



Consideration of Air Quality Consultation Responses

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Consideration of Consultation Responses

1. This document summarises the points that arose from responses to the Airports Commission’s consultation on air quality assessment (henceforth referred to as the “air quality consultation”) and details the Commission’s consideration of and responses to these points.

Structure of this document

- **Section 1** of this document outlines the Commission’s process leading up to the start of the air quality consultation.
- **Section 2** of this document outlines the responses received and the Commission’s consideration of them. Reflecting that the responses from some organisations were particularly substantial, this section is divided into a number of sub-sections:
 - **Section 2a** – responses from scheme promoters;
 - **Section 2b** – the response from Transport for London;
 - **Section 2c** – responses from local government and other public sector bodies;
 - **Section 2d** – responses from local community and environmental groups;
 - **Section 2e** – responses from national and international non-governmental organisations;
 - **Section 2f** – responses from airlines, the wider business community and trades unions; and
 - **Section 2g** – responses from the general public, including “campaign” responses.
- **Section 3** of this document outlines themes emerging from responses that relate specifically to the consultation process.

Section 1

Background to the consultation

2. On 11 November 2014 the Airports Commission launched a consultation on three options for expanding the UK's aviation capacity (referred to as the "November consultation" within this document for the purpose of clarity)¹. This consultation presented the evidence base that the Commission had developed in respect of its three shortlisted options for adding new airport capacity across all sixteen modules of the Commission's *Appraisal Framework*².
3. At the point of the November consultation, the Commission had undertaken a mass emission assessment, which predicted the increase in emission levels based on the overall scale of the airport's expansion and the anticipated growth in both airfield operations and airport-related surface transport trips. Respondents had twelve weeks to comment upon the results of this analysis, as well as the wider evidence base published for consultation.
4. In its *Appraisal Framework*, the Commission had also indicated its intention to undertake dispersion modelling of air quality impacts. This is a more sophisticated form of modelling, which is dependent upon outputs from dynamic surface transport modelling. The range of inputs and complexity of both dispersion modelling and dynamic surface transport modelling meant that it was not possible to undertake them prior to the launch of the November consultation. Although it has been acknowledged that it would have been preferable for the results to have been available at that stage, the Commission's view was that results of the high level modelling undertaken provided a sufficient evidential basis to enable both the Commission and those responding to the consultation to understand the likely broad impacts of schemes upon air quality levels and to respond intelligently to the relevant consultation questions. The Commission did not therefore consider it necessary or proportionate to hold off on its main consultation to await the results of the modelling. Accordingly, the November consultation explained that dispersion modelling would be completed over the following months. A number of consultation

1 <https://www.gov.uk/government/news/airports-commission-publishes-consultation-on-shortlisted-options-for-a-new-runway>

2 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300223/airports-commission-appraisal-framework.pdf

responses emphasised the desirability of this work and expressed a view that it should be subject to a further consultation.

5. Dispersion modelling provides a finer spatial resolution, to allow assessment of how the pollutants impact on local health-based receptors (located where pollutants will have an impact on human health and so located where people live and work) and sensitive ecological sites. Dispersion modelling takes into account the details of aircraft movements around and in the vicinity of the airport site, the volumes of traffic on specific sections of the road network throughout the day and meteorological factors such as prevailing wind conditions. Further detail is provided in further detail in Section 3.
6. The results of the dispersion modelling in most cases confirmed the high level analysis but in a small number of areas resulted in different outcomes to those previously presented such as new points of differentiation between the Heathrow schemes. In the light of this and the fact that the detail of this work had not yet been available to consultees the Commission decided that it would be appropriate to present them for further consultation. The dispersion modelling was therefore put out to consultation on 8 May 2015 in the report *Air Quality: Local Emissions – Detailed Emissions Inventory & Dispersion Modelling* from here on is referred to as (“the air quality report”). It provided further information on how the local air quality objectives and EU limit values could be affected by expansion of either Heathrow or Gatwick, and potential measures to mitigate these effects. The air quality consultation ran for three weeks and received more than 1,800 responses, from both members of the public and organisations. Further detail is provided in **Section 3**.

Work undertaken before the November consultation

7. The air quality impacts of an airport are defined by a number of factors. These include:
 - emissions from aircraft engines;
 - emissions from other airport operations; and
 - emissions from surface transport networks.
8. At the point of the November consultation, the Commission’s surface access appraisals were based on static modelling³. This modelling was sufficient to enable an appraisal of how the schemes performed against the Commission’s surface

³ The methodology used for this modelling can be found in the appendices to the Surface Access reports at <https://www.gov.uk/government/publications/additional-airport-capacity-surface-access-analysis>

access objectives and to allow for a high-level review of air quality impacts. To carry out dispersion modelling, more sophisticated surface access modelling was required, based on an analysis of the detailed impacts of schemes on road congestion, particularly outside of the strategic road network.

Work undertaken following the November consultation in preparation for the air quality consultation

9. Following the launch of the November consultation, Jacobs, along with their sub-consultants AQC Ltd (referred to jointly as ‘the Commission’s consultants’ throughout the remainder of this document), began work on more detailed and complex dynamic network modelling of the surface transport impacts of the shortlisted schemes. The results of this analysis were used to provide more detail and certainty regarding the Commission’s understanding of the surface access impacts of schemes, in terms of mode share, capacity, resilience and the implications of a growth in freight traffic. These results are reflected in the *Final Report* and the details of the analysis can be found in the consultants’ reports⁴.
10. The outputs of the dynamic network modelling exercise were also used to underpin air quality dispersion modelling. The surface transport data was combined with quantified data on emissions from airport operations (both aircraft movements and non-aircraft operations such as ground vehicle movements on the airport site) using the ADMS-Airport modelling suite, a comprehensive tool for air quality management at airports. This produced a detailed and quantified analysis of the air quality impacts of each of the shortlisted schemes, focused on a Principal Study Area within a 2km radius of the scheme boundary and a Wider Study Area covering all roads for which the surface access modelling had predicted a significant change in traffic levels as specified in the *Appraisal Framework*. The modelling inputs, outputs and process were continually checked by CERC Ltd, the licence holders of ADMS-Airport and the Commission’s expert panellist for air quality, Helen ApSimon, a professor at Imperial College London. This ensured that the process was robust, that the most recent air quality work outside the Commission was incorporated and that constant sense checks of the results were undertaken.
11. For each scheme, measured air quality information from 2009 was used for model verification. As baseline emissions inventories were only available from the promoters for Heathrow (2008/09) and Gatwick (2010), a harmonised year of 2009

4 *Surface Access Dynamic Modelling Report – Gatwick Airport Second Runway*
Surface Access Dynamic Modelling Report – Heathrow Airport Northwest Runway
Surface Access Dynamic Modelling Report – Heathrow Airport Extended Northern Runway

was used. This decision was made on the basis that the choice of verification year influences the choice of meteorological year that may be used for the future year (2030) modelling predictions. 2010 is widely recognised as a high pollution year and airport operations in that year were disrupted due to volcanic eruption in Iceland, hence 2009 was deemed the most appropriate year.

- 12.** The assessment year used was 2030. This was selected on the basis that 2030 is as far as the surface access modelling can be completed with any confidence. Beyond this the assumptions required render the assessment highly uncertain, with no robust underpinning of activity data and emission factors. For example the Pollution Climate Mapping (PCM) model upon which compliance with the EU legislation is measured is not available after that year, nor are any assumptions on Euro standard vehicles beyond Euro 6/VI which are critical to future emissions estimates.
- 13.** As part of its broader appraisal process, the Commission has made use of a number of different demand scenarios, which allow it to test the implications of different ways in which the aviation industry may develop in the future. For the purpose of air quality dispersion modelling, the Commission decided to use a high end demand scenario for each of its schemes, which demonstrated the greatest likely air quality impacts consistent with plausible worst case air traffic and surface transport movements.
- 14.** The scenarios selected see significantly higher traffic than the *assessment of need* carbon-capped scenario that have been used for many of the Commission's other appraisals. For instance, for the Heathrow Airport Northwest Runway scheme, the *global growth* carbon-traded scenario used for the dispersion modelling would see the airport accommodating 125 million passengers in 2030, compared with 109 million under the *assessment of need* carbon-capped scenario, while the scheme promoter only predicts 104 million passengers by 2030.

The consultation questions

- 15.** The air quality consultation's questions were constructed in direct reference to the questions set out in the November consultation. Respondents were invited to review the air quality analysis published and to frame their responses in terms of the following questions from the November consultation:
 - Q5: Do you have any comments on how the Commission has carried out its appraisal of specific topics (as defined by the Commission's 16 appraisal modules), including methodology and results?

- Q6: Do you have any comments on the Commission's sustainability assessments, including methodology and results?
 - Q7: Do you have any comments on the Commission's business cases, including methodology and results?
- 16.** However, the consultation document made clear that where respondents felt that the new published material impacted upon any of the other questions from the November consultation, they were free to make reference to those questions in their response.
- 17.** The consultation documents consisted of the air quality report which outlined the assessment methodology, the relevant legislation regarding air quality emissions and the results of the dispersion modelling. Also included were maps of the areas affected by expansion, the input information regarding airport operations and fleet-mix information as well as outputs from the dynamic surface access modelling that underpinned the dispersion modelling. A covering note was also published summarising the specific points which represented a change from the analysis contained in the November consultation⁵. The Commission considered this to be sufficient information for consultees to make an informed response on the issues that were the subject of the consultation. Shortly after the start of the consultation period, the Commission received a number of questions from stakeholders. The Commission considered that these questions, and the answers to them, could be of benefit to all interested parties. These questions and the answers to them were therefore published alongside the other consultation documents on 19 May.
- 18.** A number of responses raised concerns regarding the length of time allowed for and the highly technical nature of the air quality consultation. These issues are addressed in **Section 3**, rather than alongside the issues raised in response to consultation questions covered in **Section 2**.

5 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/426264/air-quality-consultation-cover-note.pdf

Section 2

- 19.** The air quality consultation generated responses from a wide range of organisations, as well as from a large number of members of the public. The Commission considered each of the responses submitted and they are reflected within the *Final Report*, as well as in the accompanying *Business Case and Sustainability Assessment*.
- 20.** For the purposes of reflecting the range of responses received and how the Commission took them into account, it was considered most effective to break down the responses by categories of respondent, recognising the particular views and concerns that emerged from different groups of stakeholders. The responses from each particular group of stakeholders were not, of course, homogenous and this report will bring out particular differences of opinion within a group where these arose.
- 21.** The Commission has considered all the points raised in response to its consultation. However, for the purposes of clarity, this report summarises the most substantial points that were made in relation to the Commission's analysis. As many organisations and individuals raised some of the same points, any subsequent response by the Commission to a point already dealt with will be referred back to the initial discussion in this report.

Section 2a – Responses from scheme promoters

- 22.** Each of the three scheme promoters made a substantial response to the Commission's air quality consultation. This section summarises the points made by each scheme promoter, as well as the Commission's consideration of those points.

Gatwick Airport Limited

Gatwick Airport Limited (GAL) used its response to state its view that *“It would be unlawful for Government to approve any scheme unless it can be demonstrated convincingly that legal limits will not be exceeded, and that the scheme will not cause a delay in compliance with legal limits. The test applied by the Commission’s consultants, Jacobs, to determine compliance with legal limits (i.e. if limits are exceeded to a greater extent elsewhere within a zone or agglomeration, then there is no delay to compliance) is incorrect as a matter of law and should be disregarded.”*

The response further notes that *“the legal test for scheme compliance with the limit values is clear – a scheme must not cause a breach of a limit value where otherwise there would be compliance, and where there is current non-compliance, a scheme must not extend the time by which a limit value would otherwise be attained in locations within a zone/agglomeration”*.

GAL’s response continued that while Gatwick Airport is already in an area that is compliant with legal air quality limits, the area around Heathrow is one of the most polluted in the UK, where legal limits have been exceeded for many years. As both Heathrow schemes would, in GAL’s view, delay compliance with the legal limits, a decision to expand at Heathrow would be unlawful.

- 23.** These comments refer to EU Directive 2008/50/EC, which was made law in the UK through the Air Quality Standards Regulations 2010⁶. The UK Government has chosen to split the UK into 43 zones/agglomerations for the purposes of monitoring for compliance. The test undertaken by the Commission’s consultants is based on advice from Highways England (Advice Note IAN175/13), which is currently the interpretation of the Directive it uses when assessing its projects.
- 24.** The Greater London agglomeration (in which the Heathrow schemes lie) is predicted by the Department for the Environment, Food and Rural Affairs (Defra) to be non-compliant with the Directive in 2030 (i.e. there are forecast exceedances of the limit value within the agglomeration). By definition, neither Heathrow scheme can cause non-compliance (as non-compliance already exists), and so the first part of the legal test cited by GAL is not applicable.
- 25.** The Greater London agglomeration will not become compliant with the limit value until there are no exceedances at any of the road links reported by Defra. It is thus the road link where the highest concentration occurs in 2030 (or in years beyond)

6 S.I. 2010 No. 1001

that will delay Defra in being able to report compliance with the limit values. For the without scheme scenario, this highest concentration is predicted by Defra to occur at Marylebone Road. The unmitigated Heathrow schemes would cause a higher concentration to occur on Bath Road, and thus delay compliance with the limit values and would fail the second part of the legal test cited by GAL. Mitigation to a level that would avoid extending the time by which the limit value would be otherwise attained would therefore be required (i.e. to reduce concentrations to below the level predicted for the Marylebone Road). The Commission's analysis indicates that the possible mitigation measures required to reduce the emissions associated with the Heathrow Airport Northwest Runway (NWR) scheme to be below the level of the highest concentrations in the agglomeration are plausible and credible, while more ambitious measures than have been quantified would be required for the Heathrow Airport Extended Northern Runway (ENR) scheme.

26. Emissions are not only caused by airport activity but also to a large extent by background activity. In the case of Heathrow Airport this is notably vehicular traffic in West London. As the UK Government is now required, following a Supreme Court decision of April 2015⁷, to submit a plan by the end of December 2015 to ensure compliance with the EU Directive limit values, the Commission considers that expansion at Heathrow should be capable of being incorporated into that plan without delaying compliance. The air quality assessment has quantified adequate mitigation measures to bring Bath Road below the highest level in the agglomeration for the Northwest Runway scheme. This was through a range of mitigations to help deal with airport emissions and it is reasonable to anticipate that there will be interventions to reduce background traffic impacts. The Commission is satisfied that this combination of interventions can address concerns about delayed compliance.

27. As discussed in the Commission's *Final Report* published alongside this paper, the Commission considers it reasonable that new runway capacity at Heathrow Airport should only be released when it is clear that air quality at sites around the airport will not delay compliance with EU limits. The Commission expects action to be led by the Government to tackle the problem, working alongside the airport and others. This would require active monitoring during the design and implementation process as well as scrutiny by the appropriate authorities of detailed plans and the package of mitigation measures as the scheme is worked up in more detail and progress is made towards achieving compliance. Although, as GAL points out, there would be deliverability risks associated with this commitment, in light of the Supreme Court

⁷ R (on the application of ClientEarth (Appellant) vs Secretary of State for the Environment, Food and Rural Affairs (Respondent). Available at: https://www.supremecourt.uk/decided-cases/docs/UKSC_2012_0179_PressSummary.pdf

ruling and the government's consequent commitment to reducing NO₂ levels to reach compliance, this is deemed a reasonable requirement and the level of risk is not considered excessive.

- 28.** The Commission further notes that its decision to select high-end demand forecast scenarios means that the scenario presented for consultation represents a plausible worst case. Should demand levels not grow as rapidly as predicted by these high end scenarios, then the potential would exist for mitigation measures to produce benefits greater than those which have been quantified as part of the Commission's appraisal. The Commission recognises that this, alongside the wider action that Government will have to put in place, means that the true extent of possible emissions reductions due to mitigation measures has not been fully assessed.

GAL's response stated that the air quality analysis had failed to take into account the Habitats Directive.

- 29.** The *Biodiversity Assessment* report published as part of the November consultation describes the requirements of the Conservation of Habitats and Species Regulations 2010⁸, which transpose the European Habitats Directive (92/43/EEC), the process of Habitats Regulations Assessment and the five steps that relate to the tests set within the Regulations. This report highlights that a Habitats Regulations Assessment will be required for any expansion proposals at Heathrow Airport and given that likely significant effects from bird strike management cannot be ruled out, an Appropriate Assessment would be required. In relation to air quality the report notes that there is the potential for nitrogen deposition to affect vegetation and invertebrate communities with potential impacts on the designation's qualifying bird species, and although the expectation is that the impact on designated sites would not be significant, the need for further study is identified. The Commission therefore considers that GAL's point had already been addressed through materials published as part of the November consultation.

GAL also criticised the Commission's consultants' assessment methodology, claiming that it allowed for implausibly optimistic assumptions in relation to the Heathrow schemes and understated the air quality impacts of expanding Heathrow. In particular GAL stated that the emissions factors and background concentrations forecast by DfT and Defra may be overly optimistic and that the Highways England approach to adjusting future background concentrations should have been applied.

30. Highways England's (HE) Interim Advice Note, IAN 170/12 (Nov 2013), as referenced by GAL, sets out an approach to correct the verified modelled total NO₂ concentrations in order to account for future under-performance of vehicle emissions standards. However, HE notes that "*emerging evidence indicates that currently published future NO_x and NO₂ projections in this IAN may be too pessimistic, when taking into account emerging evidence associated with the performance of Euro 6/VI vehicles*". It further notes that "*the long term trend is assumed to be linear as there is no observed long term impact of emissions from Euro 6/VI vehicles on air quality monitoring trends available at this time*". It is thus left to the "*project's air quality specialist to identify which set of projection factors to use*". The HE approach was not used to adjust predicted values for the following reasons:

- the emerging evidence on the expected performance of Euro 6/VI, referred to by HE, has been strengthened since 2013 such that the emissions factors in Defra's Emissions Factor Toolkit (EFT) 6.0.2 are considered to provide a good representation of the performance of Euro 6a/b and Euro VI vehicles (see Appendix H2 of the air quality report);
- EFT 6.0.2 includes no consideration of the expected improvements from Euro 6c (expected to become available post-2018); and
- the 2030 assessment year is at the extreme end of the factors published by Highways England.

31. Taking these factors into account it is considered that the HE approach would be overly pessimistic for 2030 and would indicate unrealistic forecasts. As a general principle, the assumptions used for the air quality dispersion modelling were designed to replicate a plausible worst case scenario. This is why, for example, demand forecasts from the top end of the Commission's range were used.

GAL highlighted concerns relating to the construction phase of any Heathrow schemes, where it presented analysis from Arup, its own advisors, which showed that the construction works were likely to lead to significant breaches of air quality rules.

32. The *Appraisal Framework* states (para 6.8) that "*the construction phase is not required to be modelled explicitly as part of this high level appraisal. However, useful information on the length of time and likely scope of effects will be recorded together with any relevant mitigation measures*". The Commission's consideration of this led it to conclude that construction impacts of the scheme would be temporary and of relatively short duration (with the most significant impacts likely limited to

the couple of years during which surface access schemes would be delivered). It is therefore reasonable to assume that the detailed design and planning of the construction phase could be used to keep these impacts to a minimum.

GAL claimed that the Commission had failed to test the worst case year for the Heathrow schemes, which GAL claimed would be 2025; the year the scheme opened. GAL also claims that the worst case scenario in terms of number of passengers and aircraft transport movements, which for the Heathrow Airport Northwest Runway scheme is *low-cost is king* (carbon-traded), should have been used.

- 33.** The Commission noted there is inadequate evidence to suggest that the opening year of a Heathrow scheme (assessed as 2026, as opposed to the 2025 stated by Gatwick) would represent the worst case year. As the assumptions on fleet improvements are modest whereas the traffic increases for both air and surface access are significant, the reasonable approach was to use 2030 as the assessment year. This was selected on the basis that 2030 is as far as the surface access modelling can be completed with any confidence; beyond this the assumptions required render the assessment highly uncertain, with no robust underpinning of activity data and emission factors. For example, the PCM model upon which compliance with the EU legislation is measured is not available after that year, nor are any assumptions on Euro standard vehicles beyond Euro 6/VI which are critical to future emissions estimates. Other appraisal modules have used appropriate appraisal periods. This, along with one of the plausible worst case demand scenarios, gives a high level of air transport movements and surface access demand and gives a good indication of how an unmitigated expansion could impact on air quality. However, the *low-cost is king* scenario, which gives the highest ATM count and passenger numbers, was not used for the Heathrow Airport Northwest Runway scheme. There were two reasons for this; first, the scenario is generally inconsistent with the promoter's assumed business model. Second, it was desirable to maintain consistency between the Heathrow schemes and the worst case scenario for the Heathrow Airport Extended Northern Runway is *global growth*. In any event, the differences between the scenarios for the scheme in question are not great, with 129 million passengers under the *low-cost is king* carbon-traded scenario, as opposed to 125 million under the *global growth* carbon-traded scenario.

GAL stated that the Commission had not assessed all components of the Heathrow Airport Northwest Runway scheme, such as the realignment of the A4 and the relocation of the Lakeside Energy from Waste (EfW) Plant.

- 34.** As set out in the air quality report it is not possible to replicate Defra's PCM calculations along the realigned road links, and nor is it possible to confirm that the new links would be included in future PCM predictions. Only the competent authority can confirm this position and it would depend on public access to the road. The realigned road, from the perspective of EU limits, cannot be assessed with any confidence and the process of designing the realignment would be expected to minimise air quality impacts where possible.
- 35.** While an EfW plant currently operates in the area, there is insufficient detail of the proposed EfW replacement to allow accurate quantification to be undertaken. The airport owner has also continued to investigate possible locations for such a plant and it would be therefore unreasonable to assess it alongside other features. Future Waste Incineration Directive (WID) requirements and Best Available Technology (BAT) expectations would be expected to apply to any such plant. Crucially, however, there is no relevance to the Northwest Runway or Extended Northern Runway Schemes with regard to "*PM₁₀, PM_{2.5}, heavy metals, dioxins and furans*" and the process of granting permits will ensure that emissions do not cause an exceedance of the limit values for NO₂.

GAL claimed that the Commission had placed too much reliance in its assessments upon mitigation and demand management measures whose effectiveness and impacts had not been subject to testing. GAL also considers that the benefits of mitigations need to be fully assessed for feasibility and enforceability and then those that can be used without expansion added to the baseline.

- 36.** Many respondents to the surface access report of the November consultation pointed to the need to consider the opportunities to manage congestion. As a result the Commission asked its consultants to carry out a number of pieces of work on road demand management measures, assessing both the track record of such measures within the UK and internationally and the likely quantitative impacts if such measures were applied at Heathrow. These reports, published alongside this paper, have been drawn on for the air quality assessment and are part of the Commission's evidence base.

- 37.** In respect of mitigation measures relating to airfield operations and the movement of aircraft, the Commission has adopted generally conservative assumptions. It has noted the risks associated with the use of many of the operational measures such as reduced-engine taxiing put forward by scheme promoters and has treated these measures with caution in defining its testing scenario. Although the mitigations have been assessed enough for the purpose of decision making, they will have to be developed in more detail during the planning process. As this assessment was completed on a precautionary approach the mitigation measures are rightly shown separately to the unmitigated impacts.

GAL claimed that the Commission's consultant had used a deficient model validation process, leading to the air quality impacts of Gatwick's expansion being overstated and the impacts of Heathrow's expansion being understated. In particular, GAL claimed that the model verification process has derived an adjustment factor using a combination of Heathrow and Gatwick air quality monitoring data, which they feel is incorrect. Defra technical guidance states that verification should involve only local sites. The Jacobs verification study indicates modelled concentrations [in 2009] of $40.4 \mu\text{g}/\text{m}^3$ at Gatwick LGW3, where the local authority's published measured concentration was only $34.3 \mu\text{g}/\text{m}^3$. GAL claimed that the conclusions reached in the current assessment are therefore unreliable. They result in an overestimate of the impacts from Gatwick and underestimate the impacts at Heathrow.

- 38.** Advice from the Commission's consultants on this issue indicated that in order to carry out a fair assessment of each scheme in comparison to the do minimum in 2030, it would not be appropriate to apply a different road traffic verification factor to Heathrow and Gatwick, as this would unfairly overstate the emissions from vehicles generated by one airport over the other. There are no suitable local roadside automatic monitoring sites in the Gatwick study area; therefore the sites close to Gatwick (all of which are located either close to the airport or in urban settings away from roads) were input into the verification as a final comparison exercise only. This demonstrates adequate model performance for this strategic level assessment.
- 39.** The comment made by GAL relates to absolute (total) predicted NO_2 concentrations, but the impacts of a scheme are actually related to changes in pollutant concentrations. In this regard, each scheme has been treated equally, using consistent assumptions regarding vehicle and aircraft fleet mixes and airport operations, except where specific data or information were provided by the promoters and reviewed by the Commission's consultants. The assessment of

the air quality impacts in terms of change in concentrations will therefore not be overestimated or underestimated for one scheme relative to another.

- 40.** All predicted NO₂ concentrations in 2030 are below the annual mean objective. The prediction of exceedances of the Limit Value at Bath Road is based on Defra's PCM model and is not related to the model verification process. There is therefore, no sound basis for applying a separate verification for a few sites at Heathrow as is being suggested.

GAL's response stated that Jacobs had used a strategic highways model for a local assessment of emissions. GAL noted that this type of model cannot account appropriately for congestion and delay, conditions which lead to higher emissions and impact on air quality. GAL also states that there is a flaw in the model in that it cannot distinguish between airport and non-airport related traffic.

- 41.** It was clearly stated in the consultation materials that a detailed dynamic model was used, which is capable of, and has considered delay and congestion.

- 42.** Based on the highway modelling undertaken, it would be possible to distinguish between airport and non-airport traffic through select-link analysis. This was not undertaken for the AQ assessment, as there was no requirement to identify airport-related traffic in the environmental assessment. The focus of the work was on the incremental change due to the scheme. The dynamic surface access modelling clearly differentiates between airport and non-airport traffic.

GAL's response claimed that the Commission's consultants had selected inconsistent assessment areas without evidence for why different areas have been chosen. For example, GAL claimed there was no explanation as to why the area for Gatwick was 78% larger than that chosen for Heathrow. In addition, GAL stated that major routes (particularly the M4) and major conurbations west of the M25 but close to Heathrow such as Slough, Maidenhead and Windsor were excluded from the road traffic modelling for Heathrow which was a significant omission.

- 43.** The assessment areas selected were based on the simulation areas in Transport for London's (TfL) Highway Allocation Models. There was also a requirement to extend the South London Highway Allocation Model to incorporate the road network around Gatwick.

- 44.** In respect of Gatwick, the wider simulation area means that more accurate air quality forecasts could be derived further afield from the airport, including areas in South London. However, it is noted that airport traffic is a small fraction of total

demand on many such roads, and the impacts have not been assigned to the Gatwick Airport Second Runway scheme in the environmental assessment.

- 45.** In terms of Heathrow, the West London Highway Allocation Model simulation area was extended along the M4 corridor, where the majority of Heathrow demand from the west is concentrated. Other links where airport-related traffic was low were included in the model as part of a buffer network that details link capacities but not detailed junction arrangements. However, given the low forecast airport-related traffic flows on many of these links, the buffer network is considered sufficient for the purposes of this assessment
- 46.** It should be noted that TfL's sub-regional Highway Allocation Models were the only relevant and credible strategic modelling tools available for an assessment of this nature, and the limitations of the model should be considered when interpreting any resultant outputs – further details are provided in the surface access dynamic modelling reports.

GAL claimed that the approach taken by the Commission on background concentrations does not follow standard practice for an assessment of this nature. GAL states that it has done calculations using the same methodology as the Commission's consultants and found very different results (receptor 2R-K in the Commission assessment of the Gatwick scheme shows $35.4\mu\text{g}/\text{m}^3$ where GAL's assessment shows $29\mu\text{g}/\text{m}^3$ and for the Extended Northern Runway scheme at ENR-N the Commission's assessment shows $22.5\mu\text{g}/\text{m}^3$ where GAL show $52.4\mu\text{g}/\text{m}^3$). As a council in the vicinity of Gatwick has shown the same to be $33.5\mu\text{g}/\text{m}^3$, GAL states that it is inconceivable that the background could increase over time. GAL therefore states that it appears background is underestimated for Heathrow and overestimated for Gatwick.

- 47.** Background concentrations obtained from Defra background maps have been gridded and interpolated to individual receptor locations, using kriging (estimating values at locations which have not been sampled). This prevents any step changes in background concentrations at the boundary of each $1\text{km} \times 1\text{km}$ grid square. This accounts for the difference identified by the promoter at receptor 2R-K. The large difference cited at ENR-N is because the background values have correctly had all airport emissions (in-square and out-square) removed. The promoter's conclusion is based on analysis of a single background NO_x concentration in the Gatwick Study Area (receptor 2R-K). This result is based on Defra's published background map for 2030 and it does not represent the broader picture for Gatwick. There is no clear evidence of a consistent over- or under-estimation of background concentrations in 2030 at either airport. The methodology for determining background concentrations

in both study areas is consistent, utilising the same Defra background concentration maps.

Heathrow Airport Limited

Heathrow Airport Limited's (HAL) response states *"We also consider the Commission's assessment to be conservative in that it is based on an assumption of higher air traffic movements in 2030 than we are forecasting, and also uses one of the Commission's highest 2030 demand scenarios. Furthermore the Commission's road traffic forecast is higher than our own and it does not take into account our commitment to deliver no more airport-related traffic than today's airport, underpinned by a detailed surface access strategy."*

48. The Commission's consideration of this noted that the demand forecast scenario used for air traffic movements was indeed higher than that put forward by HAL. The testing of a plausible worst case scenario had been an explicit objective of its air quality dispersion modelling and that the use of the high-end demand scenario had therefore been appropriate.
49. The difference between the Commission's road traffic forecasts and HAL's was brought out in the surface access analysis presented during the November consultation and is attributable to a number of factors, particularly the more conservative assumptions adopted by the Commission in respect of employee mode-shift towards sustainable transport. Since consultation, the Commission's consultants have carried out further work on the potential for and impacts of demand management measures to drive further passenger and employee mode shift, which will be published alongside this report. This has allowed the Commission to identify the conditions required to enable HAL's commitment to deliver no more airport-related traffic than today's airport by 2030. However, the Commission remains of the view that it was reasonable to conduct dispersion modelling on the basis of a plausible worst case scenario, without building in these additional demand management measures.

HAL acknowledged the recent Supreme Court ruling regarding the need for Government to produce an air quality action plan and set out its intention to work with Government to develop that plan, whether or not the airport should expand.

50. This point is discussed in paragraphs 26 and 27 above.

HAL's response noted that the most significant issue with air quality in the vicinity of Heathrow Airport relates to emissions from road vehicles making journeys unrelated to the airport. HAL used its response to indicate that effective action on air quality in the vicinity of Heathrow was best addressed by a concerted effort by themselves in conjunction with Government, Transport for London, the Greater London Authority (GLA) and local authorities to manage these background emissions.

- 51.** The point on effective action corresponds to the Commission's thoughts as laid out in paragraph 26. For the purposes of this assessment, the Commission remained of the view that there was too much uncertainty involved in assuming the presence of national or regional road demand management measures (such as road pricing on the strategic network) and defining these measures precisely enough to allow for their inclusion in a quantitative appraisal. Therefore, the approach of basing its air quality dispersion modelling on a scenario without road demand management measures and focusing its separate appraisal of such measures primarily upon those which it would be within the airport's own power to implement was appropriate.

HAL used its response to call upon the Commission to attach more weight to the measures it had already committed to in order to manage its air quality impacts and its blueprint for further reductions.

- 52.** Many of the measures described in HAL's AQ blueprint are those described as mitigation measures within the air quality report (as all measures suggested in the promoters' submissions were considered) such as single engine taxiing and Collaborative Decision Making (CDM) and have therefore been considered sufficiently within the assessment. The Commission would expect that HAL would take this blueprint forward to help mitigate its current and expected emissions in addition to working with Government to tackle the background emission problem.

Heathrow Hub Limited

Heathrow Hub Limited (HHL) used its consultation response to highlight a number of criticisms of the details of the Commission's traffic and emissions quality and to draw attention to the potential benefits of the hub station concept promoted by HHL.

HHL noted that it could not align the Commission's consultants' road traffic forecasts for the A4 with HHL's own forecasts and could not understand the basis on which the traffic forecasts had been reached.

- 53.** The projected increase in traffic for the A4 under the Heathrow Airport Extended Northern Runway scheme can be attributed to the removal of M25 junction 14. A large proportion of traffic from the west would access the western terminal area and southern freight area at M25 junction 14 via the M4. With the removal of junction 14, the most direct route for this traffic is to exit the M4 at junction 5 and access the airport via the A4 and A3044. Additionally, M25 bound traffic from Poyle and Colnbrook which previously had direct motorway access via junction 14 is predicted to use either M25 junction 13 or M4 junction 5, resulting in increased traffic volume surrounding this area. The Commission accepts that alternative designs for access roads could alleviate these impacts, but these would have their own impacts, certainly upon the surface access and air quality objectives, but also upon objectives under other modules such as cost and commercial viability. The Commission therefore believes that the nature and scale of the impacts demonstrated in its work on surface access and air quality form a reasonable basis for appraisal.

HHL criticised the Commission’s consultants’ use of more optimistic employee mode shift assumptions for the Gatwick scheme than for the Heathrow schemes.

- 54.** The Commission noted that while the assumptions used for employee mode shift in the modelling were less optimistic than those used by either HAL or HHL, neither of which were modelled, post-November consultation work had been used to test the scope for and impacts of higher levels of mode shift. This point has therefore already been addressed through other work that the Commission undertook following the November consultation.

HHL states that the Commission’s consultants’ analysis has used the wrong public transport mode share in its assessment of mitigations (50%), compared with 55% assumptions in the November consultation material. They also do not agree with the statement made in the air quality report that “The Stage 2 Submission from the promoter sets out a vision for high public transport access, but it is not clear whether this is deliverable”.

- 55.** The 50% public transport mode share refers to the scheme promoter forecast for the Northwest Runway scheme in 2030. This mode share forecast was referenced as a ‘scheme promoter’ assumption in the environmental report for the Extended Northern Runway scheme because the scheme was assessed based on a surface access package similar to that put forward by HAL with road network amendments to accommodate the runway extension. At the point of the November consultation, the Commission’s modelling indicated a likely 55% public transport mode share.

However, the dynamic surface access modelling produced a revised mode share forecast of 52.8% for the Extended Northern Runway in 2030. This figure of 52.8% was used as the basis for the dispersion modelling. HHL's original estimate for modal share was close to 60%, based on a different surface access package including a hub station concept. The comment made within the air quality report reflects the Commission's view of the level of challenge associated with achieving a 60% public transport mode share. .

HHL raised concerns that the assumption on the use of the southern perimeter road and the south tunnel for distribution is equally valid for the ENR proposal as has been used in the NWR assessment, but was not reflected in the analysis.

- 56.** Further analysis following the November consultation has been undertaken utilising dynamic assignment models which explains this difference in road use between the Heathrow schemes. The surface access dynamic modelling reports have been published as part of the evidence base supporting the *Final Report*.

HHL also claims that the Commission has underestimated the impact of changes to aircraft operating procedures such as reduced-engine taxiing in order to reduce emissions.

- 57.** The risks associated with the practical implementation of such measures, which were brought out in previous work done under the Project for the Sustainable Development of Heathrow, means that there is no sound evidential basis to adopt a more optimistic set of assumptions than those used in the reports published as part of the air quality consultation. The assumptions were used consistently between schemes.

In respect of aircraft movements on the ground, HHL's response states that the Commission has over-estimated taxi times for aircraft and has not factored in the efficiencies that would be achieved in this area due to the layout of the Extended Northern Runway scheme.

- 58.** The taxiing times for the Extended Northern Runway scheme have specifically considered the new layouts between apron and runway. Taxi times have been derived from known aircraft taxi speeds and measured distances derived from the scheme promoter's submission. The Commission does not believe, therefore, that there has been any underestimate in the detailed modelling study.

HHL's response states that the hub station proposal advanced by HHL would have the potential to produce more considerable congestion and emissions reductions and that the Commission should have given more consideration to this proposal.

- 59.** The Commission's consultants conducted a review of the hub station proposal, which was published as part of the materials that accompanied the November consultation. The analysis indicated that the hub station proposal had some potential to relieve road congestion, but that this potential was subject to considerable risk. It was noted that should the hub station become a destination in its own right, rather than a simple gateway to the airport (either in its role as a station with a high service frequency to a number of destinations, or due to further commercial development around the station site), these congestion and air quality benefits could easily be offset and create a new air quality problem elsewhere.
- 60.** A number of other significant drawbacks to the proposal were also identified, including longer journey times for passengers on the Great Western Main Line not travelling to the airport and a high cost compared to the alternative Western Rail Access to Heathrow proposal. On the basis of this analysis, the Commission has decided not to recommend the hub station concept forms part of the future development of Heathrow. The full reasoning behind this is set out in the *Final Report*.

HHL noted that the Extended Northern Runway scheme was the only scheme assessed by the Commission for which air quality improvements were expected.

- 61.** Other schemes also see certain properties experience an improvement in air quality (although it is accepted that the numbers are much lower than the 6,600 properties that would experience an improvement with ENR). Moreover, this presents a very partial reading of the data. More properties experience an increase than a decrease in emissions levels with the Extended Northern Runway scheme, and importantly 299 properties would experience a very significant increase of between 6 and 10 $\mu\text{g}/\text{m}^3$ of NO_2 .

Section 2b – Response from Transport for London

Transport for London (TfL) submitted a substantial and technical response to the air quality consultation, raising a number of concerns relating to process, methodology and conclusions. The response states: “*The Commission’s air quality assessment represents stage 2 of the Commission’s own two-stage process, which provides more detailed dispersion modelling, however the report fails to provide detailed impacts and does not determine overall significance of the options.*”

TfL notes that the results of the air quality consultation have not been reflected in an updated version of the *Business Case and Sustainability Assessment*.

- 62.** The air quality report does provide detailed information on impacts in the local area with the significance of each scheme apparent in the results. The Commission’s final determination of the impacts is set out in the *Sustainability Assessment* which accompanies the *Final Report*.
- 63.** The Commission acknowledges that no updates to the *Business Case* or *Sustainability Assessment* were published as part of the air quality consultation. However, updated versions of these documents are presented alongside this paper and the *Final Report*, incorporating not only the work done to underpin the air quality consultation and analyse responses to it, but also updates to the Commission’s evidence base arising from a range of other work packages initiated following responses to the November consultation.

TfL’s response notes that the Commission’s choice of an assessment year of 2030 means that the impacts of each scheme’s initial phase and mature phase have not been tested.

- 64.** Paragraph 33 above explains the reasoning behind using 2030 as an assessment year. As it was the most logical year to assess a worst case scenario and information was not available for further years, the examination of an initial year and a mature year suggested in the *Appraisal Framework* was no longer considered a useful approach for this element of the appraisal.

TfL's response states that *"the Appraisal Framework confirmed that the Commission would refer to the supplementary Green Book guidance in its assessment. According to this guidance, where monetised disbenefits are over £50 million and there is risk on non-compliance with the EU limit values – both of which apply for all three shortlisted schemes – then abatement cost estimate methods should be used for all relevant impacts. This has not been done. As these would be noticeably higher than those using the current method, these would worsen the scale of the air quality impact."*

- 65.** Supplementary Green Book guidance indicates that in cases where the costs are above £50 million, after applying damage costs, an impact pathway assessment (IPA) should be undertaken before abatement cost estimates. Following the IPA, abatement costs would be added to the IPA costs. Limitations in the available data, such as the impracticality of establishing surface access forecasts beyond 2030 and limitations also regarding availability of health and population data forecast to mature phases meant that the levels of uncertainty would limit the value of any such attempt to monetise on an impact pathway basis.
- 66.** However, the Impact Pathway Analysis snapshot that was undertaken indicates that the range of damage costs calculated (with sensitivity) is in line with the total costs that might be expected from a more detailed pathway analysis, although it is acknowledged that the specifics of the health costs are not made visible in this approach. However, the assessment follows the *Appraisal Framework* intention of following a Green Book aligned analysis. It has been noted within the text (Appendix G of the air quality report) that whichever scheme is taken forward would therefore require an Impact Pathway Assessment.
- 67.** There is sufficient information in the section considering damage costs (including the application of European Environment Agency Value of a (healthy) Life Year (VOLY) and Value of a Statistical Life (VSL) damage values which give significantly higher damage costs for NO_x) for the current stage of appraisal. VSL is based on the number of deaths associated with air pollution while VOLY is based upon the loss of life expectancy (expressed as years of life lost, or YOLLs).

TfL's response noted that *"Traffic data used covered all periods (AM peak, PM peak, inter-peak, off-peak) but it is unclear how much of this is derived from actual traffic modelling. There is no mention of any consideration of a weekend model or sensitivity of weekend traffic impact which, given the increased airport activity at the weekend, is a notable omission."*

68. As noted in paragraph 43, TfL's Highway Allocation Models were used for this assessment. The AM peak, PM peak, and inter-peak periods were derived from traffic modelling. Off-peak periods were derived from Annual Average Daily Traffic (AADT) calculations and other modelled periods, through long standing vehicle counters on roads within the vicinity of Heathrow and Gatwick. These were used to factor inter-peak traffic flows to off-peak levels. Weekend modelling was not undertaken, as airport activity at the weekend is only increased proportionally to reduced non-airport traffic at the weekends. The use of weekday traffic typically comprises a greater number of vehicles per day than weekend; and as such provides a high end estimate of annual average daily traffic on the network.

TfL's response expressed concern that the traffic modelling did not separate airport-related trips from background trips. TfL argued that this meant that it was not possible to properly assess the impacts of the schemes upon air quality levels, or to test the impacts of airport-specific demand management measures.

69. The information separating airport-related trips from background trips has been generated by the Commission's consultants as part of the surface access modelling. However, it was not possible to make this information available in an easily comprehensible format as part of the information released with the air quality consultation without significantly broadening the scope of the consultation. Furthermore, the Commission considered the information that was published to be sufficient for stakeholders to respond intelligently to the Consultation Report. This is discussed in paragraph 17 above. The Commission's consultants have carried out separate studies on demand management measures, which are published alongside and referenced within the *Final Report*. However, the demand management scenarios tested as part of this work were not a component of the air quality dispersion modelling, so the results of that modelling do not depend upon the demand management studies.

TfL's response noted that without the results of the surface access dynamic access modelling, it was not possible to understand the full range of assumptions underpinning the air quality dispersion modelling, particularly in relation to issues such as road alignments. TfL further noted concerns about the consistency of road alignment between schemes and the lack of assumptions regarding vertical alignment.

70. The dynamic highway modelling undertaken involved calibrating base models sourced from TfL, in compliance with the relevant guidance, and producing airport forecasts based on detailed and robust mode-share and trip distribution models.

The absence or presence of a published traffic modelling report does not influence the uncertainty of the air quality assessment outcomes.

71. Road geometry for existing roads is consistent across all schemes. Road geometry for realigned existing roads differs depending on the scheme being considered. Without further detail regarding the specific inconsistencies with which TfL is concerned, the Commission is unable to comment on the potential effects this comment implies.

72. Vertical alignment has not been taken account of but would be expected to have a marginal impact on air quality outputs for this stage of strategic air quality assessment. All road link modelling has been undertaken assuming both ground-level emission sources and ground-level receptors, consequently providing a conservative approach.

TfL's response stated that *"the actual alignment of new road infrastructure will be different from that modelled in the assessment, which has employed a simple straight line geometry using the traffic model nodes. This has been used to justify excluding all relevant receptors adjacent to new infrastructure from the concentration results and the maximum changes. Given these are liable to be the very locations with the largest changes in air quality, this will likely result in an underestimate of the scale of impact of the capacity changes."*

73. The alignments shown for new surface access infrastructure are indicative and will be subject to alteration through detailed design. This was acknowledged within the published reports.

74. Relevant receptors adjacent to new infrastructure have not been excluded from the assessment and therefore there is no related underestimation of the scale of impact of the capacity changes. Relevant receptors adjacent to new infrastructure have however been excluded from being presented in maps showing the results of the assessment. This has been undertaken to avoid any alarm for residents living at properties adjacent to a simple straight line geometry using the traffic model nodes, as the actual alignment of new road infrastructure will almost certainly be different from that modelled in the assessment.

TfL noted that the Commission's consideration of the impacts of the realignment of the M25 into a tunnel under the runway for the Heathrow schemes was simplistic and that it did not capture the impact of wake-vortices from aircraft movements on emissions distribution.

- 75.** The Commission considers that its assessment has considered emissions from the tunnel portals, appropriate to a strategic level assessment. There is evidence to show that the impact of portal emissions typically extends up to 100-200 metres from the portal, and beyond this distance any effects are imperceptible. The results of modelling at this level – including the tunnels – are caveated. While there are receptors within 200 metres of the tunnel portals, it is considered unlikely that any impacts have been understated, within the context of the high level assessment undertaken at this stage.
- 76.** Effects of wake vortices on tunnel portal emissions would require detailed modelling of tunnel extraction, and some level of Computational Fluid Dynamics (CFD) modelling of wingtip vortices and their interaction with portal emissions: that level of analysis is beyond the scope of this assessment. In addition, based on known wake vortex effects, the most likely impact would be to increase near-field dispersion of tunnel emissions and is likely to reduce any potential impacts from the more concentrated portal emissions source, although the full effects will be spatially dependent. Final tunnel design details would need to address any such impacts, as would any road realignment, and it is considered that the assessment presented is appropriate for the level of assessment in the *Appraisal Framework*.

TfL noted that *“Emissions from the airport car parks have not been included on the grounds that they only make a minor contribution to ground-level concentrations. This is debatable for multi-storey ventilated carparks, especially as they tend to be close to roads (and associated receptors). Several airport car parks will be relocated under the expansion options – the effect of this is also not assessed and given the land constraints these too would quite possibly be near to receptors.”*

- 77.** It is reasonable to consider that any new multi-storey car parks are likely to be located close to terminal buildings and well away from sensitive receptors. The contribution from new surface car park emissions to concentrations at receptors will be extremely small compared to other traffic and airport sources, and their exclusion in a strategic level assessment will have no effect on the outcome.
- 78.** The surface access models do not forecast car sub-mode share (i.e. the split between taxi, kiss-and-fly, and short-term or long-term parking) as the variables impacting on demand for each activity are highly complex, and subject to a considerable degree of uncertainty based on current information about each scheme. None of the scheme promoters have attempted to forecast car sub-mode share in detail.

TfL's response raises detailed concerns regarding the validation of the Commission's models. This includes airport, road and total concentration verification:

TfL suggests for the airport verification that the argument used to not adjust Heathrow or Gatwick is debatable. Heathrow monitoring suggests that the model slightly underestimates the airport fraction (but significantly underestimates the total). For Gatwick, the modelling overestimates the airport fraction materially and should be adjusted downward, potentially reducing the impact of Gatwick capacity increases.

TfL states that: *"No separate roads verification for Gatwick has been undertaken (although there are five diffusion tubes in the area which could have been used). Instead an adjustment of 1.808 (i.e. a factor to counter the model underestimating roads sources) has been applied to all sites in Gatwick based on the Heathrow data. Given the importance of roads sources to total concentrations this is likely to substantially weaken the reliability of the results for Gatwick."*

TfL notes that a single adjustment factor of 0.931 has been determined and applied at both Heathrow and Gatwick. It considers this is inappropriate. Adjustments should be by separate study areas for models which are separate (and use different meteorological data). TfL therefore concludes that all Gatwick comparisons show over-estimates, whilst for Heathrow half under-estimate and half over-estimate.

- 79.** The Heathrow monitoring data do not support a conclusion that “the model slightly underestimates the airport fraction”; the monitored component of airport NO_x cannot be derived to allow the comparison with the modelled airport NO_x. The underestimate of the total measured NO_x concentration at the receptor in question (LH2) in Table F1 of the air quality report is due to the road-NO_x contribution not being included in the modelled NO_x. For Gatwick, the combined modelled airport and background NO_x exceed the measured total NO_x. This may be due to either the airport or background NO_x concentrations being over-estimated. Any potential under or over-estimate due to these factors would not change the fundamental outcomes of this strategic assessment.
- 80.** There are no roadside automatic sites in the vicinity of Gatwick Airport. Whilst diffusion tube data could have been used, it was considered that this would potentially introduce additional uncertainty (as the overall uncertainty of diffusion tube data is much higher than that for continuous analysers) – and that this additional uncertainty could bias the assessment between the schemes. Also, the reason that the road NO_x is being underestimated at Heathrow Airport (which could be emissions being underestimated and/or dispersion alongside road being over-estimated) would be expected to apply in a similar way at Gatwick Airport, justifying the use of the same adjustment factor to both areas.
- 81.** A different adjustment factor could have been applied to Gatwick, but it was considered more appropriate to use a single adjustment for all schemes. Any overestimation of predicted concentrations for the Gatwick scheme will have no effect on the overall outcome of this strategic level assessment. Whilst zonal adjustments can be made, there needs to be sound justification to support this (e.g. different road characteristics in the different zones). There is no justification on the basis of the data available to apply separate road NO_x adjustment factors for the different areas around Heathrow. The application of any zonal adjustment would have no effect on the overall outcome of this strategic level assessment.

TfL’s response noted the recent Supreme Court judgement on air quality and questioned whether this would render it impossible to deliver Heathrow expansion. TfL noted that the action plan under development by Defra will contain mitigation measures, rendering these unavailable for future expansion scenarios.

- 82.** Consideration of the Supreme Court ruling can be found above in paragraph 26. There is clearly the opportunity to ensure that the necessary mitigation is addressed as part of the air quality plan and the Commission does not consider that there is any need to discount the availability of mitigation as suggested by TfL. Rather, the

plan provides an opportunity to ensure that the necessary package of mitigation measures can be secured. The Commission's assessment is that the air quality issue around Heathrow represents a manageable component of a wider problem, the underlying causes of which will need to be addressed by the UK Government. The recent Supreme Court ruling requiring the UK Government to submit an action plan to the European Commission detailing how it will comply with limit values for NO₂ created a supervised process for national and regional measures required to resolve the background air quality issue. Active monitoring during the design and implementation process for the runway as well as an appropriate form of risk-sharing and liability between Government and the airport may be required.

TfL's response expressed concern that the assumptions on Times in Mode (the duration of time that an aircraft spends in the various stages of take-off and landing) will not change in 2030 from 2009 even though a new runway will alter airport operations.

- 83.** Assumptions for 2030 do something Times in Mode (TIMs) for take-off, climbout and approach were unchanged from the 2030 do minimum, based on information provided by the scheme promoters, and were applied equally across all schemes. There was no robust evidence to challenge this assumption. Emissions from climbout and approach have very little impact on ground-level concentrations, and there is no logic to support a conclusion that take-off times would be affected; take-off roll times were estimated for each Model Category (MCAT) (as described in Appendix B of the air quality report) and the effects of different fleet mixes in the do minimum and with scheme cases has been explicitly considered. Times in Mode for taxi-in and taxi-out were adjusted to account for the new apron and runway layouts.

Section 2c – Responses from local authorities and other public sector bodies

- 84.** Most local authorities submitted comments relating only to the scheme that would have the largest impacts upon their residents. This section therefore considers separately the responses from local authorities primarily concerned with the Gatwick scheme, local authorities primarily concerned with the Heathrow schemes and other public sector bodies.

Local authorities primarily concerned with the Gatwick scheme

A large number of responses stated that the EU Air Quality Directive requires air quality status to be maintained where it is good or improved and further stated that a second runway at Gatwick would reduce air quality and prejudice the achievement of that requirement.

- 85.** The requirement in the Directive is that the Secretary of State must endeavour to maintain the best ambient air quality compatible with sustainable development. Sustainable development includes more than just environmental concerns and needs to be considerate of several factors such as economic and social impacts. The Commission considers that at a more detailed design stage, the developer should be cognisant of the need to reduce emissions while considering this combination of sustainability factors.

Several local authorities raised concerns with the Commission's choice of 2030 for its appraisal year and highlighted the forecast growth in passenger numbers between 2030 and 2050 as a particular cause for concern.

- 86.** This point is addressed in paragraph 33 above.

Several local authorities were concerned that the Commission had drawn the boundaries of its study area too tightly around the airport and that congestion and air quality impacts would be experienced at a much greater distance.

- 87.** The Commission's work to date on the surface access impacts of schemes has demonstrated that the road traffic impacts of Gatwick expansion diminish relatively quickly as distance from the airport increases. Impacts on most of the links highlighted in consultation, such as the M26, M20 and A2 are not expected to be significant.
- 88.** The air quality assessment for all schemes was based on a 2 kilometres radius around each scheme boundary as well as an assessment of the area where roads would experience a 5% change on annual average daily traffic or 10% change of peak hour flows or a change of 1,000 (vehicles) annual average daily traffic as a result of the expansion. The Commission is satisfied that the study area was fit for purpose.

Several responses called for more attention to be given to receptors within Areas of Outstanding Natural Beauty, such as the Kent Downs and High Weald.

- 89.** Any designated sites that were in the vicinity of the study areas as described in the previous point were taken into account for potential of exceedance of critical loads as a result of NO_x impacts.

A number of responses highlighted concerns about emissions from aircraft on arrival or departure to Gatwick from outside of the assessment area. In some cases, this issue was linked to the trial of flight concentration measures in Gatwick's airspace which took place during 2014.

- 90.** None of the schemes considered by the Commission are dependent upon the concentration of flight paths. Aircraft do not “fly lower than necessary” as some respondents state and emissions from aircraft at altitude make very little contribution to ground-level pollutant concentrations. This is confirmed both by the International Civil Aviation Organisation (ICAO) Air Quality Manual⁹ which states that “1000ft [300m] is the typical limiting altitude for ground level NO₂ concerns” and by the report issued by the UK Government's independent Air Quality Expert Group (AQEG)¹⁰, where it was acknowledged that “aircraft emissions between 100m and 1000m contribute little to ground level concentrations.”

Some responses indicated concerns with the level of mode-shift towards public transport that underpinned the Commission's analysis, expressing concerns that these levels would not be achieved owing to congestion on the rail network.

- 91.** The Commission's surface access analysis indicated at the point of the November consultation that by 2030, there was sufficient capacity for both background demand and the increased traffic resulting from airport expansion on the airport's rail link. While the capacity situation may grow more challenging beyond 2030 and may require mitigating actions (such as demand management or the provision of major new infrastructure), the expansion of the airport is not a significant driver of this.

Some responses expressed concerns at the decision not to model emissions at receptors immediately adjacent to proposed new surface access infrastructure, stating that these receptors would be likely to show the largest increases in harmful emissions.

9 http://www.icao.int/publications/Documents/9889_cons_en.pdf

10 <http://uk-air.defra.gov.uk/assets/documents/reports/aqeg/nd-chapter2.pdf>

92. As stated above in paragraph 74 the relevant receptors adjacent to new infrastructure have not been excluded from the assessment.

Local authorities primarily concerned with the Heathrow schemes

93. The response from the 2M Group has been included within this subsection.

A large number of responses noted the recent Supreme Court ruling on air quality compliance and set out a belief that this would render the expansion of Heathrow illegal.

94. This point has been addressed in paragraph 26.

Several responses raised concerns with the Commission's choice of 2030 for its appraisal year and highlighted the forecast growth in passenger numbers between 2030 and 2050 as a particular cause for concern.

95. This point has been addressed in paragraph 33 above.

A number of responses expressed concern that the study area was drawn too tightly around the Heathrow site, meaning that areas such as the Royal Borough of Windsor and Maidenhead were excluded.

96. The extent of the study area for assessment is described above in paragraph 88.

Some responses highlighted concerns with a perceived lack of attention to local roads and the road freight impacts of airport expansion and the potential impact that these would have upon air quality. The specific concerns set out in relation to roads included a perceived lack of sufficient detail on the re-routing of the Bath Road.

97. The Commission's dynamic network modelling that was undertaken following the November consultation took account of local roads and the road freight impacts anticipated to stem from airport expansion and the results of this exercise were built into the dispersion modelling. The results of the dynamic network modelling were not published at the time of the air quality consultation, but the Commission considers that the point raised by councils has been covered by this work. As for the Bath Road realignment, as set out in the air quality report it is not possible to replicate Defra's PCM calculations along the realigned road links, and nor is it possible to confirm that the new links would be included in future PCM predictions. Only the competent authority can confirm this position.

Some responses stated that the updated road geographies that would exist following expansion had not been taken into account in the dispersion modelling.

- 98.** All of the anticipated road geography changes associated with each scheme were captured within the dispersion modelling.

Some responses called for more work on the impacts of the scheme on air quality during the construction phase.

- 99.** This point has been addressed in paragraph 32 above.

A number of responses expressed concern about using predictions of technology improvements for car engines when historically the predictions have been optimistic.

- 100.** This point has been discussed in paragraph 30 above.

Some responses remarked on the partial impact pathway assessment, where they thought there should be a full impact pathway assessment.

- 101.** This comment has been discussed in paragraphs 65 and 66 above.

Other public sector bodies

- 102.** This section covers the responses from the Civil Aviation Authority, Natural England, the Local Authorities Aviation Noise Council, the London Assembly Environment Committee and the Thames Valley Berkshire Local Enterprise Partnership.

The Civil Aviation Authority's response raised two specific questions; one on why 2030 was chosen as the appraisal year and one on an apparent discrepancy in the road-side modelling results between the two Heathrow schemes. In relation to the second point the CAA states: "In the Appendix containing Figures from the analysis, Figures 5.4 and 6.4 are labelled 'Annual Mean Roadside NO₂ Concentrations (µg/m³) – 2009' for the Heathrow NWR and ENR respectively. The results on these figures are slightly different, even though they are showing historic levels of NO₂ and therefore would be expected to be identical."

- 103.** In respect of the appraisal year, this has been addressed in paragraph 33.

- 104.** Concerning the second point, the results as presented in figures 5.4 and 6.4 of the air quality report are not the same as they do not replicate the same links in both cases. They have in each case been chosen by relevance to the development scheme. The figures show the PCM roadside annual mean concentrations on links affected by the scheme and ENR and NWR affect a slightly different network of

road links, according to the traffic modelling. These data have no material effect on the outcomes of the assessments of the two schemes. These 2009 data were only included to provide context on baseline conditions and were not used for the 2030 scheme assessments in any way at all.

Natural England stated in its response it does not agree that the critical levels are not applicable at the designated sites stated in the report. This is because, it states, where a European or international site (Special Area of Conservation (SAC), Special Protection Area (SPA) or Ramsar site) is involved, the provisions of the Habitats Directive require that potential air quality impacts must be fully assessed and, consequently, Natural England is of the opinion that the NO_x critical level does apply to these sites, irrespective of their geographic location.

In terms of the Heathrow Airport Northwest Runway scheme, however, Natural England agrees with the statement made in the air quality report that there will be no new exceedances of the lower or upper bands of the critical loads. It also states that although there are forecast to be new exceedances of critical levels at the Southwest London Water Bodies RAMSAR/SPA and Wraysbury Reservoir Site of Special Scientific Interest (SSSI), the interest features for which the SPA/Ramsar is designated (wintering wildfowl, in particular Gadwall and Shoveler) are not considered to be sensitive to NO_x or N deposition; so it should be possible to screen out this impact at the Likely Significant Effect stage of the Habitats Regulations Assessment, without the need to proceed to an Appropriate Assessment. In respect of Staines Moor SSSI, the area that would be impacted is currently in “unfavourable declining” condition, and Natural England suggests that the scheme promoter should consider additional mitigation to help bring the site into “unfavourable recovering” condition.

Natural England further states that in consideration of the Extended Northern Runway, where it could impact on the Staines Moor SSSI, which is in favourable condition, the scheme operators should consider additional mitigation to maintain the condition of the site. Once again Natural England agrees with the statement made in the air quality report that there will be no new exceedances of the lower or upper bands of the critical loads.

Considering Gatwick, Natural England notes that the increase affecting the Mole Gap to Reigate Escarpment SSSI has potential to have a Likely Significant Effect on the SAC and should be assessed at the screening stage of the Habitats Regulations Assessment. It agrees with the statement made in the air quality report that there will be no new exceedances of the lower or upper bands of the critical loads.

- 105.** The Commission notes that although Natural England does not agree that the critical levels do not apply, it does agree with the outcome and encourages the promoter of the recommended scheme to work with Natural England to ensure appropriate mitigation is considered.

The Local Authorities Aviation Noise Council (LAANC) response set out the view that laws regarding air quality and the requirement upon Government to improve air quality around Heathrow meant that it was not possible to be confident that it would be legal to expand Heathrow.

- 106.** Discussion of this point is covered above in paragraph 26.

The LAANC response also stated that any impacts of air quality mitigation measures on noise must be captured and represented in the Commission's analysis.

- 107.** The Commission considers that it has assessed the different modules adequately to understand their implications and will not look into this further. Detailed planning process will consider the linkages between the subjects further when more detail is available.

The LAANC response expresses concerns about the selection of 2030 as the Commission's appraisal year, on the grounds that the expanded airport would not be operating at full capacity by this point.

- 108.** This is covered in paragraph 33 above.

The LAANC response also sets out the view that the Commission has placed too much reliance upon beneficial developments in engine technology and their potential to reduce emissions.

- 109.** The discussion on this point can be found above in paragraph 30.

The LAANC response sets out the view that the health impacts of air quality changes around Heathrow will be greater than is apparent from the assessment once the impacts of new housing development are taken into account. The response states that once these factors and the consequent increase in hospital admissions have been taken into account, future expansion at Heathrow should be banned.

- 110.** The Commission's view is that building of new housing will go through normal planning processes, which will have to take environmental impacts into account. Health impacts have been taken into account in the assessment through monetisation and measurement of the number of people impacted by increased levels of NO₂ and PM. It has also included possible hospital visit costs as part of the partial impact pathway assessment.

The LAANC response questions the Commission's mode share assumptions and, in particular, whether the required works to deliver these mode shares can be delivered if the cost is the £20 billion estimated by TfL.

- 111.** The Commission published mode share assumptions based on static modelling as part of its November consultation. Following the launch of the November consultation, this analysis was re-run on the basis of more sophisticated dynamic modelling. This modelling produced broadly similar results and was used to underpin the air quality dispersion modelling. The Commission has seen no credible evidence to call this mode share analysis into doubt. Moreover, the £20 billion cost for surface access works estimated by TfL is unevicenced and would appear to include both works which are already funded and committed (such as elements of Crossrail) and works which the Commission does not believe are needed to support Heathrow expansion (such as a link between HS1 and HS2). It therefore lacks credibility and is not a suitable basis for assessment.

The London Assembly Environment Committee response questions the Commission's methodology for determining compliance with the EU Directive on air quality and notes the recent Supreme Court ruling on air quality compliance and sets out a belief that this would be likely to render the expansion of Heathrow illegal.

- 112.** This point is discussed above in paragraph 26.

The Committee's response also called for more work on the impacts of the scheme on air quality during the construction phase.

- 113.** Discussion on construction can be found in paragraph 32.

The Thames Valley Berkshire Local Enterprise Partnership response raised a number of points in respect of the importance of Heathrow to the local and national economy and urged Government to invest in improved surface access to the airport to mitigate environmental impacts.

- 114.** The Commission noted the points regarding the economic importance of Heathrow, but considered that they were not material to the subject of this consultation. The Commission also noted that the assessed surface access package for Heathrow, which includes new links such as Crossrail, Western Rail Access, Southern Rail Access and the connection with the HS2 interchange at Old Oak Common would significantly enhance the airport's surface access.

Section 2d – Responses from local community and environmental groups

- 115.** By their nature, most of these groups were only concerned with either the Gatwick or the Heathrow site. This section therefore considers the key themes put forward by these groups in respect of each site separately. As the majority of the points raised have been considered above, only those which have not yet been considered will be discussed here.

Local community and environmental groups primarily concerned with the Gatwick scheme

- 116.** Many of the points made by this group of respondents have been discussed in the preceding paragraphs. These are listed below with the relevant paragraph numbers beside them.
- Impacts of the Supreme Court ruling (26)
 - Interpretation of EU rules (26)
 - Choice of 2030 as the appraisal year (33)
 - General surface access congestion (41)
 - Freight impacts (97)
 - Size of the appraisal area (43) (88)

- Receptors adjacent to realigned roads (34) (71)
 - Flight path concentration (90).
- 117.** Comments made by respondents in this group that have not been mentioned previously are listed and discussed below.
- A forecast 100,000 extra vehicles on the road due to expansion (GACC)
 - Secondary development impacts/induced employment
 - Health impacts (and monetisation of them).
- 118.** The 100,000 extra vehicles on the Gatwick area road network following expansion is an assumption made by the Gatwick Area Conservation Campaign (GACC) and is not consistent with the Commission's surface access forecasts.
- 119.** The Commission has noted that any secondary commercial or residential developments would be subject to separate planning processes and would need to demonstrate compliance with air quality rules in their own right. It would not be appropriate to attach the impacts of such developments, the nature and scale of which cannot be estimated at this time, to the schemes under consideration.
- 120.** The health impacts have been monetised according to Green Book guidance as far as possible (showing damage costs with high end sensitivity using Value of a (healthy) Life Year and Value of a Statistical Life) and the number of people impacted by increased NO₂ and PM have been included in the report for consideration.

Local community and environmental groups primarily concerned with the Heathrow schemes

- 121.** Many of the points made by this group of respondents have been discussed in the preceding paragraphs. These are listed below with the relevant paragraph numbers beside them.
- Impacts of Supreme Court ruling (26)
 - Interpretation of EU rules (26)
 - Choice of 2030 as the appraisal year (33)
 - Over-reliance on assumptions on engine technology (30)
 - Health impacts (and their monetisation) (120).
- 122.** Comments made by respondents in this group that have not been mentioned previously are listed and discussed below.

- Over-reliance on assumption that there will be no more airport-related car journeys
 - Cost to business of congestion charging or low emission zones.
- 123.** The Commission has not built HAL's aspiration to ensure that there are no more airport-related car journeys in 2030 following expansion than there are today into its surface access or dispersion modelling. The inputs for the dispersion modelling included an increased number of road trips as a result of expansion and this is reflected in the results. The Commission has separately tested the conditions that would need to be met in order to realise HAL's aspiration and a report on this has been published alongside the *Final Report*.
- 124.** The Commission's view is that demand management measures such as congestion charging or low emission zones are likely to be required to improve background air quality even without airport expansion. The Government has the opportunity to ensure the design of such measures would account for the impact of airport expansion.

Section 2e – Responses from national and international non-governmental organisations

- 125.** Many of the points made by this group of respondents have been discussed in the preceding paragraphs. These are listed below with the relevant paragraph numbers beside them.
- Impacts of Supreme Court ruling (26)
 - Importance of building mitigation measures into Action Plan (ClientEarth) (26)
 - Impact on South West London WaterBodies SPA and Wraysbury Reservoir SSSI (105)
 - Selection of 2030 as the appraisal year (33)
 - Interpretation of EU air quality rules (26)
 - The requirement under an EU Directive to endeavour to preserve the best ambient air quality compatible with sustainable development (85)
 - Catalytic growth and secondary developments (119)
 - Costs of health impacts (120).
- 126.** Comments made by respondents in this group that have not been mentioned previously are listed and discussed below.

- Insufficient testing of the effectiveness of mitigation measures
 - Definition of “significant” congestion changes (5% is too generous – FoE)
 - Disparities between Defra PCM model and ADMS-Airport results (AEF)
 - Assessment must take into account kerbside levels of pollution as well as background levels (ClientEarth).
- 127.** The Commission has taken a precautionary approach as suggested by ClientEarth to its assessment and therefore considered the scheme impact without mitigation before looking into the possible mitigation measures that exist. Mitigation measures have been quantitatively assessed wherever information allowed and qualitatively assessed where not. These mitigations could be part of the air quality action planning that the Government must complete as per the Supreme Court ruling. These measures would therefore be designed and implemented to a level that could reduce the impacts described in the air quality report to a greater degree than quantified there. More robust testing of mitigations will therefore be part of a more detailed design stage for the action plan and expansion but the mitigations have been assessed adequately for consideration of the impacts at this stage.
- 128.** The wider study area parameters of roads changes that result in ± 1000 Annual Average Daily Traffic (AADT), $\pm 5\%$ change to AADT or $\pm 10\%$ change to peak flows are based on standard practice through Local Air Quality Management Technical Guidance and Environmental Protection UK Guidance.
- 129.** Two assessments are made in terms of measuring concentrations, one for local objectives and one for EU limits. In the UK, the local assessment is not used at all by Defra to inform the EU Commission on compliance with the Limit Values; this is solely based on national network monitoring sites and the PCM model. The local assessment is used by local authorities to measure against the air quality objectives set by the UK Government.
- 130.** As set out in paragraph 1.1.4 of the air quality report, “the model only takes account of those sources that are explicitly included within the emissions inventory. In order to account for emissions arising from other sources, both within and outside of the Study Areas, the background pollution contribution has also been taken into account”. For comparison with the limit value, predictions have been carried out at a distance of 4 metres from the carriageway consistent with Defra’s assumptions for the PCM model and reporting compliance to the Commission.

Section 2f – Responses from airlines, the wider business community and trades unions

- 131.** Many of the points made by this group of respondents have been discussed in the preceding paragraphs. These are listed below with the relevant paragraph numbers beside them.
- Congestion charging will deter passengers (124)
 - The airport must work with local and national government on mode-shift and air quality (26)
 - Schemes should not be penalised for background emissions, though there may be a need to demonstrate compliance with rules at a broader level (26)
 - Assessments demonstrate a worst case scenario and actual impacts would likely be less severe (48).
- 132.** Comments made by respondents in this group that have not been mentioned previously are listed and discussed below.
- Potential for operational measures to reduce emissions
 - Investment in cleaner on-airfield ground vehicles
 - Importance of sustainable fuels and biofuels
 - Levels of emissions on the airport site are of concern, due to impacts on employees (Unite).
- 133.** Operational measures that may contribute to a reduction in emissions have been discussed in the air quality report in the mitigation section but the Commission is aware that the scope for other measures to help do exist and it will be up to the operator to instigate them. Investment in cleaner on-airfield vehicles is in the airport's gift to incentivise, though an increase in the use of biofuels is up to the aviation industry as a whole. Biofuels have the potential to impact emissions but this is not assessed in the air quality work due to uncertainty about the extent of any reductions.
- 134.** In terms of impacts on employees, the air quality limit values and objectives do not apply with regard to occupational exposure. Annex III (A) (2) of Directive 2008/50/EC notes that compliance with the Directive shall not be assessed as in accordance with Article (21) on factory premises or at industrial installations where all relevant provisions concerning health and safety apply. This is governed by the Health and Safety at Work Act 1974 and regulated by the Health and Safety Executive.

Workplace Exposure Limits (WELs) are many times higher than the air quality limit values or objectives. Expansion as proposed at any of the airports is unlikely to cause any of these WELs to be exceeded. On the aprons, the levels of pollutants will not be substantially different from today as the new emission sources will be on new runways or at new terminals, but with more electric vehicles airside there is the potential for improvement.

Section 2g – Responses from members of the public, including campaign responses

- 135.** The majority of responses to the air quality consultation were from members of the public, demonstrating the high profile and importance of this subject. Of the public responses, over 1,100 were campaign responses organised by the “Gatwick – Obviously Not” group. While most public responses were primarily non-technical, a number raised substantial and technical issues, which were given detailed consideration.
- 136.** Many of the points made by members of the public have been discussed in the preceding paragraphs. These are listed below with the relevant paragraph numbers beside them.
- Impacts of the Supreme Court ruling (26)
 - Interpretation of EU rules (26)
 - Heathrow already exceeding EU limits and cannot guarantee emission reductions (26)
 - Choice of 2030 as the appraisal year (33)
 - Impacts on health (“profit before people”) (120)
 - Impact of flight path concentration (90)
 - Mitigations optimistic and unproven (37)
 - Projections of future engine technology over-optimistic (30)
 - Congestion on surface transport networks (41)
 - Freight impacts (97)
 - Assumption of no new cars on road with Heathrow Expansion (49).
- 137.** Comments made by members of the public that have not been mentioned previously are listed and discussed below.

- AQMAs already exist in Windsor and air quality is already bad in Crawley
 - “Gatwick is better than Heathrow because it affects fewer people”
 - NO_x to NO₂ conversion doesn't take into account regional ozone concentration and doesn't acknowledge uncertainty of primary NO₂ fraction of NO_x in aircraft operations.
 - Use of 2009 hold times for 2030
 - Focus on national compliance.
- 138.** The Commission is aware of the current air quality situation in the communities around Heathrow and Gatwick. This air quality assessment incorporates future expected technological changes and background changes as per Defra forecasts which are envisaged to help change the current situation. It also takes into account future surface access changes and traffic forecasts all of which input into the final result.
- 139.** The Commission has taken all results into account in its consideration of the schemes including the number of people affected in all of the assessments.
- 140.** With respect to uncertainty in the NO_x/NO₂ relationship the Commission's consultants conducted a sensitivity test with respect to the total oxidant, but in the form of uncertainties in the primary NO₂ fraction associated with new Euro 6 diesel vehicles. This had a modest effect. It was not feasible to conduct multiple sensitivity studies to chemistry and different model projections.
- 141.** Hold times used were supplied by the promoters and as no robust future hold times were supplied they were assumed to be unchanged. As noted on page 53 of the air quality report however, a study was published in 2008 on departure delay times at Heathrow and Gatwick which concluded the delay times on average were higher than the promoters suggested. A sensitivity test was therefore run using longer delay times calculated by the Commission's consultants.
- 142.** The assessment of national compliance only forms one part of the report, which also provides a quantification of emissions, compliance with emissions ceilings, predicted concentrations and incremental changes at health-based receptors (receptors near a place of work or living), monetisation of health impacts and environmental damage, and impacts on ecosystems. Further qualitative commentary was also included in the air quality report.

Section 3 – themes emerging from responses that relate specifically to the consultation process

143. A large number of responses, across each of the categories covered within **Section 2**, raised points relating to the consultation process itself. The most common themes were the length of the consultation, its timing immediately after the General Election, the highly technical nature of the consultation and the unavailability of surface transport modelling results.

The length of the consultation period

144. The Commission has recognised throughout its process the importance of public consultation to inform its work, not only in order to capture the key input of the large number of interested and often expert stakeholders, but also to ensure the transparency and independence of the Commission's process culminating in its ability to deliver credible recommendations to Government. To this end, the Commission has consulted widely at all stages of its process via a number of methods such as formal consultation exercises, public meetings and calls for evidence.

145. At the point of launching its November consultation, the Commission recognised that, although the high-level air quality modelling presented for consultation enabled a comparison to be made of the scale of impacts and risks associated with each option, the more detailed dispersion modelling intended, as identified in the *Appraisal Framework*, had not yet been carried out. The range of inputs required and the complexity of this work meant that it was not possible to do so before the launch of the November consultation. The Commission acknowledged in the November consultation that it would have been preferable to have the outcome of the exercise available prior to consultation, but, on balance, and in light of all relevant considerations, the Commission was satisfied that the high level modelling undertaken to date provided a sufficient evidential basis for consultees to express their views on the questions asked in the consultation document. The response to the November consultation reinforced this view.

146. The results of the air quality dispersion modelling, which became available in late April 2015, in most cases confirmed the earlier analysis upon which the November

consultation had been based, but in a small number of areas resulted in different outcomes to those presented previously. In light of the fact that the detail of this work had not yet been available for consultation and that that results of it were different in certain respects such as to impact on the analysis of the schemes, the Commission decided that it would be appropriate to conduct a separate air quality consultation.

- 147.** The length of the consultation period was decided upon after considering a range of factors, at the centre of which was fairness to stakeholders and the need to ensure that they were given adequate time to consider the material and to respond appropriately. Cabinet Office guidance advises that periods should be proportionate and realistic. The Commission took into account the relatively limited scope of the consultation compared to the full consultation exercises already undertaken and the fact that the consultation would be building upon detailed air quality materials already published as part of the November consultation. The Commission also had to keep in mind that its terms of reference require it to deliver its *Final Report* in the summer of 2015 and the fact that the results of the exercise were provided in the lead up to the General Election when the Cabinet Office guidance advises that politically contentious consultations should not be launched except in exceptional circumstances. In all these circumstances, the Commission considered on balance that a three week consultation period would be proportionate, in giving adequate time for consideration of the points arising from the newly available material, whilst also enabling the Commission to meet certain practical constraints.
- 148.** The Commission has welcomed the 1,800 responses to the consultation, many comprising detailed technical input. The Commission is grateful to all consultees who responded.

The timing of the consultation

- 149.** As indicated above, there is a convention that public bodies and the Civil Service should refrain from politically contentious publications during the short campaign period that precedes elections. On this basis, the Commission decided that it was not appropriate to commence the air quality consultation during the election period. The Commission took the view that, in light of its requirement to deliver a *Final Report* in the summer of 2015 and to enable adequate time for consideration of responses, the most proportionate action was to issue the report for consultation as soon as possible after the General Election.
- 150.** Some responses have accused the Commission of trying to reduce the profile of the consultation. The Commission strongly refutes this allegation. The launch of the

consultation was immediately notified to a wide range of interested stakeholders and received coverage in the national and local news media. The scale of response demonstrates the fact that it was widely available.

The technical nature of the consultation

- 151.** The information put out to consultation was substantial and technical in nature, and the Commission recognises that some parties may have had difficulty engaging with some of the material. The November consultation contained summary materials which were suitable for allowing a general audience to understand the key messages emerging from the Commission's work. This approach – and the consultation questions – were designed to make the consultation process as accessible as possible for all types of respondent.
- 152.** The Commission published extensive material on air quality as part of its November consultation, giving a clear idea of the likely impacts of each scheme. The air quality consultation provided the main findings of the dispersion modelling in the executive summary. The Commission also published a covering note indicating the small number of areas in which the modelling results affected the analysis in the November consultation. The Commission was satisfied that the executive summary and this covering note ensured that the key results were accessible to the general reader for the purposes of responding to the consultation. However, the nature of dispersion modelling is such that it is not possible to present the bulk of the material in a manner that is accessible to the general reader while retaining its utility for the technical specialists best placed to analyse it.

Surface transport modelling

- 153.** The surface access and air quality materials in the November consultation were based upon static models. To underpin air quality dispersion modelling (and to validate the results of its surface access appraisals), the Commission asked its consultants to carry out more sophisticated dynamic surface transport modelling. This work produced results that were similar, though not, in some respects, identical to the static modelling.
- 154.** A number of consultation responses commented on the absence of the detailed results of this dynamic modelling from the air quality consultation. In preparing the air quality consultation, the Commission endeavoured to ensure that all materials required to comment upon the air quality dispersion modelling were present within the published materials, including material extracted from the dynamic surface access modelling where appropriate. The decision not to publish the full suite of

dynamic modelling results was taken, as to do so would have broadened the scope of the consultation significantly beyond that intended by the Commission.

- 155.** In some instances, particularly in respect of freight impacts and the realignment of road links, the Commission acknowledges that respondents have raised points that had already been addressed by the dynamic surface transport modelling. The Commission considers that there was adequate information available for consultation to allow parties to comment on the modelling methodology or results, and that it was not necessary or proportionate for the purposes of the consultation exercise to publish all the dynamic surface transport modelling.

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