

Heathrow Hub Limited/Runway Innovations Limited Response to Airports Commission Consultation

Submission

February 2015





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Executive Summary

Introduction

Heathrow Hub Limited welcomes the opportunity to respond to the Airport Commission's consultation on proposals for maintaining the UK's status as an international hub for aviation.

We believe our response shows that, of the three short listed options, our Heathrow Extended Northern Runway scheme (LHR-ENR) offers the most benefits at least cost and is the only scheme capable of meeting the Commission's objective.

Our analysis of the consultation material also suggests a number of factors which could be further addressed by the Commission.

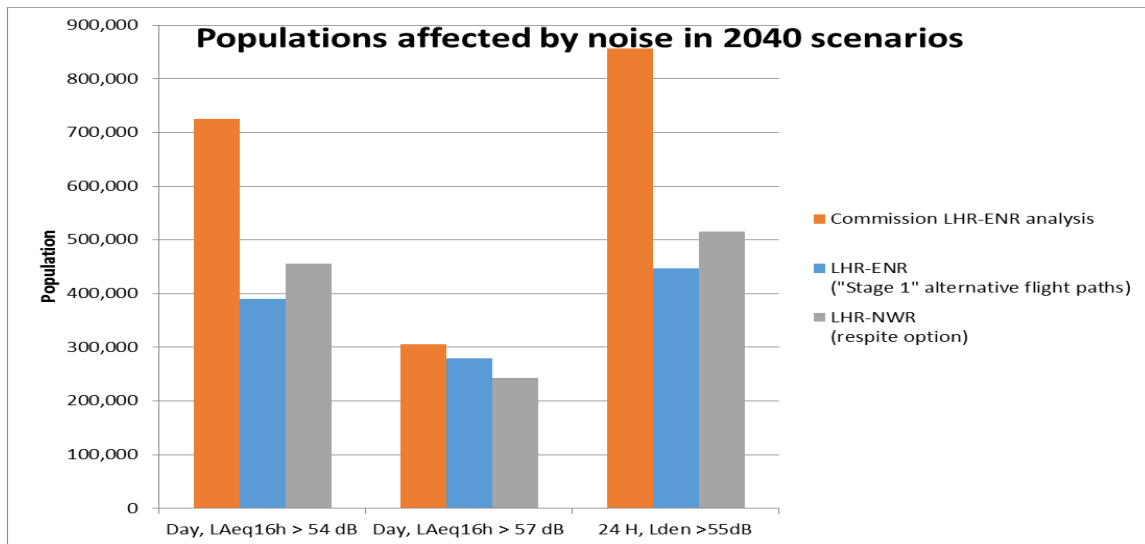
Noise

The most important of these is the consultation's assessment of the noise impacts of our scheme. Our understanding is that the Commission's analysis was based on a set of flight paths for LHR-ENR that were not optimised for their noise impact. At our request the Civil Aviation Authority (CAA) has repeated its noise analysis with a set of flight paths similar to the Heathrow North-West Runway scheme (LHR-NWR) respite option.

Without making any other changes to the Commission's assumptions, the results now show that:

- LHR-ENR impacts significantly fewer people than LHR-NWR on two of the Commission's key scorecard metrics (14% less population within the LAeq 16h 54 dB and 13% less within the Lden 55 dB contours) in the Commission's 2040 "with development" scenario. The LHR-ENR population within LAeq 8h 48 dB is within 1% of the LHR-NWR respite option.
- The LHR-ENR scheme also affects fewer people in 2040 within a number of noise contours, including Lden 55 dB: -42%, LAeq 16h 54 dB: -38%, and LAeq 8h 48 dB: -26%, than for the existing two runway operations, based on population data for both 2013 and projections for 2040, even allowing for significant population growth in line with the Commission's forecasts.

These results are shown in the figure overleaf.



The Commission did not model the respice features of the LHR-ENR scheme or include other scheme enhancements which would further reduce the number of people affected. Respice remains a crucial issue and we have developed additional concepts to provide runway alternation and variations of flight paths to address this.

We have also created a scenario for Heathrow expansion which eliminates early morning night quota landings. Based on our public consultations we believe that such a proposal would do a great deal to address concern about incremental noise.

Our noise analysis of alternative flight paths therefore shows that the overall noise impacts of LHR-ENR are in most respects better than, and in remaining respects similar to, LHR-NWR. This is fundamentally different to the assessment presented in the consultation.

We also note that our safety assessment for LHR-ENR has been developed in greater detail than is apparent from the consultation documentation for Gatwick (LGW-2R) or LHR-NWR and is sound.

Economic benefits to UK

The consultation confirms that both Heathrow expansion options deliver similar substantial national economic benefits, which are significantly greater than LGW-2R.

Our analysis shows that it is extremely difficult to produce a viable business case for a second runway at Gatwick.

The cost of expansion would mean airport charges rising dramatically, with costs to users higher than Heathrow.

Gatwick would therefore not only be unlikely to attract new carriers, but would lose much of its existing, largely low cost, traffic to other airports with lower charges, either in the UK or overseas.

The result would be the exact opposite of the Airports Commission's objective – Gatwick with even more spare capacity than today, and even greater capacity constraints at Heathrow with consequent negative economic impacts for the UK.

Of the Heathrow options LHR-ENR provides similar capacity to LHR-NWR at significantly lower cost, (£13.5bn vs £18.6bn at 2014 prices according to the Commission's estimates), with fewer negative impacts. Its lower cost also means that there is more money available for mitigation measures and compensation for local communities.

LHR-ENR consequently provides the best overall benefits of the three schemes, ensuring lower costs to users and that resources in the UK economy, both private and public, are allocated in the most efficient way.

The consultation confirms that surface access is capable of supporting Heathrow expansion, but our analysis shows the Heathrow Hub interchange proposal (LHR-HStn) increases the economic benefits of both LHR-ENR and LHR-NWR schemes.

Cost to Users

LHR-ENR's lower cost and risk compared to LHR-NWR maintains affordable charges at an expanded Heathrow. Our response identifies opportunities for further cost reductions to increase the airports' – and the UK's – competitiveness.

The Commission has assumed similar estimated costs of capital across all three shortlisted airport expansion schemes. In our view this does not accurately represent the very different market perceptions of risk between Gatwick and Heathrow expansion options.

The reduced cost and risk of our scheme has a direct and positive impact on funding. Feedback from transport analysts and bankers confirms that funding via bond issue within the existing regulatory framework would be a reliable and deliverable mechanism – Heathrow Airport Holdings Ltd's credit rating would likely not be impacted.

Surface Access

The Commissions' LHR–NWR and LHR–ENR surface access proposals significantly outperform those of LGW-2R in providing sustainable access to the maximum population in a reliable way without negatively impacting other transport users

Our overall conclusions are that:

- Using the Commission's parameters (i.e. without the Heathrow Hub (LHR-HStn) interchange), deliverable surface access schemes support both options for Heathrow expansion. A key reason for this is that Heathrow is on the right side of London for the majority of the UK population with resilient road and rail connections to the rest of the country.
- The population catchments for Gatwick and Heathrow are incorrectly stated as being similar. In reality the population within 2 hours of Heathrow is twice that of Gatwick as a result of the extensive new rail connections including HS2, Crossrail, Southern Access and Western Access increasing accessibility throughout the country.
- This contrasts with Gatwick where the more limited and less resilient proposals, and the more restricted accessibility to the rest of the country, are serious weaknesses and in our view, incapable of supporting airport expansion.

The addition of LHR-HStn to both LHR-ENR and LHR-NWR would further increase Heathrow's accessibility and provide other benefits, including improved local air quality.

Local Environment and Community

LHR-ENR occupies a smaller footprint and is further from most local communities, and therefore incurs significantly fewer negative local environmental and community impacts than LHR–NWR. In our view LHR–NWR has unacceptable impacts on local communities and the local environment.

We suggest that the Commission considers carrying out further work on the implications if the local economy is able to respond to Heathrow expansion in a more flexible way than assumed in the consultation.

In particular, our analysis suggests that demands for new local housing and employment space may be able to be accommodated in a wider area, including possibly more of West London. We suggest it would be useful for the Commission to explore what trade-offs and benefits this could offer, for example in extending the opportunities and benefits of expansion to a wider sub-regional area.

Conclusion

We have carried out an overall comparison of the three short-listed options, summarised in the figure below (and assuming the Commission's preferred Heathrow surface access scheme). Our work draws upon the Commission's analysis¹ and is modified by our suggested improvements to the appraisal process and parameters.

¹ We note the Commission's analysis in Table 2.12 of the LHR-ENR Business Case and Sustainability Assessment

	A	B	C	D	E
Criteria	Noise Impact & Safety	Economic Benefit to UK	Cost to Users - Pax & Airlines	Surface Access	Local Environment and Community
Proposal					
LGW-2R					
LHR-NWR					
LHR- ENR					

Key

- Red** Show-stopper
- Orange** Potentially acceptable solutions and impacts
- Green** Significant positive benefits

Replacing the Commission’s current surface access scheme with LHR-HStn would change our Criterion D assessment from orange to green for both LHR-ENR/LHR-NWR.

Our analysis shows that there is unlikely to be a viable business case for LGW-2R, as expansion at Gatwick would result in aero charges more than doubling to a level higher than Heathrow whilst yields would be less than half.

Heathrow expansion delivers substantial economic benefits to the UK and of the two Heathrow schemes LHR-ENR has a significantly lower cost and risk, with fewer negative impacts on local communities and the environment,.

Heathrow Hub Ltd/Runway Innovations Ltd, as promoters of the LHR-ENR scheme, enjoy a good on-going relationship with Heathrow Airport Holdings Limited, the airport’s owner. We have also consulted widely with local communities and have generally received positive feedback on the specifics of our proposals where a preference has been expressed between the Heathrow schemes.

Overall, our conclusion is simple - only Heathrow can meet the Commission’s objective of “*maintaining the UK’s status as an international hub for aviation*” and LHR-ENR, following the design refinement which we have carried out to inform this response, performs better than LHR-NWR against all assessment criteria.

follows a similar structure to that adopted here.

Introduction

Heathrow Hub Ltd/Runway Innovations Ltd (HHL/RIL) are pleased to provide this response to the Airports Commission's (The Commission) public consultation on the three shortlisted options for airport expansion - Gatwick Airport Second Runway, (LGW-2R), Heathrow Airport Extended Northern Runway (LHR-ENR) and Heathrow Airport North West Runway (LHR-NWR)

Our conclusion is simple - only Heathrow can meet the Commission's objective of *"maintaining the UK's status as an international hub for aviation"* and LHR-ENR, following the design refinement which we have carried out to inform this response, performs better than LHR-NWR against all assessment criteria.

The Commission requests responses to eight questions. To provide a clear and structured response, we have established a framework within which the Commission's 16 appraisal modules are considered under what we see as five core criteria (as shown in the table below).

Heathrow Hub Conclusions on the Three Short-Listed Options

	A	B	C	D	E
Criteria	Noise Impact & Safety	Economic Benefit to UK	Cost to Users - Pax & Airlines	Surface Access	Local Environment and Community
LGW-2R	Orange	Red	Orange	Red	Orange
LHR-NWR	Orange	Green	Red	Orange	Red
LHR-ENR	Orange	Green	Orange	Orange	Orange

Key

- Red** Show-stopper
- Orange** Potentially acceptable solutions and impacts
- Green** Significant positive benefits

Our assessment of Criterion D is based on the consultation's surface access proposal. This would change from orange to green with the alternative Heathrow Hub interchange (LHR-HStn) proposal discussed in the Surface Access (Q2) section of this submission.

The 16 appraisal modules, and how they align with the primary criteria noted above, are described in **Appendix F-1**.²

² We note the Commission's analysis in Table 2.12 of the LHR-ENR Business Case and Sustainability Assessment follows a similar structure to that adopted in our response.

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Criterion A – Noise Impact

Summary

The Commission assessed LHR-ENR using flight paths that were not optimised for their noise impact. Our revised assessment confirms that LHR-ENR in fact affects fewer people than LHR-NWR on the Commission’s key noise metrics including $L_{Aeq\ 16h\ day} > 54dB$ and $L_{den} > 55dB$. These results are significantly different from those in the Commission’s analysis. Consequently, we draw different conclusions regarding the short-listed options.

Q1. What conclusions, if any, do you draw in respect of the three short-listed options?

The Commission assessed the Heathrow Extended Northern Runway option (LHR-ENR) using historic flight paths that were not optimised for their noise impacts and do not accurately reflect the noise performance of LHR-ENR or the chosen “Do-Minimum” scenario. Since publication of the consultation, our expert consultant team, supported by CAA’s Environmental Research and Consultancy Department (ERCD),³, has therefore carried out further work, to model a range of scenarios to properly assess the noise impacts of LHR-ENR.

The three principal scenarios are summarised in the following table. They adopt the approach of an incremental series of changes to the Commission’s assumptions to allow the effect of each to be assessed.

	Stage 1	Stage 2	Stage 3
Year modelled	2040	2040	2040
Commission scenario	“with development”		
Flight paths	Our own (Stage 1)	Our own (Stage 2)	Our own (Stage 3)
Deep landing respite applied?	No	Yes	Yes
Displaced threshold on 27L?	No	Yes	Yes
Traffic distribution on flight paths ¹	Equal ²	Unequal ³	Unequal ³
Night flights (average)	118 ⁴	118 ⁴	82.4
Straight-in final approach distance	4NM	4NM	3NM
Fleet mix	Commission’s	Commission’s	Our own

Note 1: Traffic distributions in all stages reflect the required split between navigation beacons.

³ The CAA has requested that we describe their role as follows - “The CAA operate the UK civil aircraft noise model (ANCON) on behalf of the Department for Transport and as such are obliged to undertake assessments for any customer on a fee for service basis. As HHL/RIL’s subcontractor, the CAAs involvement was limited to aviation noise modelling, using the UK aircraft noise model (ANCON), of airport scenarios and assumptions provided by HHL/RIL. The CAA provided no input into the development of these scenarios and assumptions, and has neither supported nor opposed the appropriateness of them. This impartial approach has been consistently taken with all sponsors requesting noise modelling from the CAA of their proposals to the Airports Commission”

Note 2: Traffic distribution split equally by the CAA, as happened in the Commission's analysis.

Note 3: Traffic distribution between flight paths defined by us.

Note 4: The Commission assumed an increased in the number of night flights and we retained this in Stages 2 and 3 even though it is not part of our concept.

Table 1: Summary of scenarios analysed

All of the input assumptions and results from the noise modelling are provided in **Appendix A-1**.

Stage 1

This modelled LHR-ENR with an alternative set of flight paths but **with all of the Commission's other assumptions remaining the same**.

This shows a significant reduction in population exposure and much closer results to LHR-NWR. These are illustrated in the following figure showing what we consider to be arguably the three key metrics in the Commissions noise scorecard – $L_{Aeq\ 16h\ day} > 54dB$ and $> 57\ dB$ measures, and $L_{den} > 55dB$. It is apparent that there is a significant reduction in some of the noise metrics, a change that has been confirmed by the CAA's ERCD that undertook the work.

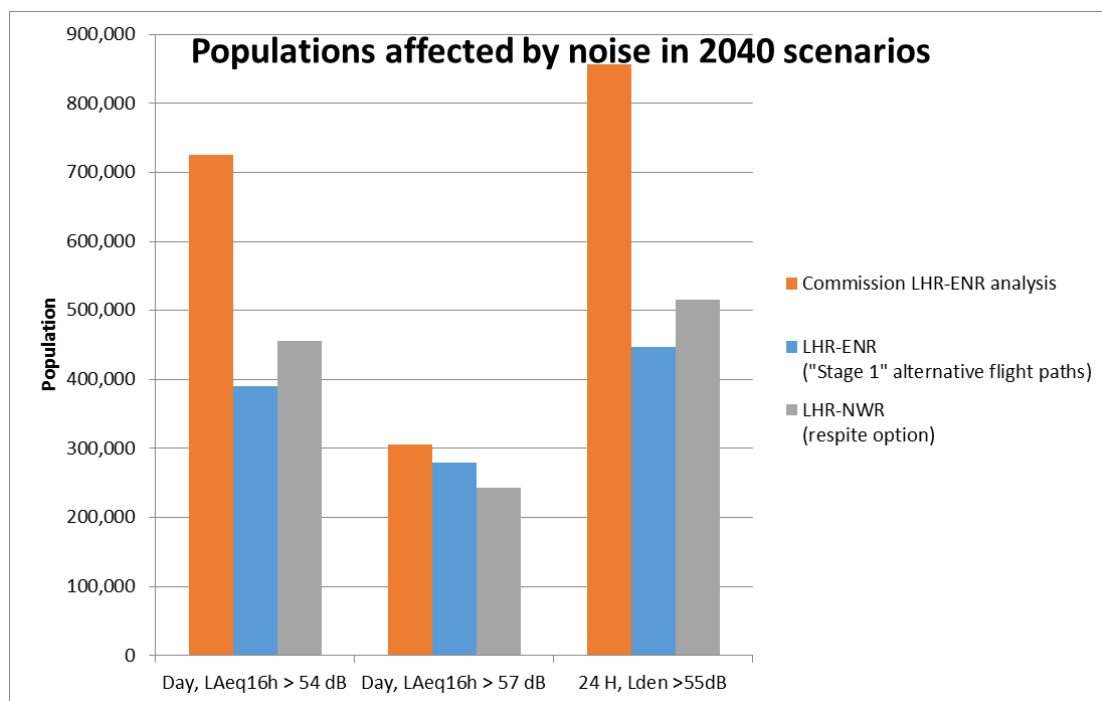


Figure 1: Stage 1 - Population affected by noise in 2040 "with development" scenarios

The population affected by noise for LHR-ENR (Stage 1) and LHR-NWR are similar. The Stage 1 LHR-ENR results are respectively lower than LHR-NWR by 14% ($L_{Aeq\ 16h\ day} > 54dB$) and 13% ($L_{den} > 55dB$) and higher by 15% ($L_{Aeq\ 16h\ day} > 57\ dB$).

The full set of results is provided in **Appendix A-1**, which shows that LHR-ENR also affects fewer people than LHR-NWR on other metrics such as the principal night measures of ($L_{Aeq\ 8h} > 48\ dB$) and ($L_{Aeq\ 8h} > 51\ dB$).

The scheme also affects fewer people in 2040 within a number of noise contours, including Lden 55 dB: -42%, LAeq 16h 54 dB: -38%, and LAeq 8h 48 dB: -26%, than for the existing two runway operations, based on population data for both 2013 and projections for 2040, even allowing for significant population growth in line with the Commission's forecasts.

We note that the Stage 1 analysis compared LHR-ENR and LHR-NWR on the basis of different Air Transport Movements (ATMs) – 700,000 ATMs for LHR-ENR and 740,000 ATMs for LHR-NWR (a difference of 6% as assumed in the consultation).

The consultation assumes that our LHR-ENR scheme is capable of accommodating a maximum of 700,000 ATM's.⁴ Our previous submissions to the Commission proposed and assessed this number of ATM's on the basis of the demand estimates in the Commission's Interim Report - *"By 2050, the gap between demand and capacity equates to some 170-200,000 ATM's"*⁵

Our proposals were developed to slightly exceed this estimate, providing an additional 220,000 ATM's over and above Heathrow's current notional capacity (and planning cap) of 480,000 ATM's.

However as the consultation assesses LHR-NWR on the basis of 740,000 ATM's, we have carried out further analysis and confirm that LHR-ENR can similarly provide this higher capacity in terms of runway flow rates, ground operations and stand capacity.

This is described in detail in our Ground Modelling report at **Appendix A-2**

We also confirm this increase in capacity will not change the conclusion of the noise comparison with LHR-NWR. Even if the population exposure numbers for LHR-ENR are increased by 6%, consistent with 740,000 ATM's, they are still lower on the key LAeq 16h day and the Lden >55dB measures.

We emphasise that these results are from our "Stage 1" analysis, which varied only the flight paths and **made no other changes to the Commission's 2040 "with development" scenario.**

Stage 2

The Commissions analysis excluded any respite offered by the "deep landings" that are possible with, and a key benefit of, LHR-ENR. Our Stage 2 analysis therefore included the respite offered by "deep landings", as a result of aircraft landing on the furthest section of runway at times when there are few or no departures as well as for several hours during the day and evening.

Stage 2 modelling also:

- Displaced the threshold on the 27L by 600m,
- Applied further modifications to the flight paths,
- Redistributed the traffic between the flight paths.

These changes led to further improvements in the population exposure, particularly for the night and Lden measures. For example, the LAeq 8h night >48dB population (2040) exposure fell by 6.6% and the Lden >55dB figure fell by 2.3%. Greater falls are seen with the higher exposure levels – for example the LAeq 8h

⁴ e.g. "In the Heathrow Airport Extended Northern Runway option the northern runway is extended, increasing capacity at Heathrow to 700,000 ATMs from 2026" – Para 6.35, Strategic Fit: Forecasts, Airports Commission

⁵ Para 4.70, Interim Report, Airports Commission

night >54dB fell by 10.5%. This shows the potential significant benefits of the “deep-landing” respite, particularly at night.

The following figure shows the results compared to LHR-NWR for the above metrics and an additional night measure.

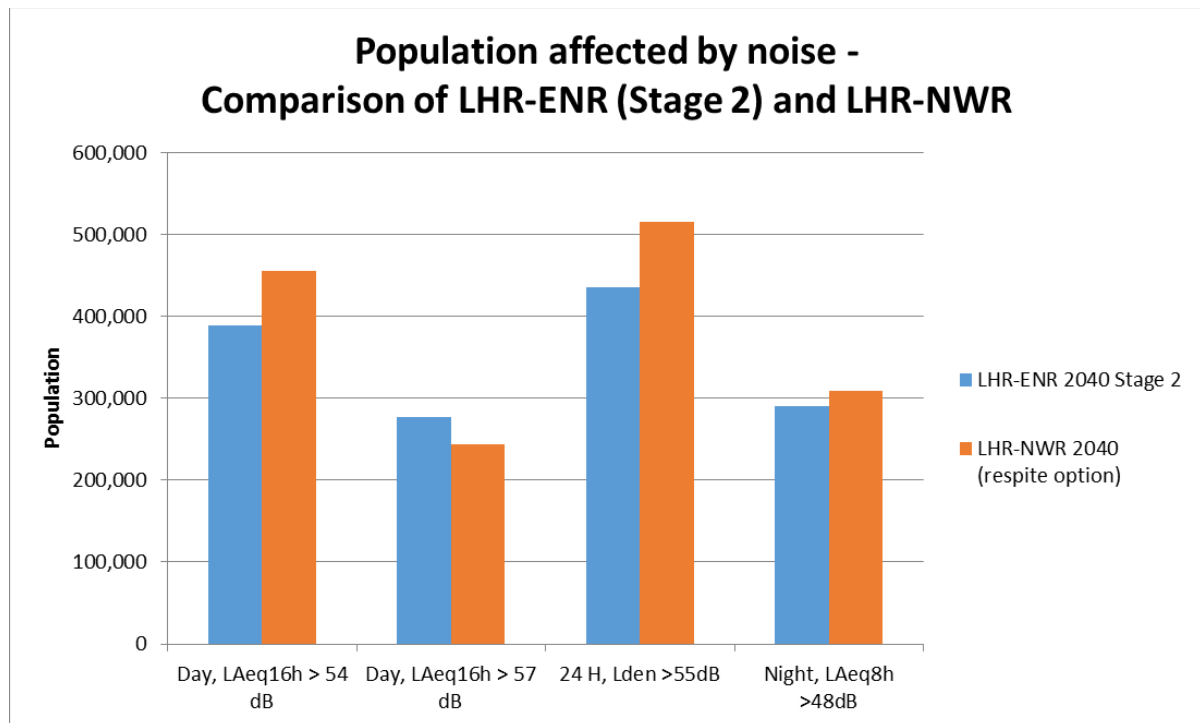


Figure 2: Stage 2 - Population affected by noise in 2040 “with development” scenarios

Stage 3

We then developed a Stage 3 assessment, based on the “with development” 2050 scenario, and with the following changes from the Stage 2 assessment:

- Reduction of the straight-in final approach distance from 4 Nautical Miles (NM) to 3NM.
- Reduced the number of night flights to 82.4 (from 118) based on the existing average. [The consultation assumes an increased number of night flights that we do not propose and which are not required to provide the necessary capacity]
- Revised the Commissions’ 2050 fleet mix to reflect our expected fleet mix in 2050.

One of the aims of Stage 3 was to reduce the noise impact on Windsor, which had become affected by the some of the contours in Stage 1 and 2. The results of the stage 3 assessment shows that more than half of Windsor is now located outside of the LAeq,16hr 57 dB noise contour, and about a quarter is outside LAeq,16hr 54 dB.

The key results are shown in the figure below for the LHR-ENR and LHR-NWR options (showing the 2050 respite option for LHR-NWR).

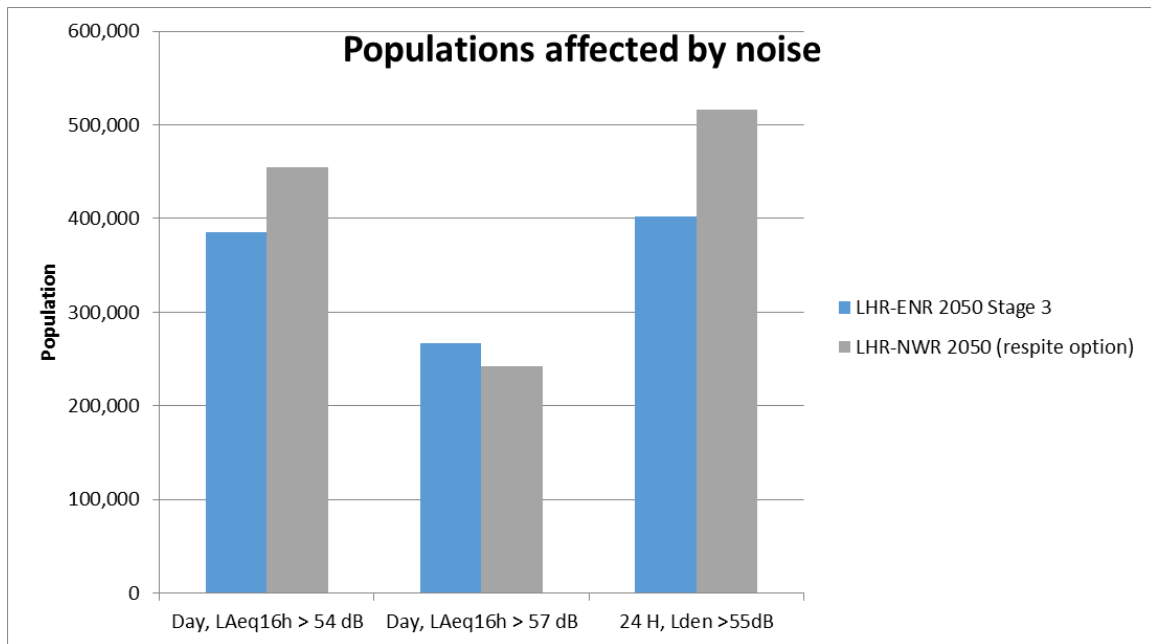


Figure 3: Stage 3 - Population affected by noise in 2050 “with development” scenarios

Q2. Do you have any suggestions for how the short listed options could be improved; ie their benefits enhanced or negative impacts mitigated

Our response to Q2 confirms that LHR-ENR, with different flight path designs but otherwise using the same assumptions as the Commission, affects fewer people than LHR-NWR on two of the three key noise metrics and that negative impacts are considerably reduced compared to the Commission’s assessment.

We describe above the three stages of analysis, which demonstrate the significant improvement in noise population exposure for LHR-ENR compared to the consultation’s assessment.

The key change is the significant improvement of the noise population exposure compared to the Commission’s analysis of our Stage 1 results, as shown in the figure below.

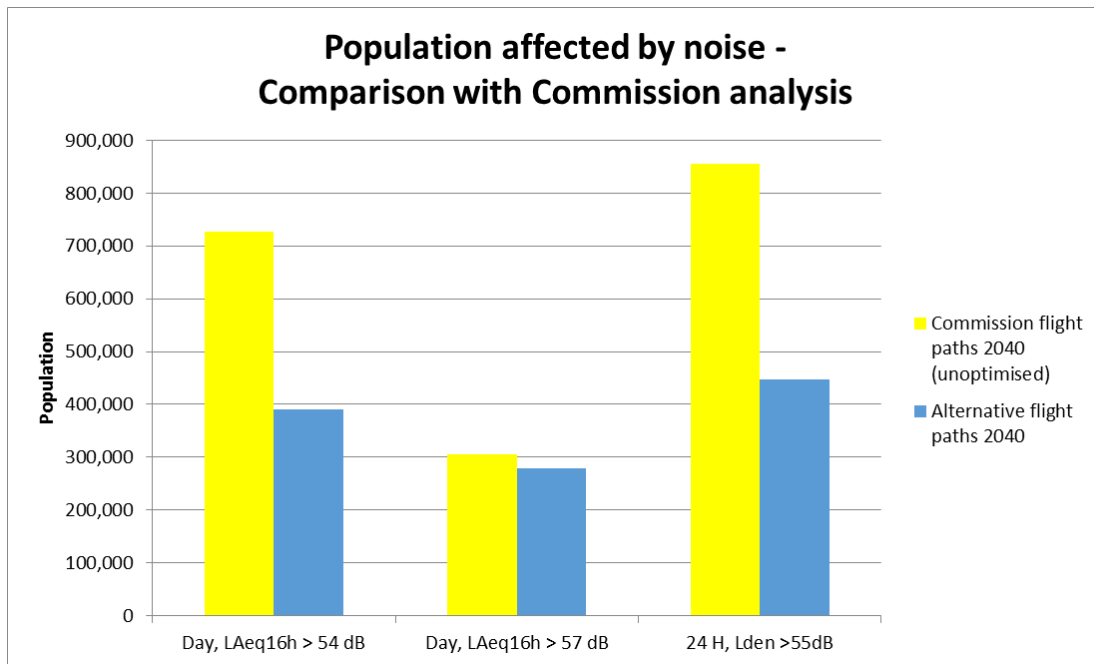


Figure 4: Population affected by noise – Stage 1 assessment compared with Commission’s analysis

The alternative flight paths used in our modelling are indicative only and any flight paths will need to be agreed through formal consultation. Nevertheless, this analysis demonstrates the potential to operate LHR-ENR with a noise footprint that is significantly smaller than described in the Commission’s consultation documents. This results from simply modelling different flight paths from those used by the Commission.

Although the alternative flight paths used in our modelling are indicative, they are not unrealistic. For example, the turn rates have been checked to ensure they are not too tight, and Stages 1 and 2 used a 4NM straight final approach path, as did the Commission’s. (Stage 3, a 2050 scenario, used a 3 NM final approach path.)

The revised Stage 1 footprints are shown below for the Summer Day $L_{Aeq\ 16hr}$ contours.

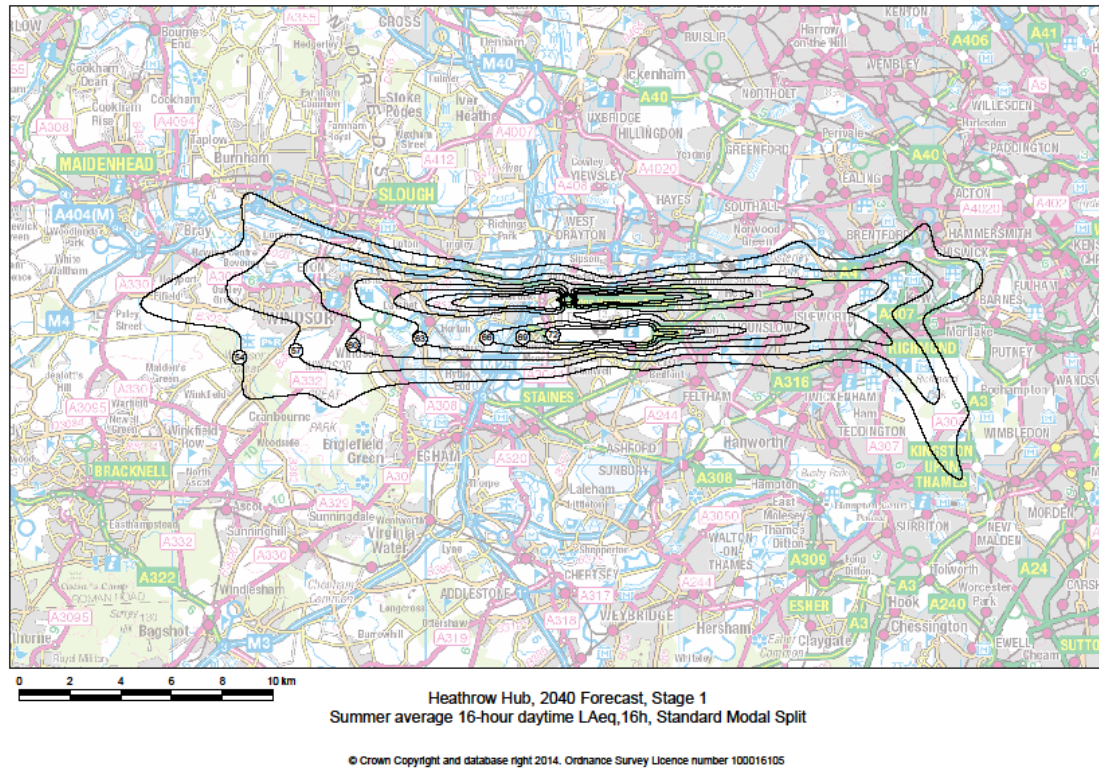


Figure 5: Noise contours (2040) with alternative flight paths - Summer Day 16h LAeq 16h

With the alternative flight paths the population affected by noise is, by some measures, much lower than 2013 levels, as shown in the Stage 1 analysis below.

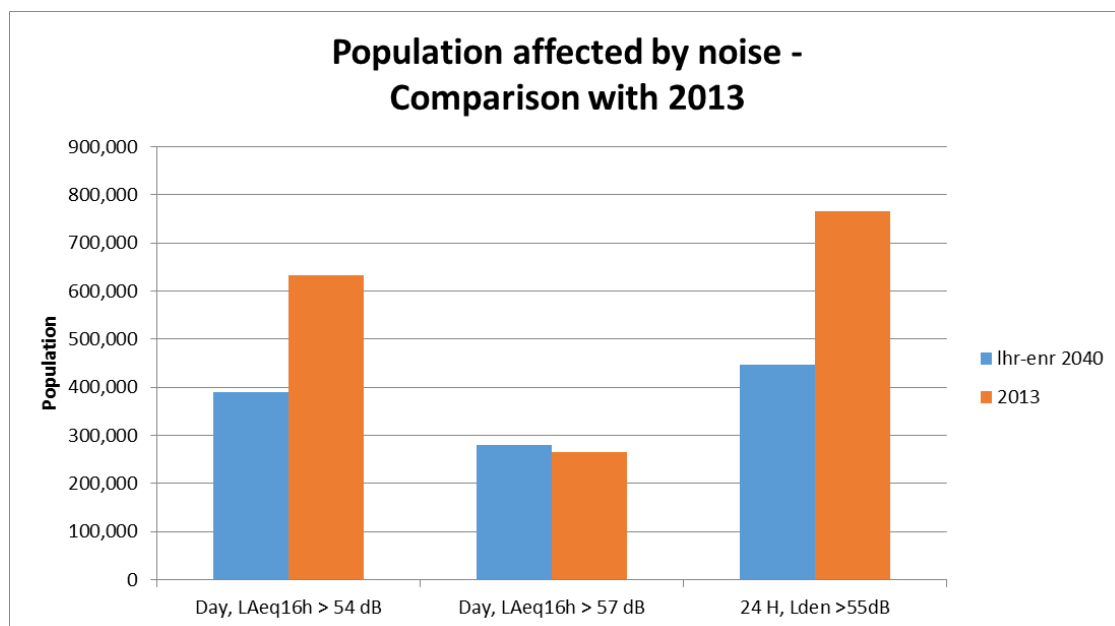


Figure 6: Population affected by noise – Comparison of Stage 1 with 2013

We note that the above LHR-ENR 2040 population figures include an assumed population growth in the area around the airport. This growth varies for different contours but is always greater than 15%. This means that in a like-for-like comparison without population growth, the LHR-ENR figures would in each case be smaller by at least 15%.

The results of all 3 stages for the three key metrics and also the most sensitive night metric are shown in the figure below. It is apparent that the optimisations of Stage 2 and 3 improved the results, in some cases quite significantly beyond Stage 1. Further optimisation is almost certainly possible.

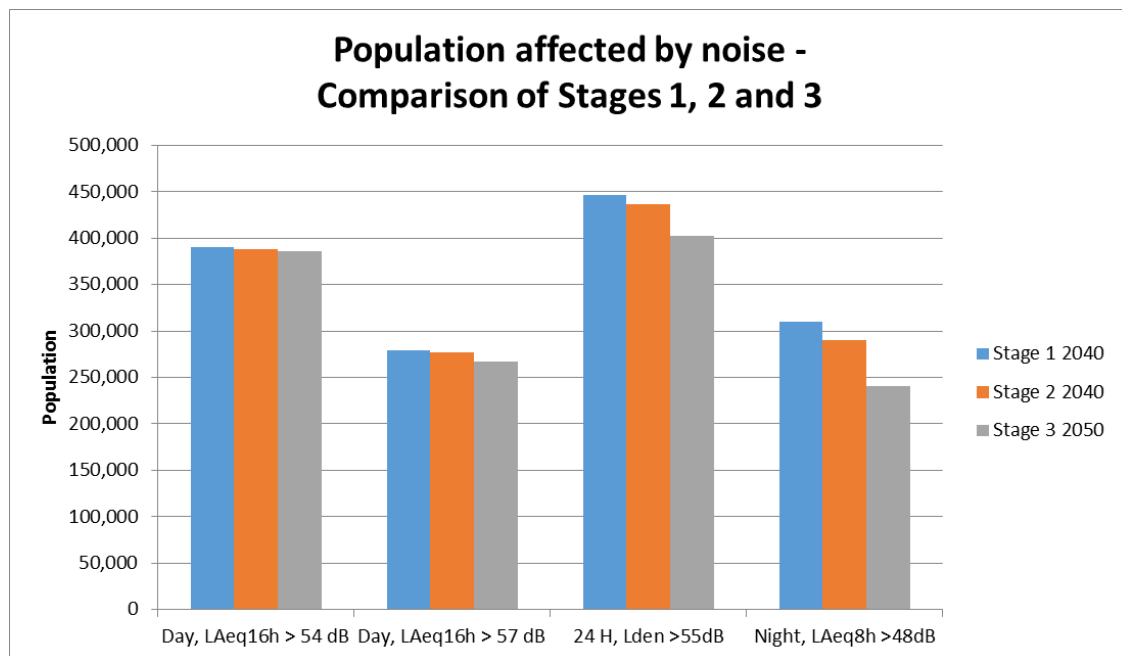


Figure 7: Comparison of Stages 1, 2 and 3

We support the Commission's recommendation of an Independent Noise Regulator, who could, with the necessary statutory and regulatory powers, take forward development of these and other operating concepts.

Q3. Do you have comments on how the Commission has carried out its appraisal?

We suggest that a revised fleet mix is tested in the Commission's 2030 "Do-Minimum" scenario to assess the impact of increased numbers of large and therefore noisier aircraft.

This would reflect the likely airline response to continuing capacity constraints at a two runway Heathrow.

Q4. In your view, are there any relevant factors that have not been addressed by the Commission to date?

See above and below comments

Q5. Do you have any comments on how the Commission has carried out its appraisal (16 Appraisal Modules), including methodology and results?

The Commission's appraisal was based on flight paths that were not optimised from a noise perspective and omitted two intended features of the scheme (respite and a displaced threshold on the southern runway). This section addresses these two features, as well as the Commission's assumptions on night flights, fleet mix, glide path angle and other operational developments and how these were treated in our analysis.

Respite

Respite is a key element of noise mitigation strategies. Respite will be offered by the LHR-ENR option in the following ways:

- Through periods when runway modes offer **deep landings** (or in some cases another respite configuration) for about 2 hours in the day time periods, 2 hours in the evening periods and between 06:00 - 06:30 (or 06:00 – 07:00 depending on the number of movements – see discussion on night flights below).
- Through **rotation** of flight paths to provide more sustained relief. In our alternate flight paths, we have provided multiple approach and departure flight paths to each runway end. For example, for the existing runway 27R we have modelled the three approaches (a,b,c) shown below.



Figure 8: Approaches to existing runway 27R allowing for rotation

We propose a rotation scheme between these approaches when this runway is in use. An example rotation scheme is shown below.

	Morning	Day	Evening
Day 1	a	b	c
Day 2	b	c	a
Day 3	c	a	b

Table 2: Example rotation scheme

We have not developed any firm proposals for rotation and propose that the scheme would be developed through public consultation.

No respite options were included in the Commission's analysis. In particular, the "deep landings" were not modelled even at night, which undoubtedly has a significant impact on the night and L_{den} noise measures. Our modelling introduced deep landings into Stages 2 and 3 of the analysis.

Displaced threshold

A displaced threshold is possible on the southern runway. We propose that the threshold on 27R is displaced by 600m, and this was included in Stages 2 and 3 of our analysis.

Night flights

The number and type of night movements today are controlled by Government policy and we expect this to continue. Today there are controls on which types of aircraft are permitted to fly in the night period (23:00 – 07:00). There are also controls on the number and total noise quota points of flights in the night quota period (23:30 – 06:00). It is not unreasonable to assume that approval of a new runway would come with a proviso that there should be tighter controls on night flights.

The Commission's analysis assumed that the night flights (23:00 - 07:00) would increase from 82.4 (2013 average) to 118 in 2050. However, we propose that no such increase should take place and that these additional movements should be incorporated in the daytime period.

In addition, we propose to disallow flights to be scheduled in the night quota period (from 23:30 - 06:00). There are currently 16-18 such flights, which are almost entirely early morning arrivals and cause discomfort to local residents. We propose to move these flights to after 06:00. Based on our public consultations we believe that such a proposal would do a great deal to address concern about incremental noise.

In summary we propose that there would be no scheduled flights from 23:00 to 06:00 and an average of 82.4 flights in the 06:00 – 07:00 period. This was applied in Stage 3 of our analysis.

Fleet mix

We believe the Commissions fleet mix predictions are open to question and have proposed some changes as follows:

- Replacing the freight movements with passenger services,
- Replacing some 747-8 aircraft with A380-800 NEOs.

These changes were included in Stage 3 and are described in **Appendix A-1**.

Operational developments

There are several other operating concepts that could reduce the impact of noise from the airport. Although we have not assumed any of these in the three stages of our modelling, it is our view that as many as possible should be considered:

- A **steeper glideslope** would reduce the noise away from the airport. The commission assumed a 3.2 degree glide path angle in its analysis but tested a 3.5 degree glide path in a 2050 sensitivity scenario for the LHR-NWR option. It is our view that this glide path angle should indeed be assumed in 2050 and probably earlier, which would serve to further improve the benefit gained from deep landings on the extended runway.
- **Continuous climbs and descents** to reduce the noise associated with level flight and to keep aircraft higher from the ground for longer. Heathrow already practises continuous descents but these could be further optimised. Following the re-design of the London Airspace (currently underway by NATS) and taking account of new aircraft technology we anticipate that greater use of continuous climbs and descents could be made.
- **Two-segment approaches**, in which aircraft descend at 4-5 degrees and then transition to a standard 3 degree final segment. This reduces noise further away from the airport.

- **Changing the modal split** of the airport. Heathrow currently operates a “Westerly preference”. There may be benefits in changing this preference but these will depend on the actual location of future flight paths and other issues.
- **Curved approaches** which provide even more options for flight paths and respite close-in to the airport.

These operating concepts and the enabling technologies are described in **Appendix A-3** on approach and landing capabilities. However we have not applied any of these changes in our analysis.

Q6. Do you have any comments on the Commission’s sustainability assessments, including methodology and results?

See above comments

Q7. Do you have any comments on the Commission’s business cases, including methodology and results?

See above comments

Q8. Do you have any other comments?

Safety

The consultation confirms *“on the basis of the available evidence, the Commission believes that the proposed runway option can be operated, and proven to be operated, in a safe manner. The Commission recognises that further work with the CAA and appropriate international bodies would be required to validate fully this finding”*⁶

Following completion of our safety report, included in **Appendix A-4**, our discussions with the CAA have concluded that whilst some regulatory work would be required, we do not anticipate any risk of delay to our projected operational opening date. We note that nothing in the various relevant regulations excludes the use of in-line runways and no major issues have been identified which would prevent full implementation of the ENR concept.

Where areas of change to the regulations have been identified in the detailed work carried out by our specialist consultants and the CAA, there is no reason why these could not be addressed in a timely manner allowing operational opening by our estimated completion date.

Further details on safety in response to the CAA’s assessment are provided in **Appendix A-5**.

⁶ Para. 3.101, Consultation Document

Capacity

Our ground movement simulations have shown that the airport can operate at up to 130 ATMs per hour, which would enable the annual capacity to reach 740k ATMs. Some limited additional or revised ground infrastructure (e.g. approximately five additional remote stands or taxiway changes) may be required. Further detail is provided in our report on ground modelling at **Appendix A- 2**.

We observe that both LHR-ENR and LHR-NWR are expected to have broadly the same capacity since both operate the airport at maximum throughput with one runway for arrivals, one for departure and one for both.

Criterion B – Economic Benefit to UK

Summary

Both the Heathrow expansion proposals deliver far larger economic benefits with greater certainty to the UK compared to the Gatwick proposal. Of the Heathrow options LHR-ENR provides similar capacity to LHR-NWR at lower cost, less risk and with fewer negative impacts, therefore delivering the greatest overall benefits of the three options.

Q1. What conclusions, if any, do you draw in respect of the three short-listed options?

Our key conclusions on the Commission's appraisal of the three short-listed options are:

- We broadly agree with the Commission's assessment of the relative economic impacts of the three schemes and note that the two Heathrow schemes have similar significant positive economic benefits, which are substantially greater than the Gatwick scheme's assessed economic benefits.
- We further believe it is important to emphasise that the realisation of these benefits for the Gatwick proposal is subject to a far greater degree of uncertainty and risk than the Heathrow schemes. This is due for example to far less certainty that: investors will back the scheme; airlines and alliances will be willing to be based/expand their presence at Gatwick and pay the extra charges associated with expansion; and that overall levels of assessed demand will be manifest in the UK rather than rival foreign airports for example at Schiphol and/or Paris.
- We commissioned Oxford Economics to consider whether the Gatwick proposals could represent a viable business case. They conclude that aeronautical charges at an expanded Gatwick would be close to those at a constrained two runway Heathrow. Given proven price sensitivities and passenger preferences, and the past reluctance of airlines to switch operations from a (congested and higher cost) Heathrow to Gatwick, there is a significant risk of an expanded Gatwick with surplus capacity alongside an increasingly constrained Heathrow. Oxford Economics report is included at **Appendix B-1**.

We suggest that more explicit acknowledgement is made of the costs versus benefits comparisons of the LHR-ENR and LHR-NWR schemes. On the Commission's appraisal both these schemes have similar wider economic benefits but LHR-NWR is around £5bn or 37% more expensive than LHR-ENR (£18.6bn vs £13.5bn at 2014 prices). LHR-ENR clearly represents significantly better value for money investment. (LHR-ENR also in our view has significantly fewer negative local economic and community impacts than LHR-NWR – see our comments on Criterion E). Its lower cost also means that there is more money available for mitigation measures and compensation for local communities.

Q2. Do you have any suggestions for how the short listed options could be improved; ie their benefits enhanced or negative impacts mitigated

We believe that the economic benefits of both of the Heathrow schemes are improved by including the Heathrow Hub interchange (LHR-HStn). This is described under Criterion D.

Q3 Do you have comments on how the Commission has carried out its appraisal?

The Commissions' consultants assessment of wider impacts⁷ covers an impressive level of detail and modelling, but some of the results do not appear to match up with a more straight forward anticipation of what might be expected. In particular we are not clear why LHR-ENR and LHR-NWR do not have a more direct relationship to differences in forecast passenger numbers (126-142m vs 132-149m passengers by 2050, i.e. 5% more⁸). Our understanding is that the slight difference in overall capacity in the longer term is from the perspective of the economic benefits to relevant economic players (passengers, airlines, businesses etc) is the only substantive difference in the schemes. The results though show more significant differences with for example:

- Overall present value of GDP impacts show that LHR-NWR has greater benefits in four of the five growth scenarios, with these figures being between 1.2% and 11.4% more than the corresponding LHR-ENR scheme. (The average is 8.1%. If Global Growth scenario is included then the average is 6.2%).
- 'passenger flows' net economic benefits being higher for LHR-ENR compared to LHR-NWR for four of the five growth scenarios.⁹

It also appears odd that the Gatwick scheme shows greater benefits than Heathrow schemes for the 'frequency benefits' 'Global Growth' scenario and 'productivity' 'Low Cost is King' scenario¹⁰, when on almost all other counts the Gatwick scheme performs substantially less well than the Heathrow schemes.

While the results for the 'passenger flows' effect are supportive to our scheme, three of the five overall results appear to disproportionately favour LHR-NWR over LHR-ENR and they appear counter-intuitive to the specifics of the differences between the schemes.

We would also have expected that the marginal benefits of LHR-NWR over LHR-ENR would be less than 5% as these benefits are concentrated at the end of the appraisal period (i.e. at the point at which demand exceeds the assessed capacity of LHR-ENR) and would be more discounted in present value terms.

We suspect that the reasons for what to us appear counter-intuitive results may lie in the specifics of the modelling assumptions and parameters and suggest that the PwC and the Commission team further review and test these assumptions for reasonableness.

⁷ Economy: Wider Impacts Assessment, PwC

⁸ Paras 3.62 and 3.117, Consultation Document

⁹ Table 50 vs Table 32, Economy Wider Impacts Assessment, PwC

¹⁰ Tables 14, 32 and 50, Economy Wider Impacts Assessment, PwC

Assumed Capacity of LHR-ENR

The Commission's assessment assumes that LHR-ENR has a lower capacity (700,000 ATMs) than LHR-NWR (740,000 ATMs). The consultation material notes *'The difference in annual capacity between the two options is due to operational constraints during the early morning and late evening period under the Heathrow Hub option that would have to be introduced to provide local communities with respite'*¹¹.

Our additional work on noise impacts, described under Criterion A, confirms that LHR-ENR in fact provides the same capacity and similar opportunities for respite as LHR-NWR. The two schemes should therefore be assessed on the basis of the same capacity and we would expect the national economic benefits to be similar (though local negative economic impacts would differ).

Do Minimum Assumptions

We believe the 2030 'Do Minimum' assumptions in the consultation do not accurately reflect likely airline responses to a future where Heathrow remains capacity constrained. This has two significant economic impacts: a decline in frequencies, resulting in less choice and adversely affecting the UK's competitiveness; and a continuing attrition of domestic services, resulting in more UK regions becoming dependent on interlining through European hubs to access global markets.

Domestic Services

The consultation suggests that our proposals, presumably assuming 700,000 ATMs, *'would enable passenger numbers at the airport to reach 126-142 million by 2050.'*¹² *In view of this doubling of capacity it is not clear why it is suggested that '...without any specific measures to incentivise new services, the forecasts suggest that only very limited changes in the number of domestic services may be seen.'*¹³ Increasing the number of available slots would increase the likelihood of additional domestic services, particularly where capacity allows these to be co-ordinated with long haul flights, enhancing the efficiency of the network carrier's hub operations.

Freight Traffic

The consultation notes *'Heathrow plays a vital role in the UK's air freight market.'*¹⁴ We suggest this deserves greater emphasis.

Heathrow is the UK's biggest port by value of freight handled¹⁵ and accounts for 64% of the UK's total airfreight by volume¹⁶. It provides vital belly hold capacity on routes that would not support a dedicated

¹¹ Footnote 20, Expanding Airport Capacity: Competition and Connectivity, Country Specific Policy Analysis, OECD

¹² Para 3.61, Consultation Document

¹³ Para 3.66, Consultation Document

¹⁴ Para 3.70 Consultation Document

¹⁵ *'Freight going through Heathrow alone is worth £35bn a year and the airport is the UK's most important freight port by value'* - Heathrow Airport press release 25th April 2013 <http://mediacentre.heathrowairport.com/Press-releases/Heathrow-welcomes-Freight-Transport-Association-s-submission-to-the-Airports-Commission-528.aspx>

¹⁶ Para. 3.19, Interim Report, Airports Commission December 2013

freight service¹⁷, supporting more marginal routes where passenger demand alone may be insufficient. This is particularly relevant to UK economic growth and connectivity with developing economies.

Proximity to air freight hubs is a critical factor in locational decisions for the high added value industries on which the UK's future competitiveness depends. These advanced manufacturing and service industries rely on global shipping of high value, low bulk time sensitive goods, including for example pharmaceuticals, precision instruments, and automotive & aerospace components¹⁸.

There is a significant difference in Heathrow and Gatwick's respective freight capabilities. Heathrow handled 1.50m metric tonnes of airfreight in 2014, Gatwick 0.09m metric tonnes¹⁹ reflected in the freight handling infrastructure associated with each airport.²⁰

We suggest that the Commission considers whether greater emphasis should be given to the role of air freight in its appraisal of economic benefits of the different schemes.

Q4 In your view, are there any relevant factors that have not been addressed by the Commission to date?

Local Economy²¹

We suggest that the Commission carries out further work to consider the implications if the local economy were able to respond more flexibly than assumed to the expansion of Heathrow. In particular our analysis suggests that demands for new local housing and employment space may be able to be accommodated in a wider area, including for example more of West London. We suggest it would be useful for the Commission to explore what trade-offs and benefits this could offer, for example in terms of extending the opportunities and benefits of the expansion to a wider sub-regional area.

Heathrow Hub Interchange

We suggest that the Commission carries out additional analysis of the wider economic impacts of including the Heathrow Hub interchange (LHR-HStn).

A significant component of the wider benefits of airport expansion is associated with increased air connectivity²². By the same logic we would expect there to be additional benefits from improving

¹⁷ 'Around 60% of air freight travels in the hold of passenger planes', Freight Transport Association http://www.fta.co.uk/export/sites/fta/_galleries/downloads/air_freight/the-role-of-air-freight-in-the-UK.pdf

¹⁸ See for example Industrial Strategy: UK Sector Analysis BIS Economics Paper 18 September 2012 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/34607/12-1140-industrial-strategy-uk-sector-analysis.pdf

¹⁹ <http://www.mediacentre.gatwickairport.com/press-releases/2015/2015-01-13-traffic.aspx>

²⁰ The consultation notes 'any significant growth in the cargo sector at Gatwick would require significant investment by third parties in the provision of freight handling and forwarding facilities.' (Para 3.20, Consultation Document). We believe such investment is highly unlikely, since this would require the effective construction of entirely new infrastructure in a location remote from air freight markets. In addition very little air freight is carried on the low cost short haul routes which Gatwick expansion is primarily intended to serve, since the short turn-rounds and aircraft types used are fundamentally unsuitable for freight handling.

²¹ This response mainly relates to our Criteria E but may have wider national economic impact implications.

²² The consultation recognises that additional runway capacity has 'catalytic impacts as a result of the wider benefits that air travel provides, improving connectivity and reducing costs through reduced travel times, a greater choice of destinations and more regular flights, as well as reduced country to country trade costs' P.7, Local Economy Impacts: Assessment, Airports Commission. Also 'investment in enhancing aviation capacity and connectivity can support economic growth' (Para 2.0, BCAS). The Commission

surface connectivity to the airport, for example for businesses and communities in the West and South West of England and South Wales. A large part of these wider benefits are associated with the increased connectivity arising from additional links with an expanded airport. They may also be of particular strategic importance as some of the areas that would benefit most are amongst the most economically disadvantaged in Europe.²³

However the consultation material does not substantively analyse these potential benefits, noting that *'while the Commission in principle does not disagree that such impacts are possible, it would be very difficult at this point to quantify these with any level of certainty'*²⁴.

Given the potentially significant benefits we have carried out our own assessment, which is discussed under Criterion D – Surface Access. We suggest that the Commission carries out additional work on this matter, both in terms of narrower transport economic impacts, and wider catalytic benefits.

Q5 Do you have any comments on how the Commission has carried out its appraisal (16 Appraisal Modules), including methodology and results?

See answers above

Q6 Do you have any comments on the Commission's sustainability assessments, including methodology and results?

See answers above

Q7 Do you have any comments on the Commission's business cases, including methodology and results?

See answers above

Q8 Do you have any other comments?

No comments

acknowledges that 'Heathrow Hub Ltd believe that the journey time benefits associated with this hub station could result in £2.2 billion of benefits, with the associated agglomeration and efficiency being much higher, in the region of £5 billion to £10 billion' p.93, Local Economy Impacts: Assessment, Airports Commission

²³ Cornwall, West Wales and the Welsh Valleys, as some of the poorest European regions, fall under the Convergence Objective under EU Structural Fund rules - http://ec.europa.eu/regional_policy/sources/docgener/informat/country2009/uk_en.pdf

²⁴ Para 3.106, Consultation Document

Criterion C – Cost to Users

Summary

Gatwick expansion would result in a very significant increase in aero charges, to a level higher than a two runway Heathrow. This would destroy the key attribute of Gatwick as a low cost alternative to Heathrow for South East England, whilst further increasing pressure on Heathrow's constrained capacity. The result would be the opposite of the Commission's objective. LHR-ENR's lower cost compared to LHR-NWR maintains affordable charges at an expanded Heathrow and we identify opportunities for further cost reductions to increase the airports' – and the UK's – competitiveness.

Q1. What conclusions, if any, do you draw in respect of the three short-listed options?

Heathrow LHR-ENR

LHR-ENR's lower cost and risk results in lower aero charges than LHR-NWR and would be less challenging to fund.

Our proposals have a significantly lower cost than LHR-NWR because we build less runway, using part of the existing, our M25 diversion is less complicated because it is further from the M4, the airport layout has less complicated links to new satellites, and the access link road is in open land rather having to relocate the facilities along the A4. Generally LHR-ENR occupies land that has fewer existing facilities requiring relocation. Building less also means less disruption, less land is required and risks are reduced.

The Commission's analysis has materially increased the estimated costs of both the Heathrow expansion schemes, primarily through the addition of optimism bias factors which add some 20% to overall scheme costs. We discuss this issue further below (in response to Q5).

It is apparent that there is, on the Commission's numbers, a fundamental and material cost advantage to users of LHR-ENR over LHR-NWR. By far the largest driver of this cost difference is the more efficient, lower cost and lower risk capital programme that we propose to deliver LHR-ENR and its associated infrastructure. The Commission estimates the difference in capital expenditure between LHR-ENR and LHR-NWR to be more than £5 billion (£13.539bn v at £18.583bn at 2014 prices). The LHR-NWR scheme is 38% more expensive than LHR-ENR.

This advantage in capital costs equates to a saving in aeronautical charges to users of some £2.90 per passenger every year over three decades, from around 2020 to 2050. This is a substantial cost advantage to LHR-ENR, representing 14% of the current charge and nearly 11% of the projected higher charges necessary over 30 years to fund the airport's expansion.²⁵

²⁵ Estimates based upon the Commission's own projection of traffic for LHR-ENR, with capacity opening in 2026, movements increasing to 700,000 ATMs, and using the assumed regulated real pre-tax weighted average cost of capital of 5.4%. Our proposals in fact provide 740,000 ATM's

Heathrow LHR-NWR

Our conclusion is that LHR-NWR remains a relatively high risk, high impact scheme to deliver with a number of major challenges to overcome not least relocating key existing facilities as well as the homes and communities affected.

The LHR-NWR scheme requires considerable acquisition and re-provision of private/public infrastructure including British Airway's headquarters, the Harmondsworth and Colnbrook Immigration Removal Centres, (the largest in Europe), and rail freight/aviation fuel terminals on the Colnbrook branch. These would all require replacement close to the airport, presenting severe challenges in view of limited available land and other constraints, for example, Green Belt policy designation.

The Lakeside Energy from Waste (EfW) plant would also require relocation. This major facility was completed in 2010 following a protracted planning process over more than ten years, in part reflecting controversy over environmental and access issues. Environmental constraints on developing such facilities have also become more challenging since development of the Lakeside site was first envisaged. In order to meet long-term contractual obligations, completion and commissioning would be required before demolition of the existing facility.

The Commission recognises that the process for securing statutory consents for a replacement facility is comparable in duration to airport expansion.²⁶ The LHR-NWR scheme would require a new site to be secured, all necessary statutory and regulatory consents to be obtained and a replacement facility completed and commissioned before any work could commence on airport expansion.

A letter from Lakeside's owners in support of our LHR-ENR scheme is attached at **Appendix C-1**

While the LHR-NWR scheme includes land for commercial development, this is inadequate to accommodate all activities requiring relocation. In addition, many have specific locational requirements – for example, the aggregate and aviation fuel terminals require rail access.

We suggest the Commission scrutinises the LHR-NWR cost estimates to ensure appropriate cost allowances have been made, including for example land acquisition outside the LHR-NWR boundary, site clearance and remediation, business disruption and Planning Contributions that would be sought by Local Authorities.²⁷

We consider that the practical challenges associated with these and other operational factors are not reflected in the Commission's differentiation between the two Heathrow schemes in terms of risk of delay and cost escalation. We would suggest that the Commission further scrutinises the impact these factors could have on the deliverability and strategic programme of the LHR-NWR.

Gatwick LGW-2R

Our conclusion is that a decision to provide additional runway capacity at Gatwick not only fails to deliver the required economic benefits but, by increasing the airport's charges so significantly, risks destroying the key attribute of Gatwick as a low cost alternative to Heathrow for South East England.

²⁶ "The planning and construction of an Energy from Waste Plant is a substantial exercise in its own right, whose timescales are not substantially shorter than the delivery of new runway infrastructure" Para. 5.14 Delivery: Risk Assessment and Mitigation, Airports Commission

²⁷ e.g.: Section 106 and Community Infrastructure Levy, see for example <http://www.londoncouncils.gov.uk/policylobbying/planning/developer/developer.htm>

Expanding Gatwick would result in its aero charges being higher than Heathrow's.²⁸ Whilst Gatwick would therefore be highly unlikely to attract new entrant carriers, existing airlines would also be likely to relocate to other South East airports which have ample spare capacity and would be able to offer much lower charges. Some airlines may alternatively choose to locate abroad and serve the UK via overseas hubs, with adverse effects on the UK's connectivity and competitiveness.

Meanwhile Heathrow would continue to suffer severe capacity constraints, leading to further upward demand and operational pressures.

The Commission recognises that Heathrow expansion would be likely to lead to a *"reduction in scarcity rents at Heathrow (which) could potentially contribute to lower fares at the airport."*²⁹ The corollary is continued capacity constraints would lead to upward pressure on fares at Heathrow, which would be highly unlikely to be eased by the alternative of Gatwick expansion.

Q2: Do you have any suggestions for how the short-listed options could be improved, i.e. their benefits enhanced or negative impacts mitigated?

We believe there are a number of opportunities to reduce the capex for LHR-ENR below the Commission's estimated capital cost of £13.5bn.

The consultation assesses the Commission's long-term average estimate of LHR-ENR aero charge at £27.95 compared to LHR-NWR £29.87 - a differential of £1.92, 7% of the LHR-ENR aero charge.

However LHR-ENR provides the opportunity to deliver the maximum economic benefit afforded by Heathrow's strategic position and with lower aeronautical charges by considering for example;

- a. LHR-ENR's lower risk, shorter programme and greater efficiency being reflected in applied level of risk and Optimism Bias – a potential reduction of the order of £0.80 per pax (discussed further below under Q4).
- b. Key scope areas and costs associated with land, infrastructure, new terminal facilities and car parking are substantively lower within our own team's assessment (collectively in the order of £1bn capital cost). This subject is worthy of further consideration in order to ensure that the cost reduction opportunities of the LHR-ENR option have been captured for comparison. An estimated £1bn capex reduction would reduce aeronautical charges by around £0.60 per pax.
- c. An increase from 700,000 ATMs to 740,000 ATMs, to provide the same capacity as LHR-NWR with minimal further Capex (principally the addition of five additional stands) – potential reduction of £1.10 per pax in the period 2037-2050 (discussed further below under Q7).
- d. The combined impact of these three factors would result in a total potential reduction in LHR-ENR aero charges of £1.40 per pax in the 2020s rising to £2.50 per pax from the late 2030s onwards, in addition to the Commission's currently modelled £1.90 differential over the three decades 2019-2050. This would equate to a weighted average cost per pax for LHR-ENR of around £26 over 2019-2050 compared to LHR-NWR of £29.90 (i.e. LHR-NWR 15% higher).

²⁸ If Gatwick were to expand, and assuming no major new capital expenditure at Heathrow and a continuation of the RAB-based approach to regulating airport charges, the Heathrow charge would trend downwards from its current level of c£20 per passenger.

²⁹ Para 3.68 Consultation Document

In addition to the above the Commission's modelling assumes a 15 year depreciation period on assets within the existing RAB (at January 2014)³⁰. Our view is that this length appears to be unreasonably short especially considering the scale of capex spend over the last 5-10 years, including the T5 and T2 developments. Our own modelling assumes a period of gradual decline to 0 by the end of the assessment period from the current RAB depreciation of £700m+ for Q6.

Whilst common to each scheme, a longer depreciation assumption on existing RAB would nevertheless further reduce the aeronautical charges. We estimate the impact could be a peak charge reduction of an additional -£1.40/pax, resulting in a weighted average cost per pax for LHR-ENR of around £24.60. We would encourage the Commission to revisit this aspect of its aero charge modelling.

Our original submission to the Commission estimated a peak charge of £22/pax at 2011/12 prices, equivalent to £24/pax at the 2014 prices. This compares to the £28/pax that the Commission estimate in its report. The main factors for this difference are the Commission's addition of Optimism Bias for capex and opex costs, discussed further below under Q4, as well as non-aeronautical revenue.

Q3: Do you have any comments on how the Commission has carried out its appraisal?

Financing

The Commission has described the financing of LHR-ENR as 'challenging'³¹. We believe the financing requirement for our proposal may not be as challenging as the Commission's assessment, and certainly relatively less than the competing options.

- We agree with the assessment by Moody's³² credit rating agency in December 2014 that any expansion of Heathrow would be relatively easily implemented. Heathrow has demonstrated a consistent ability to attract and retain traffic through every economic cycle and global shocks. A comparison of slot values³³ shows that it remains one of the world's most commercially attractive airports for airlines and passengers.
- Heathrow Airport Holdings Ltd (HAL) has extensive experience of undertaking large scale capital projects at the airport. LHR-ENR could be financed in the same way as other capital expenditure has been over the past ten years. Furthermore the expenditure would not represent an excessive increase in the size of the RAB at the airport, nor would it result in an excessive increase in aeronautical charges. Hence, expansion would reinforce Heathrow's position as a globally attractive asset within a stable regulatory framework that is well understood by and attractive to institutional and sovereign wealth funders.
- We also note that Moody's was less positive about the ability of Gatwick to implement the proposed LGW-2R expenditure programme, given the size of the financing required relative to the size of the RAB for the airport, as well as the consequential impact on aero-nautical charges.

³⁰ Tables 20 and 34: Asset life assumptions, Cost and Commercial Viability: Input Costs, PwC

³¹ Cost and Commercial Viability, Funding and Financing, PwC, page 64

³² New Runway will have mixed credit implications for London's airports, Moody's Investors Service, Sector In Depth, EMEA Airports, 10 December 2014

³³ "At Heathrow the value of a slot pair is estimated at roughly £25-30 million" – Para 3.18 Airports Commission Interim Report. In comparison, Easyjet acquired 25 slot pairs from Flybe at Gatwick for £20m (£0.8m per pair), FT 23rd May 2013

Heathrow's RAB (£14.6bn³⁴), revenues (£2.5bn³⁵) and average fare (£401³⁶) are all considerably higher than Gatwick (RAB of £2.5bn³⁷), revenues (£0.59bn³⁸) and average fare (£132³⁹), reducing the incremental cost of expansion.

- We also take comfort from the strong shareholding base of HAL which comprises long term investors including sovereign wealth funds, and a major UK pension fund. We note that Global Infrastructure Partners Fund I, the leading partner in the Gatwick Airport, is a closed-end fund.
- We are therefore confident the LHR-ENR could be financed by a combination of equity contributions from the HAL shareholders, and debt financing from the capital markets. Heathrow Funding Limited, the primary financing vehicle for the regulated airport, has extensive long term bond issues in a range of currencies and markets, and at a lower cost of funding than Gatwick.

Feedback from transport analysts and bankers (including Deutsche Bank, HSBC, Credit Suisse and Liberum)⁴⁰ confirms that funding via bond issue within the existing regulatory framework would be a reliable mechanism – HAL's credit rating would likely not be impacted.

In all plausible demand scenarios Heathrow trumps Gatwick in terms of risk/reward and bond yields will reflect this. Suppressed demand for access to slots is well established at Heathrow and minimises the risk of utilisation issues for new capacity.

Q4. In your view, are there any relevant factors that have not been fully addressed by the Commission to date?

The Commission has assumed similar estimated costs of capital across all three shortlisted airport expansion schemes. In our view this does not accurately represent different market perceptions of risk between Gatwick and Heathrow expansion options.

In reality, markets would price the risks attached to Gatwick expansion very differently from those at Heathrow, which has been consistently demonstrated to be one of the most successful airports and attractive infrastructure investments in the world, with airlines attaching high value to scarce capacity.

This issue is of fundamental importance to the choice between Heathrow and Gatwick expansion, but is recognized only in principle in the consultation material, which notes *"financiers may not assume that any charge allowed by the regulator could in practice be successfully passed to the airlines"*⁴¹ However,

³⁴ Figure 8, Cost and Commercial Viability: Literature Review, PwC

³⁵ Figure 8, Cost and Commercial Viability: Literature Review, PwC

³⁶ Para 5.3, Cost and Commercial Viability: Funding and Financing, PwC

³⁷ Figure 4, Cost and Commercial Viability: Literature Review, PwC

³⁸ Figure 4, Cost and Commercial Viability: Literature Review, PwC

³⁹ Para 5.3, Cost and Commercial Viability: Funding and Financing, PwC

⁴⁰ In addition to those advisors who have requested anonymity for the purpose of this consultation response, Stephen Vineburg has provided HHL/RIL with financial advice based on over twenty years experience in managing infrastructure investment portfolios. Previously Global Head of Infrastructure Investment for Colonial First State Asset Management, his airport experience includes gaining regulatory and financial approval for large scale capital projects including new runway expansions. He has also worked closely with leading airport operators including Amsterdam Airport Schiphol and Fraport. Mr Vineburg was previously a board member of Brisbane Airport and Perth Airport, as well as a foundation investor in the Macquarie Airport Group, with interests in Bristol Airport and Birmingham Airport. He was a lead investor in the Goldman Sachs led consortium that sought to acquire BAA Plc in 2006. Mr Vineburg was a founding director of Infrastructure Partnerships Australia, and from 2008 to 2014, he was Partner and CEO Infrastructure with CVC Capital Partners.

⁴¹ Cost and Commercial Viability, Funding and Financing, PwC

the sensitivity modelling carried out to test the impact on Gatwick's business case is narrowly framed and does not expose the risk that debt funding may not be secured at an acceptable price. It also does not address the substantial demand risk for the commercial viability of Gatwick expansion if the increased aero charges cannot be fully passed through to users.

The Commission's analysis does model a higher risk and hence higher cost of capital for Gatwick versus Heathrow schemes:⁴²

	Debt	Equity
LGW	+200bps over 10yr gilts	10% pre-tax nominal
LHR	+175bps	9%

However we do not believe these differentials adequately reflect the much higher demand risk associated with Gatwick expansion. Hence the Gatwick cost of capital should be modelled with a substantial rise, which would thereby narrow the gap in aero charges with both Heathrow schemes.

Consequently, we believe the uniform application of a percentage uplift is fundamentally inappropriate to consideration of the capex, opex and funding implications for each scheme.

Application of Risk – Lack of Differentiation in Heathrow Schemes

The Commission's analysis has applied to the capital costs of LHR-ENR and LHR-NWR the same risk factors (20% of base capex) and additional costs for Optimism Bias (also 20%), in attempt to derive the most likely overall cost of each scheme. In our view, applying these factors at the same rate to two very different schemes does not reflect the material differences in programme and delivery risk between the schemes (discussed above). In particular, LHR-NWR has inherently much higher programme risk arising from the very considerable complexities of developing a relatively built-up area to the north of Heathrow's current boundary. This creates a high risk dependency between enabling works, to relocate existing facilities and services, and airport expansion, which could not commence until all enabling works had secured statutory and regulatory consents, and were fully completed, commissioned and operational.

By contrast LHR-ENR involves expansion of the airport westwards into largely under-developed land to the west of the M25. LHR-NWR is therefore exposed to a range of additional planning, land acquisition, relocation and construction risks associated with acquiring and redeveloping currently fully utilised land to the north of the airport. These risks are not present to the same degree in LHR-ENR.

In our view this difference is material and should be assessed as part of the Commission's analysis. In practice the difference in risk would manifest itself in lower risk budgets, outturn costs and ultimately lower aeronautical charges to users. For example, a 10 percentage point differential in risk estimates between LHR-ENR (with a risk adjustment of 15%) and LHR-NWR (with a risk adjustment of 25%) would translate to an additional capex advantage of LHR-ENR over LHR-NWR of some £1.3bn, widening the capex advantage to £6.3bn. This in turn would translate into further savings for users in aeronautical charges of around £0.80 per passenger every year for three decades, on top of the £2.90 per passenger

⁴² Paras 2.4.3.1 and 2.4.3.2, Cost and Commercial Viability: Funding and Financing, PwC

savings, which are attributable to the £5bn capex advantage of LHR-ENR, on the Commission's base case analysis.

Gatwick Increased Charges– Overstatement of Demand and Understatement of Risk

We believe that the Commission's assessment overstates demand for LGW-2R and understates its associated risk relative to the LHR schemes.

The Commission has acknowledged and highlighted the significant effect of an increase in airport charges to the overall air fares for the specific schemes and the impact on demand in general.

However, the Commission has not factored in the impact on elastic demand of the price increase directly in its modelling of the scheme's traffic demand or as separate scenarios. This is relevant as the large aeronautical price increase at LGW-2R of +140% from £9/pax to £21/pax would make it much less attractive to low cost carrier (LCC) traffic, its largest customer base. See **Appendix C-2**.

EasyJet's latest annual report states that the airline makes a profit before tax per seat of £8.12⁴³ and therefore such a rise in aeronautical charges is likely to severely adversely affect its and other similar airlines' profitability.

With expansion, the Commission estimates Gatwick's peak charges would be higher than Heathrow today,⁴⁴ while achievable yields are less than half.⁴⁵

Gatwick currently succeeds because, *"while yields that can be achieved at Gatwick are lower than at Heathrow, airline costs to operate out of Gatwick are substantially lower"*⁴⁶

Not only would an expanded Gatwick therefore be unlikely to attract new entrants to a less commercially attractive airport that was more expensive than Heathrow, but its existing low cost and charter carriers may consider relocating to other South East airports with spare capacity,⁴⁷ lower charges and - in some cases - higher yields.⁴⁸

It is therefore fundamentally implausible that there can be a viable business case for LGW-2R, which would result in aero charges more than doubling to a level higher than Heathrow whilst yields would be less than half.

⁴³ <http://corporate.easyjet.com/~media/Files/E/Easyjet-Plc-V2/pdf/investors/result-center-investor/annual-report-2014.pdf>

⁴⁴ Para 3.93 Consultation Document

⁴⁵ *"In 2012 airlines operating out of Heathrow earned approximately 21 US cents per passenger mile on average. In contrast the average yield at Gatwick was just under 10 US cents"* Para 3.18 Airports Commission Interim Report

⁴⁶ Para 3.3 Expanding Airport Capacity: Competition and Connectivity, Country Specific Policy Analysis OECD

⁴⁷ *"By 2030 ...there will still be some unused capacity at Stansted"* – Para 6.2 Interim Report, Airports Commission. Planning consent granted May 2014 to expand Luton from 12mppa to 18mppa by 2031 - <http://www.london-luton.co.uk/en/news/1/314/london-luton-airport-embarks-on-100m-transformation.html>

⁴⁸ *"In 2012 the average yield at Stansted was approximately 15 US cents per passenger mile"* - Para 3.18 Airports Commission Interim Report

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?

Programme – Differential between LHR-ENR and LHR-NWR

A high level critical path programme for the LHR-ENR scheme is in **Appendix C-3**, and assumes the Commissions view of a 2026 delivery⁴⁹. This was used to evaluate the information so far provided from the LHR-NWR scheme.

All three shortlisted airport expansion schemes share a common critical path, albeit different in length, to secure a Development Consent Order, implement Compulsory Purchase Orders, carry out decant/demolition and complete replacement facilities/infrastructure before work on airport expansion can start.

The programme for LHR-NWR⁵⁰ assumes three and four year timelines for these enabling works prior to construction and commissioning of the new runway, taxiways, stands and buildings. However the linkages to support a clear critical path programme are not all in place. As a consequence, decant/demolition starts and concludes at the same time as the revised M25 works (both a three year period), with the runway being constructed one and half years into this three year period.

The need for LHR-NWR to relocate major facilities including British Airways headquarters and the Lakeside EfW plant, running in parallel with the M25 diversion and works to the M4 interchange, introduces key risks.⁵¹ HAL's programme shows the runway construction over the new M25 without any critical path or appropriate 'float' suggesting the need for a review of the overall programme duration and dependencies. In light of these risks, in our view a 2030+ runway programme completion date for LHR-NWR is probable, given the degree of risk that does not appear to have been fully evaluated.

Aviation fuel

The consultation only considers aviation fuel supply by reference to increasing on-site storage⁵² and possible "*provision of additional pipelines*"⁵³ While much of Heathrow's fuel is supplied by pipeline, at least one trainload of aviation fuel per day is currently delivered by rail through the existing rail terminal on the Colnbrook freight branch, connected by pipeline to on-airport storage.

Maintaining options for rail delivery of fuel over the longer term is a critical issue. Additional runway capacity will inevitably require additional supplies, potentially very much greater if expansion leads to a disproportionate increase in long haul services. However LHR-NWR would appear to result in the loss of the Colnbrook branch and the aviation fuel depot.

The ability to deliver fuel by rail significantly enhances resilience and provides much greater choice in supply compared to the inflexibility of pipeline distribution. This is of particular importance as the UK's

⁴⁹ Para 3.98, Consultation Document

⁵⁰ Taking Britain Further, Technical Submission Volume 3 p. 44-46, HAL

⁵¹ LHR-NWR works to the M25 are more complex than LHR-ENR due to the proximity of the LHR-NWR site boundary to the M4 interchange, requiring works to the M4 interchange that are not required with LHR-ENR

⁵² Para 7.3 and 7.5.4 Operational Efficiency: Ground infrastructure LHR-ENR

⁵³ Para 2.5 Operational Risk: Ground Infrastructure LHR-ENR and LHR-NWR

refining capacity continues to decline with increasing reliance on imported supplies. Rail can provide access to most of the UK's major ports while Heathrow's existing pipelines reflect legacy patterns of refinery and storage capacity⁵⁴ – much of which is now redundant following refinery closures and the loss of the Buncefield storage facility.⁵⁵ A recent report by the House of Commons Energy and Climate Change Committee⁵⁶ concluded that the UK's security of aviation fuel supply was classed as high risk.⁵⁷

Other impacts

The LHR-NWR scheme would also appear likely to prevent or at least severely constrain development of the proposed Slough International Freight Exchange, a major Strategic Rail Freight Interchange (SRFI) site dependent on rail access via the Colnbrook branch.⁵⁸ This is the only such facility under consideration west of London that could fulfil Government's commitment to the development of freight interchanges around the capital.⁵⁹

In summary, these factors collectively impose a significant programme constraint and risk, and therefore cost on LHR-NWR.

We do not consider that the practical challenges associated with these factors are reflected in the Commission's differentiation between LHR-ENR and LHR-NWR in terms of risk of delay and cost escalation.

Q6. Do you have any comments on the Commission's sustainability assessments, including methodology and results?

We have covered this elsewhere in our response and additionally note the opportunity for LHR-ENR to provide an integrated approach to energy and waste. This is discussed in **Appendix C-4**

Q7. Do you have any comments on the Commission's business cases, including methodology and results?

In our original submission we estimated a peak charge of £22/pax at 2011/12 prices. This is equivalent to £24/pax at 2014 prices. This compares to the Commission's peak charge estimate of c£29.

The main factors for the difference are the addition of Optimism Bias in the Commission's estimate both for capex and opex cost as well as non-aeronautical revenue.

⁵⁴ http://infrastructure.planningportal.gov.uk/wp-content/ipc/uploads/projects/TR040005/2.%20Post-Submission/Section%20127%20Application/130402_TR040005_National_Grid_Addendum_Appendix_8.PDF

⁵⁵ <http://blogs.platts.com/2014/08/27/privatization-of-key-uk-jet-fuel-pipeline-could-bring-cash-to-expand-capacity/>

⁵⁶ UK oil refining, Third Report of Session 2013–14, House of Commons Energy and Climate Change Committee, published 26th July 2013

⁵⁷ *"The International Energy Authority model for Short Term Energy Security (MOSES) and the guidance issued by the IEA [suggests] that import dependence greater than or equal to 45% of market demand is high risk to a country's energy security. The UK dependence on imports is currently at a level of 56% for jet kerosene"* Para 35 *ibid*

⁵⁸ c185,000m2 floorspace proposed, Slough International Freight Exchange <http://www.consultation-online.co.uk/sife/>

⁵⁹ *"SRFI capacity needs to be provided at a wide range of locations, particularly but not exclusively serving London and the South East"* Para. 4.2 Strategic Rail Freight Interchange Policy Guidance, DfT November 2011

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/4377/strategic-rail-freight-interchange.pdf

Based on the Commission's demand projection for AoN CC scenario, the passenger throughput between the two schemes diverges starting from 2037. Assuming LHR-ENR throughput increases in line with LHR-NWR traffic levels in the later years, the average aeronautical charge between 2037 and 2050 for LHR-ENR could be further reduced by an average of £1.10/passenger. This equates to an average reduction over the whole period 2019-2050 of £0.60 .

	2037-2050
Commission Aeronautical Revenue requirement for LHR-ENR (£2014)	<u>£51.546bn</u>
Commission cumulative estimate of LHR-ENR passengers	1,751m
Aeronautical charge/pax	£29.4
Commission cumulative estimate of LHR-NWR passengers	1,821m
Aeronautical charge/pax using LHR-NWR passengers/LHR-ENR revenue	£28.3
Difference	-£1.10

Q8: Do you have any other comments?

The consultation assesses a number of delivery risks for LHR-ENR⁶⁰ which we address in **Appendix C-5**

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⁶⁰ Delivery: Risk Assessment and Mitigation, Airports Commission

Criterion D – Surface Access

Summary

The LHR–NWR and LHR–ENR surface access proposals significantly outperform those of LGW-2R in providing sustainable access to the maximum population in a reliable way without negatively impacting other transport users because:

- Heathrow airport is in the more convenient and accessible location - just under 20m more people and 65% of population of England and Wales can access the airport within 2hr compared with only 33% of population to Gatwick;
- Heathrow is served by multiple road and rail corridors and is thus much more resilient than Gatwick which is reliant on a single rail and road artery, resulting in major disruption for air passenger when there are any incidents;
- Sufficient capacity is provided on the rail and highway networks that serve Heathrow to accommodate both air passengers/airport staff and non-airport users.

There appear to be significant disparities in the Commission's assessments of the Gatwick and Heathrow proposals, particularly in relation to the treatment of the scope of highways works, costing, accessibility and impacts and benefits of the rail proposals. We suggest that the Commission carries out a comprehensive review of all of the surface access strategies to provide a robust and realistic like for like comparison.

Q1. What conclusions, if any, do you draw in respect of the three shortlisted options?

In assessing LGW-2R, LHR-NWR and LHR-ENR in relation to the three objectives set by the Airports Commission it is clear using the criteria in the consultation that both LHR-NWR and LHR-ENR perform considerably better than LGW-2R. The difference between Heathrow and Gatwick becomes even more marked when corrections are made for some inaccuracies and inconsistencies in the consultation evaluation.

Relative comparison of LGW-2R, LHR-NWR, LHR-ENR proposals against Commission objectives⁶¹

Proposal	Surface Access			Relative overall comparison
	AC Objective 1 Maximising the use of sustainable modes of transport	AC Objective 2 Accommodating the needs of other users	AC Objective 3 Enabling access to the airport from a wide catchment	
LGW-2R				
Summary				
LHR-NWR				
Summary				
LHR-ENR				
Summary				

Objective 1: Maximising the use of sustainable modes of transport – see also Appendix D-1

The Commission forecasts a similar public transport mode share for all three options, ranging from 54% - 56%^{62 63}. Given Heathrow's extensive new rail services and increased connectivity (Crossrail, Western Rail Access to Heathrow, Southern Access and HS2) it is easy to understand how LHR-NWR/LHR-ENR would produce a mode shift of 15% to rail; indeed our further analysis suggests this is a considerable under estimate⁶⁴. However there appears to be little to underpin the claim of a rail mode share increase of 7% for LGW-2R when the only new routes are to Cambridge and Peterborough⁶⁵.

It is much quicker to get to Heathrow rather than Gatwick for the majority of the country. The average generalised rail journey time to Heathrow (69minutes)⁶⁶ is less than half that to Gatwick (139minutes)⁶⁷. This is significant in view of the Commission previously concluding, in considering an Inner Thames

⁶¹ This assumes the Surface Access schemes assessed in the consultation

⁶² Figure 7, Surface Access, Heathrow Airport Northern Runway Extension, Jacobs

⁶³ Figure 1, Surface Access, Gatwick Airport Second Runway, Jacobs

⁶⁴ Appendix D-3 Business Case Comparison LHR-HStn v WRAtH

⁶⁵ Figure 8, Surface Access, Gatwick Airport Second Runway, Jacobs

⁶⁶ p.10, Surface Access, Heathrow Airport Northern Runway Extension Executive Summary, Jacobs

⁶⁷ p.8, Surface Access, Gatwick Airport Second Runway Executive Summary, Jacobs

Estuary airport, *“the location of the airport would be less convenient than Heathrow for the majority of passengers”*⁶⁸

Objective 2: Accommodating the needs of other users. – see also Appendix D-1

Both LHR–NWR/LHR–ENR benefit from considerable resilience in terms of public transport, with four different rail routes from/to London. The consultation confirms *“the new routes will offer improved resilience to London passengers over the present situation. If one route is closed by an incident, the other routes should not be affected”*⁶⁹

Heathrow benefits from *“multiple baseline rail improvements (which) will provide enhanced access routes to the airport, boosting connectivity from the west, the north and across London. With airport expansion and anticipated Southern Rail Access programme, access from the south will also be improved via Clapham Junction”*⁷⁰.

In contrast LGW-2R relies on a single north - south route, the Brighton Main Line (BML), which has had 22 full line blockages in the last three years⁷¹. There are no alternative rail routes if there is a blockage or disruption on the BML.

The analysis of LGW-2R’s impact on non-airport rail users only considered additional airport passengers as a result of the second runway whereas the analysis of LHR–NWR/LHR–ENR considered total airport passengers. LHR–NWR/LHR–ENR total air passengers have less impact on the wider rail network and non-airport passengers than LGW-2R.

The Commission’s assessment of LGW-2R assumes a doubling in the number of trains stopping at the Gatwick Airport station. This will result in a significant disbenefit to non-airport passenger/commuters and has not been considered in the analysis.

LHR–NWR/LHR–ENR have multiple highway access points via motorways and A roads both from London and the Regions bringing greater resilience in the event of accidents and incidents. In contrast LGW-2R is dependent on a single highway artery - the M23. The consultation notes the *“Highways Agency (is) concerned over the heavy reliance of Gatwick on the stretch of M23 between junctions 8 and 9 for strategic road connectivity. In the event of a major incident it is likely that the link would be closed for a period of time”*⁷²

Objective 3: Enabling access to the airport from a wide catchment - see also Appendices D-1 & D-2

The correct measure of catchment for any airport should be the total population within a certain timeframe, not the increase in population as a result of schemes in the *“extended baseline”*, as considered in the consultation.

The consultation’s estimates of population catchments are also incorrect in some cases. For example: Gatwick’s 2 hour catchment is assumed to be the same as Heathrow’s - Manchester is shown as within 2

⁶⁸ Para 2.7, Inner Thames Estuary Airport, Summary and Decision Paper Sept 2014)

⁶⁹ p.9 Surface Access, Heathrow Airport Northern Runway Extension Executive Summary, Jacobs

⁷⁰ Para 14, Strategic Fit: Fit with Wider Spatial and Socio-Economic Development Strategies, Airports Commission

⁷¹ Para 6.2.15 Surface Access, Gatwick Airport Second Runway, Jacobs

⁷² Para 4.2.12 Surface Access, Gatwick Airport Second Runway, Jacobs

hours of Gatwick⁷³ when HS2 Ltd's own published figures state 2 hours 27 minutes⁷⁴. We have developed revised catchments using Accession software which demonstrates that in reality twice as many people are within 2 hours of Heathrow (35m) compared with Gatwick (18m).⁷⁵

	Heathrow current	Gatwick current	LHR-NWR /LHR-ENR	LGW-2R
Within 1 hour	9,660,000	9,000,000	10,550,000	9,320,000
Within 2 hour	20,300,000	17,710,000	35,560,000	18,580,000

Table 1 – Accession Analysis

Q2. Do you have any suggestions for how the short-listed options can be improved?

We suggest the Commission reviews the additional benefits to airport passengers and employees provided by our Heathrow Hub interchange proposal (LHR-HStn).

The Commission notes this is “*designed to meet a number of objectives, such as improved access times for passengers from the West and South West of England and Wales, the dispersion of traffic on the M25 and the potential to open up a wider number of direct destinations from Heathrow.*”⁷⁶ It also recognises the benefits of an “*integrated interchange allowing for connections to a large part of the country from what is, in essence, an extension of the airport site*”⁷⁷

We agree with the Commission's assessment that “*the scheme's success would be dependent upon passengers being willing to accept the hub station as a part of the airport itself.*”⁷⁸

The LHR-HStn proposal is modelled on the highly successful intermodal air/rail interchanges at, for example, Schiphol, Charles de Gaulle and Frankfurt. Because of its site outside the constraints of an existing airfield, it would provide an even more seamless connection between road and rail ground transportation and the airport.

The passenger experience and benefits of LHR-HStn are enhanced by developments in passenger and baggage processing systems. The reports in **Appendices D-4 and D-5** describe these in more detail. LHR-HStn would fully address the surface access demands of those passengers and staff who currently, have difficulties in accessing sustainable public transport modes to Heathrow.

⁷³ Figure 23, Surface Access, Gatwick Airport Second Runway, Jacobs

⁷⁴ www.hs2.org.uk/about-hs2/facts-figures/connecting-britain

⁷⁵ Appendix D-2 Heathrow and Gatwick Accessibility Analysis

⁷⁶ Para 3.80, Consultation Document

⁷⁷ Para 3.81, Consultation Document

⁷⁸ Para 3.81, Consultation Document

It is clear that when LHR-HStn is included in the comparative assessment, it performs better than any of the LGW-2R, LHR-NWR, or LHR-ENR surface access schemes assessed by the Commission.

The inclusion of LHR-HStn has the effect of changing our assessment as shown below.

Relative comparison of LGW-2R, LHR-NWR, LHR-ENR proposals against Commission objectives⁷⁹

Proposal	Surface Access			Relative overall comparison
	AC Objective 1 Maximising the use of sustainable modes of transport	AC Objective 2 Accommodating the needs of other users	AC Objective 3 Enabling access to the airport from a wide catchment	
LGW-2R				
Summary				
LHR-NWR				
Summary				
LHR-HStn				
Summary				

The LHR-HStn strategy is compatible with both LHR-NWR and LHR-ENR. It includes an intermodal rail and road interchange located on the Great Western Main Line (GWML) just to the north of the airport. This provides check in and bag drop facilities, connected to airport satellites and terminals by baggage systems and a fast, frequent and direct APM (Automated People Mover), similar to that in use at many airports worldwide. Heathrow would be served by the national rail network for the first time, with direct access from all points of the compass as shown in the diagram below.

⁷⁹ Assumes the LHR-HStn (Hub interchange) proposal

Accessibility / catchment – see also Appendix D-2

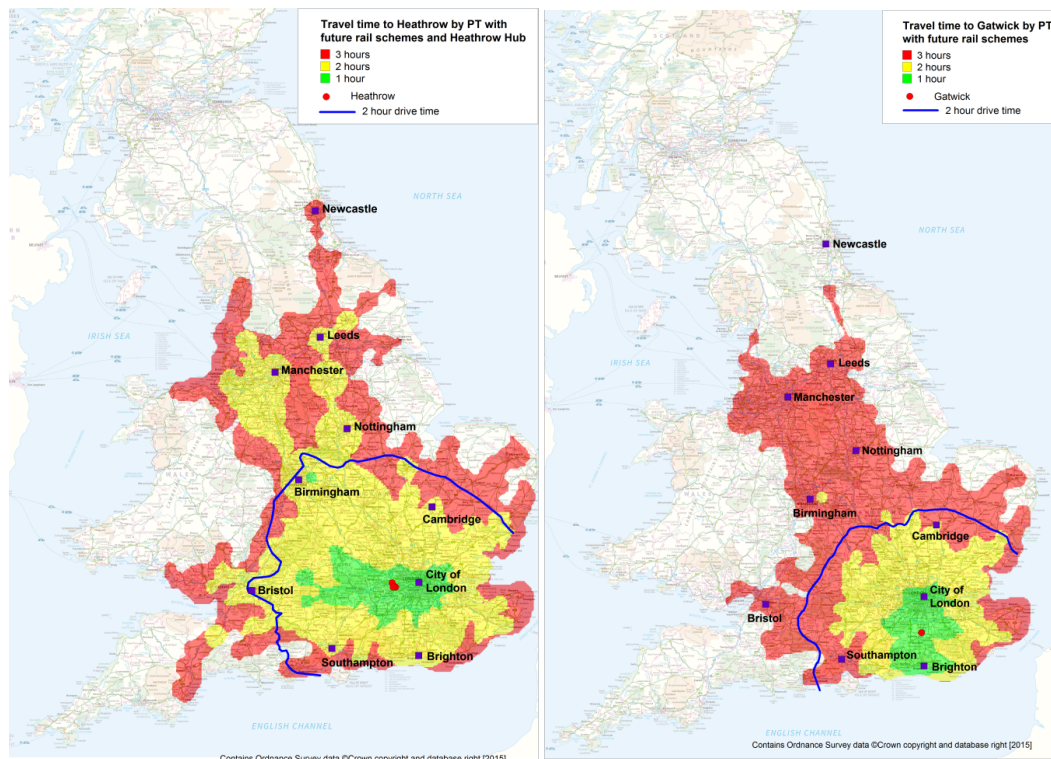
LHR-HStn provides fast, frequent and direct rail access, avoiding the impact of interchange penalty in suppressing demand, whereas Western Rail Access to Heathrow (WRaTh) requires all passengers west of Reading to interchange between rail services overall adding some 30-40 minutes (additional journey time from Reading – Heathrow and interchange time) to each journey plus the inconvenience.

There is wide recognition of passengers' particular sensitivity to interchange in an airport access journey. Star Alliance, the world's largest airline group, state *"research, and our experience, clearly*

⁸⁰ Para 2.2.3 Business Case and Sustainability Assessment, LHR-ENR Airports Commission

shows that even one interchange in an airport access journey acts as a significant disincentive to choosing rail”⁸¹.

Our analysis using Accession software and including the infrastructure in the LHR-HStn strategy shows significant differences from the Commission’s assessment,



Demand / Business Case – see also Appendix D-3

The consultation does not present demand forecasts for LHR-HStn on the same basis as for WRAtH and appears misleading. The consultation suggests that WRAtH will attract 12% of airport total rail demand⁸² which equates to some 3.5mppa and accepts that LHR-HStn attracts nearly twice as many passengers in the Great Western corridor as WRAtH. However, the LHR-HStn demand in the Great Western corridor is stated as only 1.5mppa⁸³.

Our forecasting methodology has validated demand for WRAtH and estimates that LHR-HStn attracts 50% more airport passengers. This equates to a 5% increase in the total number of passenger travelling to the airport by rail – far greater than the 1% stated in the consultation⁸⁴.

⁸¹ <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmtran/writev/rail/rail3.pdf>

⁸² Para 3.4.10, Surface Access, Heathrow Airport Northern Runway Extension, Jacobs

⁸³ Table 4-7, Surface Access, LHR-HStn Station Option, Jacobs

⁸⁴ Table 4-8, Surface Access, LHR-HStn Station Option, Jacobs

By increasing rail's mode share, LHR-HStn could also reduce road demand and provide some of the mitigation which the consultation recognises may allow a reduction in the scale and cost of highway works,⁸⁵ and which it suggests requires further study.⁸⁶

Perceived journey time dis-benefits to non-airport passengers as a result of stopping trains at LHR-HStn influenced the Commission's view that its appraisal should be conducted based on an "on-site" surface access strategy (WRAtH) even though a full cost benefit comparison was not undertaken.⁸⁷ However the comparable dis-benefits to non-airport passengers of approximately doubling the number of trains stopping at Gatwick Airport station has been ignored in the assessment of LGW-2R.⁸⁸

We have undertaken an initial comparison of the relative business cases for WRAtH and LHR-HStn, which shows that LHR-HStn has a Benefit Cost Ratio (BCR) of 4.5:1 - nearly twice that for WRAtH. When treated in the same way as Gatwick's rail proposals – no dis-benefit to non-airport passengers from stopping trains at the airport station – the LHR-HStn rail business case increases further with a BCR of nearly 5.5:1.

Costs – see also Appendices D-1 and D-2

The capital cost estimates presented in the consultation appear to be inconsistent and in our view should be re-assessed to enable any meaningful comparison.

Two examples are given below

- WRAtH is quoted at £500m and Southern Access to Heathrow from Staines (SAtH) (Staines) is quoted at £809m (including Optimism Bias).⁸⁹ This appears inconsistent given that WRAtH consists of c5.5km of twin bore tunnel, a major grade separated junction with the four track Great Western Main Line and reconstruction of Langley station whilst SAtH consists of c4.5km of at-grade railway with a flat junction with the Windsor line.
- The LHR-HStn APM from the Hub Interchange to the airport terminal (T5), on an elevated structure shorter than the WRAtH route, is costed in the consultation at £1.16bn (including Optimism Bias).

The consultation includes all the costs of LHR-HStn including highways, car parking etc in comparing costs with WRAtH90 but because no business case comparison appears to have been carried out, none of the benefits, i.e. parking revenues etc. have been taken into account. Our business case analysis referred to above therefore identifies those costs that are directly related to the rail station element of the interchange and its passenger and baggage connections to the airport. This reduces the attributable Hub station rail costs to £1.2bn, and it is this figure that should be compared with the WRAtH cost estimate.

⁸⁵ "Additional widening on the M4 (which) it may be possible to avoid or reduce through mitigation measures" Para 3.79 Consultation Document

⁸⁶ The consultation recommends that "more detailed analysis is undertaken to determine whether other methods of increasing capacity are more suitable" Para 5.5.6, Surface Access – LHR-ENR, Jacobs

⁸⁷ "Offset against (the benefits) would be .. an increase in journey times for non-airport passengers on the Great Western Main Line" – Para 3.80 Consultation Document

⁸⁸ Para 3.2.3, Surface Access, Gatwick Airport Second Runway, Jacobs

⁸⁹ Table 18, Surface Access, Heathrow Airport Northern Runway Extension, Jacobs

⁹⁰ Table 5-1, Surface Access, LHR-HStn Station Option, Jacobs

Resilience and Capacity – see also Appendix D-1

LHR-HStn maximises the uses of available rail capacity by applying a standard fare to future rail services using Heathrow Express (HEX) paths on the Great Western Main Line. This almost trebles the HEX mode share, and provides relief to Crossrail and the Piccadilly Line as well as a much more balanced patronage of rail passengers to Heathrow⁹¹.

LHR-HStn also increases resilience still further compared to the consultation's assumed rail schemes for LHR-NWR/LHR – ENR as it provides a valuable alternative should the Heathrow central spine railway (T5-Central Terminal Area) be blocked or disrupted.

LHR-HStn also provides more resilience to the highway network as the interchange provides an alternative airport access point, enabling highway users from the M4 (West) and M25 (North) to avoid the most congested section of the M25 between junctions 15 & 13.

Southern Access to Heathrow (SAtH) – see also Appendix D-6

In addition to the Heathrow – Waterloo service considered in the consultation, the LHR-HStn strategy includes a new fast connection from Heathrow to Woking, via a new route adjacent to and twinned with the M25 corridor, avoiding the problems encountered by BAA's previous Airtrack scheme.⁹² Network Rail are currently undertaking the SAtH study for the DfT and their outputs are intended to feed into the Airport Commission's final report.

We have undertaken an analysis using TfL's Railplan and HAL's LASAM models which clearly shows that combining the Woking service with Heathrow Express paths, as a through cross-airport service, gives major benefits both in terms of the financial performance of the route and relief to the highly congested South West Main Line into Waterloo.

Q3. Do you have any comments on how the Commission has carried out its appraisal?

No additional comments

Q4. In your view, are there any relevant factors that have not been fully addressed by the Commission to date?

No additional comments

⁹¹ Table 27, Surface Access, Heathrow Airport Northern Runway Extension, Jacobs

⁹² <http://ww3.wandsworth.gov.uk/committ/documents/s26622/13-134%20South%20London%20-%20Heathrow%20Rail%20Link.pdf>

Q5. Do you have any comments on appraisal of specific topics

The components of surface access identified by the Commission's consultants for LGW-2R, LHR-NWR and LHR-ENR appear to be based on different criteria for the inclusion or otherwise of infrastructure improvements and a different basis for the quantification of costs. The presentation of this information, particularly between LGW-2R and LHR-NWR/LHR-ENR, is thus misleading which suggests the need for a re-assessment of the cost and benefits of all surface access schemes.

Accessibility – see also Appendices D-1 & D-2

The correct measure of catchment for any airport should be the total population within a certain timeframe, not the increase in population as a result of schemes in the extended baseline, as presented in the consultation. In reality the two hour catchment is the most important, and is used by the CAA, because once access times become greater, the attractiveness of other airports such as Manchester become a significant factor. When corrected for anomalies the 2hr catchments for Heathrow are actually nearly twice that for Gatwick and not similar as the consultation suggests.

The consultation also recognises that *“passengers enjoy benefits associated with greater frequency – so being more likely to be able to travel at their preferred time – and access to a greater range of destinations without having to transfer”*⁹³

Highways – see also Appendix D-1

The consultation uses different criteria for the evaluations: Major additional highway works on the M4, costed at more than £2bn⁹⁴, have been included for LHR-ENR/LHR-NWR on the basis of airport traffic being assessed as responsible for tipping sections of the M4 over the volume to capacity (V/C) trigger ratio of 85%,⁹⁵ in some instances by only 1% - equivalent to approximately 40 vehicles in the peak hour. However, it is ignored for LGW-2R when airport traffic is forecast to have a similar impact on the M23 & sections of the M25⁹⁶.

The cost estimates for LGW-2R also appear to have been carried out using Lower Bound costs⁹⁷ and those for LHR-ENR/LHR-NWR Upper Bound costs^{98 99}. Comparing LGW-2R and LHR-ENR/LHR-NWR on a like for like cost basis and with the correct scope would reduce the highways cost estimate for Heathrow expansion from £5.3bn¹⁰⁰ to approximately £1.8bn.

Rail – see also Appendix D-1

Given the extensive new rail services and increased connectivity it is easy to understand how the LHR-NWR/LHR-ENR proposals produce a mode shift of 15% to rail. Indeed it is surprising that a greater mode shift to rail is not forecast from London given the addition of Crossrail and Southern Access.

⁹³ Para 2.2.3 Business Case and Sustainability Assessment, LHR-ENR Airports Commission

⁹⁴ Table 39: Surface access capex breakdown, LHR-ENR – Cost and Commercial Viability: Financial Modelling Input Costs, PwC

⁹⁵ Table 14, Surface Access: Heathrow Northern Runway Extension, Jacobs

⁹⁶ Table 14, Surface Access: Gatwick Second Runway, Jacobs

⁹⁷ Table 17, Surface Access: Gatwick Second Runway, Jacobs

⁹⁸ Table 16, Surface Access: Heathrow Northern Runway Extension, Jacobs

⁹⁹ Table 18, Surface Access: Heathrow North West Runway, Jacobs

¹⁰⁰ Table 39: Surface access capex breakdown, LHR-ENR – Cost and Commercial Viability: Financial Modelling Input Costs, PwC

The extended baseline for LGW-2R relates primarily to capacity increases on the BML. However there appears to be little to underpin the claim of a rail mode share increase of 7% for LGW-2R; the only new routes are to Cambridge and Peterborough.

LGW-2R proposals include approximately doubling the number of trains stopping at Gatwick Airport compared with today which will have a significant potential dis-benefit to non-airport passengers but has been ignored within the consultation's analysis. In contrast, a monetised dis-benefit was applied to the LHR-HStn analysis and was a significant factor in the Commission's decision to adopt WRAtH as the preferred rail scheme.

The analysis for LGW-2R only considered additional airport passengers as a result of a second runway and their impact on non-airport rail users, whereas the analysis of LHR-NWR/LHR-ENR considered total airport passengers (both existing and additional from a third runway). Air passengers constitute a very low proportion of the total forecast rail volumes and LHR-NWR/LHR-ENR has less impact on the wider rail network and non-airport passengers than LGW-2R.

The consultation also appears to contain significant discrepancies in the costing of rail schemes. The cost estimate for WRAtH is stated as a Network Rail Grip 2 cost of £500m for a scheme that in broad terms consists of approximately 5.5km of twin bore tunnel running north west from the Heathrow T5 station and a grade separated junction with the Great Western Main Line to the west of Iver. Southern Rail Access from Heathrow T5 to Staines consists of approximately 4.5km of at grade railway a flat junction with the Windsor – Staines line and an extra bay platform at Staines, for which the consultation estimates a cost of £808m including Optimism Bias (OB). These appear fundamentally inconsistent

No costs have been included for any LGW-2R extended baseline rail schemes even though none of the schemes have been committed to or funded. Indeed Network Rail confirms these are at a very early stage of development and hence no cost estimates have been developed. This constitutes a major risk to the delivery of the LGW-2R rail strategy, particularly as all schemes are required to provide the necessary capacity for airport expansion. In contrast a capital cost of £809m is included for Southern Rail Access in LHR-NWR/LHR-ENR costs even though the scheme is included in the extended baseline¹⁰¹ and Network Rail are undertaking a specific study on the project.

¹⁰¹ Para 4.1.1.1, Surface Access: Heathrow Airport Northern Runway Extension, Jacobs

Criterion E - Local Environment and Community

This Criterion covers the following modules within the Commission's Appraisal Framework; paragraph numbers in brackets relate to the Commission's Consultation Document.

- 3 - Local Economy (see 3.22-3.25/3.72-3.75/3.127-3.130)
- 6 – Air Quality (see 3.87/3.139-3.140)
- 7 - Biodiversity (see 3.35/3.88/3.140)
- 8 - Carbon (see 3.67/3.122)
- 9 - Water and Flood Risk (see 3.35/3.88/3.140)
- 10 - Place (see 3.5/3.56/3.111 and 3.35/3.88/3.140)
- 11 – Quality of Life (see 2.61-2.62/3.91/3.142)
- 12 - Community (3.36-3.38/3.89-3.91/3.141-3.142)

Summary

The Commission has produced a substantial volume of work on the remaining assessment areas of Local Economy, Air Quality, Biodiversity, Carbon, Water and Flood Risk, Place, Quality of Life and Community and the summary necessarily selects from this. The limited space afforded to the results of these topic assessments within the summary reinforces the broad conclusion that these, whilst important, are on-balance neutral overall or are capable of being mitigated within the framework of the options under consideration.

The quantum of environmental mitigation required is usually a function of the footprint of the scheme and in this respect LGW-2R and LHR-ENR are similar, with LHR-NWR covering more land, taking more properties and disrupting more communities and businesses than either of the other options.

Q1. What conclusions, if any, do you draw in respect of the three short-listed options?

Our principal conclusion is that the environmental impacts, assessed in these modules, of LHR-ENR are lower than those of LHR-NWR and fully capable of mitigation.

Our other conclusions on the Commission's appraisal of the three short-listed options are:

- While we broadly understand the Commission's approach to assessment of local economy, community, and quality of life assessments (as summarised in Tables 2.12 of the Business Case and Sustainability Assessments for each of the three schemes) we are surprised that this appraisal is showing the same impacts for LHR-ENR and LHR-NWR. The LHR-NWR scheme clearly has greater negative local community impacts, with considerably more homes lost than LHR-ENR (783 against 242 on the Commission's assessment) and more communities significantly affected (including Harmondsworth, Longford and Sipson). We suggest that the appraisal explicitly takes this in to account, either by for example changing LHR-NWR's appraisal to a dark red or taking a refined appraisal approach to recognise this important difference.
- The Commission concludes for all options under consideration that existing housing policies in the adjacent areas are capable of meeting the challenge of providing the additional housing required.
- The Commission is continuing its work on Air Quality on the basis that mitigation of all schemes is feasible.
- The biodiversity, carbon and flood risk impacts can be mitigated within the framework of the shortlisted options. The quantum of mitigation required is fundamentally a function of the footprint of the scheme and in this respect LGW-2R and LHR-ENR are similar with LHR-NWR covering more land, taking more properties and disrupting more communities and businesses than either of the other options. The summary document does not make clear the difference in land occupied by the two shortlisted options at Heathrow. LHR-NWR is assessed as 906ha and LHR-ENR as at most 724 ha (and probably less) when the Consultants' work is interrogated in detail. This is clarified in **Appendix E-1**.
- The point concerning impact on local communities also applies to the Commission's Quality of Life assessment – that is it should acknowledge that the local negative quality of life impacts of LHR-NWR are more severe than LHR-ENR.

Q2. Do you have any suggestions for how the short listed options could be improved; i.e. their benefits enhanced or negative impacts mitigated

The design imperative of LHR-ENR was to limit land take to the minimum and use land under the existing approaches which has limited other use. It is this focus on this aspect of the scheme that limits the impact in respect of Local Environment. The Commission's appraised option, without the Heathrow Hub interchange (LHR-HStn), provides the core functionality for the airport in a compact site.

The addition of the LHR-HStn site would increase the land take but not by the full extent of its footprint as the Commission's option includes land for car parking which would otherwise be provided at the interchange site. Benefits would include dispersed surface access, reduced reliance on road based transport, improved air quality, wider connectivity and the like. The option to include this depends on whether these benefits outweigh local and other impacts.

Q3. Do you have comments on how the Commission has carried out its appraisal?

There are some differences in matters of detail in how the appraisals have been carried out, but these do not affect the conclusions when appropriate comparisons are made. These are noted in **Appendices E1-E7** for reference.

We note that the commission makes reference to our arguments around the flexibility in the local economy over time to accommodate growth by economic activity shuffling around to allow more location specific and higher value activities to focus near Heathrow and other activities to locate further away.¹⁰² We suggest that the Commission takes more explicit account of this in its local economy assessment, for example by extending it to include the London Boroughs of Brent and Hammersmith & Fulham, where the significant development opportunities of Old Oak and White City are partly located.¹⁰³

Q4. In your view, are there any relevant factors that have not been addressed by the Commission to date?

We believe the major factors have been considered by the Commission. Detailed comments are set out in **Appendices E1-E7**.

Q5. Do you have any comments on how the Commission has carried out its appraisal (16 Appraisal Modules), including methodology and results?

The following sections set out our headline comments on the Appraisal Modules.

Local Economy, Community and Quality of Life

While we broadly understand the Commission's approach to assessment of local economy, community, and quality of life assessments (as summarised in Tables 2.12 of the Business Case and Sustainability Assessments for each of the three schemes) we are surprised that this appraisal is showing the same impacts for LHR-ENR and LHR-NWR. The LHR-NWR scheme clearly has greater negative local community impacts, with considerably more homes lost than LHR-ENR (783 against 242 as assessed by the Commission) and more communities significantly affected (including Harmondsworth, Longford and Sipson). We suggest that the appraisal explicitly takes this in to account, either by for example changing LHR-NWR's appraisal to a dark red or taking a refined appraisal approach to recognise this important difference.

Further details are contained in **Appendix E-2**.

The Commission notes the potential impact of construction traffic on the local environment and communities.¹⁰⁴ However we suggest that its assessment should also consider the potential for the Colnbrook freight branch to reduce the environmental impacts of construction traffic related to Heathrow expansion through delivery of materials and removal of waste by rail. This was a condition of the planning consent for Heathrow T5.¹⁰⁵ LHR-ENR allows the branch to be retained, with safeguarding to allow potential capacity enhancements, but LHR-NWR would appear to require its closure.

¹⁰² Para 3.106, Consultation Document and Paras 2.6.3 and 2.6.4, HHL/RIL's May 2014 submission to the Airports Commission

¹⁰³ Para 2.6.5, HHL/RIL's May 2014 submission to the Airports Commission

¹⁰⁴ Para 3.4 and Table 5.30, Place: Assessment, Jacobs

¹⁰⁵ <http://www.slough.gov.uk/moderngov/documents/s9995/d%20P-12244-007%20e.pdf>

Air Quality

The Commission acknowledges that additional work is required to identify the precise interaction between the various sources of pollution. We agree that such modelling is required to determine specific issues. We are pleased that the Commission has confirmed that in principal air quality impacts can be mitigated through implementation of the various measures proposed.

Further details are contained in **Appendix E-3**.

Biodiversity

The methodology used by the Commission's consultants for the biodiversity assessment is clear and consistent and the conclusions are broadly similar. There is some discrepancy with regard to calculations of habitat loss and replacement habitat required, however these are minor and would be finalised at a more detailed design stage.

The one area of disagreement is with regard to bird strike and the conclusion in the Commission's assessment that the impacts associated with the mitigation measures required to reduce the risk of bird strike during operations will be highly adverse. We would dispute this finding on the basis that aircraft flying over the reservoirs and gravel pits to the west of the airport are at an altitude of 300m and above; at this height the risk of bird strike would remain unchanged and mitigation measures would not be required.

Further details are contained in **Appendix E-4**.

Carbon

The methodologies employed by the Commission's and our consultants differ, however the conclusions in terms of projected carbon emissions are broadly similar. The consultation concludes that LHR-ENR scores better than both LHR-NWR and LGW-2R in terms of surface access and airport operations. In terms of construction carbon footprint the two Heathrow schemes do not differ substantially

The differences in methodology are examined in further detail in **Appendix E-5**

Water and Flood Risk

Volume calculations and the topography of the area support the position that the scheme is viable without significant residual risk and discussions with the Environment Agency confirm that this conclusion is based on suitable planning policies and a robust methodology.

There are a number of matters of detail within the assessment where specific comments are appropriate. For example, the interaction between ground water and surface water is understood and the proposals would include lining of flood attenuation areas and making use of the volume of the embankments above existing ground level to store and attenuation flows from the airfield.

These are set out in **Appendix E-6**.

Place

The Place Module considers heritage, townscape, landscape & waterscape, and waste. None of these topics are considered to be key differentiators and it is important to note that our assessment was at a level appropriate with a concept design appraisal, with the clear rationale of identifying and mitigating any significant impacts.

The methodological approaches taken by the Commission's and our consultants were different and there are a number of areas where we do not agree with the overall approach, level of receptor sensitivity or value stated in the consultation, receptors identified and/or level of assessment detail. Notwithstanding all these difference of detail, the conclusions are broadly similar.

These details and discrepancies are covered in further detail in **Appendix E-7**.

Q6 Do you have any comments on the Commission's sustainability assessments, including methodology and results?

There may be matters of detail between our assessments and those of the Commission, but where applied consistently and the correct conclusions drawn we are in broad agreement. These differences are considered in further detail in the relevant topic **Appendices E-1 to E-7**.

Q7. Do you have any comments on the Commission's business cases, including methodology and results?

There are no significant comments. Any detailed matters are contained in **Appendices E1-E7**.

Q8. Do you have any other comments?

Community Engagement

As part of the development of our scheme we have continued our process of Community Engagement. The details of this work are presented in **Appendix E-8**.

Principal consultants and advisors to Heathrow Hub Ltd/Runway Innovations Ltd



Lead technical consultant - URS/AECOM



Cost consultant – Gardiner & Theobald



Safety and noise consultant – Helios



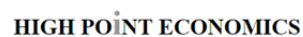
Noise consultant – Clarke Saunders



Rail consultant – First Class Partnerships



Aviation economics consultant – RDC Aviation



Regulatory consultant – High Point Economics



Economics consultant – Oxford Economics



Programme management – Gleeds



Masterplanners – Güller & Güller



Public affairs – Maitland



Public consultation – Quatro



Legal advisors – Nabarro



Intellectual Property advisors - Mathys & Squire

HHL/RIL also acknowledge the specialist assistance of CAA ERCD who operate the UK civil aircraft noise model (ANCON) on behalf of the Department for Transport and as such are obliged to undertake assessments for any customer on a fee for service basis. As HHL/RIL's subcontractor, the CAAs involvement was limited to aviation noise modelling, using the UK aircraft noise model (ANCON), of airport scenarios and assumptions provided by HHL/RIL. The CAA provided no input into the development of these scenarios and assumptions, and has neither supported nor opposed the appropriateness of them. This impartial approach has been consistently taken with all sponsors requesting noise modelling from the CAA of their proposals to the Airports Commission



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