Predicted significant effect	25.8	3-130	46.3	40.7	40.6	-12.3	-14.9	-36.6%	-14.8	-36.5%
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Predicted significant effect	27.2	1-48	60.7	53	53.1	-24.7	-25.8	-48.7%	-25.9	-48.8%
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Predicted significant effect	28.0	1-62	61.5	51.5	51.8	-21.3	-23.5	-45.6%	-23.8	-45.9%
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Predicted significant effect	27.7	6-40	48.9	42.7	43.3	-14.9	-15.0	-35.1%	-15.6	-36.0%
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Predicted significant effect	28.1	6-31	68.1	59.5	60.6	-28.1	-31.4	-52.8%	-32.5	-53.6%
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background not affected by scheme	20.5	N/A (Background location not affected by the scheme)								
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Predicted significant effect	25.8	6-52	44.8	38.7	38.3	42	-12.9	-33.3%	-12.5	-32.6%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Predicted significant effect	26.5	4-104	70.2	60.2	60.2	19	-33.7	-56.0%	-33.7	-56.0%
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Predicted significant effect	34.6	4-209	68.7	58.5	58.6	57	-23.9	-40.9%	-24.0	-41.0%
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Predicted significant effect	26.8	4-173	75.2	63.8	63.9	33	-37.0	-58.0%	-37.1	-58.1%
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbroke Grove, south of A404 Harrow Road	Predicted significant effect	32.4	4-223	50.5	43.1	43.1	13	-10.7	-24.8%	-10.7	-24.8%
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Predicted significant effect	32.6	4-206	64.8	55.3	55.4	59	-22.7	-41.0%	-22.8	-41.2%
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Predicted significant effect	31.2	1-4	76.1	62.1	64.1	4	-30.9	-49.8%	-32.9	-51.3%
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Predicted significant effect	29.0	1-58	56.1	46.9	46.7	27	-17.9	-38.2%	-17.7	-37.9%
HS2-000020BPX	Camden Council	Netley Street	Predicted significant effect	27.1	1-292	83.2	66.6	67.5	87	-39.5	-59.3%	-40.4	-59.9%
HS2-000020BPY	Camden Council	Stanhope Street	Predicted significant effect	24.0	1-254	51.5	43.5	43.6	97	-19.5	-44.8%	-19.6	-45.0%
HS2-000020BPZ	Camden Council	Albany Street	Predicted significant effect	24.1	1-283	54.1	46.3	45.7	32	-22.2	-47.9%	-21.6	-47.3%
HS2-000020BQ0	Camden Council	Werrington Street	Predicted significant effect	21.0	1-191	56.7	50.1	50.9	82	-29.1	-58.1%	-29.9	-58.7%
HS2-000020BQ1	Camden Council	Polygon Road	Predicted significant effect	21.4	1-208	50.2	43.1	43.2	57	-21.7	-50.3%	-21.8	-50.5%
HS2-000020BQ2	Camden Council	Alexandra Place	Predicted significant effect	22.2	No assessed receptor location nearby								
HS2-000020BQ3	Camden Council	Harrington Square	Predicted significant effect	33.1	1-134	61.5	52.2	53.5	38	-19.1	-36.6%	-20.4	-38.1%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Predicted significant effect	27.0	1-166	65.4	54.4	54.2	39	-27.4	-50.4%	-27.2	-50.2%
HS2-000020BQ5	Camden Council	Adelaide Road	Predicted significant effect	25.3	3-211	46.2	39.3	39.5	109	-14.0	-35.6%	-14.2	-35.9%
HS2-000020BQ6	Camden Council	Mornington Terrace	Predicted significant effect	22.0	1-246	55.8	46.7	48.7	100	-24.7	-52.9%	-26.7	-54.8%
HS2-000020BQ7	Camden Council	Arlington Road	Predicted significant effect	22.4	1-198	51.9	44.1	43.2	23	-21.7	-49.2%	-20.8	-48.1%
HS2-000020BQ8	Camden Council	Clarkson Row	Predicted significant effect	25.0	1-253	50.9	43.8	43.3	56	-18.8	-42.9%	-18.3	-42.3%
HS2-000020BQ9	Camden Council	Park Village East	Predicted significant effect	23.6	No assessed receptor location nearby								
HS2-000020BQA	Camden Council	Eversholt Street	Predicted significant effect	32.3	1-192	57.7	51.2	52.0	13	-18.9	-36.9%	-19.7	-37.9%
HS2-000020BQB	Camden Council	Junction of Harrington Street and Varndell Street	Predicted significant effect	23.2	1-322	63.6	50	51.5	5	-26.8	-53.6%	-28.3	-55.0%
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Predicted significant effect	28.2	1-71	63.1	53.5	54.8	32	-25.3	-47.3%	-26.6	-48.5%
HS2-000020BQD	Camden Council	Drummond Crescent	Predicted significant effect	28.9	1-186	66.7	56.8	57.8	58	-27.9	-49.1%	-28.9	-50.0%
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Predicted significant effect	23.0	4-262	48.1	40.8	40.7	8	-17.8	-43.6%	-17.7	-43.5%
HS2-000020BQF	Ealing Council	Conway Drive sign post	Predicted significant effect	40.1	4-55	63.7	55.2	55.3	36	-15.1	-27.4%	-15.2	-27.5%
HS2-000020BQG	Ealing Council	Lamp post outside No 1, Wells House Road on Old Oak Common Lane	Predicted significant effect	31.5	4-143	52.6	45.2	45.3	6	-13.7	-30.3%	-13.8	-30.5%
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Predicted significant effect	30.8	6-73	45.6	39.0	38.8	59	-8.2	-21.0%	-8.0	-20.6%
HS2-000020BQJ	Camden Council	Grafton Way	Predicted significant effect	33.6	1-4	76.1	62.1	64.1	109	-28.5	-45.9%	-30.5	-47.6%

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local authority	Site location	Site purpose	2021 annual mean NO ₂ concentration, annualised and bias adjusted (µg/m ³)	Nearest ES assessed receptor ID	Modelled annual mean NO ₂ 2012 (µg/m ³)	Modelled annual mean NO ₂ 2017 (without scheme, µg/m ³)	Modelled peak annual mean NO ₂ (with scheme, µg/m ³)	Distance of diffusion tube to nearest ES assessed receptor (m)	Difference monitored 2021 vs 2017 without scheme modelled	% difference 2017 without scheme modelled	Difference monitored 2021 vs with-scheme modelled	% diff with scheme modelled vs 2021 monitored
HS2-000020BQL	Camden Council	Delancey Street	Predicted significant effect	32.5	2-87	62.5	51.4	50.0	19	-18.9	-36.8%	-17.5	-35.0%
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Predicted significant effect	33.2	6-62	64.5	54.5	53.8	21	-21.3	-39.1%	-20.6	-38.3%
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Predicted significant effect	29.5	No assessed receptor location nearby								
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbroke Grove, near shops and bus stop at Trevorton Road junction	Predicted significant effect	31.2	4-217	61.5	51.7	51.9	16	-20.5	-39.7%	-20.7	-39.9%
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Predicted significant effect	23.8	1-284	53.4	45.5	43.0	28	-21.7	-47.7%	-19.2	-44.7%
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Predicted significant effect	22.8	1-269	57.4	51.3	51.7	22	-28.5	-55.6%	-28.9	-55.9%
HS2-000020BQT	Camden Council	Drummond Street	Predicted significant effect	27.4	1-169	64	52.6	51.6	13	-25.2	-47.9%	-24.2	-46.9%
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Predicted significant effect	44.4	1-25	100.3	86.8	86.6	2	-42.4	-48.8%	-42.2	-48.7%
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Predicted significant effect	30.1	4-182	59.5	50.8	50.9	1	-20.7	-40.7%	-20.8	-40.9%
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road (replaced HS2-000020BNX)	Predicted significant effect	27.8	No assessed receptor location nearby								
HS2-000020BQX	Camden Council	Lamp post on Brunswick Square (replaced HS2-000020BM6)	Predicted significant effect	25.8	1-7	61.1	52.5	52.4	67	-26.7	-50.9%	-26.6	-50.8%
HS2-000020BQY	Westminster City Council	Sign post on Ladbroke Grove (replaced HS2-000020BNO)	Predicted significant effect	35.3	No assessed receptor location nearby								

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

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HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Predicted significant effect	38.4						No assessed receptor location nearby			
HS2-000020BR0	Ealing Council	Sign post on Shaftesbury Gardens	Predicted significant effect	27.8						No assessed receptor location nearby			
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Predicted significant effect	26.9						No assessed receptor location nearby			
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Predicted significant effect	38.9						No assessed receptor location nearby			

Notes:

- HS2-000020BQW replaces HS2-000020BNX as such ES scenario data for HS2-000020BNX6 is used for HS2-000020BQW.
- HS2-000020BQX replaces HS2-000020BM6 as such ES scenario data for HS2-000020BM6 is used for HS2-000020BQX.
- HS2-000020BQY replaced HS2000020BN0.

Appendix F – Comparison of the annual mean NO₂ diffusion tube monitoring results

Table 15 and 16 presents a comparison of the annual mean NO₂ diffusion tube results across Phase One and Phase 2a, to date. Sites that were removed / replaced during 2018 have not been included in this comparison.

Table 15: Comparison of the Phase One annual mean NO₂ diffusion tube monitoring results (2016 – 2021)

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)					
				2016	2017	2018	2019	2020	2021
HS2-000020BM5	Camden Council	Junction of St Chad's Street and Grays Inn Road	Roadside	59.8	50.4	50.4	45.9	36.3	31.3
HS2-000020BM6	Camden Council	Brunswick Square	Roadside	50.4	47.4	44	40.3	47.7	Site Replaced
HS2-000020BM7	Camden Council	Chalton Street	Roadside	66.8	58.4	54.9	52.0	42.3	36.5
HS2-000020BM8	Camden Council	Junction of Euston Square and Grafton Place	Roadside	66.9	58	59.3	56.3	42.1	37.2
HS2-000020BM9	Camden Council	Junction of Endsleigh Gardens and Upper Woburn Place	Roadside	59.5	52.4	57.9	49.1	39.5	35.9
HS2-000020BMA	Camden Council	Junction of Euston Road and Gower Street	Roadside	70.1	60.3	58.7	51.4	39.3	35.0
HS2-000020BMB	Camden Council	Whitfield Street	Background	46.7	45	39.0	37.2	28.5	27.3
HS2-000020BMC	Camden Council	Hampstead Road	Roadside	68.0	59.1	61.4	61.5	48.2	51.7
HS2-000020BMD	Westminster City Council	Lamp post on Park Crescent Road	Roadside	74.2	67.4	66.2	60.0	38.6	37.2
HS2-000020BME	Westminster City Council	Lamp post in between A501 and A4201	Roadside	96.7	81.6	85.5	77.2	51.5	49.8
HS2-000020BMF	Camden Council	Junction of Polygon Road and Ossulston Street	Background	42.4	35.8	29.7	28.6	23.7	23.5
HS2-000020BMH	Camden Council	Nash Street	Background	42.5	39.5	34.8	30.9	27.0	23.6
HS2-000020BMJ	Camden Council	Junction on Robert Street and Stanhope Street	Background	44.1	39.1	33.7	29.8	27.6	27.3
HS2-000020BMK	Camden Council	Junction of Plender Street and Bayham Street	Roadside	60.5	51.4	49.6	48.2	40.6	35.2
HS2-000020BML	Camden Council	Junction of Arlington Road and Mornington Crescent	Background	44.9	38.2	34.0	30.1	27.1	23.9
HS2-000020BMM	Camden Council	Junction of Bayham Street and Pratt Street	Roadside	71.4	67.3	57.4	51.3	41.5	38.6
HS2-000020BMN	Camden Council	Junction of Delancey Street and Albert Street	Roadside	45.6	41.9	39.5	36.9	31.1	24.8
HS2-000020BMQ	Camden Council	Junction of Parkway and Delancey Street	Roadside	61.0	48.6	53	44.8	35.5	32.8
HS2-000020BMR	Camden Council	Junction of Oval Road and Jamestown Road	Background	43.2	40.1	35.7	31.8	26.4	25.4
HS2-000020BMS	Camden Council	Junction of Chalk Farm Road and Castlehaven Road	Roadside	61.0	50.6	54.6	46.9	38.5	32.6
HS2-000020BMT	Camden Council	Junction of Camden Road and Camden Street	Kerbside	88.1	62.4	48.7	44.3	32.8	33.3
HS2-000020BMU	Camden Council	Junction of Southampton Road and Fleet Road	Roadside	45.0	37.3	41.1	37.5	31.6	28.8
HS2-000020BMV	Camden Council	Primrose Hill Road	Roadside	43.4	39.3	38.3	33.7	28.1	25.9
HS2-000020BMW	Camden Council	Junction of Finchley Road and Hilgrove Road	Roadside	63.7	55.5	52.9	47.4	36.2	38.9

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)					
				2016	2017	2018	2019	2020	2021
HS2-000020BMX	Westminster City Council	Sign post by roundabout on A5205	Roadside	59.3	51.7	49.5	43.0	31.5	26.8
HS2-000020BMY	Westminster City Council	Lamp post between Blomfield Road and Edgware Road	Roadside	64.4	57.4	55.9	49.4	35.6	32.7
HS2-000020BMZ	Camden Council	Junction of Finchley Road and Hendon Way	Roadside	93.4	83.9	81.9	75.1	53.6	48.1
HS2-000020BNO	Westminster City Council	Lamp post on Ladbroke Grove	Roadside	50.9	45.8	48.0	48.7	36.2	Site Replaced
HS2-000020BN1	Kensington and Chelsea Council	Sign post on St Ann's Villas	Roadside	53.9	43.1	44.5	42.6	36.0	33.3
HS2-000020BN2	Hammersmith & Fulham Council	Lamp post on Du Cane Road	Roadside	61.2	57.8	55.1	44.8	36.2	34.8
HS2-000020BN3	Brent Council	Sign post on High Street Harlesden	Roadside	65.7	52.5	56.1	50.2	42.3	41.5
HS2-000020BN4	Hammersmith & Fulham Council	End of cycle lane sign on Old Oak Road	Roadside	68.7	52.6	51.9	44.0	36.6	35.2
HS2-000020BN5	Ealing Council	Sign post on Victoria Road	Roadside	58.5	50.5	51.9	48.7	37.4	39.3
HS2-000020BN7	Ealing Council	The Approach street sign	Roadside	67.6	61.0	56.0	52.4	41.3	36.4
HS2-000020BNA	Camden Council	Junction of Regent's Park Road and Rothwell Street	Roadside	42.3	38.5	36.5	31.4	24.8	22.8
HS2-000020BNB	Camden Council	Junction of Gloucester Gate Bridge and Park Village East	Roadside	50.2	42.4	43.5	33.4	-	-
HS2-000020BNC	Camden Council	Junction of Outer Circle and Gloucester Gate	Background	32.4	28.8	30.2	25.6	18.4	19.8
HS2-000020BND	Westminster City Council	Outer Circle Regent's Park	Kerbside	42.7	40.1	35.0	31.8	22.9	22.5
HS2-000020BNG	Brent Council	Lamp post on Donnington Road	Roadside	45.5	38.6	39.6	38.0	31.7	28.9
HS2-000020BNH	Camden Council	Junction of Parkway and Albert Street	Kerbside	49.6	39.8	38.2	34.5	26.4	26.0
HS2-000020BNJ	Westminster City Council	Light post on Park Road	Roadside	66.3	54.1	55.0	47.6	35.7	32.9
HS2-000020BNL	Westminster City Council	Lamp post on Penfold Street	Background	46.4	43.8	38.5	31.8	27.5	24.4
HS2-000020BNN	Camden Council	Lincoln's Inn Fields	Background	38.6	36.9	35.6	31.3	25.0	24.5
HS2-000020BNQ	Camden Council	Camley Street	Background	47.5	41.1	37.4	29.6	27.1	27.6
HS2-000020BNR	Hammersmith & Fulham Council	Lamp posts in Shepherd's Bush Common	Background	49.5	39.6	38.9	34.2	29.8	27.3
HS2-000020BNS	Brent Council	Lamp post on Tower Road by Willesden Jewish Cemetery	Background	34.1	30.6	27.4	25.3	21.9	20.6
HS2-000020BNT	Hillingdon Council	Lamp post on Pembroke Road	Background	-	30.6	25.3	23.4	20.3	21.0
HS2-000020BNU	Hillingdon Council	Cowley Road sign post at junction with Hillingdon Road	Roadside	-	47	45.8	41.1	33.7	33.9
HS2-000020BNV	Hillingdon Council	High Street sign post at junction with Pembroke Road	Roadside	-	37	43	37.7	30.5	29.9
HS2-000020BNW	Hillingdon Council	Signpost on A4020 Uxbridge Road at junction with Long Lane	Roadside	-	43.3	46.4	40.9	31.9	33.1
HS2-000020BNX	Hammersmith & Fulham Council	Signpost on A402 Goldhawk Road	Roadside	48.5	38.6	41.8	39.5	-	-
HS2-000020BNY	Camden Council	Junction of Mill Lane and Hillfield Road	Roadside	43.8	42.7	41.8	39.3	30.8	29.2
HS2-000020BNZ	Camden Council	Mansfield Road	Roadside	36.4	37.4	35.8	31.7	27.1	24.8
HS2-000020BP0	Camden Council	Junction of Camden Road and Torriano Avenue	Roadside	60.6	55.0	61.1	50.7	40.6	39.4

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)					
				2016	2017	2018	2019	2020	2021
HS2-000020BP1	Westminster City Council	Lamp post on Brook Street	Roadside	61.8	58.7	63.3	54.0	34.7	33.9
HS2-000020BP2	Camden Council	Junction of Grays Inn Road and Holborn	Roadside	52	46.8	48.7	43.8	30.5	27.5
HS2-000020BP3	Westminster City Council	Triplicate site next to the Marylebone Road kerbside automatic monitoring stations	Kerbside	86.8	74.3	69.9	58.3	42.4	46.3
HS2-000020BP4	Camden Council	Triplicate site on Finchley Road next to Swiss Cottage kerbside automatic monitoring station	Kerbside	66.6	62.1	60.6	44.2	33.8	42.3
HS2-000020BP5	Camden Council	Triplicate site next to the Euston Road roadside automatic monitoring stations	Roadside	86.7	76.2	80.8	66.2	46.9	46.7
HS2-000020BP6	Ealing Council	Triplicate site next to the Ealing, Western Avenue Acton roadside automatic monitoring station	Roadside	64.7	57.3	56.2	50.6	40.5	35.9
HS2-000020BP7	Ealing Council	Triplicate site next to the Ealing, Hangar Lane Gyratory roadside automatic monitoring station	Roadside	72.3	71.9	70.2	63.1	51.0	48.6
HS2-000020BP8	Hillingdon Council	Triplicate site at South Ruislip roadside automatic monitoring station	Roadside	-	-	37.8	36.4	27.5	26.5
HS2-000020BP9	Camden Council	Triplicate site in Russell Square next to Bloomsbury urban background automatic monitoring station	Background	39.2	38.7	35.7	32.5	27.9	24.4
HS2-000020BPA	Kensington and Chelsea Council	Triplicate site at Sion Manning School, St. Charles' square, next to the North Kensington urban background automatic monitoring stations	Background	36.2	30.7	28.4	26.2	22.5	21.6
HS2-000020BPB	Camden Council	Camden High Street	Roadside	74.6	66.0	69.1	60.1	50.2	45.1
HS2-000020BPC	Camden Council	Castlehaven Road	Background	41	36.6	31.5	32.1	26.1	24.3
HS2-000020BPD	Camden Council	Prince of Wales Road	Roadside	36.8	34.4	33.8	30.0	24.4	20.7
HS2-000020BPE	Camden Council	Haverstock Hill	Roadside	48.3	44.3	43.0	42.2	32.9	27.3
HS2-000020BPF	Camden Council	Junction of Primrose Gardens and England's Lane	Background	40.9	37.2	31.9	31.8	28.4	25.8
HS2-000020BPG	Westminster City Council	Lamp post on St John's Wood Street	Roadside	49.8	43.2	43.4	38.5	28.3	27.2
HS2-000020BPH	Westminster City Council	Lamp post St John's Wood Terrace	Roadside	49.0	45.7	42.7	39.5	30.2	27.9
HS2-000020BPK	Hillingdon Council	Lamp post in crescent off Swakeleys Road	Roadside	-	-	35.8	34.9	27.8	27.7
HS2-000020BPL	Hillingdon Council	Warren Road sign post on corner of Swakeleys Road and Warren Road	Roadside	-	-	41.3	37.6	31.4	28.1
HS2-000020BPM	Brent Council	Lamp post along Gorefield Place near block of flats	Background	38	32.1	27.8	27.2	23.1	20.5
HS2-000020BPN	Hillingdon Council	Lamp post on B467	Roadside			31.0	31.0	24.8	25.8
HS2-000020BPO	Kensington and Chelsea Council	Lamp post off Silchester Road	Roadside	45.3	38.5	38.7	36.7	28.4	26.5
HS2-000020BPP	Hammersmith & Fulham Council	Sign post on A219 Scrubs Lane, South of Harrow Road	Roadside	54.4	46.3	46.3	46.5	38.1	34.6
HS2-000020BPR	Kensington and Chelsea Council	Lamp post at junction of Crowthorne Road and Bramley Road	Roadside	49.2	43.0	43.7	41.0	31.1	26.8
HS2-000020BPS	Kensington and Chelsea Council	Lamp post by fence on B450 Ladbroke Grove, south of A404 Harrow Road	Roadside	54.2	44.5	45.6	45.6	36.7	32.4
HS2-000020BPT	Hammersmith & Fulham Council	Controlled Zone/Zone Ends road sign on A219 Scrubs Lane, north of Hythe Road	Roadside	57.3	45.5	47.6	47.0	37.3	32.6

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)					
				2016	2017	2018	2019	2020	2021
HS2-000020BPU	Camden Council	Junction of Gower Street and Grafton Way	Roadside	59.7	51.5	50.5	47.6	35.4	31.2
HS2-000020BPW	Camden Council	Junction of Delancey Street and Arlington Road	Roadside	53.4	42.9	45.0	40.2	32.3	29.1
HS2-000020BPX	Camden Council	Netley Street	Background	41.5	36.0	35.9	33.2	25.5	27.1
HS2-000020BPY	Camden Council	Stanhope Street	Background	38.3	32.4	32.2	28.9	24.4	24.1
HS2-000020BPZ	Camden Council	Albany Street	Roadside	47.4	39.5	40.4	38.5	26.9	24.1
HS2-000020BQ0	Camden Council	Werrington Street	Background	41.8	33.9	32.1	29.4	25.5	21.0
HS2-000020BQ1	Camden Council	Polygon Road	Background	39.7	35	34	31.6	26.7	21.4
HS2-000020BQ2	Camden Council	Alexandra Place	Background	34.8	31.6	28.7	27.6	23.4	22.2
HS2-000020BQ3	Camden Council	Harrington Square	Kerbside	53.8	45.5	44.6	40.6	31.1	33.1
HS2-000020BQ4	Camden Council	Junction of North Gower Street and Starcross Street	Background	43.8	39.2	37.7	33.2	28.4	27.0
HS2-000020BQ5	Camden Council	Adelaide Road	Roadside	54.6	43	39.9	37.6	28.6	25.3
HS2-000020BQ6	Camden Council	Mornington Terrace	Background	47.8	35.2	33.2	28.9	23.3	21.9
HS2-000020BQ7	Camden Council	Arlington Road	Background	52.4	34.9	32.1	28.9	25.5	22.4
HS2-000020BQ8	Camden Council	Clarkson Row	Background	-	35.3	32.6	28.9	24.9	25.0
HS2-000020BQ9	Camden Council	Park Village East	Background	49.0	32.7	30.8	27.1	23.1	23.6
HS2-000020BQA	Camden Council	Eversholt Street	Kerbside	71.3	53.6	49	45.6	33.6	32.3
HS2-000020BQB	Camden Council	Junction of Harrington Street and Varndell Street	Background	54.1	33.4	35.0	29.0	24.1	23.2
HS2-000020BQC	Camden Council	Junction of Robert Street and Hampstead Road	Kerbside	59.3	39.7	41.3	36.3	28.2	28.2
HS2-000020BQD	Camden Council	Drummond Crescent	Background	58.7	41.2	39.5	35.3	30.7	28.9
HS2-000020BQE	Hammersmith & Fulham Council	Lamp post next to No 11 Wulfstan Street	Background	52.7	36.8	32.6	28.6	25.5	23.0
HS2-000020BQF	Ealing Council	Conway Drive sign post	Roadside	76.2	57.0	58.5	53.3	40.6	40.1
HS2-000020BQG	Ealing Council	Lamp post outside No 1. Wells House Road on Old Oak Common Lane	Roadside	75.0	64.0	58.0	48.9	39.4	31.5
HS2-000020BQH	Hillingdon Council	Lamp post on High Road Ickenham	Roadside	-	37.2	41.6	38.1	29.8	30.8
HS2-000020BQJ	Camden Council	Grafton Way	Background	-	54.2	51.2	51.3	38.1	33.6
HS2-000020BQL	Camden Council	Delancey Street	Roadside	-	49.3	51	44.8	33.7	32.5
HS2-000020BQN	Hillingdon Council	Lamp post on Park Road	Roadside	-	-	50.1	44.5	32.5	33.2
HS2-000020BQP	Hillingdon Council	Sign post on Long Lane	Roadside	-	-	41.8	40.9	30.8	29.5
HS2-000020BQQ	Kensington and Chelsea Council	Lamp post along Ladbroke Grove, near shops and bus stop at Trevorton Road junction	Kerbside	-	-	48.2	44.3	34.2	31.2
HS2-000020BQR	Camden Council	Lamp post on Park Village East	Background	-	-	34.8	29.3	24.7	23.8
HS2-000020BQS	Camden Council	Opposite Maria fidelis school on Phoenix Road	Background	-	-	33.1	30.9	26.2	22.8
HS2-000020BQT	Camden Council	Drummond Street	Background	-	-	38.8	35.7	28.5	27.4
HS2-000020BQU	Westminster City Council	Lamp post outside Edgware Road Station	Kerbside	-	-	61.9	61.6	40.0	44.4
HS2-000020BQV	Kensington and Chelsea Council	Lamp post on St Ann's Street	Kerbside	-	-	-	35.0	27.2	30.1
HS2-000020BQW	Hammersmith & Fulham Council	Lamp post on A402 Goldhawk Road (replaced HS2-000020BNX)	Kerbside	-	-	-	-	26.2	27.8

Air Quality Annual Report 2021

Document no: HS2-HS2-EV-REP-000-000240

Revision: P01

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)					
				2016	2017	2018	2019	2020	2021
HS2-000020BQX	Camden Council	Lamp post on Brunswick Square <i>(replaced HS2-000020BM6)</i>	Roadside	-	-	-	-	29.0	25.8
HS2-000020BQY	Westminster City Council	Sign post on Ladbroke Grove <i>(replaced HS2-000020BN0)</i>	Roadside	-	-	-	-	-	35.3
HS2-000020BQZ	Ealing Council	Lamp post on Victoria Road opposite Tudor House	Kerbside	-	-	-	-	-	38.4
HS2-000029BR0	Ealing Council	Sign post on Shaftesbury Gardens	Roadside	-	-	-	-	-	27.8
HS2-000020BR1	Ealing Council	Lamp post on Midland Terrace	Background	-	-	-	-	-	26.9
HS2-000020BR2	Ealing Council	Lamp post on Victoria Road outside Papa John's	Roadside	-	-	-	-	-	38.9

Note:

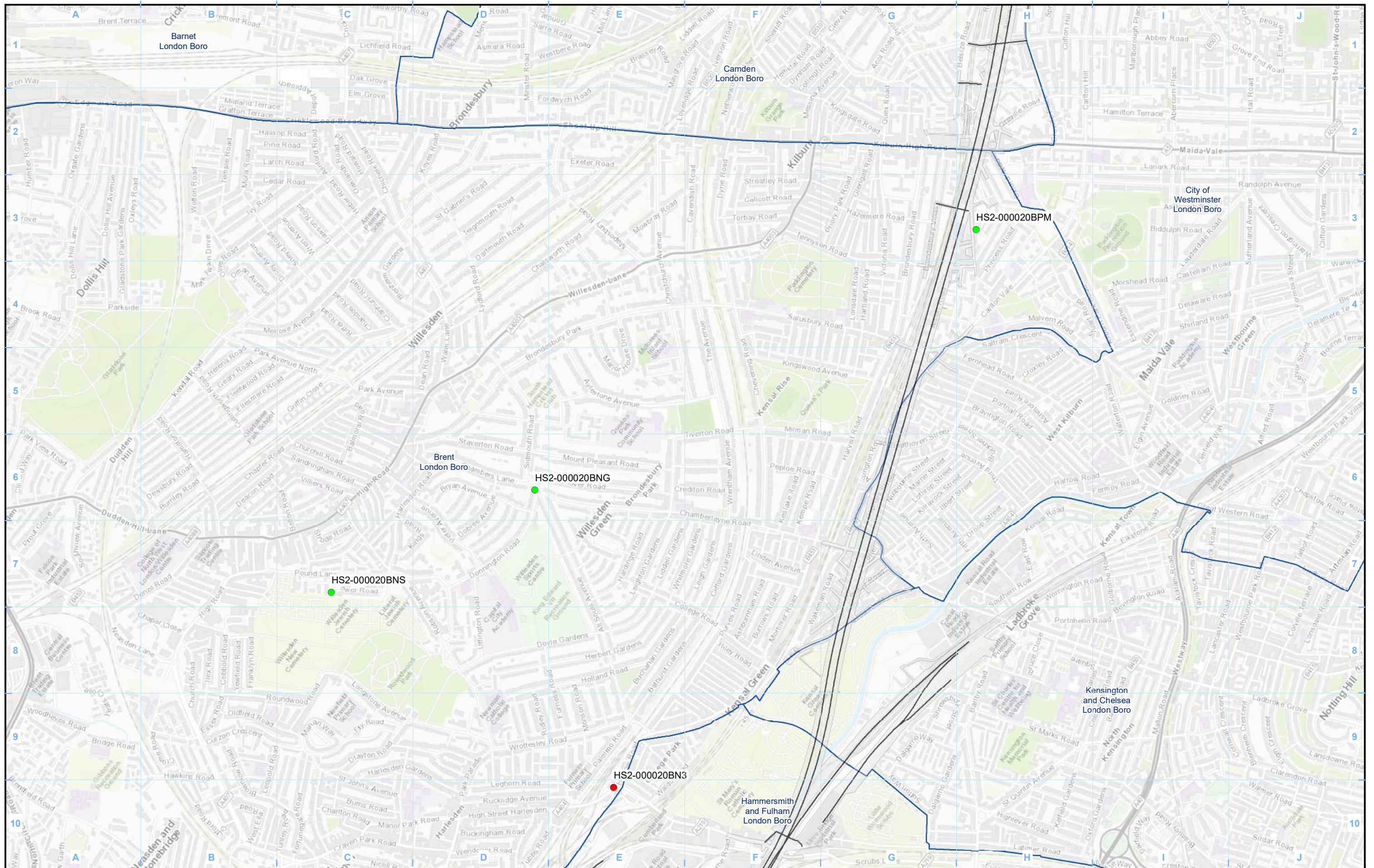
- Exceedances of the NO₂ annual mean air quality standard of 40 µg/m³ are shown in bold.
- HS2-000020BQW replaces HS2-000020BNX as such ES scenario data for HS2-000020BNX6 is used for HS2-000020BQW.
- HS2-000020BQX replaces HS2-000020BM6 as such ES scenario data for HS2-000020BM6 is used for HS2-000020BQX.
- HS2-000020BQY replaced HS2000020BN0.

Table 16: Comparison of the Phase 2a annual mean NO₂ diffusion tube monitoring results (2019 – 2021)

Site ID	Local Authority	Site Location	Location Type	Annual mean NO ₂ diffusion tube monitoring results (µg/m ³)		
				2019	2020	2021
1	Staffordshire	South-west of Stafford (CA2) – Ashflats Lane	Roadside	13.7	8.8	9.3
2	Staffordshire	South-west of Stafford (CA2) – Ash Rise	Suburban	18.3	13.1	12.8
3	Staffordshire	South-west of Stafford (CA2) – Barn Bank Lane	Suburban	26.8	19.7	19.4
4	Staffordshire	South-west of Stafford (CA2) – Southfields Close	Suburban	27.8	21.4	19.8
5	Staffordshire	South-west of Stafford (CA2) – Devon Way	Suburban	28.0	21.1	18.5
6	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road E	Roadside	20.2	16.4	14.9
7	Staffordshire	South-west of Stafford (CA2) – Burton Manor Road W	Kerbside	21.5	14.7	15.1
8	Staffordshire	South-west of Stafford (CA2) – Crinan Grove	Suburban	24.4	17.2	15.6
9	Newcastle under Lyme	Madeley Heath (CA4) – Newcastle Road	Roadside	27.6	20.8	19.5
10	Cheshire East Council	Oakhanger (CA5) – Nursery Road	Rural	16.4	11.9	12.3

Appendix G – Maps of HS2 monitoring survey locations and 2021 results

Figure 1 - 10: Maps of HS2 monitoring survey locations and 2021 results



Legend

2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)
- Work Sections Centreline

Consolidated Land Boundary
 District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Brent**

(1 of 8)

hs2

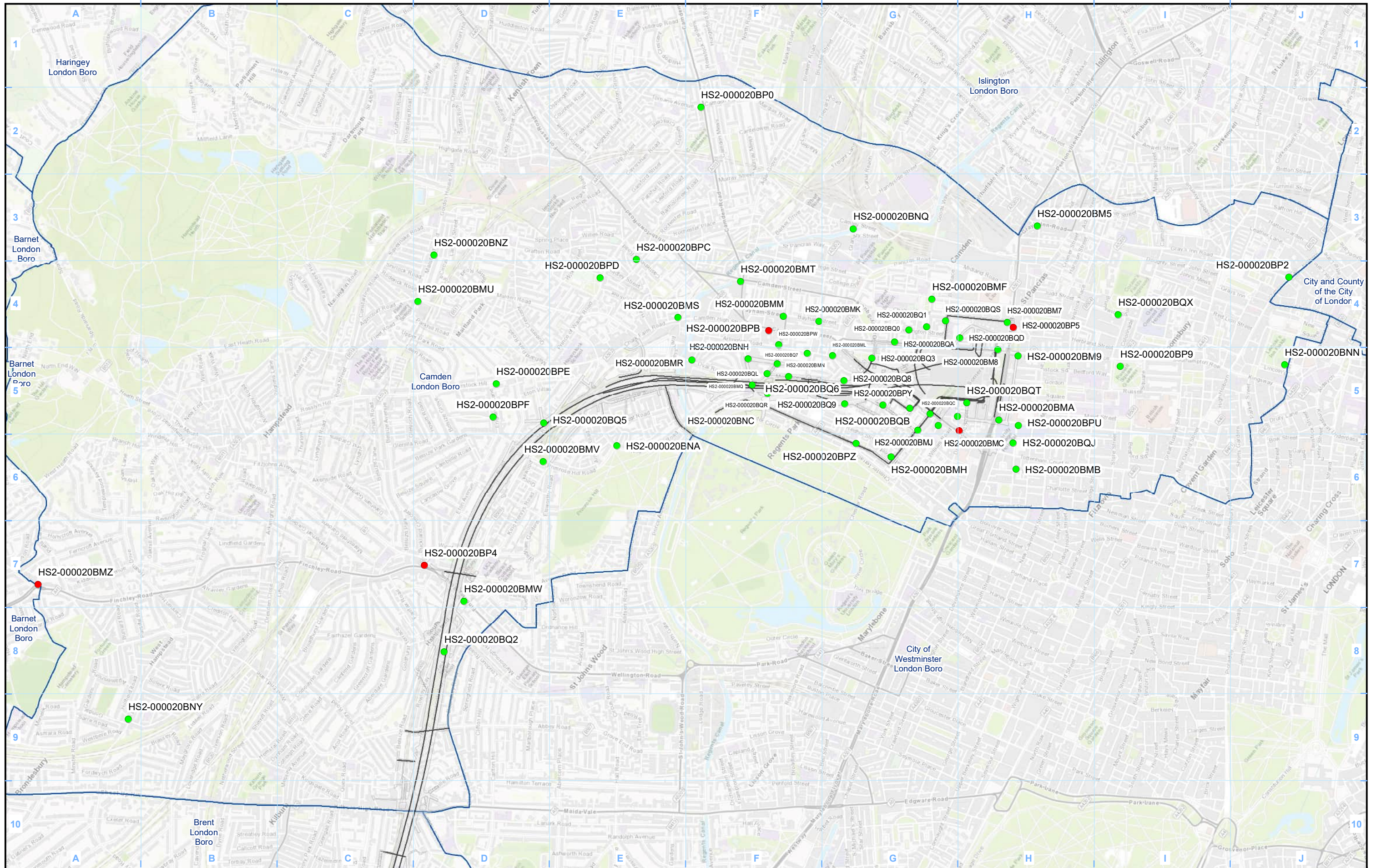
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Legend

2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Camden**

(2 of 8)

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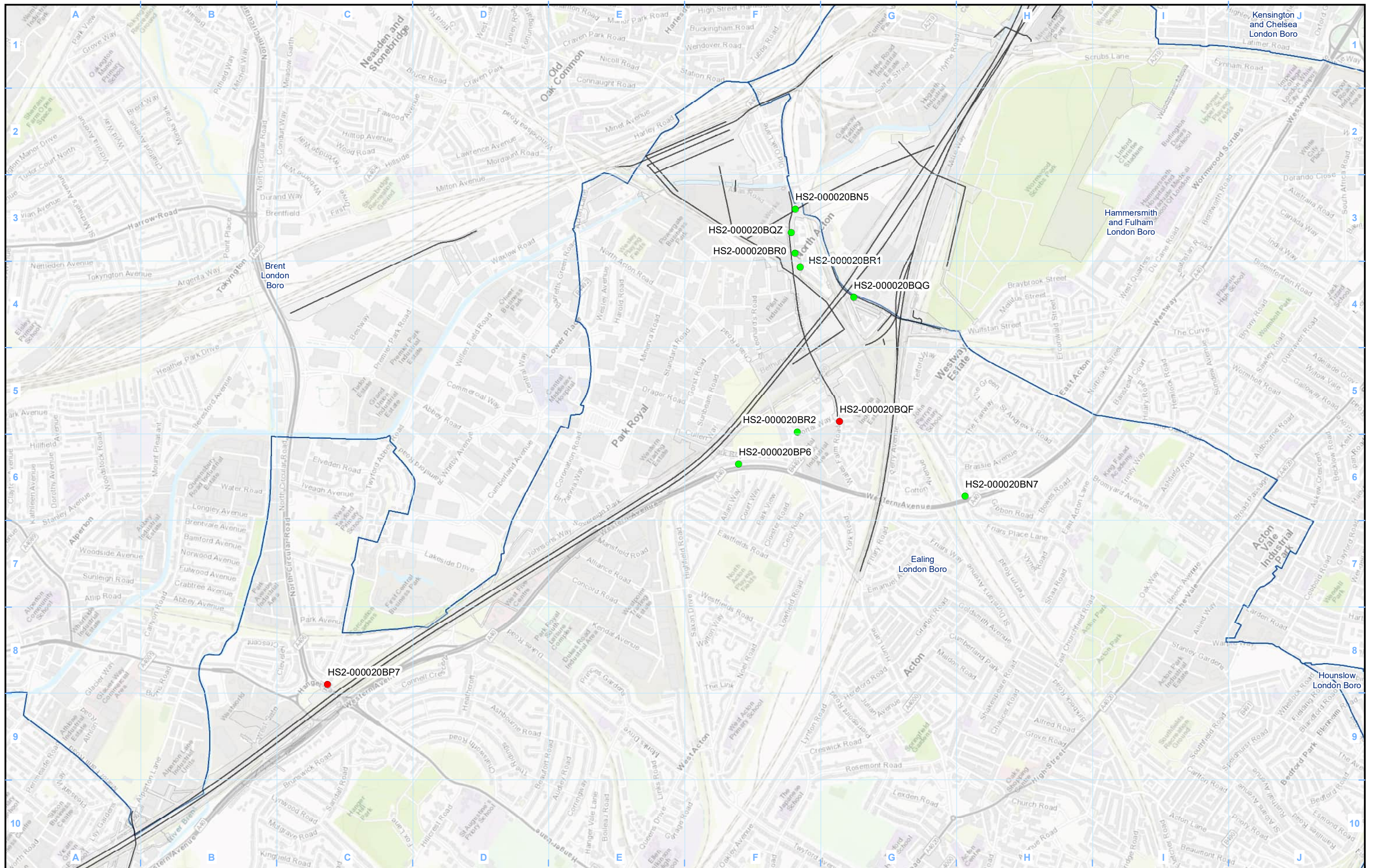
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2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Ealing**

(3 of 8)

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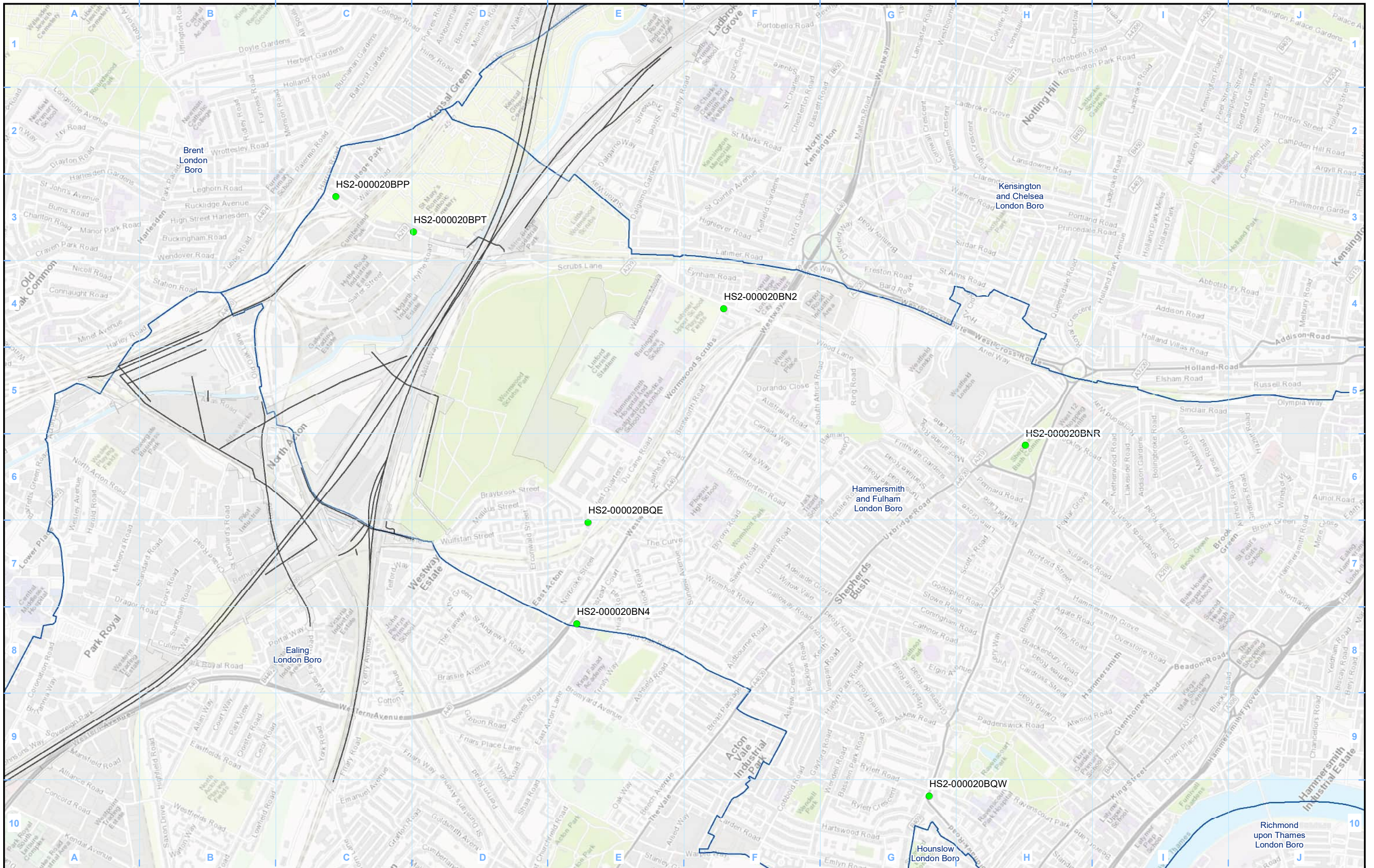
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2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
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Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Hammersmith and Fulham**

(4 of 8)

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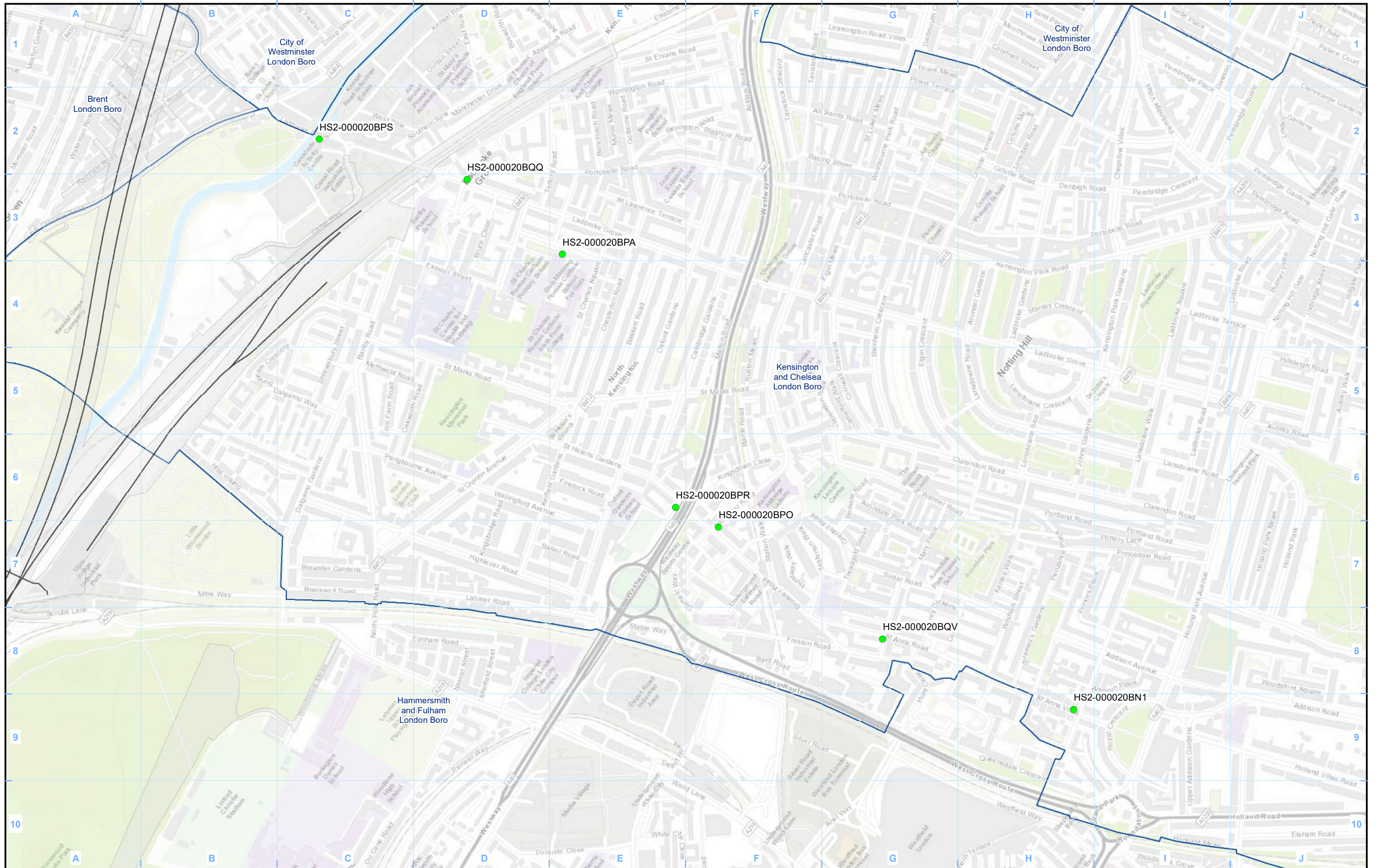
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2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
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Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Kensington and Chelsea**

(5 of 8)

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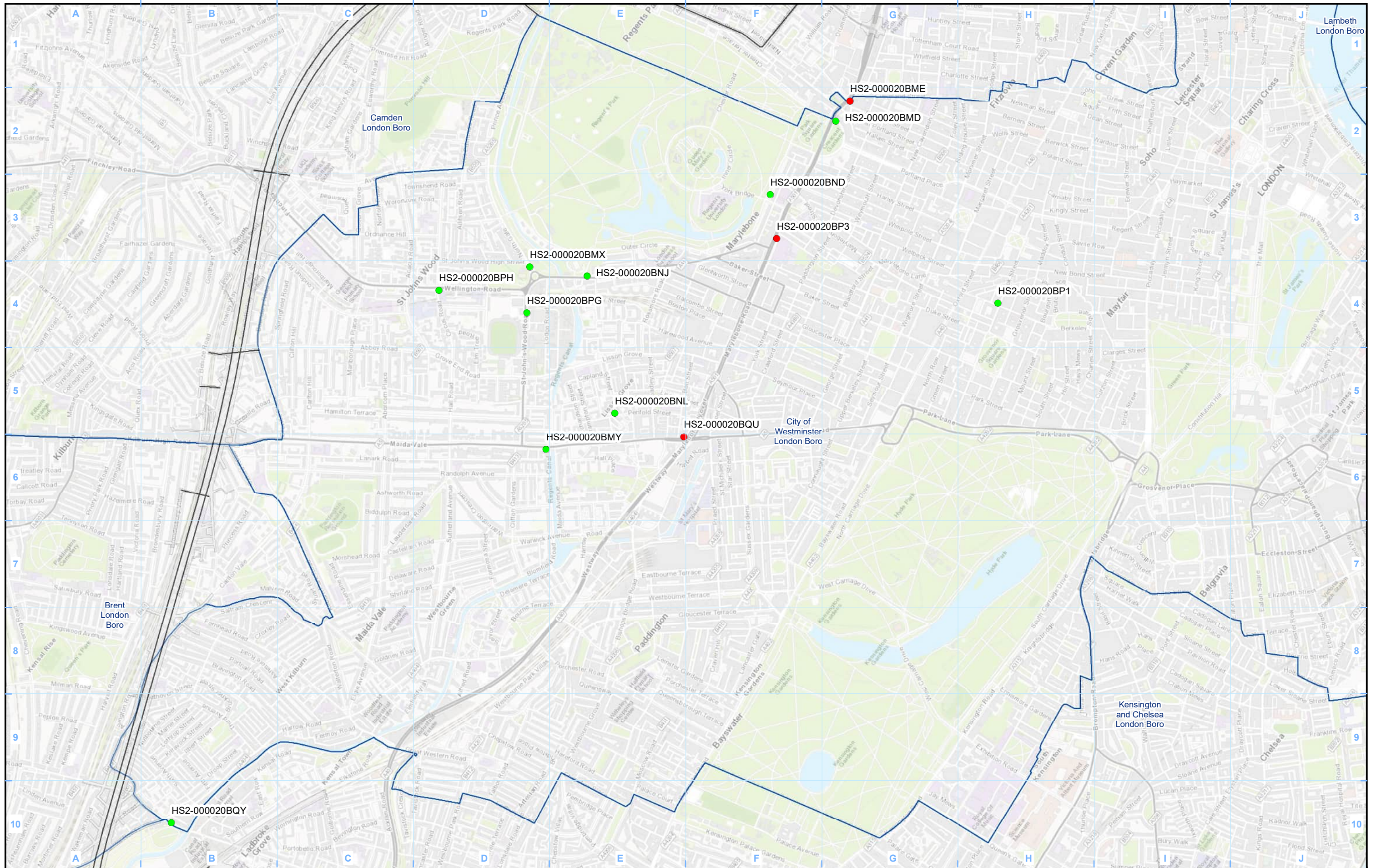
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2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 1 NO₂ Monitoring Positions
City of Westminster**

(6 of 8)

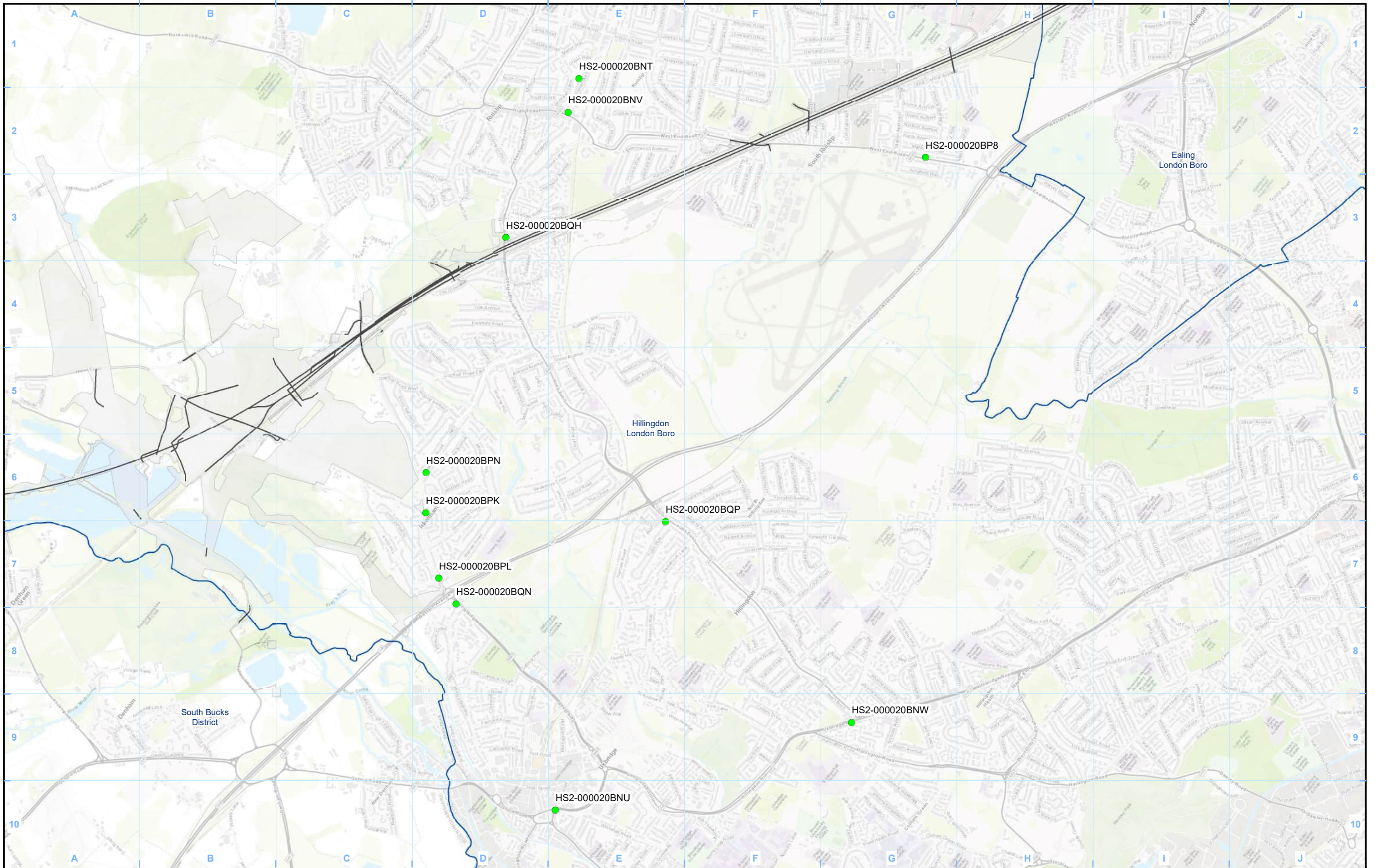
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2021 NO₂ Monitoring

- < 40 µg/m³ (below AQS)
- ≥ 40 µg/m³ (above AQS)

- Work Sections Centreline
- Consolidated Land Boundary
- District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 1 NO₂ Monitoring Positions
London Borough of Hillingdon**

(7 of 8)

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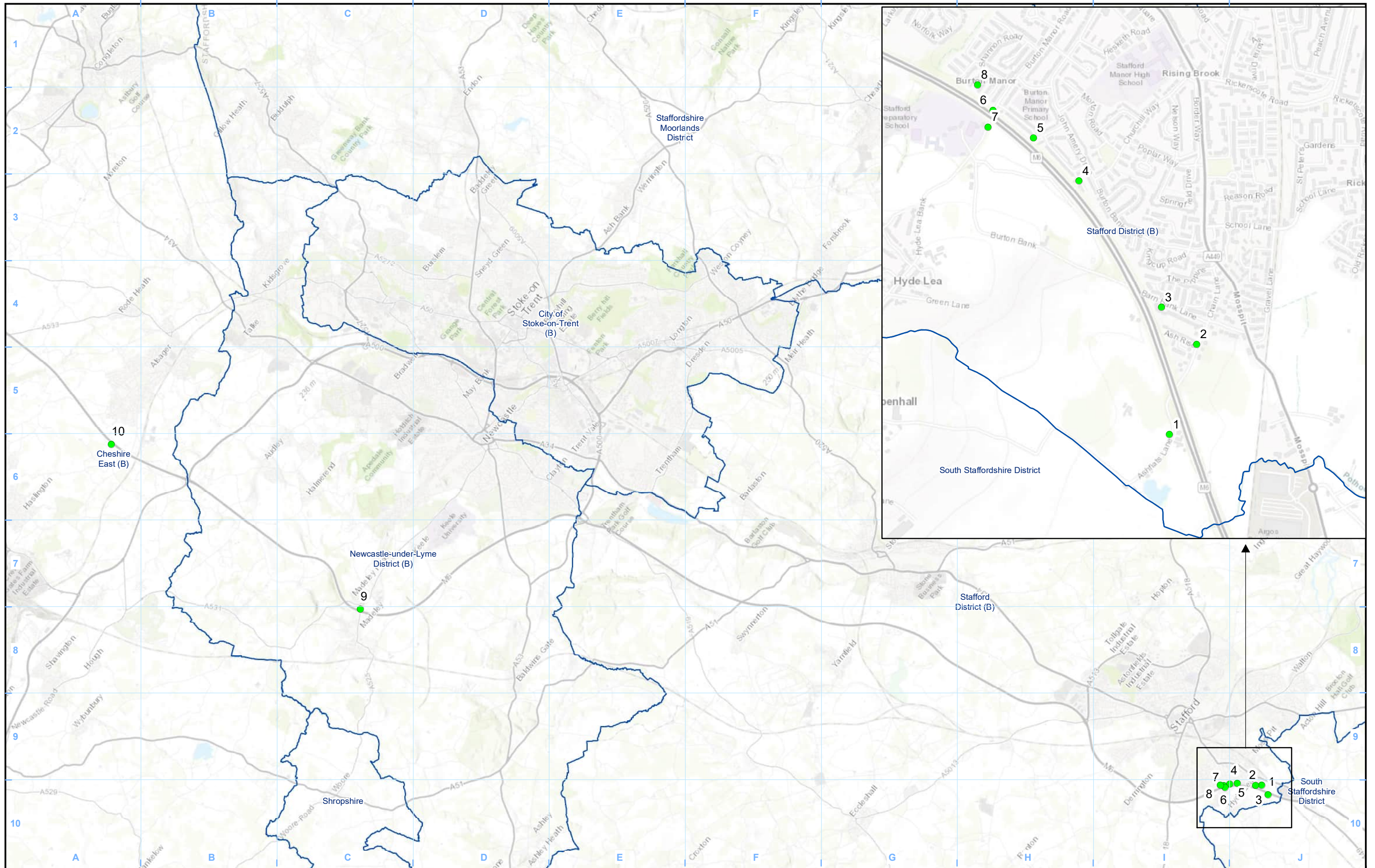
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- Legend**
- 2021 NO₂ Monitoring**
- < 40 µg/m³ (below AQS)
 - ≥ 40 µg/m³ (above AQS)
- Work Sections Centreline
 - Consolidated Land Boundary
 - District Borough Unitary Boundaries



Map Number
HS2-HS2-EV-REP-000-000201

Map Name
**Phase 2 NO₂ Monitoring Positions
 in Staffordshire, Newcastle-under-Lyme and
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(8 of 8)

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