Appendix C: Noise and Vibration – District and Borough Profiles

Mole Valley District Council - Impacts and Mitigations

Construction Phase

Construction Summary Position

Positive

There are no anticipated positive impacts on noise and vibration during construction under the existing proposals.

Neutral

There are no anticipated neutral impacts on noise and vibration during construction under the existing proposals.

Negative

There are a number of anticipated negative impacts on noise and vibration during construction under the existing proposals for the district and proposed mitigation is currently insufficient.

Construction Noise: Core Working Hours Issues and Impacts

Although Mole Valley communities will not experience the same level of noise impacts from construction as those most closely located to where development is taking place, they are not unaffected and complaints relating to night time noise and evening or early morning activities are still likely to be justified and remain a concern.

One such concern relates to the operating hours of the construction works which The Code of Construction Practice (CoCP) (APP-082) proposes to extend (paragraph 4.2.5) and states that operating hours will be as follows:

"Outside the airport boundary, the core working hours will be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 07:00 to 13:00 on Saturdays".

Section 4.2.6 goes on to state there will be an additional hour at the beginning and end of the day for work unlikely to cause a nuisance and specifies the work as loading and unloading of lorries and if this takes place in the early hours of the morning or late at night these activities are highly intrusive. Movements of HGVs in and of themselves generate high levels of noise Government Policy, the NPSE requires such intrusive noise to be mitigated and minimised.

The proposed working hours in the COCP are unacceptable to Mole Valley DC.

MVDC expects standard off airport operating hours to be limited as follows, with one hour either side for mobilisation and low impact work as detailed in paragraph 4.2.6 of the COCP:

08:00 to 18:00 weekdays
08:00 to 13:00 Saturdays

Construction Noise: LOAEL and SOAEL Issues and Impacts

It is noted that the level of any noise impacts will depend upon the LOAEL and SOAELs that are applied. However, the SOAEL noise levels stated in Para 5.9.11 of the CoCP are insufficiently justified for all locations and are not accepted. Furthermore and in relation to the extended hours, specific SOAELs need to be determined for the shoulder periods in order to be fully understood and justified.

Long term impacts above the LOAEL and shorter but more intense noise impacts will create significant disturbance even if they are below the SOAEL. It's important that residents have certainty over the duration of works and for this reason the COCP needs to commit to developing and maintaining a suitable Phasing plan for high impact noise.

The DCO should ensure development of a suitable Construction Environmental Management Plan (CEMP) providing much stronger commitments and controls than those currently provided. This should ensure a suitable contractor funded dedicated environmental management team is put in place with responsibility for implementing and maintaining a programme of continuous monitoring of construction impacts in high impact areas. Communities need to have access to environmental data, and be able to record complaints. As part of the DCO a governance board should also be established to share information with other stakeholders.

A detailed programme of implementation of the construction noise insulation scheme should be provided and suitable consideration as to how over heating impacts will be assessed and prevented from compromising the scheme.

Mole Valley does not believe that the proposed management of the impact from the construction phase properly recognises the long duration of the works and the extent of the disturbance and disruption caused. The proposals indicate that the works would last for many months or even years.

The location of sources of construction noise will include but not be limited to, construction compounds, vehicle haul roads and loading/unloading areas which will be determined by necessity as the programme develops. Even areas such as the welfare compound is likely to have fixed plant that can give rise to significant intrusive noise for example from large fixed diesel generators. It is considered that using BS4142 (2019) is a more appropriate assessment method for this type of source at the compounds..

Appendix 14.9.1 of the Construction Noise Modelling [APP-171] presents results of construction noise modelling in terms of the number of properties predicted to experience construction noise levels between LOAEL and SOAEL and the number of properties predicted to experience construction noise levels exceeding SOAEL.

Construction noise predictions are presented in Table 14.9.1 (daytime) and Table 14.9.2 (night-time) of Chapter 14 Noise and Vibration [APP-039]. There is some confusion regarding how these results apply to the construction noise assessment as they do not align with results presented in Table 3.1.2 and Table 3.1.3 [APP-171]. Paragraph 14.9.8 [APP-039] states: *"The daytime SOAEL for residential receptors for construction noise is Leq, 12 hr 75 dB. This level of construction noise is not predicted at any of the representative community locations".* This directly contradicts the identification of daytime exceedances of the SOAEL in paragraph 16.9.26 [APP-039].

Construction noise predictions were undertaken at "…*12 of the 13 baseline noise measurement locations shown in Figure 14.4.1. The Charlwood Road Receptor Area has two receptors 3 and 4, but only 3 is used here*." (paragraph 14.9.5 [APP-039]). This approach does not align with Appendix

14.9.1 [APP-171], which identifies the number of properties affected by construction noise. Some clarification is required as to the receptors used for the construction noise predictions as using monitoring locations as assessment locations does not cover all receptors that may be affected.

No residual exceedances of the daytime construction noise SOAEL are predicted in Mole Valley, however, residual exceedances of the night-time SOAEL are predicted at a property in Lowfield Heath Road. The property would be offered noise insulation to reduce significant effects. This property is within the inner zone for aircraft noise insulation. Details should be provided on the interaction between the proposed construction noise insulation and the proposed aircraft noise insulation.

Residual exceedances of the night-time SOAEL are predicted at five properties on Povey Cross Road within MVDC due to works on the A23 Brighton Road Bridge for approximately 20 nights. As the SOAEL would not be exceeded for a duration of 10 or more days in any 15 consecutive day period or for more than 15 days in any six-month, the properties would not qualify for noise insulation. As such, effects are deemed as not significant despite exceedances of the SOAEL not being addressed.

Construction Noise: Sheet Pilling Issues and Impacts

Clarification is required of construction noise assessment information presented in paragraphs 14.9.5 to 14.9.12 [APP-039] as it does not seem to correlate with the identification of likely significant effects.

No justification is provided for not using location '4' in Mole Valley to assess construction noise effects.

The construction noise assessment assumes that percussive sheet piling would occur at night; however, use of percussive piling is not considered to represent best practice and should only be applied if all other practicable options have been exhausted. This commitment should be included in the CoCP.

Sheet piling locations are identified in Table 14.9.5 [APP-039]. Construction noise effects are not identified at night at A23 Brighton Road Bridge, Network Rail Bridge, South Terminal Roundabout and Longbridge Roundabout. Clarification should be provided as to whether night-time sheet piling is required at these locations.

Detail is required on the number of properties experiencing exceedances of the SOAEL due to sheet piling at night.

Some properties are predicted to experience exceedances of the SOAEL but will not be offered insulation because of the duration of exposure. The residual effect is identified as 'not significant'; However, it must be recognised that when those exceedances occur there will be an adverse impact which needs to managed and monitored.

Alignments and heights of noise barriers used to reduce significant noise effects should be provided and a commitment made to secure provision of these noise barriers.

Construction Vibration: Issues and Impacts

No assessment on vibration effects due to the use of vibratory rollers used during road compaction has been provided.

Vibration effects from percussive sheet piling should be assessed to align with the assumptions in the construction noise assessment.

Mitigation: Construction Vibration

Embedded mitigation measures are detailed in Section 14.8 of Chapter 14 Noise and Vibration **[APP-039]** these include Best Practicable Means, which are secured in the (CoCP) **[APP-082]**.

Table 14.8.1 **[APP-039]** states that "*Use of percussive piling technique have been avoided where practicable*" and the construction vibration assessment has been undertaken assuming vibratory sheet piling. However, there is no commitment to avoid percussive sheet piling in the CoCP **[APP-082]**. The construction noise assessment assumes driven piling, which is not a consistent assumption with the construction vibration assessment.

Construction: Road Traffic Noise

Increases in road traffic noise as a result of construction traffic are identified; however, no significant effects are identified as a result of construction traffic movements. Appendix 14.9.4 **[APP-174]** provides the results of calculations in terms of the change in road traffic noise. No detailed information of baseline flow and construction traffic flows are provided for key road links and no calculations are provided.

In addition, Mole Valley receives frequent complaints of taxi drivers and non-local traffic waiting on public roads in local communities. Given the scale of the project and the rural nature of Mole Valley it is important that offsite parking is strictly controlled. The Construction Transport Management Plan (CTMP) should ensure that there is no need for workers to park on work site locations unless they have a need to use their vehicle to get round the site.

Additional detail on the construction traffic noise assessment should be provided.

Construction Noise: Noise Insulation Issues and Impacts

During the construction phase, it is possible that communities will be impacted by some noise and embedded mitigation measures are detailed in Section 14.8 **[APP-039]**; these include Best Practicable Means, which are secured in the Code of Construction Practice (CoCP) **[APP-082]**. The CoCP also includes a noise insulation scheme and a commitment to obtaining prior consent through the Section 61 process.

Eligibility for the noise insulation scheme is on the basis that predicted or actual noise exceeds any of the relevant thresholds for:

A period of 10 or more days of working in any 15 consecutive days during construction; or
For a total of 40 days or more in any 6 consecutive months during construction.

The key qualifying noise levels are as follows:

- Noise Insulation:

  - Leq 10 hr day 75dB
  - Leq 1 hr night 55dB
- Temporary Rehousing:
  - Leq 10 hr day 85dB
  - Leq 1 hr night 65dB

Further mitigation measures are identified in Section 14.9 [APP-039] , however, it is unclear how the implementation of this specific mitigation would be secured. The CoCP [APP-082] contains details of Best Practicable Means; however, there is nothing specific in the CoCP to secure the assumptions made in the construction noise assessment. Similarly, the locations of noise barriers are not provided nor are the barriers secured in the CoCP or the DCO [AS-004], as such it is not possible to determine the impacts or benefits for MV and reassurances on this are needed.

It is noted that Gatwick have asked for extensive and unlimited derogations under Section 82 (Environmental Protection Act 1990). The extent of these derogations in the DCO far out strip that provided in the planning act and should be restricted to construction and it should be time limited for the duration of the construction work only.

Operational Phase

Operational Summary Position

Positive

There are no anticipated positive impacts on noise and vibration during operation under the existing proposals.

Neutral

There are no anticipated neutral impacts on noise and vibration during operation under the existing proposals.

Negative

There are a number of anticipated negative impacts on noise and vibration during operation under the existing proposals for the district and **proposed mitigation is currently insufficient.**

Operational: Air Noise Issues and Impacts

Mole Valley is already severely impacted by operational aircraft noise and the greatest most significant change in the primary metric is close into the airport 1-2 km west of the airport boundary. The impact here is significant with an increase in noise of 3-6 dB at around 40 properties.

Further away there are no material changes in the primary LAeq metrics from 2019 but there is a significant increase in intrusive noise from increased overflights. This metric increases by an order of magnitude and from operational descriptions during the noise envelop process it is expected that most of this increase will be concentrated in the shoulder period of 06:00 to 07:00 when the impact will be more noticeable just as people emerging from deep sleep.

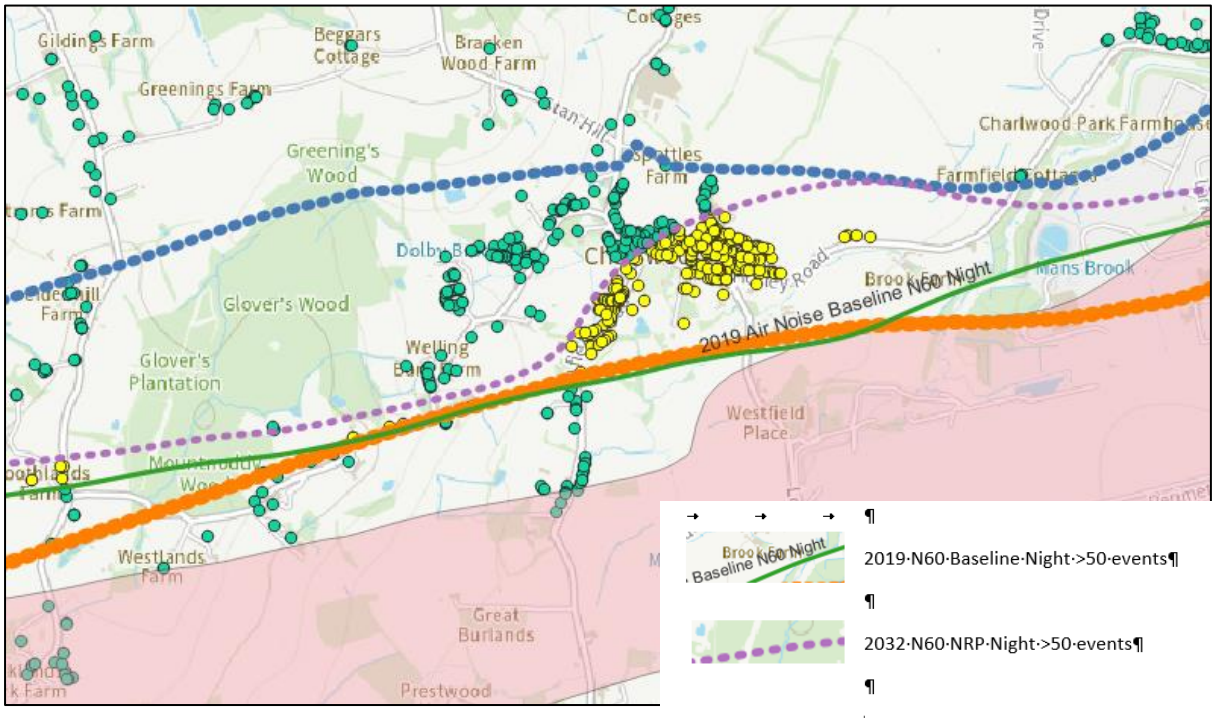
Table MVX1

Location	Metric	Impact		Change In properties Exposed
		2019	**2032**	
Charlwood including *Russhill and Ifield Road*	L_{Aeq8hr}	45	45	No material Change
	$L_{Aeq16hr}$	60	63	Around 30 properties will be exposed to an additional 3dB of Noise
	N60- Base Case versus NRP	50 events per night	50 events per night	Around 250 Additional properties will be exposed to 50 events >60dBA per night*
	N60 Base Case Versus growth as normal with no NRP	50 events per night	50 events per night based on predicted growth without NRP	Around 10 Additional Properties exposed to 50 events >60dBA per night* based on the base case without NRP

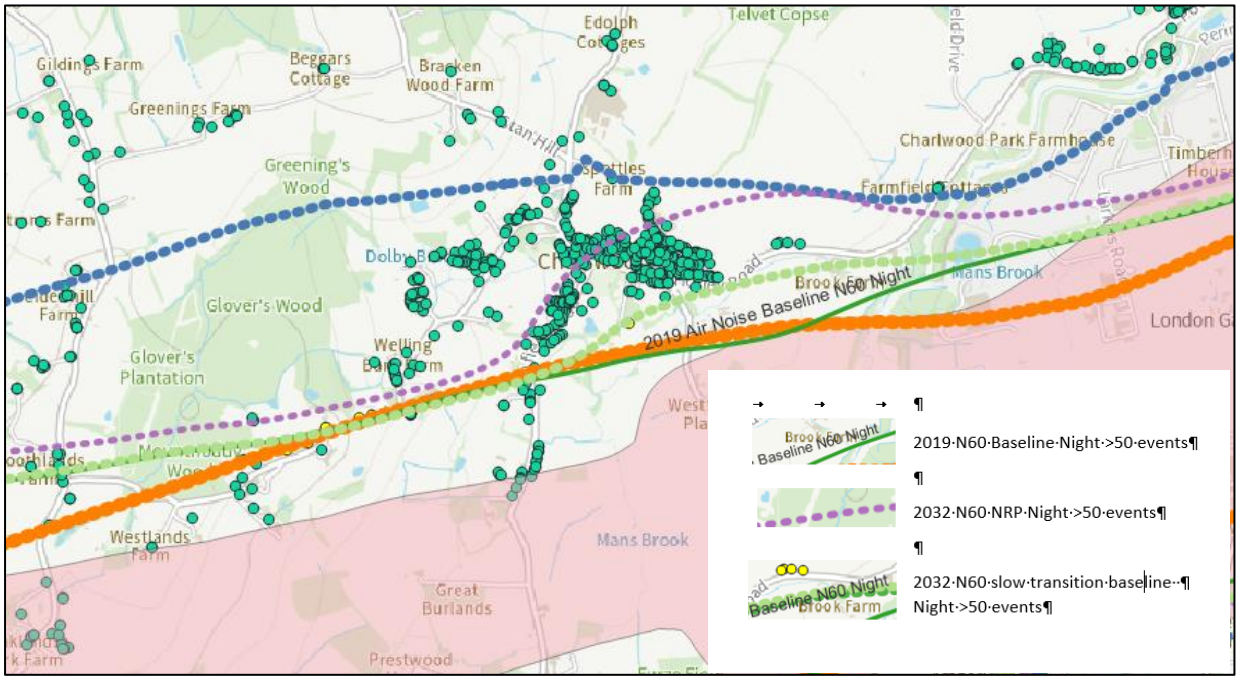
*All of these properties are outside the inner noise insulation zone figure **MV X1**

N60 Events: The table above and the figures below show the additional impacted residential homes which experience more than 50 noise events of greater than 60dBA in the night time period compared to 2019 with and without the Northern Runway project

MV X1 Additional Residential Properties @ Charlwood captured by predicted increasing N60 exposure from 2019 baseline to 2032 operations of the NRP predicted under Slow transition.



MV X2 Additional Residential Properties @ Charlwood captured by predicted increasing N60 exposure from 2019 baseline to 2032 operations under slow transition with no Northern Runway

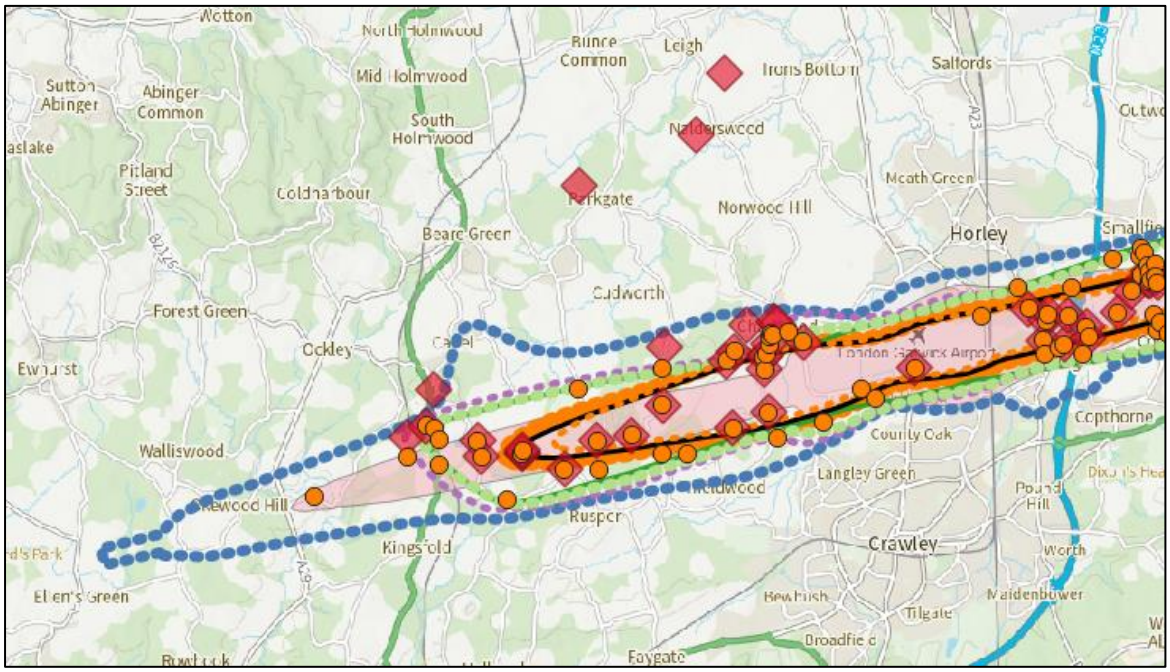


The above plan shows there are a negligible number of properties that are impacted by noise events of greater than 60dBA under the base case with no NRP. It can therefore clearly be seen that in the case of Charlwood the increase in adversely impacted residential properties is entirely caused by introduction of the new northern runway

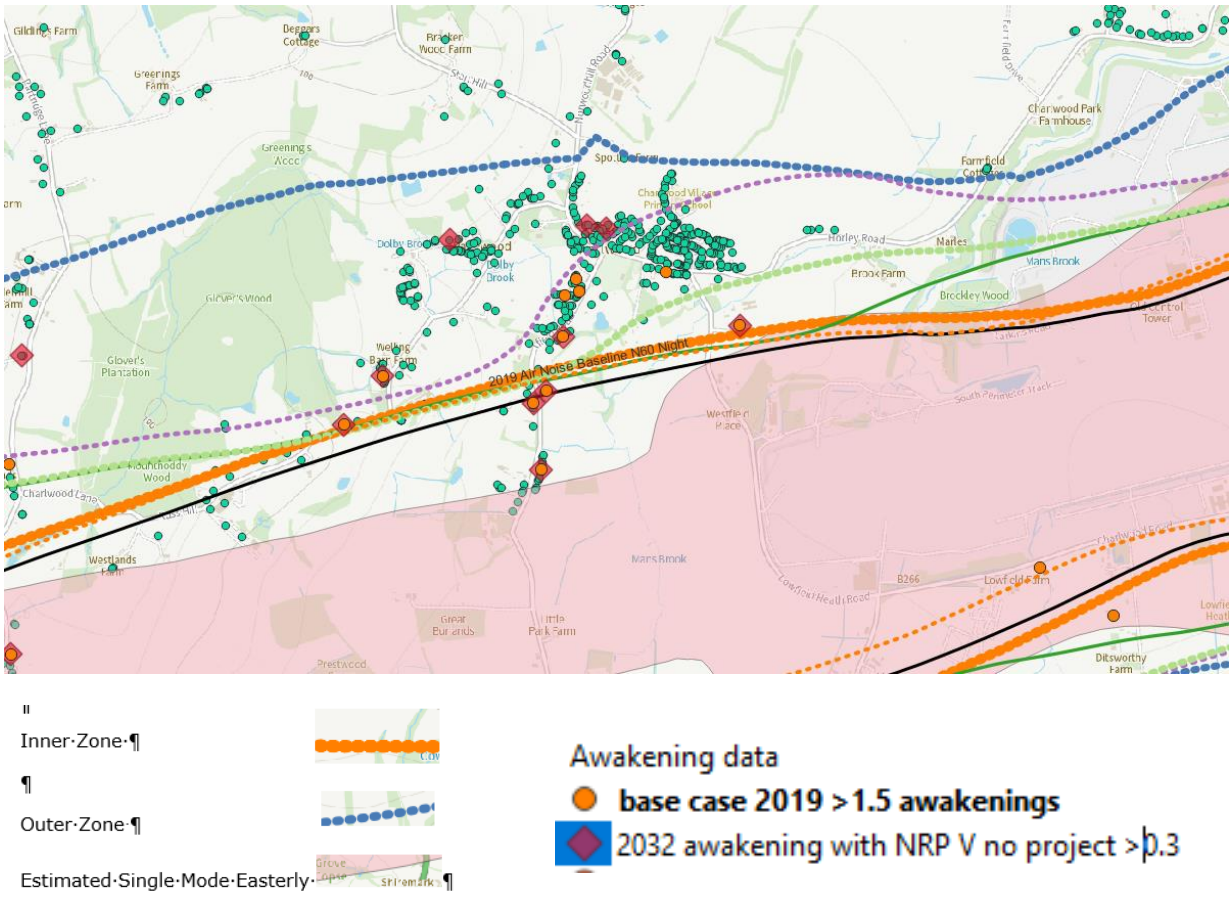
N60 is used as a surrogate for awakening as it is accepted that an open window provides 13 to 15dBA of attenuation and that maximum noise levels of greater than 45dBA* in a bedroom have a measurable impact on sleep

> In Dwellings. The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 dB LAeq for continuous noise and 45 dB LAmax for single sound events**
>
> *Guidelines for Community Noise is the outcome of the WHO- expert task force meeting held in London, United Kingdom, in April 1999 and
>
> ** ProPG Professional Practice Guidance on Planning & Noise explores this further and citing work by Basner and others and putting forward an LAmax fast internal level of 45dBA that should not be exceeded more than 10 times a night in new residential development taking due account of context
>
> ** Basner et al[$] have carried out extensive research on awakening events and Mole Valley considers that awakening events should be used to assess impacts rather than LAeq or N60 which only counts the number of events over an arbitrary threshold rather than considering the overall noise climate
>
> [$]Basner M, Isermann U, Elmenhotrst D et al. Effects of nocturnal aircraft noise (Vol1): executive summary. Deutsches Zentrum FurLuft-und Ruamfarht (DLR) Cologne, Germany 2004:FB2004-07/E; Marks A, Griefahn B, Basner M, Event related awakenings caused bynocturnal transportation noise. Noise Control Eng J 2008; 31:569-77; and, Passchier-Vermeer, Vos H, Stenbeekeers J H M, Van der Ploeg FD,Groothuis-Oudshoorn K. Sleep disturbance and aircraft noise exposure effect relationships. TNO Neterlands 2002: Report 2002.027:1-245.

MVX 3 Awakening patterns for the Mole Valley DC including additional Impacts from Route 4



MV X4 Shows Awakening data provided by GAL for the Charlwood



Awakening Events: The 2019 base case for Gatwick Airport there are already many location within the District where Gatwick's own data (not provided within the ES) shows of more than 1.5 events per night. It should be noted that an additional probability of noise induced awakening of more than 1 per night is already a significant adverse effect.

The NRP increases this to 1.8 worsening an already significantly adverse effects are occurring. Policy requires that mitigation is required to avoid these impacts and therefore the noise insulation scheme should significantly revised.

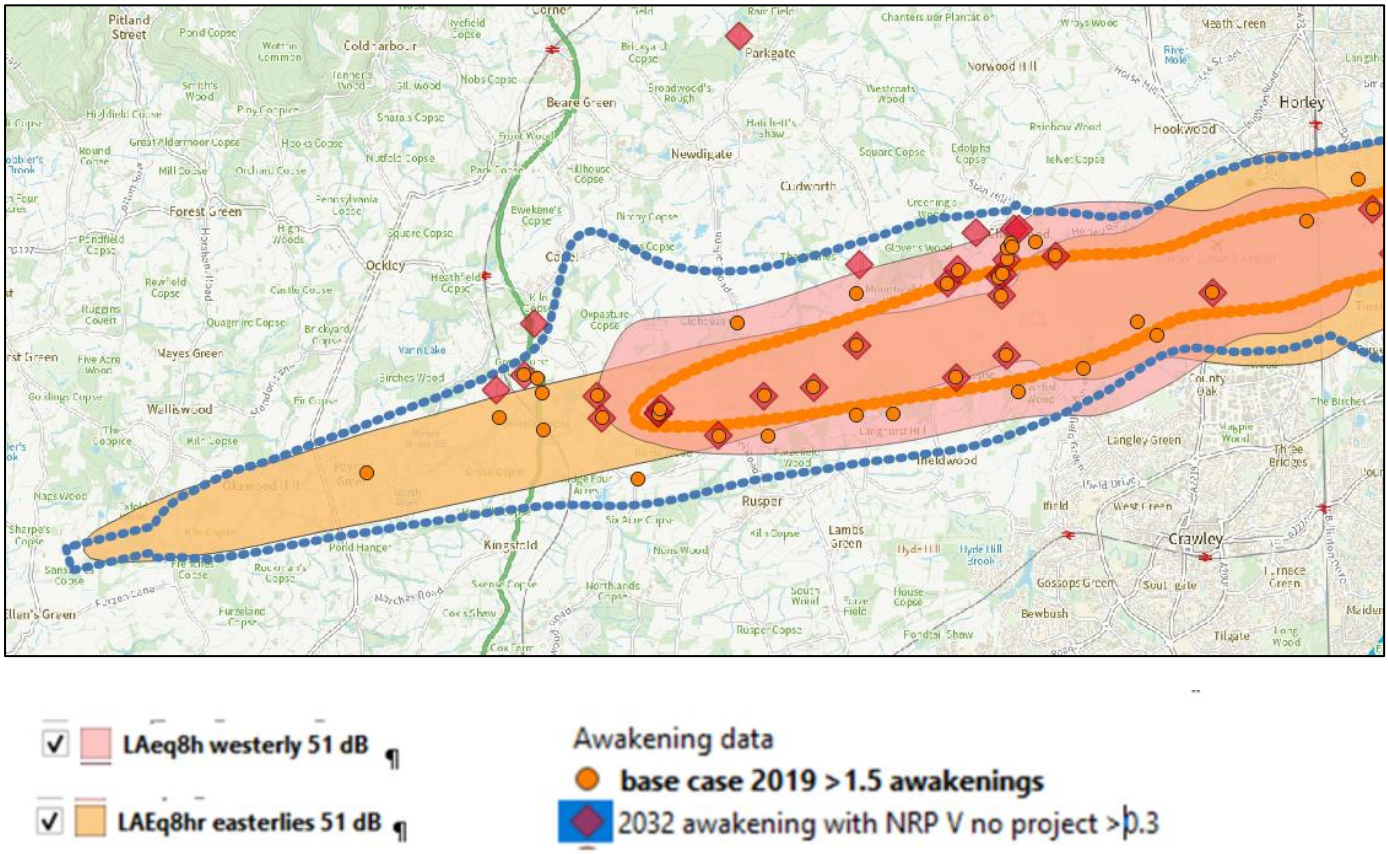
It is estimated that within Mole Valley there are currently just under 1000 residential premises located within the outer insulation zone and approximately 130 properties are within the inner insulation zone. This does not adequately include the awakening effects detailed above.

Single Mode Contours: Within Mole Valley the number of properties exposed to the summer 92 day summer average SOAEL of 60dBA (Aviation 2050) or to the night time noise at 54 LAeq does not change significantly using the 2019 easterly single mode contours as modelled for the purposes of informing this LIR with approximately 113 properties impacted under the single mode operation in easterly operation

Not unreasonably the insulation zone is designed using LAeq but single mode contours help understand this and mole valley is effected by westerly departures and easterly arrivals. Not only does single mode show the properties effected on a single day it also helps provide further information on how the sound insulation scheme should be revised to better inform the mitigation requirements of the adversely impacted residents.

The way the airport operates effects the pattern of daily noise and how it is experienced by local residents and single mode contours, modelled by GAL, will be the most accurate way of portraying those effects and designing an effective noise insulation scheme to avoid significant adverse impacts

Figure MV X5 Shows the Impacts on residents for Single Mode 51 dBA contours during Easterly and Westerly Operations.

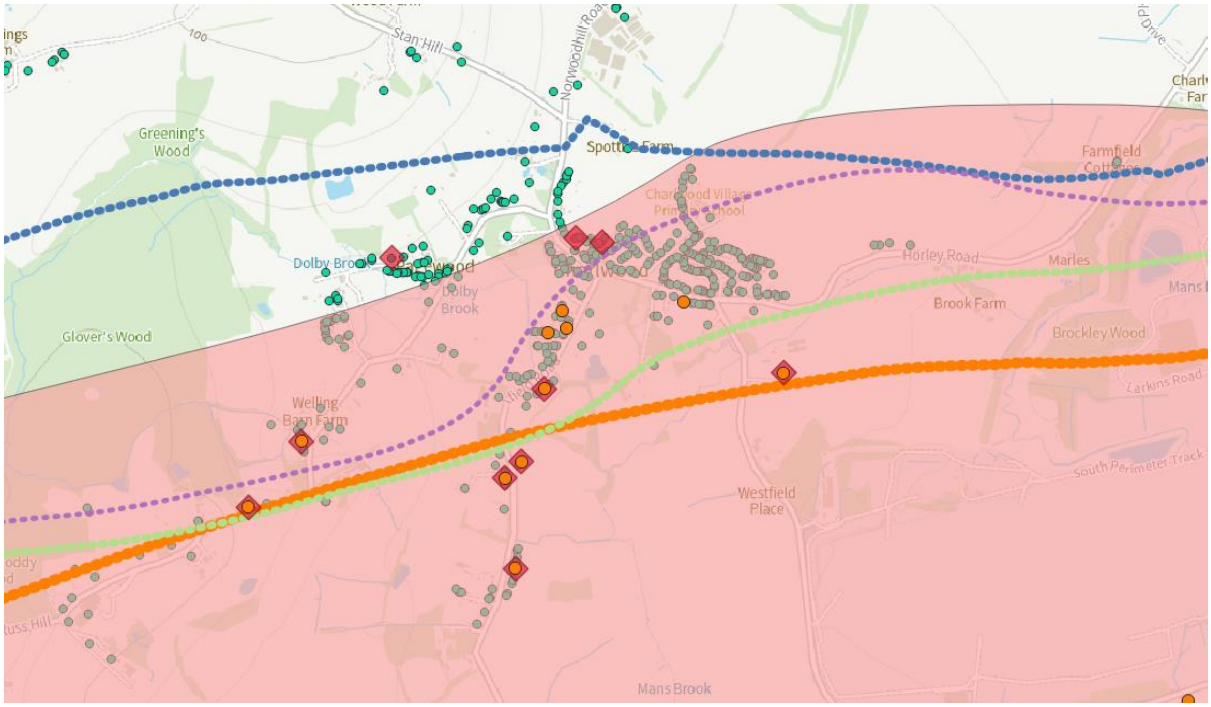


For residents of Mole Valley, when the airport is operating in either westerly or easterly mode, the single mode contours clearly show an increased impact in noise compared with the average mode contours and which is consistent with the awakening data described earlier in the Charlwood area.

GAL provide single mode noise levels for community representative locations (Table 4.2.8 to 4.2.14 of APP-172) so they clearly consider they have some value but this manner of presentation is difficult to understand and provision of a full set of single mode contours would assist local communities in understanding how they are impacted under different modes of operation.

This is because the impact shown by the average mode contours rarely if ever actually happens. On any particular day, the airport operations are either single mode westerly or single mode easterly and when aircraft are taking off or landing the noise has a different impact on those people who actually experience it.

MV X6 Awakening data provided by GAL for the Charlwood overlaid with Westerly single Mode 51dB night contours



The assessment of likely significant effects only accounts for noise effects in 2032, which is identified as the worst-case year. In terms of secondary metrics such as Number Above and Overflights, 2032 is not the worst-case. It would be helpful to have an assessment that covered all assessment years to fully understand the temporal effects to the local population due to the proposed expansion.

The assessment of likely significant effects was undertaken using the primary $L_{Aeq,16h}$ and $L_{Aeq,8h}$ noise metrics. Context was provided to the assessment using the following secondary noise metrics:

- Number Above N65 (day) and N60 (night).
- L_{Amax}.
- Annual L_{den} and L_{night} contours.
- Overflights.

These secondary metrics should have been used for more than just context and should have been used when identifying likely significant effects.

Paragraph 14.9.93 **[APP-039]** identifies that: "*In 2032, the population within the SOAEL Leq, 16 hour day 63 dB contour is predicted to rise from approximately 400 - 500 in the base case to approximately 500 - 600 with the Project, compared against approximately 500 people in 2019. These population counts are rounded to the nearest 100, and are discussed in more detail below*".

There are new properties exposed to daytime $L_{Aeq,16h}$ noise levels above SOAEL than in the 2019 baseline scenario. These properties should be identified.

Paragraph 14.9.112 **[APP-039]** identifies that: "*In 2032, the population within the SOAEL Leq, 8 hour night 55 dB contour is predicted to rise from the range of approximately 900 - 1,100 in the base case to approximately 1,000 - 1,200 with the Project, and remain below the approximately 1,250 people in 2019*".

Figure 14.9.3 **[APP-064]** presents a comparison of the 2032 baseline with the equivalent 'slower transition case' contours; however, the SOAEL 55 dB $L_{Aeq,8h}$ contour is not provided. This contour should be provided along with a suitably scaled image so the extents and the change in SOAEL contour can be understood. A zoomed in view of the daytime SOAEL contours should also be provided for all night-time noise contours.

Primary Metric

Properties identified as experiencing significant noise effects are within the Inner Zone NIS and would be provided with an insulation package. However, it is acknowledged that insulation would not be sufficient to mitigate disturbance in outdoor areas so significant residual effects are identified.

Residual significant noise effects are identified as follows:

- Increase in daytime noise of between 3 and 6 dB at approximately 20 properties on Ifield Road approximately 1 km west of the airport boundary and approximately 20 properties in Russ Hill approximately 2 km west of the airport.
- Approximately 40 properties at Russ Hill and Partridge Lane are predicted to have daytime increases of greater than 1 dB above SOAEL.
- Increase in night-time noise of greater than 1 dB at properties directly to the west of the airport within the night-time SOAEL contour.

Secondary Metric – L_{Amax}

L_{Amax} levels from the A320 were calculated to provide an indication of how they may change as a result of the proposed expansion. The A320 is one of the most common aircraft at Gatwick so was considered suitably representative of typical aircraft noise levels.

A decrease in L_{Amax} levels is discussed in an area east of the airport just beyond Balcombe Road. It should be stressed that this decrease in L_{Amax} is only when a departure from the northern runway is compared to a departure from the southern runway. In reality, there will be no reduction in L_{Amax} noise as the properties are currently exposed to aircraft noise and will continue to be so if the proposed expansion goes ahead.

Identification of decreases in L_{Amax} levels is misleading as L_{Amax} levels will not change as a result of the expansion.

Secondary Metric - Number Above

No figures showing the change Number Above (Nx) contours are provided. This information would be helpful to provide better understanding of the change in Nx contours **[APP-064]**.

Secondary Metric - Annual L_{den} and L_{night} contours.

Annual noise contours have been used to determine if extra capacity would affect noise levels during periods outside of the 92-day summer period. It is hard to draw any meaningful conclusion from the analysis of annual contours. Paragraph 14.9.139 **[APP-039]** identifies that, in 2032, increases in L_{den} contours are the same as the increase in $L_{Aeq,16h}$ noise contours; however, L_{night} contours increase by 11-12%, which is larger than the increase in $L_{Aeq,8h}$ contours. This suggests that there is a larger increase in annual night-time movements than in the 92-day summer period.

Clarification should be provided on seasonality during the annual night-time period and whether a larger increase in contour size warrants any identification of significant effects.

It would be helpful to understand if there are any seasonal variations in movements during other assessment years.

Secondary Metric – Overflights

The discussion on overflights is lacking any kind of information on how communities would be affected by the proposed expansion. Figure 14.9.30 **[APP-065]** shows analysis where new areas would experience overflights, but no details on the number of overflights are provided. Additionally, Figure 14.9.30 **[APP-065]** presents information on "*the most common rapid climbing aircraft, the A319*" (paragraph 14.9.141 **[APP-039]**). It is unclear why the A319 was used to illustrate overflights but the A320 was used to illustrate L_{Amax} noise levels.

Figure 14.6.7 to 14.6.9 **[APP-063]** provide overflight figures from analysis of 2019 data, but no figures are provided for any future scenarios. It is unclear why no other figures have been provided. Figures showing overflights for future scenarios would allow greater understanding of how communities would be affected by the proposed expansion.

Paragraph 2.2.9 **[APP-172]** states: "*As a simplifying assumption all flights were modelled on the main runway, which implies an approximation in the flight densities calculated because a proportion (see above) of departures will be shifted 200 m to the Northern Runway. Hence the overflight density analysis is not accurate near the airport, as reflected in the 1 km grid size adopted for quantification. This is considered a reasonable approximation because*".

Secondary Metric - Community Representative Locations

Seven community representative locations within Mole Valley were selected to: "…describe the air noise changes expected from the Project in more detail" (paragraph 14.9.150 **[APP-039]**).

It should be noted that no consideration of the specific impacts under single mode or awakening events.

Secondary Metric - Noise Sensitive Buildings

Fifty 'noise sensitive community buildings' (paragraph 14.9.159 **[APP-039]**) are identified within the 2032 51 dB $L_{Aeq,16h}$ noise contour. It is unclear how these community locations differ from the 'Community Representative Location'.

Whilst these locations provide some helpful context on how these sites would be affected by LAeq,T noise levels as a result of the proposed expansion, they do not provide any detail at communities where significant effects are identified. Additionally provision of information on secondary metrics would be useful.

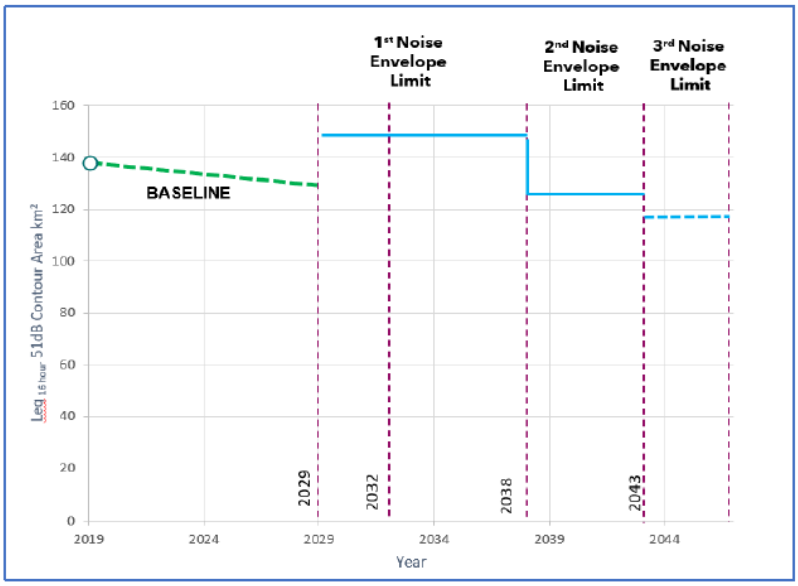
Operational: Noise Envelope

The noise envelope document envelope document APP-177 states states in Para 6.1.8 that the following limits shall not be exceeded:

- Area within the $L_{Aeq,16h}$ 51 dB contour: 146.7 km^2
- Area within the $L_{Aeq,8h}$ 45 dB contour: 157.4 km^2

The noise envelope document states in Para 6.1.9 that the *first noise envelope limit* shall continue for: "*Nine years after the opening of the NRP or by the end of the year when annual commercial ATMs reach 382,000 (whichever is the sooner)…"* It goes on to say: "*The diagram below illustrates the daytime noise envelope limits for the 1st Noise Envelope Period, the following five years which represents the 2nd Noise Envelope Period, and an example of what the limit may be for the 3rd Noise Envelope Period (being the period of 5 years following the end of the 2nd Noise Envelope Period) following a review of the noise envelope limits, discussed further below".*

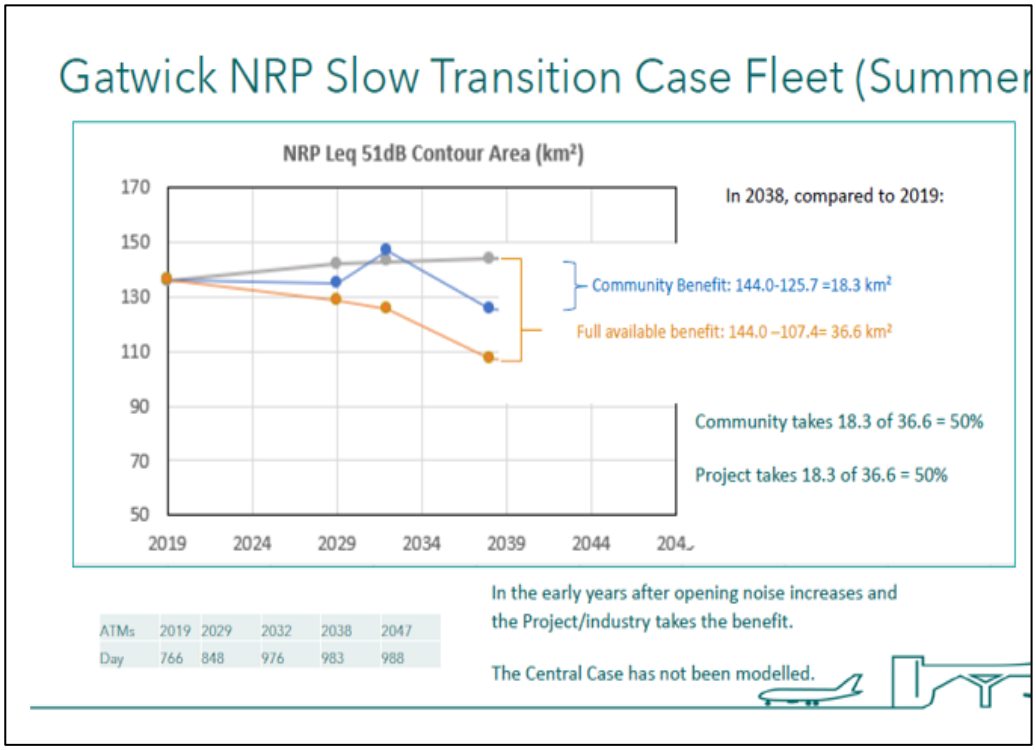
Figure MVX 4



This contrasts with the discussions presented in community meeting held as part of the CAP 1129 where an alternative mechanism was presented. Key features of this alternative mechanism were:

- A relatively small increase in the area within the 51 dB, $L_{Aeq,16h+}$ contour above the baseline case to between 145km^2 and 150km^2;
- Continuous improvement over time reducing to area within that contour to less than 130km^2 by 2039;
- Compared to the current proposal which only reduces the area to something slightly less than the 130km^2 after 9 years of extended operations and increased impacts

Figure MVX 5



The submitted noise envelope proposal provides end points based on the slow transition case:

- Noise levels are initially permitted to grow significantly above current predicted baseline noise levels without the project;
- When the envelope is triggered there is no meaningful sharing of future technological benefits and all improvements are based on slow transition of the fleet placing the applicant under no meaningful requirements to share technological improvements in the aircraft fleet with local communities;
- There is no overall limit on the number of aircraft movements and this allows the promoter to maximise operations at the expense of local communities, particularly if aircraft become less noisy in the future.

Mole Valley considers there should be no initial increase above the predicted levels in the base case of the airport expressed in terms of the area within the 51dB LAeq contour and this should be a hard limit in the DCO. The Examining Authority is asked to bear in mind that:

- such a limit is based on substantial predicted growth within the base case with no sharing of technological improvements in noise mitigation as the fleet changes over the next 10 years,

- A suitable limit should then be set based on the central case fleet improvement model but only for the first five years after opening as seems to be the emerging approach with regard to London Luton Airport
- The values and other measures in the noise envelope should thereafter be reviewed every 5years

Mole Valley notes that GAL's proposed enforcement mechanism is the CAA. This is not acceptable and the CAA have advised the Planning Inspectorate directly that they have not agreed to this approach as stated in CAA relevant representation to London Gatwick Airport Limited's July 2023 DCO application Paragraph 4.5 states:

> 4.5 We also note that GAL describes a role for the CAA as an Independent Air Noise Reviewer to scrutinise and verify the Annual Monitoring and Forecasting Reports (for example in Appendix 14.9.7 to the Environmental Statement (APP-177) paragraphs 7.1.2 to 7.1.10). GAL has not discussed the details of this role with the CAA. **The CAA does not agree that it is appropriate for the DCO to designate an individual regulatory or oversight role absent a broader direction from Government.** However, we are willing to explore with GAL how the requirements of such a role could become part of environmental publications which we are intending to have in place for the wider industry.

The noise envelope should be reviewed every five years and subject to the following management controls which need to be fully funded by the airport.

Mole Valley DC notes that the DCO states there shall be no use of the new runway between 23:00 and 06:00 and can confirm we support this protection for our residents.

Fixed movements limits for the airport's operation need to be set out in the DCO. In particular these must ensure that the night noise regime is preserved and prevent further creeping expansion. For instance as a result of changes in local airspace or removal of technological and physical constraints.

- Preserve the current night noise regime of all aircraft movements of 11250 (summer) and 3250 (winter) period
- A total movement cap of all aircraft movements of 389,000 to align with the predicted capacity for 2047

Mole Valley notes that the DCO prevent operation of the runway between 23:00 and 06:00.

The proposed management of the noise envelope and the review arrangements are unacceptable. MVDC expects that the noise envelope will be self-governing in accordance with a rolling programme of fleet forecasting and noise modelling. This approach should be underpinned with:

- A local authority enforcement body with suitable additional representation such as Parish Council chairs
- Annual reporting with independent technical scrutiny of the agreed noise metrics, including but not limited to agreed trigger levels
- Five year reviews of the noise monitoring and modelling by a suitably qualified person
- Five year reviews of the underlying fleet forecasts; and
- Suitable enforcement powers to ensure production of information and to address any non-compliance.

Mole Valley, recognises the issue of proportionality and recommends the annual modelling reports provided by the CAA should be scrutinised by a suitably qualified independent third party. The

report should be publicly available and should identify any significant nonconformities, along with potential corrective action that should be considered by the airport to avoid a material breach of the agreed trigger levels in any five year period. Mole Valley accepts that this should be a "light touch" and would be content with reasonable limitations on this and our consultants advise us that an allowance of 3 days consultancy time would be sufficient to achieve this.

The Council believes that there should be a mechanism to identify suitably qualified consultants to review the assumptions and for noise and air traffic fleet modelling and validate the suitability of the noise monitoring network. These consultants should be agreed with GAL from a pool of suitably qualified persons. The pool should ideally consist of at least three consultancies in each discipline.

Threshold controls and sanctions need to be agreed Mole Valley DC expects the examination process to resolve these matters through development of suitable supplementary control documents. There also needs to be a mechanism for the scrutiny group to approve changes to the future noise contours based on the modelling validation process.

Finally given that the proposed noise envelope relies on forecasting five years in the future, in order to predict the airports performance. Mole Valley considers it would be very informative to understand the accuracy of previous forecasts over the last five to ten years, so that the level of confidence that can be placed in the forecasting process is better understood.

Operational: Noise Insulation Scheme Issues and Impacts

The noise insulation zones are defined as follows:

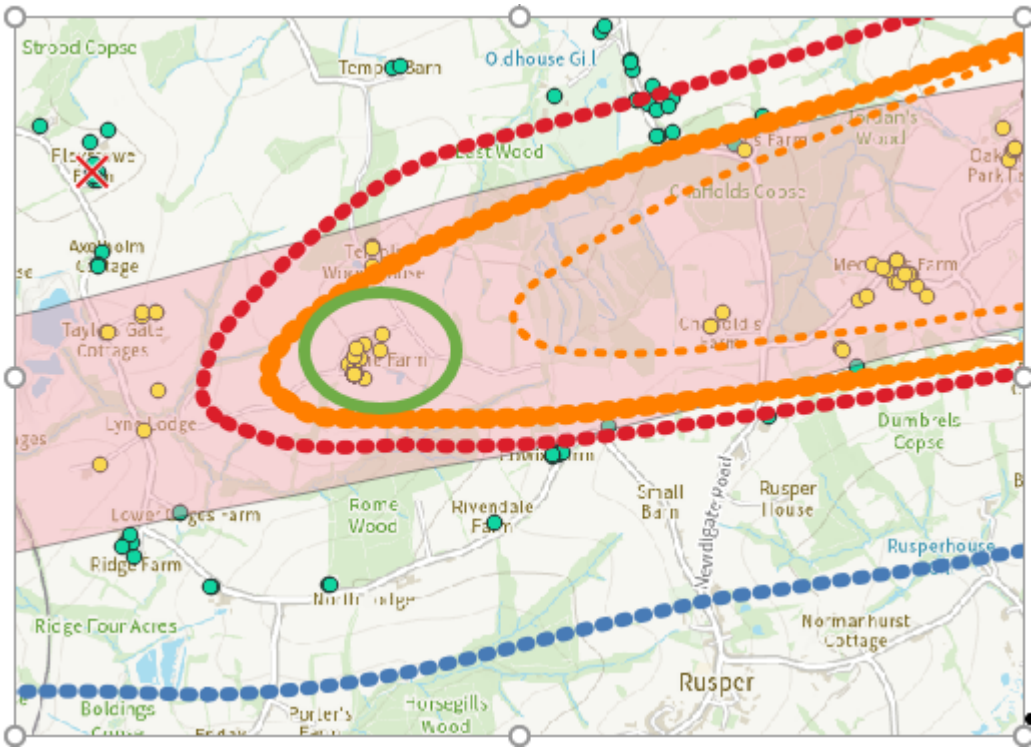
- *Inner Zone* Leq 8 hr night 55dB contour (incorporating Leq 16hr daytime 63dB contour) and
- *Outer Zone* Leq 16 hr 54dB contour

The inner scheme offers substantial sums of money for both improved glazing and noise insulation measures. However the detailed measures are not identified and there is insufficient information on how the scheme will be delivered and no consideration of overheating.

The outer zone is divided into bandings of financial support and the highest payment is proposed to be £8,000 for residents living within the 60-63 Leq contour. It is noted that within Mole valley 28 residential properties are located within the inner insulation zone ***and*** the 60-63 d Leq 16hours.

It is unclear how the upper level of noise mitigation at 60 to 63 Leq 16hr and the measures provided for the inner noise insulation zone as currently defined will be resolved and whether residents will be eligible for both schemes.

Figure MV-x6 Showing 28 properties within both the higher bandings of 60-63 dBA mitigation payments and the inner insulation zone



Single mode contour describes the impacts that actually occur on a single day. The design of any noise insulation scheme must reflect that impact rather than the average mode impact. The awakening events help characterise and define the night time impacts and the insulation scheme should take due account of this to avoid significant adverse impacts as experienced by the impacted communities rather than that defined by an average LAeq.

As with construction noise, any noise insulation scheme could be compromised by the effects of summer overheating as occupiers will have to choose either to open windows to cool their bedrooms or keep the windows shut and then be have increased sleep disturbance because of night-time overheating.

There should be an overheating screening assessment for all eligible properties based on CIBSE TM59 model using Design Year Files 2 as a minimum. The outer zones should be offered measures to minimise overheating and solar gain such as shutters or louvres as well as the proposed acoustic ventilators.

The inner insulation zone should be provided with mechanical cooling such as

- An air to air source heat pump (A-ASHP) and
- An allowance to run the unit per annum.
- An option to capitalise this as a grant for solar panels to mitigate running costs and reduce the overall environmental impact

Some communities such as Capel and Oakwood Hill are cut in two by the extent of the current inner noise insulation scheme. Given that Policy requires mitigation of intrusive noise and the uncertainty in the modelling a sensitivity assessment should be provided to consider if the noise insulation scheme should be expanded in these locations to ensure consistency and fairness.

As a minimum the sensitivity assessment should take account of the increased impact during single mode easterly and westerly operations along with the effects of awakening impacts detailed above.

This should then be used to redefine the extent of the inner insulation

- Additional cooling solutions and
- Enhanced mitigation measures eg replacement glazing in selected habitable rooms.
- Optional grant funding for installation of an air source heat pump in addition to the current proposals.

Mole Valley is particularly concerned that residents will not have sufficient upfront information to confidently engage with the representatives delivering the insulation scheme in particular and a scheme of delivery needs to be developed which should include but not be limited to:

- Scheme of assessment of overheating of relevant rooms where insulation is to be installed
- A document codifying typical Insulation options that are generally practical in typical housing stock in the area
- Measures to mitigate and reduce overheating

The proposed commitment to firstly deliver the inner insulation zone is insufficiently defined. A scheme of delivery should be provided and this should take account of ground noise and cumulative short term impacts from construction. Eligibility should be established in advance for all cases on the basis of prediction and an annualised target should be provided such as that provided in the Luton Noise Envelope Improvements REP4-079.

Mitigation: Noise Insulation

The Noise Insulation Scheme is the main form of mitigation and is summarised as follows:

Inner Zone (larger of the 63 dB LAeq,16h or the 55 dB LAeq,8h contour)– Up to £20,000 for replacement acoustic glazing or internal secondary glazing to noise sensitive rooms. Replacement doors to noise sensitive rooms will also be offered if necessary. Acoustic upgrading of bedroom ceilings where practicable.

Outer Zone – provision of acoustic ventilators of value up to:
Leq 16 hr 54 to 57 dB £3,500.
Leq 16 hr 57 to 60 dB £5,000.
Leq 16 hr 60 to 63 dB £8,000.

There does not appear to be any option for properties in the Outer Zone to improve glazing if the occupier feels that it would provide the greatest benefit. The option of glazing should be provided.

Acoustic ventilators will allow fresh air into properties that rely on closed windows for mitigation; however, there could be an issue of overheating, which would not be addressed by ventilators. To allow closed windows to be an effective form of mitigation, the Noise Insulation Scheme should be updated to include the option of a cooling system.

Paragraph 14.9.235 "*For any properties outside the air noise NIS Inner Zone boundary future eligibility will be established on the basis of measurements of levels of ground noise carried out after the Project is operating. The areas where this is possible are mainly to the north (Oakfield Cottages) and to the south of the airport (Lowfield Heath) where the air noise NIS Inner Zone runs close to or inside the airfield. If ground noise is assessed through measurement after opening, the cumulative noise levels from ground noise and air noise will be considered in assessing eligibility for the Inner Zone NIS.*"

Monitoring to determine eligibility for insulation would not avoid significant effects. Significant effects would have occurred and insulation only provided after monitoring identifies a significant effect. Consequently, there could be a long period where a property experiences significant effects without any insulation.

Operational Ground Noise: Acoustic Bund Issues and Impacts

Of key relevance to Mole Valley are the taxi ways towards the western end of the airport, in particular the Juliet Runway and holding spur, which are being reconfigured. As a result, the NRP proposes to remove the existing earth bund (Northwest Noise Bund) at the end of the runway to allow for the development to take place. This would be replaced by the embedded mitigation measures are detailed in Section 14.76 and 14.8 [APP-039].

The buildability report (APP-079) goes on to state at Section 8.6.45 that a concrete panelled bund will be constructed at the North-western side of the runway as shown in figure 36 of APP-079, Buildability Report reproduced below;

Figure MV x7

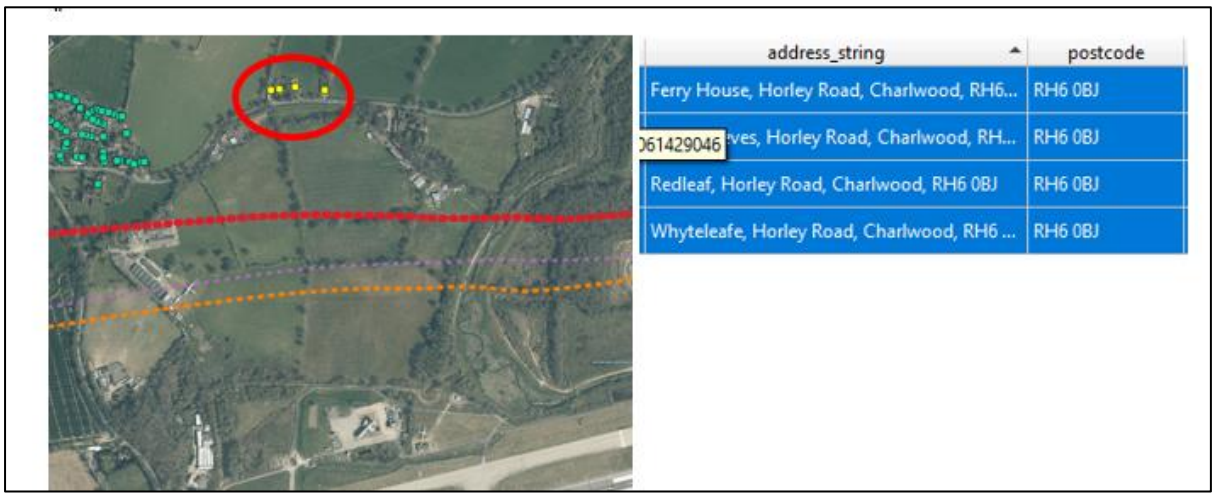
Figure 36: West runway end noise mitigation bund and wall location

The proposed acoustic barriers and associated bund are to be built following demolition of the existing end of runway mitigation measures but the phasing of the construction is unclear and further information is required including but not limited to:

- When the existing measures will be demolished
- When the new bund and associated concrete panels will be erected
- What the short term impacts on local communities will be
- How long those communities will be without mitigation

The design parameters of this are unclear and there is no evidence to support what design decisions will be made, the level of mitigation that will be offered or the magnitude of change during the life of the development. In particular the effectiveness of the bund is questioned for the four properties located at RH6 0BJ as shown below:

Figure MV x8



Ground noise has been assessed using the L_{Amax} and $L_{Aeq,T}$ indicatorsbut there is insufficient consideration of reasonable worse case of impacts when considered in terms of frequency and duration of engine ground running tests. The GAL tracking document advises information to be provided but this does not appear to be available in the application.

The L_{Amax} metric indicates significant adverse effects from noise from engine ground running at Juliet 4 in excess of 65 dB at five locations within MVDC area

- 3 Charlwood Road
- 2 Frys Cottages
- Westfield Place
- The Seasons
- Brook Farm

Generally there are multiple sensitive dwellings at these locations and the number of receptors is underestimated.

The figure below illustrates how the impact will affect a number of properties at the Seasons Ifield Road:

Figure MV x8

Operational Ground Noise: Acoustic Bund Mitigation

The existing earth bund at the end of the runway needs to be removed to allow for the development to take place. This would be replaced by the embedded mitigation measures are detailed in Section 14.8 **[APP-039]**.

Earthworks, bunding at least 8 metres in height situated at the western end of northern runway.

Noise barriers 10 metres in height adjoining the bund installed at the western end of the northern runway and running for approximately 500 metres to the north of the relocated Juliet taxiway and around the boundary of the relocated fire training ground.

Landscape bunding around the flood pond has been designed to provide additional ground noise screening.

It is not clear how the implementation of these mitigation measures would be secured.

The cumulative impact of engine ground running on a typical day needs to be assessed and the number of premises impacted properly considered. Suitable daily, summer and annual limits need to be set and appropriate mitigation designed for this location.

Operational Ground Noise: General Issues and Impacts

Noise Contours

Noise contours have been provided for aircraft noise and road traffic noise, but no noise contours are provided for ground noise. These contour plots should be provided to allow better understanding of ground noise effects for each assessment year and scenario. It would be expected that $L_{Aeq,T}$ and L_{Amax} contour plots are provided.

Failure to provide ground noise contours makes ground based impacts, and how they change over the project, hard to assess.

Ground noise contours with receptor locations as identified in table 5.1.1 of APP-173 should be provided to help identify:

- The effectiveness of end around taxi way mitigation at key stages of the project;
- Properties that are eligible for noise insulation; and
- Suitable noise targets for fixed plant.

Fixed Plant

Noise limits have been set to aid the design of fixed plant at locations that would be affected by fixed plant noise. These limits are set with reference to guidance in BS 4142:2014+A1:2019 at the measured background noise level and defined in Table 7.1.3 **[APP-176]**. It is uncertain how these noise limits will be secured.

In order to minimise cumulative impacts on local communities MVDC expects a design standard for fixed plant installations of no more than 5dBA below background when calculated under BS4142 2019 or any equivalent superseding standards

Substantial large fixed plant could be added in the future with high levels of low frequency noise . This type of noise is not suitably assessed through BS4142 and suitable targets need to be put in place to assess and limit low frequency noise impacts at 63 and 125 Hz

Ground Noise Assessment

There are numerous errors throughout the ground noise assessment, in particular Table 14.9.13 **[APP-039]** and detailed results in Table 5.4.2 **[APP-173]**. Significant effects are not adequately covered in the discussion in paragraphs 14.9.220 to 14.9.233 **[APP-039]**. Residual effects are not appropriately identified in paragraphs 14.9.236 to 14.9.241 **[APP-039]**.

The assessment of ground noise was undertaken with reference to the $L_{Aeq,T}$ and L_{Amax} noise metrics. The use of the L_{Amax} metric to assess ground noise is to *"…assist in determining significance of effects for particular intermittent noise sources such as Engine Ground Running and use of EATs*" (paragraph 14.4.84 **[APP-039]**). It is unclear why these noise sources are not included when predicting $L_{Aeq,T}$ noise levels as they should be represented in a reasonable worst-case day. Particularly as Engine Ground Running is not an instantaneous event so the duration of exposure is important to consider.

The assessment of likely significant effects is based on ground noise predictions in Table 14.9.13 **[APP-039]** and the change in noise presented in Table 14.9.14 **[APP-039]**. The assessment is based on what the change in ground noise would be as a result of the expansion; however, no consideration is given to absolute noise levels and whether they equal or exceed SOAEL as out in the assessment methodology in paragraph 14.9.43 **[APP-039]**. As such, likely significant effects may be understated.

The assessment of ground noise accounts for effects in 2032, which is identified as the worst-case scenario. The change in ground noise for the 2032 scenario is presented in Table 14.9.14 **[APP-039]** However, Table 5.3.4 and Table 5.3.6 **[APP-173]** both report larger increases in noise in 2038 and 2047. As such, likely significant effects may be understated.

The assessment of ground noise is undertaken based on the Central Case and, unlike the air noise assessment, does not cover the Slow Transition Case. This case should also be assessed as it is may identify larger increases in ground noise and result in a greater number of exceedances of SOAEL.

No significant effects are identified from assessment of the L_{Amax} noise metric despite numerous exceedances of the defined criteria being identified (Table 14.9.16 **[APP-039]**). Consequently, some clarification should be provided as to how the L_{Amax} metric is used to identify significant effects and why significant effects are not identified.

As clarifications are required on the use of the L_{Amax} noise metric, this report focuses on likely significant effects with reference to the $L_{Aeq,T}$ noise metric.

Paragraph 14.9.237 **[APP-039]** identifies that residual daytime significant effects are predicted at (3) Charlwood Road.

In accordance with Table 14.9.14 **[APP-039]**, residual daytime significant effects should also be identified at (2) Charlwood.

Paragraph 14.9.238 **[APP-039]** identifies that residual night-time significant effects are predicted at (2) Charlwood, (3) Charlwood Road and (5) Povey Cross.

In accordance with Table 14.9.14 **[APP-039]**, residual daytime significant effects should also be identified at (4) Farmfield.

Road Traffic Noise

An overview of the road traffic assessment is provided in Chapter 14 Noise and Vibration [APP-039] with a detailed description of the process and results provided in Appendix 14.9.4 **[APP-174]**.

Paragraph 14.4.16 [APP-039] states that the road traffic noise study area extends 600 m from new highway works associated with the Project as required by DMRB. The DMRB guidance does acknowledge that a 600 m study area can be appropriate for many schemes but clarifies that the study area should be adjusted to include potentially affected receptors and reasonable stakeholder expectation. No justification for use of the 'default' 600 m study area is given but paragraph 14.4.17 does clarify that all roads in the strategic model have been screened for changes in road traffic noise.

The LOAEL and SOAEL for both daytime and night-time road traffic noise have been set to the values given in DMRB. Impacts in 2032 have been considered with respect to the short-term magnitude of impact criteria from DMRB, as given in Table 14.4.8 **[APP-039]**, and impacts between 2032 and 2047 have been considered with respect to the long-term magnitude of impact criteria from DMRB, as given in Table 14.4.9 **[APP-039]**.

Baseline road traffic noise predictions have been made at 17 noise sensitive receptors (NSRs) and results are discussed in paragraph 14.6.23. Contours of baseline road traffic noise predictions for 2018 are provided in figures 14.6.10 and 14.6.11 **[APP-063]** for the daytime and night-time respectively. Additionally, future baseline road traffic noise predictions for 2032 are provided in figures 14.6.19 and 14.6.20 **[APP-063]** for the daytime and night-time respectively.

Paragraph 14.9.77 **[APP-039]** states that the additional road traffic in the opening year of 2029 would not lead to any significant increases in road traffic noise. No further evidence to support this conclusion is provided.

Road traffic noise levels 10 m from the road edge, the Basic Noise Levels (BNL), have been calculated for the wider road network. Paragraph 14.9.255 **[APP-039]** identifies Charlwood Road and Ilfield Avenue as expected to experience a minor increase in road traffic noise in 2032.

Operational road traffic noise in 2038 is stated as being lower than in 2047 and therefore the focus is on 2047 when considering long-term impacts.

MVDC Mitigation: Road Traffic Noise

It is not clear from the noise assessment where the mitigation measures that are included are secured.

Some information or evidence should be provided to support the claim that there would be no significant increases in road traffic noise in 2029. While no significant increases are found for 2032, this year includes the embedded highway improvements listed as mitigation. Therefore, it remains to be demonstrated that without such mitigation significant effects are still avoided.

Paragraph 14.9.255 **[APP-039]** highlights one link on the wider network predicted to experience a minor increase in road traffic noise but paragraph 6.3.8 **[APP-174]** explains that actually several links are predicted to experience a minor increase in road traffic noise in 2032. While it is explained that none of these links are predicted to experience an increase of more than 3 dB, the possibility of receptors close to these links having noise levels above the SOAEL (where a minor increase constitutes a significant effect) is not considered. Further information on absolute road traffic noise levels for receptors close to links predicted to experience a minor increase should be provided to support the conclusions that there are no significant effects. The explanation, in paragraph 6.3.9 **[APP-174]**, that such increases are unlikely to be due to the scheme should be supported with a more detailed explanation since the roadside traffic noise levels are higher by a non-negligible amount in the Do-Something scenario.

Similarly, Table 6.3.3 **[APP-174]** shows that 57 dwellings and 91 other NSRs are predicted to experience a minor increase in daytime road traffic noise in 2032. Commentary should be provided on the absolute noise levels at these receptors to support the conclusion that none of these increases lead to significant effects.

The limited duration of the baseline sound survey in Riverside Garden Park means that the assessment contains no validation of the road traffic noise model against measurement.

Flight paths and WIZAD

Paragraph 14.8.15 **[APP-039]**: "*The Project does not require new flight paths, which avoids the noise impacts that can be associated with those. Only departures would use the northern runway, except during maintenance, as is currently the case. The majority of these would be above 1,000 feet before they leave the airfield*".

This is broadly true; however, it should be taken in the context that the use of the northern runway would result in an intensification of movements on tracks that are currently infrequently used; those being the northern runway departure tracks that join with the existing departure routes and the WIZAD departure route.

Regarding the use of the WIZAD route, Paragraph 2.1.3 **[APP-172]** states: "*Route 9 (WIZ) is little used at present, but is forecast to be used by about 8% of departures by 2032 in the base case, ie without the Project. Its use is expected to gradually rise to ease growing congestion in the London area. It is not expected to be used at night*".

The restricted use of WIZAD at night should be secured as a commitment in the DCO and it is noted that following is also included in APP-008:

Paragraph 14.8.16 [APP-039]: "*The noise modelling has assumed that use of the northern runway would be limited to the period 06:00-23:00 hours, avoiding scheduling flights in the majority of the more sensitive night-time period.*"

Mitigation Summary

Noise mitigation is required for both the construction and operational phases. The requirements and obligations proposed to secure the mitigation are listed below and in the required mitigation and obligations tables.

MVDC Noise Construction 01-
Noise emissions from construction activities

i) **MVDC Construction :** Off airport operating hours near residential properties should be limited to

08:00 to 18:00 weekdays 08:00 to 13:00 Saturdays

Mobilisation to be limited to an hour before and after the above hours and the mobilisation activities to be permitted need to be suitably defined.

And extended hours should be limited to 17:00 hours not 22:00

ii) **MVDC Construction** SOAELs need to be determined for the shoulder periods to derive appropriate values for the one hour shoulder periods either side of core construction hours as per the Thames Tideway approach in all sensitive locations.

iii) **MVDC Construction** The COCP needs to commit to developing and maintaining a suitable Phasing plan for high impact noise and vibration and this zoning plan shall be subject to annual review

iv) **MVDC Construction:** A comprehensive Construction Environmental Management Plan (CEMP) needs to be bought forward through the DCO process. With contractor funded team sufficient to ensure

- Suitable provision of continuous noise monitoring at sensitive locations
- Contractor first complaint management
- Suitable community access to environmental data
- Ability to record complaints
- Communications plan

v) **MVDC Construction** A governance board should be established to share information with other stakeholders including local community representatives such as relevant Parish Councils

vi) **MVDC Construction** Detailed programme for implementation of the Noise insulation scheme for construction noise

vii) **MVDC Construction:** Detailed consideration as to how overheating will be assessed and mitigated.

viii) **MVDC Construction:** High level proposals for in principle mitigation measures to be considered in advance of section 61 applications and provision for dedicated support to support all local authorities in assessment of Section 61 applications

ix) **MVDC Construction:** Hydraulic piling to be used where ever practicable and assessment of ground conditions to be provided and justification where ever percussive piling is considered necessary as art of the CEMP in order to minimise vibration and noise impacts

x) **MVDC Construction** Derogation of Section 82 (Environmental Protection Act 1990) needs to be restricted within the DCO to construction noise only and time limited to the duration of construction

MVDC Noise Construction 02

Noise emissions from Construction compounds and offsite vehicle loading unloading areas and holding areas.

i) **Assessment of Noise from Ancillary Activities:** Construction work requires additional supporting areas including but not limited to construction compounds, vehicle haul roads, loading/unloading areas and other vehicle holding areas. These activities will have long term adverse effects on residents and they need to be appropriately designed to mitigate and manage ongoing noise impacts. Mole Valley DC considers that BS4142 (2019) is a more appropriate assessment method for this type of noise source rather than BS5228, especially at night.

ii) **Control and Mitigation Design Standards:** Sensitive locations should be identified and the noise rating of the associated activities should be designed and mitigated to achieve a noise rating of less than +2dBA at nearest noise sensitive premises where activities are taking place for more than three months

iii) **Code of construction Practice:** should be updated to include these measures.

MVDC Noise Construction 03

Induced ground-borne vibration from construction activities

i) **Assessment Vibration Impacts:** The Work Phasing plan identifying high risk activities must include consideration of vibration

ii) : The phasing plan should identify sensitive receptors **Exceedance of Night time SOAEL** likely to be impacted by high levels of vibration even if this is less than the SOAEL

iii) **CEMP:** Must include provision for continuous vibration monitoring and reporting in sensitive locations

iv) **Communication Plan:** Residents predicted to be impacted by high levels of vibration should be included in suitable communications on an agreed timetable in advance of the work. The commitment to provide this could be in the COCP and the communications plan could then either be part of the Work Phasing Plan or the CEMP

v) **Percussive piling:** to be minimised and risk assessment justifying its use should be provided in advance of deployment.

MVDC Noise Construction 04

Construction Road Traffic Noise and road Safety

Construction Traffic Management Plan (CTMP) and Construction Worker Transport Management Plan (CWTMP) taking account of the following

i) **Local Consultation on the (CTMP):** The proposed management board should have local representation to ensure that suitable HGV construction routes are derived taking account of the local road netwiork.

ii) **Measures to Avoid of offsite Parking:** Mole Valley receives frequent complaints of taxi drivers waiting on public roads in local communities: Given the scale of the project and the rural nature of Mole Valley it is important that offsite parking is strictly controlled The CTMP should ensure that there is no need for workers to park on work site locations unless they have a need to use their vehicle to get round the site

MVDC Operational Air Noise 05
Impacts from aircraft operations

Noise Insulation Scheme – Further information and discussion is required the noise insulation scheme. It is unclear where operational mitigation measures are secured. An Air Noise Management Plan should be provided where all air noise mitigation/ management measures are secured.

i) **Ground Noise Insulation:** Impacted residential properties requiring insulation from ground movements of aircraft and other sources should be identified before the scheme opens

ii) **Noise Insulation scheme Design:** The design of any noise insulation scheme must reflect that impact experienced by the communities rather than the average mode impact. The awakening events help characterise and define the night time impacts and the insulation scheme should take due account of this to avoid significant adverse impacts as experienced by the impacted communities rather than that defined by an average LAeq.

iii) **Under Assessment of Noise Impacts day:** The use of the 92 day 63 dBA 16 hour LAeq is insufficiently protective and this should be amended to 60dBA in accordance with emerging Policy

Under Estimate of Noise Impacts night: The use of 92 day summer contours significantly underestimates the impact on local residents and single mode contours should be used to suitably reflect night time sleep disturbance metrics. GAL contend that the Noise Insulation scheme meets Policy as the insulation scheme extends beyond what is required by policy to the 54 dBA 16 hours. However the N60 assessment, the single Mode contours shows and the supporting awakening data (provided outside of the IS) show this does not adequately take account of the impacts as experienced by residents under actual aircraft operations.

iv) **Noise Insulation scheme Enhancements:** Existing and future health Impacts need to be suitably avoided by providing appropriate mitigation. This could be achieved by adopting an inner insulation zone based on the greater of a suitable awakening contour or an appropriate single mode contour. A sensitivity assessment should be carried out to identify suitable metrics to suitably avoid significant adverse impacts in effected communities

v) **Divided Communities:** Some communities such as Capel and Oakwood Hill are cut in two by the extent of the current inner noise insulation scheme. Given that Policy requires mitigation

of intrusive noise and the uncertainty in the modelling a sensitivity assessment should be provided to consider if the noise insulation scheme should be expanded in these locations to ensure consistency and fairness.

vi) **Overheating Assessment:** There should be an overheating screening assessment for all eligible properties based on CIBSE TM59 model using Design Year Files 2 as a minimum. The outer zones should be offered measures to minimise overheating and solar gain such as shutters or louvres as well as the proposed acoustic ventilators.

vii) **Mitigating Overheating risks where identified:** Mitigation measures to minimise overheating should be provided. Outer zone should be provided with blinds and shutters and the inner insulation zone should be provided with mechanical cooling such as an Air to Air Source Heat Pump where there is considered to be unacceptable risk of overheating.

viii) **Mechanical Ventilation:** Maintenance, running costs and future replacement should be provided

ix) **Provision of Upfront Information:** Mole Valley is particularly concerned that residents will not have sufficient upfront information to confidently engage with the representatives delivering the insulation scheme. Information to be provided

- Scheme of assessment of overheating of relevant rooms where insulation is to be installed
- A document codifying typical Insulation options that are generally practical in typical housing stock in the area
- Available Measures to mitigate and reduce overheating

x) **Provision of a scheme of delivery and Installation:** To demonstrate satisfactory provision of resources to achieve effective and timely installation. Eligibility should be established in advance for all cases on the basis of prediction and an annualised target should be provided such as that provided in the Luton Noise Envelope Improvements REP4-079.

xi) **Model Insulation Options:** A document codifying the options that are generally practical in typical housing stock in the area should be provided with sample costings to show what can be achieved. The starting budget should be reviewed againt these options and sample costings provided. The budget should be reviewed every 5 year

xii) **Enhanced Funding:** Where high levels of awakening are identified if the inner insulation zone remains unchanged

MVDC Operational Air Noise 06

Impacts from aircraft operations Noise Envelop

The Noise Envelope is not considered fit for purpose as it does not align with policy requirements and the whole framework needs to be re assessed including but not limited to:

i) **Noise Envelope Limits:** To be modelled on central case and suitable sharing of technology improvements needs to be provided between the operator and Local Communities.

ii) **Additional Annual Metric:** Controlling the airport only over the 92 day summer contours is not sufficiently protective and allows uncontrolled growth over the rest of the year eg

winter holidays. An annualised primary night time metric should be developed over the examination process

iii) **Enforcement:** The Noise envelop needs to be overseen by a Governance Board accountable to local communities and the Planning Authority. The Governance Board needs suitable enforcement powers which must be defined in an enforcement control document linked to the noise envelop

iv) **Noise envelop Reviews and reporting**: The Governance Board should be responsible for annual reporting and five yearly reviews.

Every five years or on a significant change there shall be a full review of all data relating to the Noise envelop. The review process must include but not be limited to:

- Suitability of the noise monitoring network
- Fleet and capacity Modelling
- The modelling procedures used by the CAA/ERCD to determine the area of the noise envelop

All work shall be carried out by a suitably qualified consultants agreed with the operator and all work shall be funded by the operator.

v) **Ongoing Funding for Governance Board:**. There should also be funding for at least one full time equivalent. An outline structure should be required through the DCO Including but not limited to administrative support, such as a secretarial role, an independent chair as well as funding for supporting consultancy ensure the Governance Board can carry out its enforcement role. These requirements can be justified under Polluter Pays principle as most recently enshrined in the Environmental Principles Duty Environment Act 2021.

The impact of the generated pollution is monetised in Appendix 1 of the needs case assessment APP-251

vi) **Noise Envelop Predicted Breaches and Trigger Levels:** The examination process should ensure that a suitable mechanism is developed to predict potential breaches and identify suitable corrective action. To achieve this the Noise envelop needs to be amended to include a trigger level for substantive action.

vii) **Noise Envelop Breaches and Sanctions:** A suitable sanction and control regime needs to be developed through the examination process. Potential breaches should be arbitrated by the appointed consultants agreed for the 5 year reviews. The minimum sanction should be a prohibition on future slot release and a significant community fine.

MVDC Operational Air Noise 07
Impacts from aircraft operations Movement Limit Backstop

Fixed movements limits for the airport's operation need to be set out in the DCO. In particular these must ensure that the night noise regime is preserved and prevent further creeping expansion. For instance as a result of changes in local airspace or removal of technological and physical constraints.

- **Preservation of the current night noise** regime of all aircraft movements of 11250 (summer) and 3250 (winter) period
- **A total movement cap of all aircraft movements** of 389,000 to align with the predicted capacity for 2047

MVDC Operational Ground Noise 08
Removal and replacement of end around tax way acoustic bunds

Design and Performance of the replacement end around taxi way barrier/bund is not provided and the impact of the bund throughout the life of the project is not quantified.

i) **Removal of Acoustic bund:** It is not clear where barriers and bunds that are required to mitigate ground noise are secured, when they will be constructed and how they will be designed.

ii) **Impacts Phasing and Design** of removal of the end around taxi way noise barriers and the duration of that impact is not quantified nor time limited.

iii) **Phasing and Design Document** The examination process should ensure a detailed Phasing and design document is bought forward clarifying the following

- When the existing measures will be demolished
- When the new bund and associated concrete panels will be erected
- What the short term impacts on local communities will be
- How long those communities will be without mitigation
- The design and performance and location of the new bunds

MVDC Operational Ground Noise 09
Noise Contours and Engine Ground running

i) **Ground Noise contours to be provided:** They have been provided for aircraft noise and road traffic noise, but no noise contours are provided for ground noise. These contour plots should be provided to allow better understanding of ground noise effects for each assessment year and scenario. It would be expected that LAeq,T and LAmax contour plots are provided.

As a minimum suitable ground noise contours, and the impacted locations as listed in App-173 table 5.1.1 need to be provided at key stages of the project

- On commencement of opening
- Demolition of the end around taxi way noise bund and barrier
- Construction of the end around taxi way noise bund and barrier

Following the opening of the project ground noise contours should be published on an annual a basis to ensure significant impacts created by changes in layout of the airport can be managed and controlled.
*If this is to technically demanding then contours for high impact activities should be provided for the above issues.

ii) **The cumulative impact of engine ground running:** On a typical day needs to be assessed and the number of premises impacted properly considered. Suitable daily, summer and annual limits need to be set and appropriate mitigation designed for this location. Mitigation must be based on consideration of both LAmax and a daytime one hour LAeq assessment

MVDC Operational Ground Noise 10

Acoustic Design and Verification of Fixed Plant

Noise limits have been set to aid the design of fixed plant at locations that would be affected by fixed plant noise. These limits are set with reference to guidance in BS 4142:2014+A1:2019 at the measured background noise level and defined in Table 7.1.3 **[APP-176]**. It is uncertain how these noise limits will be secured.

i) **Noise Limits to be secured**: It is uncertain how these noise limits will be secured in the DCO.

ii) **Noise limits**: In order to minimise cumulative impacts on local communities MVDC expects a design standard for fixed plant installations of no more than 5dBA below background when calculated under BS4142 2019 or any equivalent superseding standards.

iii) **Large Plant Design:** With the push for decarbonisation significant and substantial large Air source Heat pump and other fixed plant could be added either as part of the scheme or under permitted development. This type of plant often has high levels of low frequency noise. This type of noise is not suitably assessed through BS4142 and suitable targets need to be put in place to assess and limit low frequency noise impacts at 63 and 125 Hz

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
MVDC Const 01	Noise emissions from construction activities	C	N	**Code of Construction Practice** – Further information and discussion is required on noise control measures within the CoCP. Including but not limited to; i. Off airport Hours of construction work to be restricted ii. SOAELS to be suitably identified for construction work in the shoulder periods outside of core working hours. iii. Prior to commencement provision of a Noise Impact zoning plan to identify areas of high noise impact. To be annually reviewed iv. Development of a suitable contractor led construction environmental management plan. Provision of continuous monitoring, access to data and means to make and record complaints. v. Governance board to be required to liaise with main contractor regarding management, and monitoring of complaints vi. Detailed programme to manage roll out of noise insulation scheme vii. Detailed consideration as to how overheating will be assessed and mitigated. viii. High level proposals for in principle mitigation measures to be considered in advance of section 61 applications	NPS EN-1: Noise and vibration can affect quality of life and health, NPPF para 191- Mitigate and reduce to a minimum potential adverse impacts MVDC Policy EN12, RBBC Policy CS10 and DES8 TDC Policy DP22 and TPL46

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				and dedicated consultancy support to be funded to assist all local authorities in assessing these applications, ix. Percussive piling to be risk assessed by work phase and justified before deployment. x. Section 82 derogation to be suitably limited to construction activities and only for the duration of the project	
MVDC Const 02	Noise emissions from Construction compounds and vehicle loading or unloading areas	C	N	**Code of Construction Practice-** to require obligation to assess fixed and mobile plant at construction compounds during night operation using BS4142 2019 methodology and to update assessment	
MVDC Const 03	Induced ground-borne vibration from construction activities	C	N	**Code of Construction Practice** – Further information and discussion is required on vibration control measures within the CoCP and these need to be included in the overarching CEMP. Measures to be considered should include but not be limited to: i. **Assessment Vibration Impacts-** to be incorporated in the work phasing and zoning plan ii. **Exceedance of Night time SOAEL's-** should be identified in advance in the Work Phasing and Zoning plan iii. **CEMP:** Must include provision for continuous vibration monitoring in sensitive location	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				iv. **Communication Plan:** To inform residents of high impact work in advance v. **Percussive piling**: to be risk assessed by work phase and justified before deployment.	
MVDC Const 04	Changes to road traffic noise levels due to construction traffic	C	N	**Construction Traffic Management Plan (CTMP)** and Construction Worker Transport Management Plan (CWTMP) i. **Local Consultation on the (CTMP):** Through the proposed construction management board **ii.** **Avoidance of offsite Parking in local communities:** To minimise conflict with local communities.	MVDC Policy EN12, RBBC Policy CS10 and DES8 TDC Policy DP22 and TPL46
MVDC Air Noise 05		O	N	**Noise Insulation Scheme** – Further information and discussion is required the noise insulation scheme. It is unclear where operational mitigation measures are secured. An Air Noise Management Plan should be provided where all air noise mitigation/ management measures are secured **i.** **Ground Noise Insulation:** Impacted residential properties requiring insulation from ground movements of aircraft and other sources should be identified before the scheme opens **ii.** **Noise Insulation scheme Design:** The design of any noise insulation scheme must reflect that impact experienced	MVDC Policy EN12, RBBC Policy CS10 TDC Policy DP22, CSP16 and TPL46

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				by the communities rather than the average mode impact. iii. **Under Assessment of Noise Impacts day:** The 63 dBA 16 is insufficiently protective and the 60dBA single mode contour should be use. iv. **Noise Insulation scheme Enhancements:** Inner insulation zone should be based on the greater of a suitable awakening contour or an appropriate single mode contour. A sensitivity assessment should be carried out to identify suitable metrics to avoid significant adverse impacts in effected communities v. **Divided Communities:** A sensitivity assessment should be carried out to assess the impact of extending the zone where there are divided population centres. vi. **Overheating Assessment** There should be an overheating screening assessment for all eligible properties based on CIBSE overheating assessment and this should inform the insulation and ventilation decisions vii. **Mitigating Overheating risks where Identified:** Provision of passive cooling where suitable and active cooling where necessary. **viii.** **Mechanical Ventilation:** Maintenance, running costs and future replacement should be provided **ix.** **Provision of Upfront Information:** Residents should have access to suitable information to help make informed decisions.	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				x. **Provision of a scheme of delivery and Installation:** To demonstrate satisfactory provision of resources to achieve effective and timely installation. **xi.** **Model Insulation Options:** A document codifying the options that are generally practical in typical housing stock in the area should be provided with sample costings to show what can be achieved **xii.** **Enhanced Funding:** Where high levels of awakening are identified if the inner insulation zone remains unchanged	
MVDC Air Noise 06	Aircraft noise emissions	O	N	The Noise Envelope is not considered fit for purpose as it does not align with policy requirements and the whole framework needs to be re assessed including but not limited to: **i.** **Noise Envelope Limits:** To be modelled on central case **ii.** **Additional Annual Metric:** An annualised primary night time metric should be developed over the examination process **iii.** **Enforcement:** The Noise envelop needs to be overseen by a Governance Board accountable to local communities and the Planning Authority **iv.** **Noise envelop Reviews and reporting**: The Governance Board should be responsible for annual reporting and five yearly reviews. All work to be supported by suitable consultancy support funded by GAL **v.** **Ongoing Funding for Governance Board:** Including but not limited to administrative support, such as a	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				secretarial role, an independent chair as well as funding for supporting consultancy. Should be required through the DCO to support the Governance Board in its enforcement role (Environmental Principles Duty Environment Act 2021.) **vi.** **Noise Envelop Predicted Breaches and Trigger Levels:** The examination process should ensure that a suitable mechanism is developed to predict potential breaches and identify suitable corrective action **vii.** **Funding** Supporting consultancy and funding for at least one full time equivalent post must be required through the DCO to support the Governance Board in its enforcement role	
MVDC Air Noise 07	Aircraft noise emissions	O	P	Fixed movements limits for the airport's operation need to be set out in the DCO. In particular these must ensure that the night noise regime is preserved and prevent further creeping expansion. As a minimum: i) Preservation of the current night noise regime of all aircraft movements of 11250 (summer) and 3250 (winter) period ii) A total movement cap of all aircraft movements of 389,000 to align with the predicted capacity for 2047	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
MVDC ground 08	Airport ground based activity noise emissions	O	N	**Removal and replacement of end around tax way acoustic bunds:** Design and Performance of the replacement end around taxi way barrier/bund is not provided and the impact of the bund throughout the life of the project is not quantified. i) Removal of Acoustic bund: It is not clear where barriers and bunds that are required to mitigate ground noise are secured, when they will be constructed and how they will be designed. ii) Phasing and Design of removal of the end around taxi way noise barriers and the duration of that impact is not quantified nor time limited. iii) The examination process should ensure a detailed Phasing and design document is bought forward.	MVDC Policy EN12, RBBC Policy CS10 TDC Policy DP22, CSP16 and TPL46
MVDC ground 09	Airport ground based	O	N	iii) **Ground Noise contours to be provided:** They have been provided for aircraft noise and road traffic noise, but no noise contours are provided for ground noise. These contour plots should be provided to allow better understanding of ground noise effects for each assessment year and scenario. It would be expected that LAeq,T and LAmax contour plots are provided.	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context
				iv) **The cumulative impact of engine ground running:** On a typical day needs to be assessed and the number of premises impacted properly considered. Suitable daily, summer and annual limits need to be set and appropriate mitigation designed for this location. Mitigation must be based on consideration of both LAmax and a daytime one hour LAeq assessment	
MVDC ground 10				Noise limits have been set to aid the design of fixed plant at locations that would be affected by fixed plant noise. These limits are set with reference to guidance in BS 4142:2014+A1:2019 at the measured background noise level and defined in Table 7.1.3 [APP-176]. It is uncertain how these noise limits will be secured. i) **Noise Limits to be secured**: It is uncertain how these noise limits will be secured in the DCO. ii) **Noise limits**: In order to minimise cumulative impacts on local communities MVDC expects a design standard for fixed plant installations of no more than 5dBA below background when calculated under BS4142 2019 or any equivalent superseding standards. iii) **Large Plant Design:** BS4142 is not suitable for assessment of low frequency noise and suitable targets need to be put in place to assess and limit low frequency noise impacts at 63 and 125 Hz	

Summary of Impacts – Noise and Vibration					
Ref No.	Description of Impact	Construction (C)/ Operation (O)	Negative (N)/ Neutral (Ne)/ Positive (P)	Required mitigation and how to secure it (Change/Requirement/Obligation)	Policy Context

Reigate & Banstead Borough Council – Noise and vibration impacts and mitigation

Introduction
Reigate and Banstead is affected by air, ground, airport related road traffic, and other airport related noise sources primarily in the south of the borough and especially in Horley, including the Horley Gardens Estate, which will also be heavily affected by construction noise (and a number of other impacts) if the proposed development goes ahead.

Elsewhere in the borough residents under and in the vicinity of the Route 4 and Route 3 departure routes from the airport – amongst the busiest routes out of the airport - are heavily affected by aircraft noise even at the present time.

While route 4 and route 3 are noise preferential routes - in effect the flightpaths that the aircraft take out of the airport – residents living under these routes will see a significant increase in the number of overflights in the 'with' development scenarios over the next 8 to 10 years.

Construction Noise

Impact: **Negative**

Introduction
The main impact from construction noise is on the Horley Gardens Estate, and residential premises along and off the Balcombe Road.

In addition to the noise during the road works on the A23 London Road and the A23 Brighton Road the Horley Gardens Estate is potentially impacted by noise from:

- the Car park Y material reprocessing area which will include concrete crushing. In addition this site will then be built on with a new Car park Y and so the construction duration time in practice is over 6 years of work at this site,

Other potential noise sources albeit with a potentially lower impact are:

- the Longbridge Roundabout site welfare compound (4.5 years in total),
- Car park B site Welfare compound (2 years concurrent with south terminal roundabout compound).

Residents along and off the Balcombe Road in addition to being affected by noise from works on the M23 spur and south terminal roundabout are likely to be affected by noise from the south terminal roundabout compound (4.5 years) which includes a batching plant.
All of the work site compounds are shown in Figure N1 below:

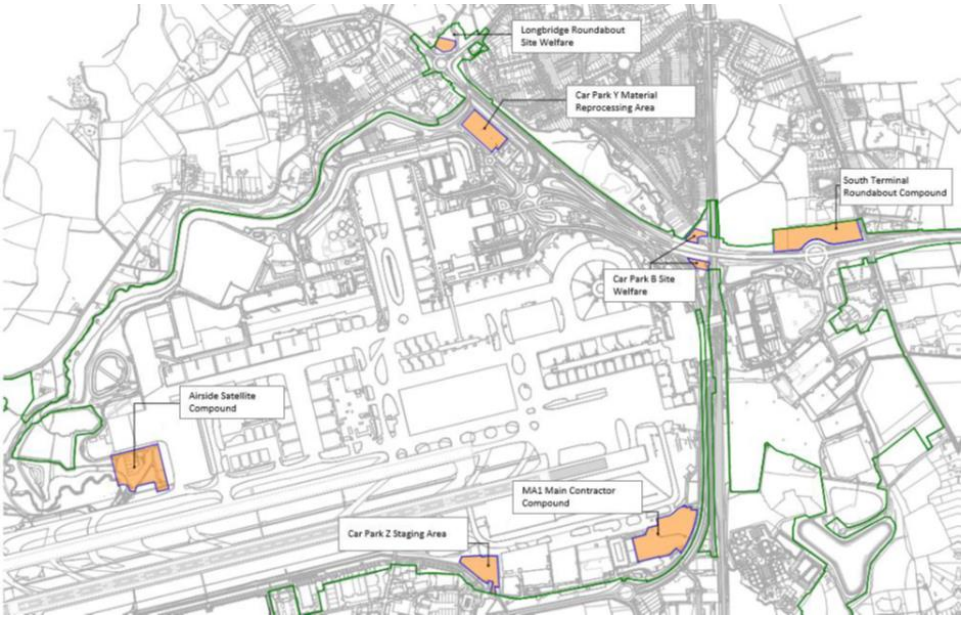


Figure N1: Location of Work Site Compounds around the airport (Appendix 5.3.1 Buildability Report – Part A).

The council notes that the concrete crusher (a very noisy piece of equipment) located in Car Park Y opposite the Horley gardens estate (para 8.5.8 appendix 5.3.1: Buildability Report - Part A) was not modelled as part of the noise assessment of the car park Y compound (p.10 appendix 14.9.1).

The absence of such a significant piece of kit from the assessment of this site does lead to the question what else has been missed in terms of potential noise sources at the construction phase, and suggests a more precautionary approach to mitigation measures is required.

Construction Noise – Techniques

Impact: Negative (at present)

Change needed:

- Hydraulic piling techniques to be used for any sheet piling work taking place in the vicinity of residential premises.

- At this stage clarification sought as to why noisier vibratory piling needs to be used on the A23 London Road and A23 Brighton Road works.

- The noise assessment has assumed the use of vibratory piling, therefore CoCP/ CEMP needs to be updated to prohibit the use of noisier percussive piling as currently no restriction on its use.

Residents on Longbridge Road in the borough will be significantly impacted by the proposed night time sheet piling activities (Chapter 14 para 14.9.30). Given this very noisy work will take place at night the Council would expect to see hydraulic piling techniques used for any sheet piling work taking place in the vicinity of this area.

The current proposal is for the use of vibratory piling (Chapter 14 para 14.9.65) and therefore an explanation is required as to why a noisier technique is being chosen in preference to hydraulic piling for this sensitive residential area.

The council also notes that while the noise assessment assumes the use of vibratory piling there is nothing in the CoCP / CEMP that excludes the use of far noisier percussive piling, and therefore the CoCP/ CEMP needs to be updated to prohibit the use of noisier percussive piling.

Construction Noise – Hours of work.

Impact: **Negative**

Change needed:

- Core hours 08:00 to 18:00 mon to Fri and 08:00 to 13:00. No working Bank Holidays or Sundays.

- Mobilisation upto 1 hour before and after core hours, with mobilisation activities defined as set out below. Note Mobilisation does NOT include lorry movements into or out of sites.

- Timings and definition of mobilisation need to be updated in Code of construction practice.

The council's suggested hours of work for all developers are Monday to Friday 8am to 6pm and then on weekends Saturday 9am to 1pm, with no working on bank holidays or Sundays.

The airport's proposal in the Code of construction practice (appendix 5.3.2 para 4.2.5) is that '*Outside the airport boundary, the core working hours will be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 07:00 to 13:00 on Saturdays*.

This is then followed by the comment (para 4.2.6 Code of construction practice - appendix 5.3.2) of '*A period of up to one hour at the beginning and end of these core working periods is anticipated to be used for start-up and close-down of activities. This will include (but not be limited to) unloading, site briefings, inspection, refuelling, maintenance and general preparation work and housekeeping works. These activities will not include operation of plant or machinery that is likely to cause a disturbance to local residents or businesses*.

The overall working hours as proposed in effect 06:00 to 20:00 weekdays and 06:00 to 14:00 on Saturdays are considered unacceptable at sites likely to impact on local residential premises, especially given the duration of the works, which for residents of part of the Horley Gardens Estate will (based on the life of the contractor compounds) last upto 8 years.

Therefore no works of any sort, including mobilisation, should start before 7am or continue after 19:00, other than in exceptional circumstances with the prior approval of the local authority where noise is likely to impact on residential premises. This for example is in line with the Thames Tideway project (Code of Construction Practice Part A: General Requirements) where:

Standard working hours:
08:00 to 18:00 weekdays
08:00 to 13:00 Saturdays

Plus upto one hour before and after for mobilisation i.e. working hours 07:00 to 19:00 weekdays and 07:00 to 14:00 on Saturdays.

Also the term 'mobilisation' is clearly defined in the Tideway project as follows which should also apply to the GAL project given GAL's current 'definition' is somewhat loose.

Arrival and departure of the workforce at the site and movement to and from places of work (if parked engines shall be turned off and staff shall be considerate towards neighbours with no loud music or raised voices); general refuelling (from jerry cans only, use of fuel tractors and bowsers shall be limited to standard working hours); site inspections and safety checks, site meetings (briefings and quiet inspections / walkovers); site clean up (site house keeping that does not require the use of plant); site maintenance; and low key maintenance and safety checking of plant and machinery (providing this does not require or cause hammering or banging, etc). Mobilisation does NOT include lorry movements into or out of sites.

Where vehicle / equipment maintenance is required outside of the standard working hours, this work should take place on the main airport estate where works can take place well away from residential areas.

Extended Working Hours.

Impact: Negative.

Change needed:

- Extended hours on Saturday to end by 17:00 not 22:00.

- Timings updated in code of construction practice.

GAL currently state the following in relation to the extended construction hours: (Code of construction practice - appendix 5.3.2) Para 4.2.7 *In most cases, extended working hours will be from 07:00 to 22:00 Monday to Saturday (excluding bank holidays).*

The council sees no reason why extended hours on a Saturday should last till 22:00 where noise from such works is likely to impact / cause an adverse effect at residential premises, given the potential for extended working to have taken place on a number of days prior to the weekend.

The council notes that on the Thames Tideway project DCO extended works only ran till 17:00 on a Saturday and would see the same applying to the Gatwick DCO where there are impacts on residential premises.

Night Working and 24/7 Working Hours.

Impact: Negative

Change needed:

- Code of construction practice needs to be clear that any overnight works (after 22:00) will need to be notified to the relevant local planning authority including on the strategic road network, and the authority needs to be notified well in advance of such works.

- Applicant needs to supply evidence from road noise monitoring late at night (01:00 to 04:00) that there are no breaks in road traffic noise to validate decision to raise LOAEL /SOAEL to 60 dB.

In relation to overnight working GAL make the following comments (Code of construction practice - appendix 5.3.2):

Para 4.2.11 In certain circumstances, works will have to be undertaken outside the core and extended working hours. The relevant local planning authority and the public will be notified in advance in accordance with the Communications and Engagement Management Plan (see section 4.12). Where necessary, Section 61 consents will be obtained from the relevant local authority.

4.2.12 Any activities required to be carried out outside of the core or extended hours within the strategic road network will be agreed with National Highways in advance.

Just to clarify that the council would expect to be notified of any overnight working (i.e. after 22:00) including on the strategic road network where local residents are likely to be impacted by noise. Also the Code of construction practice needs to be clear that discussions on the s61 notice will take place **well** in advance of night works commencing.

The council also notes the following from para 14.9.14 (Chapter 14) *For part of the Longbridge Road area and at the properties on the Balcombe Road nearest the M23, night-time traffic noise levels are above Leq 8 hr 55 dB, with façade levels in the range 60 to 61 dB. For these particular properties the night-time LOAEL and SOAEL have been increased to 60 dB in accordance with the BS5228 methodology.*

This principle in BS5228 only works if the background noise L_{eq} is driven by a relatively constant noise source i.e. traffic noise, however it is entirely possible that on the A23 and M23 late at night that there are gaps in the traffic noise, and therefore residents will hear the construction noise in these gaps and be more adversely affected by it than the existing L_{eq} noise levels may otherwise suggest.

Therefore at this stage the council wishes to see evidence from airport's traffic noise monitoring that there are 'no gaps' in the night road traffic noise to check the approach being taken by the airport is correct. In the event that gaps are present in the road traffic night noise then the LOAEL and SOAEL should not be increased as proposed.

Night Working – Securing Mitigation used in the Noise Assessment.

Impact: Negative.

Change Needed:

- Ensuring the 5dB reduction applied to sheet piling, breakers, bulldozer, compactors, cranes, dump trucks, dumpers, excavators, graders, loaders etc is actually achieved via CoCP.

- Specifying in the CoCP the need for noise barriers including a minimum height at the following sites:
  A23 Brighton Road Bridge – along the southern side of the utilities diversion bridge.

  A23 London Road Bridge – along the eastern side of the temporary footpath.

  Airport Way Rail Bridge – on the northern side of the eastbound carriageway.

  Car Park X – along the southern site boundary.

The following items have all been 'assumed' as mitigation that will be in use on the project to reduce noise levels from construction including at night. However the need for this level of mitigation has not been specified in the CoCP and so it is unclear how the applicant will actually ensure the assumed level of mitigation in the noise assessment will occur in practice.

Key assumptions that need to be secured include:

- Ensuring the 5dB reduction applied to sheet piling, breakers, bulldozer, compactors, cranes, dump trucks, dumpers, excavators, graders, loaders etc is achieved. This needs to be set in the CoCP.

- Specifying in the CoCP the need for noise barriers including a minimum height at the following sites:
  A23 Brighton Road Bridge – along the southern side of the utilities diversion bridge.

  A23 London Road Bridge – along the eastern side of the temporary footpath.

  Airport Way Rail Bridge – on the northern side of the eastbound carriageway.

  Car Park X – along the southern site boundary.

Construction Noise – Noise Insulation / Temporary Rehousing Trigger levels.

Impact: Negative.

Change needed:

- Confirmation from the applicant if night, for the purposes of noise, is defined as 6pm to 7 am, or more commonly 10 pm to 7am.

- Noise insulation trigger values and temporary rehousing values in the code of construction practice are updated as per RBBC noise table 1.

In the code of construction practice (para 5.9.10, appendix 5.3.2) it defines the following noise insulation and temporary rehousing noise thresholds as follows:

Noise Insulation:
- Leq 10 hr day 75dB
- Leq 1 hr night 55dB

Temporary Rehousing:
- Leq 10 hr day 85dB
- Leq 1 hr night 65dB

It does not appear to define the 10 hr period in terms of time – the assumption being made here is that this is 8am to 6pm, and again the night period is assumed to be 23:00 to 07:00. This leaves periods where noise trigger levels are undefined - especially in situations where extended working and 24/7 working are being undertaken.

From the meeting with GAL on 20th December 2023 it would appear that GAL are also applying the night time thresholds to the period of 6pm to 10 pm, and 7am to 8am as well, which if the case the council has no issue with this and the proposed table below can be updated accordingly

In the meantime in view of periods of undefined trigger levels the following noise trigger values for noise insulation and temporary rehousing for residential property should be used within the DCO and included in the CoCP, which simply takes the airport's proposals and extends them in line with the trigger values used in the Thames Tideway development (Off site mitigation and compensation policy) and also in the planned Heathrow development (Heathrow Noise Insulation policy- June 2019):

Day	Time	Averaging period, T	Noise insulation trigger value dB LAeq,T	Temporary rehousing trigger value dB LAeq,T
Mondays to Fridays	07:00 to 08:00	1 hour	70	80
	08:00 to 18:00	10 hours	75	85
	18:00 to 19:00	1 hour	70	80
	19:00 to 22:00	1 hour	65	75
Saturdays	07:00 to 08:00	1 hour	70	80
	08:00 to 13:00	5 hours	75	85
	13:00 to 14:00	1 hour	70	80
	14:00 to 22:00	1 hour	65	75
Sundays and Public Holidays	07:00 to 22:00	1 hour	65	75
Any day	22:00 to 07:00	1 hour	55	65

RBBC Noise Table 1: Noise Insulation and temporary rehousing trigger values to be included in CoCP.

Construction Noise – Overheating risk Overnight during the summer.

Impact: Negative.

Change Needed:

- Code of construction practice updated to offer residents where noise levels between 22:00 and 07:00 fall between the LOAEL and the SOAEL (or above the SOAEL) the option of overnight accommodation with air conditioning (at no cost) where overnight working is planned on two or more consecutive nights and where daytime temperatures are forecast to be at or above 27 C.

Where overnight working is proposed in the summer months the code of construction practice needs to recognise that residents may be unable to shut their windows at night due to excessive daytime or night time temperatures and the need to cool the property down overnight e.g. as in the summer of 2022.

Elevated night-time temperatures are a particular health hazard during heatwave events as they can prevent recovery from the heat of the day and maintain physiological stress on the body.

Therefore, in situations where daytime temperatures are over 27C (heatwave definition in south east) and overnight working is planned on two or more consecutive nights, residents where noise levels between 22:00 and 07:00 fall between the LOAEL and the SOAEL are offered the opportunity to stay in local hotels with air conditioning overnight (at no cost) so they are able to sleep.

This is especially important if the proposed noise mitigation measures fail given there are 39 properties above the night time construction SOAEL on Longbridge Road in July 2029 (Table 3.1.3, appendix 14.9.1).

Operational Noise Impacts

Road Traffic Noise.
General Comment:
The council notes that there has been no validation of the traffic modelling against measured values, with road traffic noise only measured at three locations in the Horley Gardens Park area (as opposed to where people live) and for 10 minutes at each location (Appendix 14.9.4) which is of no value in model validation.

Road Traffic Noise.

Impact: Negative – despite a marginal improvement due to the scheme, noise levels remain above the significant adverse effect level (SOAEL) in 2047 and are in a Noise Important Area.

Change Needed:

- Installation of a noise barrier (2m minimum) from the Longbridge roundabout to the proposed new junction with the A23 London Road.

Noise Barrier
Residents living along Longbridge Road (NSR 5, 6, 15, 16, 17), Woodroyd Gardens (NSR3) and Cheyne Walk (NSR 4) currently (2018) experience road traffic noise levels that are above the significant adverse effect level (SOAEL) i.e. the point at which significant adverse effects on health and quality of life are likely to occur, during both the day and night (para 14.6.23 Chapter 14), with some residents

on Longbridge Road (NSR 5) experiencing noise levels that are within the top 1 % of the highest noise exposures in the UK and as such are living within a designated Noise Important Area.

The Noise Policy Statement for England (NPSE) - March 2010 - is the Government's overarching policy on noise management. It sets out the long-term vision of government noise policy, which is fundamentally to: *"Promote good health and a good quality of life through the effective management and control of noise within the context of Government policy on sustainable development"*. The vision is supported by three key aims:

i) Avoid significant adverse impacts on health and quality of life;
ii) Mitigate and reduce to a minimum, other adverse impacts on health; and
iii) **Where possible, contribute to the improvement of health and quality of life**. (RBBC emphasis).

As discussed above and shown in the table below (RBBC Noise Table 2) a number of sites in proximity to the A23 London Road are already above the significant observed adverse effect level (highlighted in red) of 68 dB $L_{A10,\,18\,hour}$ in 2018, with no improvement forecast out to 2047 (2047 base).

While the scheme proposed by the applicant does offer a marginal improvement over the base case in a given year - typically a 1 dB reduction, by 2047 residents will have seen no real improvement in the noise climate since 2018 (2047DCO to 2018 change column), and in the Noise Important Area (NSR5) using the applicant's latest forecast (see lower half of table) noise levels will have risen from 70.2 dB in 2018 to 70.4 dB in 2047 i.e. no real improvement and if anything slightly worse.

However as can be seen from the upper half of Noise Table 2 in the 'with barrier scenario' - where the airport modelled the impact of a 2m noise barrier - for properties behind the barrier noise levels fall by 4 to 6 dB in any given year compared to the 1dB under the applicant's current proposed scheme.

In the 'with barrier' scenario in 2047 at NSR5 noise levels are 65.9 dB i.e. 4.6 dB lower than in 2018 in the noise important area, which compares to the slight worsening by 2047 under the applicant's proposal.

In addition with the barrier in place noise levels behind it are below the SOAEL in both 2032 and 2047 unlike in the applicant's proposed scenario.

- have to put up with three years of construction work on the Longbridge roundabout and associated bridge works including 20 nights of overnight working and around 5 weeks of sheet piling works, and

- see the clearance of a significant proportion of the vegetation that currently separates them from the A23. While this vegetation loss will have little impact on the measured noise levels, vegetation loss on this scale does affect the perception of noise as the road itself becomes much more visible.

- lead to a significantly greater reduction in noise levels in any given year than the applicant's current proposals.

- Reduce noise levels in a Noise Important Area, and at other properties that are currently above the SOAEL, to levels below the SOAEL.

- Result in noise levels in 2047 that are lower than those in 2018 unlike the applicant's current proposals which result in little to no change.

- Help reduce the perception of increased noise in the short term by reducing the visibility of the A23 to residential premises.

	Baseline 2018	**2032 base**	**2032 DCO**	**2032 DCO + barrier**	**2047 base**	**2047 DCO**	**2047 DCO + barrier**	**2047 DCO to 2047 base**	**2047 DCO + barrier to 2047 base**	**2047 DCO to 2018 Change**	**2047 DCO with barrier to 2018 Change**
NSR3 Woodroyd Gardens	69	70.2	69.3	64.8	70.6	69.6	65.1	-1	-5.5	0.6	-3.9
NSR4 Cheyne Walk	70.9	72.1	71.1	65.9	72.4	71.4	66.3	-1	-6.1	0.5	-4.6
NSR5 Longbridge Rd E	***70.5***	***71.6***	***70.5***	65.6	***71.9***	***70.8***	65.9	***-1.1***	***-6***	***0.3***	-4.6
NSR6 Longbridge Rd W	70.2	71.2	70.5	69.9	71.4	70.8	70.2	-0.6	-1.2	0.6	0
NSR10 Riverside Garden N*	63	64	64.4	60.1	64.3	64.7	60.4	0.4	-3.9	1.7	-2.6
NSR15 Longbridge Rd Centre E	71.2	72.3	70.6	67.8	72.6	70.9	68.1	-1.7	-4.5	-0.3	-3.1
NSR16 Longbridge Rd Centre	70.1	71.2	69.8	68.4	71.4	70.2	68.7	-1.2	-2.7	0.1	-1.4
NSR17 Longbridge Rd Centre W	69.8	70.9	69.8	68.9	71.1	70.1	69.2	-1	-1.9	0.3	-0.6
Data from Noise Barrier Note August 2022 / Table 5.1.1 Appendix 14.9.4											
NSR3 Woodroyd Gardens	68.6	70	68.9	N/A	70.3	69.2	N/A	-1.1	N/A	0.6	N/A
NSR4 Cheyne Walk	70.6	71.9	70.8	N/A	72.2	71.1	N/A	-1.1	N/A	0.5	N/A
NSR5 Longbridge Rd E	***70.2***	***71.3***	***70***	***N/A***	***71.6***	***70.4***	***N/A***	***-1.2***	***N/A***	***0.2***	***N/A***
NSR6 Longbridge Rd W	69.3	70.4	69.5	N/A	70.6	69.8	N/A	-0.8	N/A	0.5	N/A
NSR10 Riverside Garden N*	62.8	63.7	64.1	N/A	64	64.4	N/A	0.4	N/A	1.6	N/A
NSR15 Longbridge Rd Centre E	70.9	72	70	N/A	72.3	70.4	N/A	-1.9	N/A	-0.5	N/A
NSR16 Longbridge Rd C	69.3	70.4	68.7	N/A	70.7	69	N/A	-1.7	N/A	-0.3	N/A
NSR17 Longbridge Rd Centre W	68.6	69.7	68.1	N/A	69.9	68.4	N/A	-1.5	N/A	-0.2	N/A
GAL revised Noise values Table 6.3.1 Appendix 14.9.4											

*Free field noise level
Significant adverse effect level SOAEL is 68 dB LA10, 18 hour (Façade) highlighted in red.
Noise Important Area NSR5 highlighted in ***bold italic***
Modelled barrier height is 2m.

RBBC Noise Table 2: Daytime Road Traffic Noise Levels ($L_{A10, 18\ hour}$ (Façade).

Road Traffic Noise.

Impact: Negative – noise levels remain above the significant adverse effect level (SOAEL) in 2047 at properties in proximity to London Road including within a noise important area, with elevated road traffic noise elsewhere on the Horley Gardens Estate.

Change needed:

- A low noise surface to be used on A23 London Road (as a minimum), A23 Airport Way, and out to Junction 9 with the M23.

Use of Whisper Tarmac / Low Noise Road Surface.
Chapter 14 para 14.8.28 (p73) states: '*A low noise surface was also considered as an additional form of mitigation, however, the lack of noise performance of low noise surfaces at the relatively low design speeds in the relevant areas, together with potential maintenance implications, led to the decision that this would not be a suitable and effective form of noise mitigation.*

The council also notes the comment in Appendix14.9.4 Road Traffic noise modelling (Para 3.3.15 p.4) which states,' *Due to the lower speeds on the A23 and other surrounding roads (<75 kph / 46 mph), applying any low noise surface to the roads would not provide any additional reduction in noise to the roads, therefore, no additional low-noise surface correction was applied to future scenarios.*

It is unclear from this statement what evidence the airport has used in coming to this conclusion. However research has found (Proceedings of the Institute of Acoustics.v.40, Part 1, pp 400 – 408)[1], that at 30 – 40 mph there are acoustic benefits to this type of tarmac (which are worth having) and these improvements would be especially important in an area where noise levels are close to or above the SOAEL or affect a Noise Important Area.

Thus such a surface should be used in conjunction with the noise barrier above, to offer a further reduction in noise to residents in proximity to London Road.

It is also worth noting that in terms of ground noise road traffic is a very significant source in the vicinity of the airport as pointed out in para 14.9.202 (chapter 14) where it states,' *impacts are assessed in terms* (of) *the change in noise and against total ambient noise, which is dominated by road traffic noise.'* This would suggest the use of such a surface on a wider area would have benefits across the Horley Gardens Estate.

Fixed Plant Noise.
General Comment:

[1] Muirhead, M. (2018) Road Surface corrections for use with CRTN. Proceedings of the Institute of Acoustics. v.40, Part 1, pp 400 – 408.

The council is not aware that it has agreed to the approach being taken in relation to fixed plant and BS4142 (para 7.1.3 appendix 14.9.3) and would state that with any new fixed plant there should be no increase in noise above the levels already being created (L_{A90}) including during the periods that there are breaks in aviation ground and air noise when there is the potential for other plant to become noticeable. This is especially the case at night.

Ground Noise.

Impact: Negative.

Change Needed:

- A number of issues with the ground noise model discussed in main text below suggests a major reworking of this section is needed.

- Production of ground noise contour maps ($L_{Aeq,T}$ and L_{Amax}) for the assessment years as done for road traffic noise and air noise.

- The slow transition case needs to be modelled as any ground noise insulation scheme should be based on the realistic worst case as a precautionary measure.

- Houses that need insulation should be identified prior to the commencement of the project opening (currently 2029) and insulated, not after the project has opened.

- A commitment to annual monitoring of the combined air noise and ground noise levels at specified locations to check no additional properties would qualify for noise insulation.

There appear to be a number of issues with the ground noise assessment and as such there needs to be a thorough review and reworking of this section of the noise assessment. Issues include (but are not restricted to):

- Significant effects are not adequately covered in the discussion from paragraphs 14.9.220 to 14.9.233 Chapter 14.

- No consideration is given to absolute noise levels and whether they equal or exceed the SOAEL.

- The use of the L_{Amax} noise metric when identifying likely significant effects is unclear.

- Engine ground running activities should be included in $L_{Aeq,T}$ noise predictions as a reasonable worst-case day.

The airport needs to produce contour maps ($L_{Aeq,T}$ and L_{Amax}) of ground noise in the assessment years as it has done for road traffic noise and air noise.

The airport will have modelled ground noise and so it is unclear why such maps have not been produced.

Also it is unclear why the slow transition case has not been modelled as any ground noise insulation scheme should be based on the realistic worst case as a precautionary measure, and the 1 – 2 dB

extra caused by the slow transition case (Para 14.9.202, Chapter 14) may be enough to move a property either into the noise insulation scheme or into the inner zone of the scheme.

The houses that need insulation should be identified prior to the commencement of the project opening (currently 2029) and insulated, not after the project is up and running as suggested by Para 14.9.235 in Chapter 14.

There needs to be a commitment to annual monitoring of the combined air noise and ground noise levels at specified locations to test the validity of the noise models and to check whether additional properties would qualify for noise insulation.

Air Noise.

Impact: Negative.
Any given 'with development' scenario shows a greater number of people exposed to a higher noise level both day and night in the borough.

General Comment:
At this stage the council would point out that one of the key messages over the past 10 years that we have had from local residents and community groups as a consequence of various changes (e.g. Route 4) and trials (e.g. ADNID 2013) that the airport has undertaken, is that the 'average' noise metrics such as L_{eq} metrics on their own do not adequately reflect residents' noise experience on the ground, often with an L_{eq} metric suggesting that there are no noise issues whereas the residents find that there are. There is also support in the science literature for this position especially at night as reported by the DfT in the 2017 night noise consultation where it stated that '*averaging metrics indicators are insufficient to fully predict sleep disturbance and sleep quality*'.

The failure of the Leq metric to reflect residents noise experience from the impact of the number of aircraft is demonstrated in figure N2 below which shows the night time LOAEL being used by the applicant of 45 dB $L_{Aeq\ 8hr}$ (green line) compared to the same suggested LOAEL for the N60 event based metric of 10 events (red line).

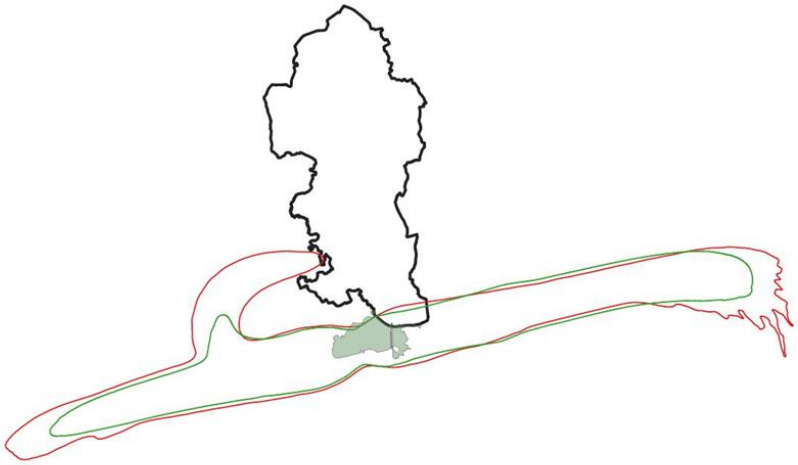


Figure N2: 2032 With Project noise contours comparing 'averaging' contour of 45 dB $L_{Aeq\ 8hr}$ (green) compared to the same LOAEL for the N60 event based metric of 10 events (red). (Green hatched area is DCO project boundary, black outline is the Borough of Reigate and Banstead).

As can be seen in the above figure only using the averaging metric misses adverse effects at the end of the contours, and also misses a large part of the impact of aircraft going round route 4 – the 'red hook' in figure N2.

It is also important to note that with an averaging metric i.e. $L_{Aeq\ 16hr}$ or $L_{Aeq\ 8hr}$ it is possible for aircraft to get quieter by 3dB (entirely possible with a shift to the airbus NEO variants), and as a consequence the number of aircraft using the airport could double and there would be no change in the area of the Leq contour, whereas the N60 indicator would increase at many locations.

Air Noise: Lowest Observable Adverse Effect level (LOAEL) and Significant adverse Effect Level (SOAEL).

Impact: Negative.

- Current noise assessment fails to include a sensitivity analysis reflecting updated science and progressive policy shift to a night time LOAEL of 40 dB $L_{Aeq\ 8hr}$.

Change Needed:

i) Sensitivity analysis to examine the impact of the WHO night time LOAEL of 40 dB $L_{Aeq\ 8hr}$ compared to 45 dB $L_{Aeq\ 8hr}$ as used in the current work, including in the health assessment.

The council previously commented on the airport's choice of LOAEL and SOAEL at the PEIR stage and none of the suggestions were accepted.

At this stage we would simply point out that the current approach taken by the applicant is likely to underestimate the health impact of noise, and therefore a far more precautionary approach is needed with regards to the noise insulation scheme.

Night time LOAEL

The WHO Night Noise Guidelines for Europe (2009) [2]state, '*The LOAEL of night noise, 40 dB $L_{night,outside}$, can be considered a health-based limit value of the night noise guidelines (NNG) necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise.'*

The WHO[3] in 2018 recommended for the night time period that, '*For night noise exposure, the GDG strongly recommends reducing noise levels produced by aircraft during night time below 40 dB L_{night}, as night time aircraft noise above this level is associated with adverse effects on sleep.*'

A more recent meta analysis by Smith *et al* in 2022 (Env. Health Perspectives. doi: 10.1289/EHP10197) confirms the WHO values, suggesting the original WHO findings were robust.

[2] WHO (2009) Night Noise Guidelines for Europe ISBN 978 92 890 4173 7. p.109.

[3] WHO (2018) ENVIRONMENTAL NOISE GUIDELINES for the European Region.

At Heathrow the importance of the WHO LOAEL for night time noise is recognised, with Heathrow using the WHO daytime and night time LOAEL in their options appraisal work looking at airspace change as a sensitivity test.

The council also notes that Crawley Borough Council's local plan[4]also has a night time LOAEL of 40 dB $L_{Aeq\ 8\ hr}$.

Daytime LOAEL.
As pointed out in the Council's PEIR response the 51 $L_{Aeq\ 16hr}$ LOAEL being used by the applicant is based on SONA, 2014 which did not sample levels of noise exposure below 51dB $L_{Aeq,16h}$. As no research has been undertaken to examine the impact of lower noise exposures this means that the 51 $dBL_{Aeq,16h}$ may not in fact be a LOAEL which needs to be borne in mind when judging the extent of the noise impact. This makes it unsuitable for identifying where health effects begin i.e. the health LOAEL.

In layman's terms this is akin to a study looking at motorway speeds above 70 mph and the study then being used to conclude that no traffic drives at less than 70 mph.

Given the applicant has not modelled below 51 dB $L_{Aeq,\ 16h}$ it suggests that the daytime impact of the scheme has not been examined in full from a health perspective.

Daytime SOAEL.
The applicant has chosen to use a daytime SOAEL of 63 dB $L_{Aeq\ 16hr}$ although it is worth noting that 60 dB $L_{Aeq\ 16hr}$ is increasingly being recognised as a 'SOAEL' both in Government policy in relation to noise insulation, and again in relation to noise insulation in the examiners final report on the Manston DCO.

Night time SOAEL.
For the purposes of the assessment the council accepts the use of the WHO $L_{Aeq\ 8hr}$ of 55 dB $L_{Aeq\ 8hr}$. However it is worth noting that the Department for Transport recently completed a reanalysis of the SONA study it undertook in 2014 (Survey of Noise Attitudes 2014: Aircraft Noise and Sleep Disturbance CAP 2161 – July 2021), to examine what additional insights could be obtained from the original study in relation to night noise.

The data analysis found that similar levels of % highly sleep disturbed occurred for exposures ranging from 48 dB $L_{Aeq\ 8hr}$ to 54 dB $L_{Aeq\ 8hr}$ with 14-17% highly sleep disturbed.

This suggests that setting the SOAEL at 55dB could be underestimating effects and mitigation requirements, and it could be argued that the SOAEL should be lowered to 48dB to be able to mitigate these effects.

It is important to note that the DfT is currently funding two domestic cross-sectional studies – an Aviation Night Noise Effects Study (ANNE) and an Aviation Noise Attitudes Study (ANAS)[5] with the

[4] Crawley Borough Local Plan 2015 – 2030 – Noise Annex Table 1 p.156 - December 2015.

[5] Government Response to the House of Lords Science and Technology Committee Report: The neglected pollutants: the effects of artificial light and noise on human health (1st December 2023). https://committees.parliament.uk/work/7256/the-effects-of-artificial-light-and-noise-on-human-health/publications/2/government-response/

ANAS study in effect an updated SONA study. It is assumed that the purpose of both studies is to assess if updates to the Government's guidance on assessing the economic impact of noise are necessary, and by extension if potential changes to the definition of LOAELs and SOAELs are required. The work is also designed to inform aviation policy in terms of the noise metrics used as well. Some of the initial findings of this work are due to report in 2024.

Awakening Contours

The LOAELs and SOAELs discussed above are for so called 'average' metric contours and as reported by the DfT (2017 night noise consultation) '*averaging metrics indicators are insufficient to fully predict sleep disturbance and sleep quality*'.

This is especially important at night given:

- this is where the biggest health impacts occur,
- with averaging metrics aircraft numbers can double and not affect the area based noise contours if individual aircraft noise levels are 3 dB less (which is entirely possible).
- Gatwick on average has more night flights (127), than Heathrow (87) and Stansted (93), based on the 92 day summer period (2019 figures).
- The applicant is looking to grow flights as part of the DCO in the night period especially 06:00 to 07:00, which is a time when people if awoken may struggle to get back to sleep.

Gatwick have produced awaking contours as part of the DCO assessment and this methodology takes account of both the number of flights and how loud they are i.e. a few loud aircraft may cause an awakening or several less noisy aircraft may cause a similar effect.

As reported by Heathrow in their PEIR document (para 17.7.46 Chapter 17 Noise and Vibration):

For aviation, research on objective sleep disturbance suggests that, on average, to protect health, bearing in mind that a healthy adult briefly awakens around 20 times during an 8-hour night period in environments without external stressors, there should be less than one additional awakening induced by aircraft noise per night.[6]

Given that research on objective sleep disturbance suggests that, on average, to protect health, there should be less than one additional awakening induced by aircraft noise per night - the night time SOAEL for awakening contours is ONE additional noise induced awakening.

Air Noise: Night Movements.

Impact: Negative.

- Need for a night movement cap in the Core night period / Night Quota period (23:30 to 06:00) of 11,200 movements in the 218 day summer period, and 3,250 in the winter period.

Change Needed:

[6] [redacted]

i) A movement cap in the core (23:30 to 06:00) night period / Night Quota Period of 11,200 movements over the 218 day summer period and 3,250 movements in the winter period.

ii) As a minimum the current DfT night noise regime (December 2023) needs to be transposed into the DCO as a requirement, stating that movements in the core night period 23:30 to 06:00 will not exceed this level.

The movement cap reflects what has been modelled in the noise section for the night noise impact and used for the health impact assessment, and as such is the scenario that any DCO permission is predicated upon.

There should be no issue with the adoption of this night time movement cap in the core 23:30 to 06:00 night period given the GAL's comment (para 14.12.24 chapter 14) '*There is an assumption that for the 42 years beyond 2047 noise levels are assumed constant in order to arrive at a 60 year discounted appraisal result.* ***This is unlikely and more so for night noise given the night noise restrictions which are expected to prevail and reduce night noise levels'.***

This is also reflected in para 14.13.21 (Chapter 14) where it states: '*Noise changes at night would be lower than during the day because it is assumed that the current night restrictions would continue to cap aircraft numbers in the 23:30-06:00 hours period'.*

It is important to note that the DfT night noise regime allows for dispensations in certain circumstances and in 2018 the airport issued 1,003 dispensations for flights in the core night period and 770 in 2019 i.e. 7% to 9 % more flights were made in the core night period than were expected.

The current modelling work submitted as part of the DCO has made no allowances for dispensations in the core night period and simply assumes 11,200 movements for example over the summer.

It is also important to note that the applicant is currently pushing for the removal of the movement caps in the core night period (Gatwick Airport Ltd – Response to the Night Flight Restrictions Consultation Part 2 – Sept 21 p.4 / response to Q53) where it sates, '*GAL's preferred option would be to remove existing movement limits for summer and winter season and use QC limits only to incentivise utilisation of quieter aircraft.'*

As a consequence the council is of the view that a DCO requirement is needed in relation to movements in the core night period 23:30 to 06:00 that states that movements will not exceed those set out in the existing DfT night noise policy in operation in 2023.

Air Noise: Noise Insulation Scheme.

Impact: Negative.

- Threshold for inner zone for air noise insulation set at a far higher level than at Heathrow in the Draft Airports National Policy Statement[7], and Manston DCO decision.

[7] DfT (2018) https://assets.publishing.service.gov.uk/media/5b1794cded915d2cccc8d336/airports-nps-new-runway-capacity-and-infrastructure-at-airports-in-the-south-east-of-england-print-version.pdf. Para 5.245 p.85.

- Failure to include the 1 additional noise induced awakening contour as a SOAEL – as used at Heathrow to define inner zone noise insulation scheme at night.

- Significant concerns around overheating risk based on ventilators currently proposed.

- No on going commitment to replace / repair ventilators that have been installed.

Changes needed:

i) Inner zone noise insulation scheme needs to be extended from the 63 dB $L_{Aeq\ 16h}$ standard mode contour at present to the full single mode easterly and westerly 60dB $L_{Aeq\ 16h}$ noise contour of the expanded airport. This is in line with the measures outlined for / by Heathrow in the Airports National Policy Statement, June 2018, p 85.

ii) At night the one event awakening contour needs to be used to define the inner zone noise insulation boundary in addition to the 55 dB $_{LAeq,8hr}$ i.e. the larger of the contours either alone or in combination defines the inner zone boundary. This is in line with the Heathrow noise insulation scheme (Heathrow Airport expansion: noise insulation policy (June 2019) and ties in with Heathrow's definition of the one awakening contour as a SOAEL in line with the 55 dB $_{LAeq,8hr}$.

iii) An independent assessment of the ability of the ventilators proposed as part of the noise insulation scheme to prevent overheating in the summer months e.g. summer of 2022 in view of the fact that GALs own work suggests *Future climate averages for the 2030s indicate that Gatwick will experience warmer temperatures across all seasons, with slightly wetter winters and slightly drier summers…..*and *By the 2030s and 2060s it is anticipated that climate change would contribute to a slight increase in Urban Heat Island effect at Gatwick, particularly at night.*

iv) Where noise insulation measures are planned the initial assessment is to also include an overheating assessment, and the noise insulation scheme needs to cover the cost of both active (e.g. air conditioning) and passive measures such as blinds.

v) A commitment to cover the on-going repair / replacement costs of the ventilators in the event they break, rather than this cost falling on the householder.

vi) The noise insulation scheme needs to include post installation monitoring to ensure that measures provided are sufficient to reduce internal noise to an acceptable level i.e. the insulation performance is as expected.

Use of 60 dB $L_{Aeq\ 16h}$ contour to set daytime inner zone for noise insulation.

The applicant at present proposes to use the 63 dB $L_{Aeq\ 16h}$ contour as the daytime SOAEL for the inner zone of the noise insulation scheme.

This is somewhat at odds with the recent final report from the examiners on the Manston DCO (para 6.8.247 Manston Airport Examining Authority's Report Findings and Conclusions and Recommendation to the Secretary of State for Transport. October 2019) where it states: '*The ExA acknowledges that the 63dB LAeq,16hr SOAEL threshold is consistent with current government policy but recognises that there is an increasing body of evidence to suggest that sensitivity to aviation*

noise has increased and that the emerging policy context seeks to address this issue. Consequently, ***the ExA concludes that a revised daytime SOAEL threshold is appropriate in order to align the daytime noise threshold with emerging policy****.* ***The revised daytime SOAEL 60dB LAeq,16hr will be secured via****…….'*

The approach taken at Manston is in line with Aviation 2050 (para 3.122) where in relation to noise insulation it states. '*Such schemes, while imposing costs on the industry, are an important element in giving impacted communities a fair deal. The government therefore proposes the following noise insulation measures:*

• to extend the noise insulation policy threshold beyond the current 63dB LAeq 16hr contour to 60dB LAeq 16hr

• to require all airports to review the effectiveness of existing schemes. This should include how effective the insulation is and whether other factors (such as ventilation) need to be considered, and also whether levels of contributions are affecting take-up

• the government or ICCAN to issue new guidance to airports on best practice for noise insulation schemes, to improve consistency

• for airspace changes which lead to significantly increased overflight, to set a new minimum threshold of an increase of 3dB LAeq, which leaves a household in the 54dB LAeq 16hr contour or above as a new eligibility criterion for assistance with noise insulation

Use of Single Mode Contours to define the inner zone.

The current daytime inner zone insulation contour is based on the standard mode split of 75 % of the aircraft taking off to the west and 25 % taking off to the east on the 92 day summer period. However this mode split can change by year for example in 2016 it was 85/15, and in 2014 it was 64/36.

Thus in 2016 a number of people to the west of the airport would have been experiencing noise levels that would qualify for the inner zone noise insulation scheme but would not actually qualify based on the 75 /25 split, while in 2014 a number of people to the east of the airport would have experienced noise levels that would qualify for the inner zone scheme but would not be able to qualify in practice.

This issue also applies on an annual basis so for example in 2018 the split was 62 / 38, again leading to people to the east of the airport losing out on noise insulation despite the fact that it was needed.

With this in mind the noise insulation scheme should be based on single mode contours i.e. the impact when the activity is 100 % westerly and or 100 % easterly, and a similar approach has been set out by Heathrow in the Airports National Policy Statement June 2018 (para 5.245):

- *Following a third-party assessment, to provide full acoustic insulation for residential property within the full single mode easterly and westerly 60dB LAeq (16 hr) noise contour of an expanded airport;*

Night time Inner Zone for noise insulation - use of awakening SOAEL contour.

The inner zone noise contour should also be based on the ONE awakening contour in addition to the 'average' 55 dB $_{LAeq,8hr}$ contour, although the one awakening contour is likely to cover a larger area.

As discussed in the awaking section above the DfT in the 2017 night noise consultation stated that '*averaging metrics indicators* (i.e. the 55 dB $_{LAeq,8hr}$ contour) *are insufficient to fully predict sleep disturbance and sleep quality*'.

This is especially important at night given:

- this is where the biggest health impacts occur,

- with averaging metrics (the 55 dB $_{LAeq,8hr}$ contour) aircraft numbers can double and not affect the area based noise contours if individual aircraft noise levels are 3 dB less (which is entirely possible).

- Gatwick on average has more night flights (127), than Heathrow (87) and Stansted (93), based on the 92 day summer period (2019 figures).

- The applicant is looking to grow flights as part of the DCO in the night period especially 06:00 to 07:00, which is a time when people if awoken may struggle to get back to sleep.

- The applicant is looking outside of the DCO process to remove the movement limits assumed in the DCO process – (Response to the Night Flight Restrictions Consultation Part 2 – Sept 21 p.4 / response to Q53) '*GAL's preferred option would be to remove existing movement limits for summer and winter season and use QC limits only to incentivise utilisation of quieter aircraft.'*

- As discussed in the night time SOAEL section – data from the SONA reanalysis indicates that similar levels of % highly sleep disturbed occur for exposures ranging from 48 dB $L_{Aeq\ 8hr}$ to 54 dB $L_{Aeq\ 8hr}$ with 14-17% highly sleep disturbed, suggesting that setting the SOAEL at 55dB is underestimating effects and mitigation requirements.

As Gatwick have produced awakening contours as part of the DCO assessment and this methodology takes account of both the number of flights and how loud they are i.e. a few loud aircraft may cause an awakening or several less noisy aircraft may cause a similar effect, and as research[8] on objective sleep disturbance suggests that, on average, to protect health, there should be less than one additional awakening induced by aircraft noise per night, the council would expect the airport to be defining the inner zone of the noise insulation scheme based on the one awakening contour.

This approach is in line with that proposed by Heathrow in their Heathrow Expansion: Noise Insulation Policy (June 2019 – Table 4.1).

Noise Insulation – Overheating Risk during the Summer Months.

A significant proportion of the airport growth resulting from the DCO is likely to be in the summer months especially in the earlier years of the project, and a key mitigation measure in the DCO is room ventilators to enable residents to keep their windows closed but still allow air into the property.

[8] Basner et al 2006. Aircraft noise effect on sleep: application of the results of a large polysomnographic field study. The Journal of the Acoustical Society of America, 11

However this approach means that in the summer months after long hot days e.g. the summer of 2022, the bulk of the property cooling overnight will depend on the performance of the ventilators especially in the inner zone of the noise insulation scheme.

At this stage it is unclear if the ventilators proposed will provide sufficient cooling capability to the property / bedroom(s) to prevent overheating especially in the summer months and given that summer temperatures are only expected to increase into the future.

Equally despite being a key component of the airport's mitigation plans there is no commitment in the noise insulation scheme to the on going service / repair / replacement of the ventilators once installed.

Therefore the noise insulation scheme needs to:

- assess properties for the risk of overheating at the same time as the noise insulation assessment is undertaken.

- Include provision in the scheme for on going service / repair / replacement of the ventilators once installed i.e. residents can simply contact an organisation appointed by GAL for the work to be done for free.

- The scheme also needs to cover the cost of active cooling systems e.g. air conditioning where passive systems will be insufficient to prevent overheating.

Noise Envelope.
Context:
When looking at controls on air noise at an airport it is important to realise that the normal legal avenues of correcting a noise problem e.g. via a statutory nuisance / nuisance complaint, are not available to local residents as air noise is specifically exempt from such legislation.

Equally it is important to realise that the existing and forecast noise levels at Gatwick are at a level recognised to have a significant health impact and / or cause annoyance and will do so to a significant number of people over the next 30 years and the DCO will simply add to that impact in any given year.

As such a noise envelope (along with the current DfT night noise regulations) represents the only control on air noise from the airport to protect the local community.

Given the lack of legal redress residents to a large degree are dependent on the airport being a 'good neighbour'. The council notes the comment at para 14.9.180 (Chapter 14) where discussing controls on noise inputs GAL states (in relation to noise envelopes) that: '*Neither do they provide any incentive for the airport or airlines to bring forward quieter operating procedures, i.e. ways to fly aircraft into and out of the airport in ways that cause less disturbance'.*

Given the health impact of the airport's operations in its totality on local residents (not just the DCO increment), the council would hope that the airport and airlines at all times are looking to bring forward quieter operating procedures to minimise the impact on the local community rather than requiring an incentive to do so.

Noise Envelope: Summary:

Impact: Negative

- Current proposals allow noise climate to deteriorate to levels worse than in 2019 after 10 years of improvement.

- Current proposals also allow noise improvements post 2032 to be lost i.e. gains are not locked in, such that post 2043 the current proposals would allow higher noise levels than in 2019 (para 6.3.1 appendix 14.9.7: The Noise Envelope).

- Lack of an events based primary control metric (awakening contour) means the number of aircraft could double (assuming 3dB reduction per aircraft) to the detriment of residents' health with no change seen in the primary metrics currently proposed.

- Lack of primary control metrics for higher noise levels means potential operational noise control measures could be introduced that have no benefit for the worst affected properties or could even increase noise for the worst affected.

- Unclear why residents have to be exposed to noise levels above the noise envelope limit for two years in succession before there is any sanction applied at the airport.

Changes needed:

i) Envelope needs to be based on central case not slow transition case as proposed.

ii) Noise improvements need to be locked in at each envelope review stage so there is an ongoing reduction in the area of the noise envelope and it is not allowed to increase (unlike para 6.3.1 appendix 14.9.7: The Noise Envelope which does allow an increase), given in 2047 there will still be thousands of people experiencing community annoyance and a significant number of people living above the SOAEL.

iii) The daytime contour needs to be based on 54 dB $L_{Aeq,\ 16\ hour}$ (formerly termed 'onset of community annoyance') not the 51 dB $L_{Aeq,\ 16\ hour}$.

iv) There needs to be a primary control noise contour at night based on annual average (L_{night}) night contours, not just the 92 day summer period.

v) There needs to be a primary control noise contour at night based on an event metric i.e. the area of the 1 event 'awakening' contour, in addition to the summer night average ($L_{Aeq\ 8h}$).

vi) The 60 dB $L_{eq,\ 16\ hour}$ and also the 55 dB $L_{eq,\ 8\ hour}$ night time contour both need to be a primary metrics for the noise envelope or capable of being promoted to a primary metric in the event that the contour areas increase – as there is a risk that measures to reduce the outer contour area could have an adverse impact on residents already severely affected by aircraft noise.

vii) The 2038 proposals for the envelope should apply nine years after opening, 2038, 382,000 commercial movements or 384,600 total movements – whichever occurs first. The airport has demonstrated it can reach the technology standard by 2038 so there is no reason why its implementation should be delayed by the airport build running late. Equally the noise modelling and thus envelope is based on the total number of aircraft movements not just

commercial movements (given non commercial aircraft also make a noise) and 384,600 total movements are forecast by 2038.

viii) The council notes the clauses around airspace change and low carbon aircraft (appendix 14.9.7 section 6.5 and 6.6 and para 8.1.4). At this stage it sees no reason why such clauses should be allowed given FASI south in part is looking to reduce overall noise levels, and it is unclear why in attempting to fix one of its environmental impacts (carbon), another environmental impact (noise) should be allowed to get worse.

If such an approach is to be adopted however then the council would ask that the following clause is also included:
In the event that the health / annoyance noise exposure response functions change then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area.

For example if the LOAEL that GAL have proposed at 51 dB $L_{Aeq, 16hr}$ is subsequently defined as 48 dB $L_{Aeq, 16hr}$ then the area threshold currently assigned to the 51 dB $L_{Aeq, 16hr}$ would be assigned to the 48 dB $L_{Aeq, 16hr}$.

ix) The project noise objective (para 14.9.190) needs to include: *The benefits of future technological improvements with regards to noise will be shared fairly between the industry and local communities.*

x) There needs to be a significant amount of work done around the enforcement mechanism, e.g. have the CAA agreed to the role being proposed by GAL and there also needs to be involvement by the local authority(ies) in the enforcement process.

xi) In terms of sanctions / compensation GAL must not be permitted to declare further capacity for additional air traffic movements from the airport when the airport has breached the noise envelope in the previous 12 months as opposed to the 24 months currently proposed, given the rate the airport is forecast to grow means the current scheme in effect shuts the stable door after the horse has bolted, and there needs to be a compensation payment to the local community paid direct to residents in the event of a breach.

Discussion.
The CAA's CAP 1129 document is the key document for the noise envelope design process and it states the following:

'For an envelope to function as intended, it is essential that full agreement is achieved between all stakeholders on the envelope's criteria, limit values and means of implementation and enforcement.

The benefits of future technological improvements must be shared fairly between industry and local communities. This is fundamental to the noise envelope concept, and will be considered when defining parameters and setting limits.

An envelope is likely to be defined by a combination of parameters.

The life-span of an envelope must be agreed, and its parameters defined to maintain appropriate sharing of the benefits over its intended life-span.

The parameters and limits, and means of implementation and enforcement of a noise envelope must be tailored to individual airports and their respective local conditions.

A possible need has been identified for independent third parties to assist stakeholders to reach agreement where necessary. Set up an envelope design team including technical and legal representatives from stakeholder groups.'

Envelope Design Process

The key stages in a noise envelope deign based on CAP 1129 are set out in appendix 14.9.5 (Air Noise Envelope Background para 2.2.6 p.2) i.e.

i) to identify stake holders,
ii) set up a design envelope team from the stakeholders,
iii) and produce a proposal.

Unfortunately GAL did none of these steps and simply produced its own proposal. It then attempted to undertake ii) with a proposal already in place and as a result the process largely consisted of the airport telling stakeholders (community groups and LAs) why they were wrong.

As part of this work the local authority group had asked the airport to produce single mode contours and also a noise footprint of the noisiest aircraft operating in 2028/29 B737-800 / A321 (appendix 14.9.9 p 324 on), and also noise contours based on aircraft movements frozen at 2019 levels but the technology allowed to advance.

This was intended to look at the data in a different way to what was being presented in meetings – reflecting comments from the community groups and residents that the conventional metrics don't reflect their experience, and also to look at how much of the technology benefit from the airport's growth from 2019 to 2028/29 was being shared with the community rather than just the DCO increment given the noise envelope controls total noise not just that arising from the DCO.

This last point was also in line with PINS scoping opinion for the northern runway[9] which states (para 2.3.13), '*The ES should also give consideration to the prospect of a 'no development' and 'no growth scenario' for comparative purposes and in support of the justification for the Proposed Development in the form that is to be presented in the DCO application.*

The airport refused on all these points (other than providing a westerly departure noise footprint on route 1 which is of limited use), and it also refused the local authorities access to the 2019 flight data held by the CAA so the local authorities were unable to commission their own work from the CAA.

The local authority group had also asked to sit in with the aviation industry group as an observer to understand the industry's perspective / concerns. However this request was also refused.

Therefore the council is of the view that the current envelope was not produced in accordance with what is considered the guidance on noise envelopes, and thus good practice, and as a result there remain a number of deficits in the current proposal which need to be corrected as discussed below.

At para 14.9.190 (Chapter 14 p125) GAL propose the following noise objective for the project that is unchanged from the PEIR i.e.

[9] SCOPING OPINION: Proposed Gatwick Airport Northern Runway Case Reference: TR020005. P.8 para 2.3.13.

The project will:
- avoid significant adverse impacts on health and quality of life from noise;
- mitigate and minimise adverse impacts on health and quality of life from noise;
- where possible, contribute to improvements to health and quality of life; and
- provide certainty to the communities around Gatwick that noise will not exceed contour limits and will reduce over time, consistent with the ICAO Balanced Approach.

In the council's response to the PEIR it stated that the above noise objective should also include the statement *'The benefits of future technological improvements with regards to noise will be shared fairly between the industry and local communities.'*

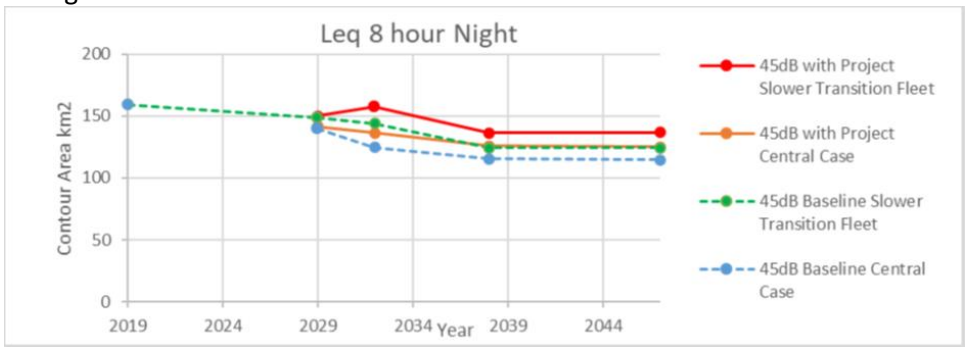
However the airport appears not to have taken up this suggestion so we would reiterate the need for this to be a key consideration in the noise envelope design and operation of the scheme into the future.

The council noted the comment by the applicant (para 14.2.44 – Chapter 14) on the DfT overarching noise policy from March 2023: *Reference to Sharing the Benefits of aircraft noise emission reduction has been removed. We consulted on sharing the benefits through our Noise Envelope Group in summer 2022 (see ES Appendix 14.9.8: The Noise Envelope Group Output Report (Doc Ref 5.3) and ES Appendix 14.9.9: Report on Engagement on the Noise Envelope (Doc Ref 5.3), and this ES does not provide further material on sharing the benefits.*

It is worth noting that while the headline policy may have changed the DfT did not alter the policy on Noise Envelopes, and therefore the requirement to share future technological benefits still applies. In addition DfT have yet to release (at December 2023) the full policy paper which will clarify how this overarching policy is to be met.

i) Envelope needs to be based on Central Case Scenario.

Diagram 14.9.1 p100 (day) and p108 (night) Chapter 14 has the graphs of how area and population change under the different scenarios:



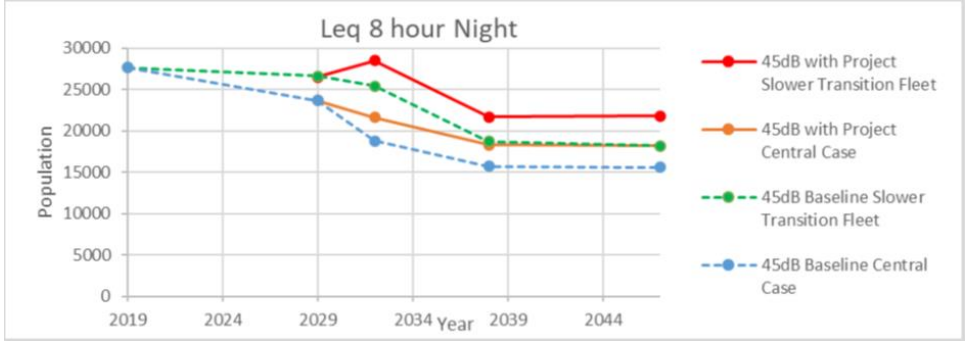


Figure N3: Night time Noise Contour area (Top) and Population Affected (bottom) under the Base and with Project Scenarios (central and slow transition cases).

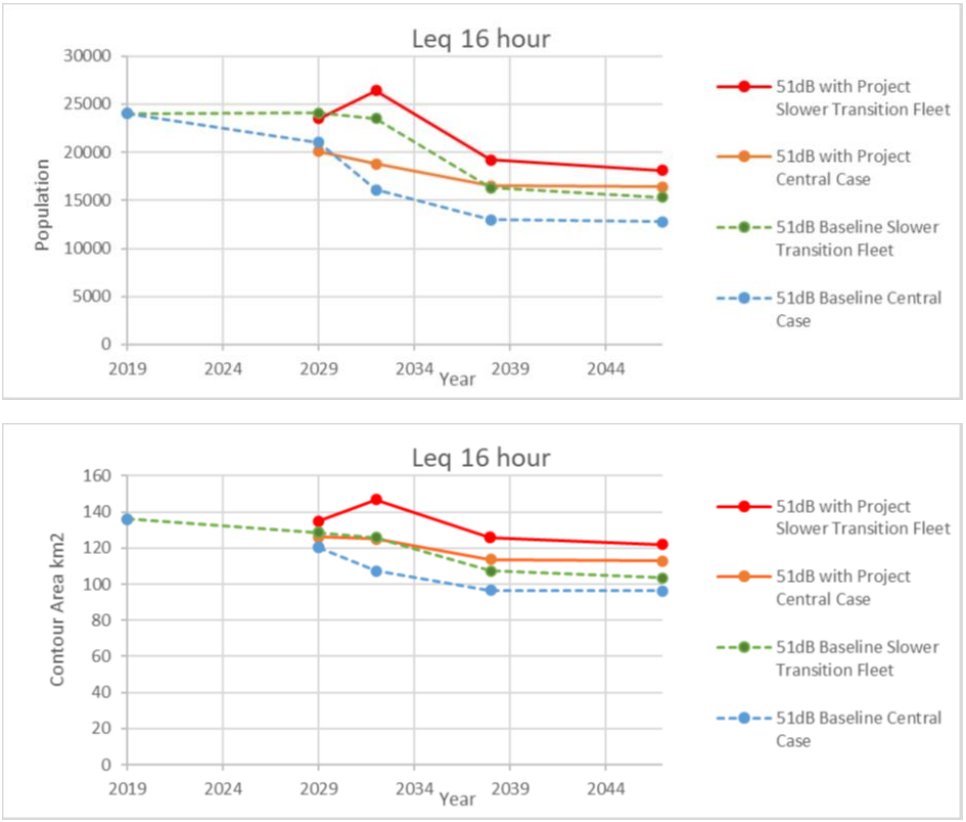


Figure N4: Daytime Noise Contour area (Bottom) and Population Affected (top) under the Base and with Project Scenarios (central and slow transition cases).

It is clear from the above graphs that by using the slow transition case to set the noise envelope boundaries the airport is in effect allowing itself to create a greater noise impact than was the case in 2019 (both day and night) and under this approach it is difficult to see how any of the technology benefits of quieter aircraft have been shared with the local community.

As such the council's view is that the current approach of setting the envelope based on the 'slow transition case' is untenable within the context of the Airports NPS [10] '*The benefits of future technological improvements should be shared between the applicant and its local communities, hence helping to achieve a balance between growth and noise reduction.'* and CAP 1129 which states '*The benefits of future technological improvements must be* ***shared fairly between industry and local communities***. ***This is fundamental to the noise envelope concept,*** *and will be considered when defining parameters and setting limits.'*

One of the draw backs with the current approach used in the DCO is that the 'with development' scenario is being compared with a future scenario in which there is already considerable future growth, and thus it is difficult to determine how much / what proportion of the technology

[10] Airports National Policy Statement: new runway capacity and infrastructure at airports in the South East of England.- June 2018. Para 5.60.

improvements / benefits have actually been shared with residents and how much is being used by the airport for its own growth.

Given there are no planning or other controls to assess the impact of the baseline development out to 2029, it was suggested to GAL in the council's PEIR response that in the final ES the 2029 noise modelling scenario should be '*run using 284,987 ATMs (i.e. 2019 air traffic movements) to demonstrate the extent to which the airport is sharing the benefits of quieter aircraft with the local community, and to assess the health impacts of the growth in its totality.'*

This was in line with the PINS scoping opinion for the northern runway [11] which states at para 2.3.13 '*The ES should also give consideration to the prospect of a 'no development' and 'no growth scenario' for comparative purposes and in support of the justification for the Proposed Development in the form that is to be presented in the DCO application.'*

This data would have then helped inform the setting of the noise envelope on the basis of the airport is allocated 50 % of the noise improvement for its growth.

Given the central case with project shows that the noise impact on the community does not deteriorate at any point in the project, the noise envelope boundary should be set as a minimum based on the central case and not the slow transition case, to ensure that the local community sees an on going improvement in noise levels.

It is also unclear how GALs use of the slow transition case meets the project objective (para 3.1.6 p.7 appendix 14.9.5) the first part of which states, '*The project will avoid significant adverse impacts on health and quality of life from noise',* given that the use of the slow transition case sees the number of people above the GAL significant observed adverse effect level (SOAEL) increase compared to 2019 which is not seen with the central case.

ii) Noise improvements need to be locked in at each envelope review stage.

Para 6.3.1 (Appendix 14.9.7) of the Noise Envelope appendix states, '*the outcome of review for the 3rd Noise Envelope Period and subsequent noise envelope periods may require the noise envelope contour to change, which may include a reduction or an increase. (Subject to not exceeding the noise contour area required to be achieved during the 1st Noise Envelope Period).*

Under the current noise envelope proposal (slow transition case) the noise contour area in 2032 is allowed to be higher than in 2019, and with the above statement this means that noise levels around Gatwick in 2048 i.e. nearly 30 years later could still be worse than they were in 2019.

It is unclear how such an approach meets the governments comments in Aviation 2050 (para 3.112) where it states, '*The government expects the industry to show continuing commitment to noise reduction and mitigation as part of its contribution to the partnership for sustainable growth.'.*

Therefore there needs to be a commitment in the noise envelope secured by requirement that ensures that previous improvements in aircraft noise are locked in at the review stage, such that the noise environment cannot deteriorate while there are residential premises experiencing air noise at levels above the SOAEL and above the LOAEL – the threshold for adverse effects occurring.

[11] SCOPING OPINION: Proposed Gatwick Airport Northern Runway Case Reference: TR020005. p.8 para 2.3.13

iii) The daytime contour needs to be based on 54 dB $L_{Aeq, 16\ hour}$ (on set of community annoyance) not the 51 dB $L_{Aeq, 16\ hour}$.

The onset of community annoyance occurs at 54 dB $L_{Aeq, 16\ hour}$ and therefore the focus on any work at the airport should be on reducing the size of this contour, and also the 60/63 dB $L_{Aeq, 16\ hour}$ contour as this is the onset of significant observed adverse effects.

As the key focus of the work should be on reducing the 54 dB $L_{Aeq, 16\ hour}$ contour it is important that the noise envelope criteria align with this.

At Luton the 54 dB $L_{Aeq, 16\ hour}$ is used for the noise envelope.

iv) Need for a primary control noise contour at night based on annual average (L_{night}) night contours, not just the 92 day summer period.

At present the only primary noise metrics used for the noise envelope are based on the 92 day summer period, and as such do little to give certainty around noise growth outside of the summer period especially at night. This is potentially important given GAL's statement:
'*Once the majority of incremental runway slots are full, further growth is anticipated to arise through a greater share of year round services as well as larger and fuller aircraft'.* (para 9.2.4 p13 Forecast growth Environmental Statement Appendix 4.3.1: Forecast Data Book).

While the current airport forecasts represent the 'best estimate' of business trends and business models, things can change rapidly e.g. emergence of the low cost business model in 1990s, and such change could easily occur within the 14 year period of the current noise envelope. Therefore an annual night time primary noise contour needs to be included within the noise envelope scheme.

v) Need for a primary control noise contour at night based on an event metric i.e. the area of the 1 event 'awakening' contour.

Average contours i.e. $L_{eq, 16\ hour}$ or $L_{eq, 8\ hour}$ can hide significant changes in the number of aircraft operating out of an airport. For example a 3 dB reduction in noise from an individual aircraft - entirely possible via a shift to NEO aircraft, means that an airport could double the number of aircraft operating out of the airport and yet there would be no change in the area of the L_{eq} contours.

The DfT in its 2017 impact assessment of night flight restrictions [12] stated '*average indicators are insufficient to fully predict sleep disturbance and sleep quality*'. This statement was based on work by Basner *et al.* [13] which found that sleep stage change risk - which impacts on health - may be lower than estimated from average L_{night} noise dose where events are noisy but relatively few, but higher, where events are relatively quiet, but more numerous.

Given at Gatwick the airport is moving to a higher number of less noisy aircraft movements i.e. a situation with a potentially higher health impact which 'average' based contours are likely to fail to reflect, the noise envelope needs a primary control metric based on an event based contour to complement the L_{eq} contours especially at night.

[12] DfT (2017) Night Flight Restrictions at the designated airports 2017-2022 Impact Assessment DfT00370 Page 26 2nd to last paragraph.
[13] Basner, M. & Samel, (2006) Aircraft noise effects on sleep: Application of the results of a large polysomnographic field study, Journal of Acoustical Society of America, 119(5), p.2772-2784, May 2006.

Therefore the noise envelope should produce annual noise awakening contours with the area of the 1 awakening contour used as the primary control metric in conjunction with the $L_{eq\ 16\ hr}$, $L_{eq\ 8hr}$, and annual L_{night} contours.

vi) 60 dB $L_{eq,\ 16\ hour}$ and 55 dB $L_{eq,\ 8\ hour}$ contours also need to be a primary metric or capable of being promoted to a primary metric in the event the contour area increases faster than forecast.
One of the key areas of noise impact is on residents above the SOAEL i.e. (60/63 dB $L_{eq,\ 16\ hour}$ during the day and 55 dB $L_{eq,\ 8\ hour}$ at night, and yet the area of these contours is not used as a primary metric.

The risk with this approach is that measures become focused on the outer contours potentially to the detriment of those already most heavily affected by noise. For example high thrust settings could be used on take off which would reduce noise further out but increase it for those closer into the airport.

Therefore the area of the 60 dB $L_{eq,\ 16\ hour}$ and 55 dB $L_{eq,\ 8\ hour}$ should be defined in the noise envelope to ensure that noise in these areas is not getting worse, and if they are to remain as a secondary metric then they need to be able to be promoted to a primary metric in the event that the forecast area is breached.

vii) Implementation of the 2nd Noise Envelope Limit.
The airport envisages hitting 382,000 commercial movements (384,600 total movements) nine years after opening in 2038, assuming an opening year of 2029.

The noise contours used in the noise envelope are based on the total number of aircraft movements such as positioning and maintenance flights, business aviation and not just the commercial movements. As all aircraft have a noise impact a further trigger for the shift to the 2nd noise envelope should be 384,600 total movements i.e. 382,000 commercial movements or 384,600 total movements whichever occurs first.

The council notes 'the nine years after opening' but given the airport is of the view that the technology will exist in 2038 to deliver quieter aircraft there appears to be no reason why the 2nd noise envelope limit should not start in 2038.

At present the airport opening could be delayed by three years and as a consequence residents are permitted to be exposed to a higher noise level in 2041 than would have otherwise been permitted had the airport opened on time.

Therefore the 2nd noise envelope limit should start nine years after opening, 2038, 382,000 commercial movements or 384,600 total movements whichever occurs first.

viii) Noise Envelope Carbon and Airspace Change Exemptions
The council notes the clauses around airspace change and low carbon aircraft (appendix 14.9.7 section 6.5 and 6.6 and para 8.1.4).

At this stage it sees no reason why such clauses should be 'allowed' given FASI south in part is looking to reduce overall noise levels, and as the noise envelope is defined based on an area which can change shape (but not overall size) the noise envelope already has a degree of flexibility built into it.

In relation to carbon it is unclear why in attempting to fix one of its environmental impacts (carbon), another environmental impact (noise) should be allowed to get worse especially at night.

Given one of the Government's aims (Aviation Policy Framework, 2013) for a noise envelope is: *'as a means of giving certainty to local communities about the levels of noise which can be expected in the future…'* it is unclear how such clauses help give residents certainty.

Such an approach also seems at odds with GAL's objective for the noise envelope (para 14.9.190 Chapter 14) of '*provide certainty to the communities around Gatwick that noise will not exceed contour limits and will reduce over time, consistent with the ICAO Balanced Approach.'*

If the above clauses on carbon and FASI are allowed to stand then the council would seek the following clause included in the noise envelope document / DCO:

In the event that the health / annoyance noise exposure response functions published by Government change, then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area.

For example if the LOAEL that GAL have proposed at 51 dB $L_{Aeq, 16hr}$ is subsequently defined as 48 dB $L_{Aeq, 16hr}$ then the area currently assigned to the 51 dB $L_{Aeq, 16hr}$ would be assigned to the 48 dB $L_{Aeq, 16hr}$.

ix) Project noise envelope objective updated to include: *The benefits of future technological improvements with regards to noise will be shared fairly between the industry and local communities.*

The council raised this point at the PEIR stage but it was not taken up by GAL. However it is a key part of the noise envelope concept as stated in CAP 1129 i.e. *The benefits of future technological improvements must be shared fairly between industry and local communities. This is fundamental to the noise envelope concept, and will be considered when defining parameters and setting limits.*

x) Enforcement Mechanism.

There needs to be a significant amount of work done around the enforcement mechanism, which was barely touched upon during the noise envelope discussions despite its importance.

At this stage the council has not seen confirmation that the CAA will take the role proposed nor is there any role for the local authority in terms of enforcement.

The council would see the local planning authority (Crawley) as having a significant role in enforcing this aspect of the noise envelope i.e. the CAA produce the noise contours as normal and the planning authority determines if the noise envelope conditions are being met or not.

The current document does not specify tolerances and therefore the council sees the areas proposed as absolute.

It also does not appear to specify the noise model, and thus the noise envelope document needs to clearly state that the ERCD model will remain the noise model for enforcement purposes until at least the 4th noise envelope round.

The document also needs to state that where the CAA are no longer able to provide noise modelling services then an intercomparison exercise will be undertaken with the new model provider to

understand the extent to which the new model under / over estimates compared to the ERCD model.

The current proposal allows the airport to breach the noise envelope for two years before any form of control cuts in, and there are no sanctions placed on the airport.

For a 12 month breach there is no sanction or control which is unacceptable given how lax the current noise envelope is in the first place.

xi) Sanctions in the Event of a Noise Envelope breach

The council would want to see an enforcement regime that is self regulating i.e. that there is no incentive to breach the noise envelope even for 12 months in the first place, and that where a breach does occur additional growth is prevented until the situation is back under control.

With this in mind GAL must not be permitted to declare further capacity for additional air traffic movements from the airport when the airport has breached the noise envelope in the previous 12 months as opposed to the 24 months currently proposed, given the rate the airport is forecast to grow means the current scheme in effect shuts the stable door after the horse has bolted.

In addition to the above the airport should not be permitted to release any new slots for a minimum of 18 months i.e. until it can demonstrate in practice that no breach of the envelope has occurred in the year following the initial breach.

It is also important that residents are compensated as they will have suffered higher noise levels than permitted by the noise envelope. Therefore there needs a mechanism by which all residential premises within the outer noise control contour in practice at the time of the breach are compensated financially, for example with a payment of £1,500 per breach.

In addition to the compensation payment any premises that were outside of the inner noise insulation zone but subsequently moved into the inner noise insulation zone as a result of the breach are offered the inner zone noise insulation package once a breach has occurred to mitigate any future risk.

Air Noise – TAG Assessment

Impact: Negative

- Current approach likely to underestimate true health cost associated with the project as using out of date and potentially inappropriate exposure response functions.

Change Needed:

- Recognition that TAG assessment is likely to be an underestimate of the health cost to the local community, and a sensitivity test be undertaken using updated exposure response functions.

- GAL to undertake noise surveys to examine community annoyance both before the airport expansion works begin and after the works have been completed. The surveys are to be designed in conjunction with academic partners in a similar vein to the UK SONA study but focused solely on Gatwick.

The TAG assessment (Table 6.1.1 – Appendix 14.9.2) is likely to underestimate the health costs of noise as it currently uses evidence for noise effects on health based on studies largely published before 2010 and includes a limited number of health outcomes including amenity (annoyance), subjective sleep disturbance, hypertension, vascular dementia, Acute Myocardial Infarction (AMI), and Stroke (para 14.12.22, Chapter 14).

Therefore, in addition to a noise TAG assessment using the 'current' methodology, GAL should also undertake an updated TAG assessment that takes account of the most recent Exposure Response Functions using for example WHO ENG 2018 ERFs[14], to help examine the potential variability in the TAG assessment methodology. The health 'cost' based on both approaches should be published. Such an approach was planned for the Heathrow expansion (Heathrow 2019 PEIR Chapter 14 noise and vibration).

It is also worth noting that that TAG does not include mental health, wellbeing and quality of life outcomes, yet a number of exposure response functions are being produced that could be used in such an analysis. Again this was the approach that Heathrow were taking prior to the suspension of their DCO work and it is disappointing that GAL have not taken such an approach in the current work given this work was discussed in the *Study on Fair and Equitable Distribution of Aircraft at Gatwick (2022)* commissioned by GAL. As a consequence the current assessment is likely to be an underestimate of the true health cost.

It is also important to note that the WHO and SoNA 2014 exposure response functions are steady-state relationships, reflecting the relationship between current noise exposure and annoyance. They do not reflect how people may respond if there is a change in exposure, which has led to criticism of their use in assessments dealing with airport expansion or airspace change including cost-benefit analyses such as TAG (Independent Commission on Civil Aviation Noise - Review of the Survey of Noise Attitudes 2019). ICCAN recommended that before and after studies of change in aviation noise are needed but studies have yet to be carried out for the UK context.

In view of the absence of before and after studies on change in aviation noise and its impact on annoyance, if the DCO is granted the council would suggest that such a study is commissioned by the airport to help UK aviation policy, inform future airport expansion plans, and help in its own work on the fair and equitable distribution of aircraft movements, and help meet local community concerns that existing surveys looking at noise impacts are too focused on Heathrow and do not take account of the more rural nature of Gatwick.

The outcomes of the work can also be acted on (if needed) via the airport's noise action plan, and the airport's proposed reviews of its noise envelope.

Air Noise - Compensation.

Impact: Neutral – if offered

Change Needed:

[14] Basner, M., and McGuire, S. (2018). "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep," Int. J. Environ. Res. Public Health 15, 519.

- Annual contribution of £1,300 (with annual CPI uplift) towards the council tax of all residential households within the 54 dB $L_{Aeq, 16hr}$ actual contour. Payment made following the publication of the actual contours for the previous year.

- Payments would be made only to residential properties built and addresses registered at the commencement of the project.

While the proposed noise envelope in theory (given current exemptions in practice) gives residents an indication that noise levels will get no worse, and the noise insulation scheme helps mitigate some of the worst impacts of noise especially at night (albeit residents are unable to open their windows), residents within the 54 dB $L_{Aeq, 16hr}$ contour and above during the day still have to cope with noise levels in their garden for example that are recognised by Government as likely to cause annoyance.

This impact was recognised by Gatwick in 2014 in their consultation document on an additional runway at Gatwick (April 2014), where it stated (p.65):

'In the past, big infrastructure projects have been criticised for not providing enough financial compensation to local communities. That is why we believe that our plans to reduce the impact of a second runway should include proposals to ensure that people most affected by expansion at Gatwick are compensated financially'.

The document also recognised the impact on people already living within an annoyance contour stating (p.69):
This proposed scheme would include homes already within the existing single runway's contour because we recognise that they would also be affected by intensification of traffic due to R2.

In view of the compensation scheme proposed in 2014 the council suggests that a similar scheme is introduced, given the passenger throughput at the airport delivered via the DCO is greater than or comparable to that under the options considered in 2014.

The 2014 scheme proposed a £1000 contribution towards the cost of the residential property's council tax, and a similar scheme is suggested for the DCO albeit with a CPI uplift to £1,300 in 2024.

It is also suggested that the scheme apply only to residential premises / addresses that are present at the commencement of the project, as any subsequent housing developments would be built in full knowledge of the consented development.

Required mitigation

Noise mitigation is required for both the construction and operational phases. The requirements and obligations proposed to secure the mitigation are listed in the following section.

Requirements and obligations

RBBC Noise 1: Construction Noise – Techniques
Hydraulic piling techniques to be used for any sheet piling work taking place in the vicinity of residential premises.

At this stage clarification sought as to why noisier vibratory piling needs to be used on the A23 London Road and A23 Brighton Road works.

Noise assessment has assumed the use of vibratory piling, therefore CoCP/ CEMP needs to be updated to prohibit the use of noisier percussive piling as currently no restriction on its use.

RBBC Noise 2: Construction Noise – Hours of work near residential premises
Core hours 08:00 to 18:00 Mon to Fri and Sat 08:00 to 13:00. No working Bank Holidays or Sundays.

Mobilisation upto 1 hour before and after core hours, with mobilisation activities defined as set out below. Note Mobilisation does NOT include lorry movements into or out of sites.

Timings and definition of mobilisation need to be updated in Code of construction practice.
Mobilisation to be defined as follows:
Arrival and departure of the workforce at the site and movement to and from places of work (if parked engines shall be turned off and staff shall be considerate towards neighbours with no loud music or raised voices); general refuelling (from jerry cans only, use of fuel tractors and bowsers shall be limited to standard working hours); site inspections and safety checks, site meetings (briefings and quiet inspections / walkovers); site clean up (site house keeping that does not require the use of plant); site maintenance; and low key maintenance and safety checking of plant and machinery (providing this does not require or cause hammering or banging, etc). Mobilisation does NOT include lorry movements into or out of sites.

RBBC Noise 3: Construction Noise Extended working hours near residential
Extended hours on Saturday limited to 17:00 not 22:00.
Timings updated in code of construction practice.

RBBC Noise 4: Construction Noise Night Working and 24/7 Working Hours where audible at Residential premises.
Code of construction practice needs to be clear i.e. updated that any overnight works (after 22:00) will need to be notified to the relevant local planning authority including on the strategic road network, and the authority needs to be notified well in advance of such works.

RBBC Noise 5: Construction Noise Night Working and 24/7 Working Hours – raised night time SOAEL to be justified.
Applicant needs to supply evidence from road noise monitoring late at night (01:00 to 04:00) that there are no breaks in road traffic noise to validate decision to raise LOAEL /SOAEL to 60 dB.

Information to be provided prior to DCO. If not provided then SOAEL remains at 55 dB with consequential follow on for noise insulation measures.

RBBC Noise 6: Construction Noise Securing Mitigation measures used in the Noise Assessment.
CoCP needs to be updated to state that equipment selected and use of such equipment will need to achieve BPM as defined in BS5228 BPM Noise Mitigation Measures.

Equipment will need to achieve a minimum 5db reduction over standard equipment (para 14.9.49 chapter 14). This includes (but not restricted to) sheet piling, breakers, bulldozer, compactors, cranes, dump trucks, dumpers, excavators, graders, loaders etc.

Specifying in the CoCP the need for noise barriers including a minimum height at the following sites:
A23 Brighton Road Bridge – along the southern side of the utilities diversion bridge.
A23 London Road Bridge – along the eastern side of the temporary footpath.
Airport Way Rail Bridge – on the northern side of the eastbound carriageway.
Car Park X – along the southern site boundary.

RBBC Noise 7: Construction Noise - Noise Insulation / Temporary Rehousing Trigger levels
Confirmation from the applicant if night, for the purposes of noise, is defined as 18:00 to 07:00, or more commonly 22:00 to 07:00.

Noise insulation trigger values and temporary rehoming values in the code of construction practice are updated as per RBBC noise table 1, with possible extension of the 'Any day' values to the 6pm to 10 pm period subject to GAL response.

RBBC Noise 8: Construction Noise - Overheating risk Overnight during the summer.
Code of construction practice updated to offer residents where noise levels between 22:00 and 07:00 fall between the LOAEL and the SOAEL (or above the SOAEL) the option of overnight accommodation with air conditioning (at no cost) where overnight working is planned on two or more consecutive nights and where daytime temperatures are forecast to be at or above 27 C.

RBBC Noise 9: Operational Noise – Road Traffic noise in noise important area / Area above SOAEL.
Installation of a noise barrier (2m minimum) from the Longbridge roundabout to the proposed new junction with the A23 London Road.

DCO requirement.

RBBC Noise 10: Operational Noise – Road Traffic noise.
A low noise surface to be used on A23 London Road (as a minimum), A23 Airport Way, and out to Junction 9 with the M23.

DCO requirement / road surface specification in CoCP.

RBBC Noise 11: Operational Noise – Fixed Plant.
The council is not aware that it has agreed to the approach being taken in relation to fixed plant and BS4142 (para 7.1.3 appendix 14.9.3) and would state that with any new fixed plant there should be no increase in noise above the levels already being created including during the periods that there are breaks in aviation ground and air noise when there is the potential for other plant to become noticeable. This is especially the case at night.

Clarification and agreement – inclusion in CoCP.

RBBC Noise 12: Operational Noise – Ground Noise

A number of issues with the ground noise model discussed in main text suggests a major reworking of this section is needed.

Production of ground noise contour maps ($L_{Aeq,T}$ and L_{Amax}) for the assessment years as done for road traffic noise and air noise.

Slow transition case needs to be modelled as any ground noise insulation scheme should be based on the realistic worst case as a precautionary measure.

Production of contours to inform DCO process.

RBBC Noise 13: Operational Noise – Ground Noise
Houses that need insulation should be identified prior to the commencement of the project opening (currently 2029) and insulated, not after the project has opened.

Commitment to annual monitoring of the combined air noise and ground noise levels at specified locations to check no additional properties would qualify for noise insulation.

Commitments in the noise insulation scheme.

RBBC Noise 14: Operational Noise – Air Noise Underestimate of potential Health Impact.
Sensitivity analysis to examine the impact of the WHO night time LOAEL of 40 dB $L_{Aeq\ 8hr}$ and associated exposure response functions compared to 45 dB $L_{Aeq\ 8hr}$ as used in the current work, including in the health assessment.

Production of work to inform DCO process and level of underestimation of health impact.

RBBC Noise 15: Operational Noise – Air Noise Night Movement Cap
A movement cap in the core (23:30 to 06:00) night period of 11,200 movements over the 218 day summer period and 3,250 movements in the winter period.

As a minimum the current DfT night noise regime (December 2023) needs to be transposed into the DCO as a requirement, stating that movements in the core night period 23:30 to 06:00 will not exceed this level in view of airport's wish expressed elsewhere that movement limits are removed.

DCO Requirement

RBBC Noise 16: Operational Noise – Air Noise Insulation Scheme (Day)
Inner zone noise insulation scheme needs to be extended from the 63 dB $L_{Aeq\ 16h}$ standard mode contour at present to the full single mode easterly and westerly 60dB $L_{Aeq\ 16h}$ noise contour of the expanded airport.

Agreed at examination and included in Noise insulation scheme.

RBBC Noise 17: Operational Noise – Air Noise Insulation Scheme (Night) - Event based Metric for SOAEL.
Inner zone noise insulation contour at night based on ONE event awakening contour.

Agreed at examination and included in Noise insulation scheme.

RBBC Noise 18: Operational Noise – Air Noise Insulation Scheme Overheating
Noise insulation measures also need to include an over heating risk assessment and include appropriate mitigation measures.

Included In noise insulation scheme.

RBBC Noise 19: Operational Noise – Air Noise Insulation Scheme Overheating - Mitigating overheating risk where identified.
Insulation scheme needs to cover the cost of both active (e.g. air conditioning) and passive measures such as blinds.

Included in noise insulation scheme.

RBBC Noise 20: Operational Noise – Air Noise Insulation Scheme Ventilators
The insulation scheme needs to cover the on going repair / replacement / servicing costs of the ventilators, given a key part of the airports mitigation strategy.

Included in noise insulation scheme.

RBBC Noise 21: Operational Noise – Air Noise Insulation Scheme Post Installation check
Noise insulation scheme to include post installation monitoring to ensure measures provided work in practice to reduce internal noise to an acceptable level.

Included in noise insulation scheme.

RBBC Noise 22: Operational Noise – Noise Envelope – Use of Central Case Scenario
Envelope needs to be based on central case not slow transition case as proposed.

Agreed via DCO and noise envelope document.

RBBC Noise 23: Operational Noise – Noise Envelope – no increase in noise exposure.
Noise improvements need to be locked in at each envelope review stage so there is an ongoing reduction in the area of the noise envelope and it is not allowed to increase contrary to current proposals. This is especially important while properties remain above the SOAEL, and on set of community annoyance.

Agreed via DCO and included in noise envelope document.

RBBC Noise 24: Operational Noise – Noise Envelope – Additional Primary control metric
Additional Primary control noise contour at night based on annual average (L_{night}) night contours to manage noise outside of summer period.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 25: Operational Noise - Noise Envelope - Additional primary night metric

Additional primary control noise contour at night based on an event metric i.e. the area of the 1 event 'awakening' contour.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 26: Operational Noise - Noise Envelope - Control metric to prevent noise deterioration at worst affected properties.
Noise envelope to include 60 dB $L_{eq,\ 16\ hour}$ or 63 dB $L_{eq,\ 16\ hour}$ and night time 55 dB $L_{eq,\ 8\ hour}$ as a primary metric for the noise envelope or capable of being promoted to a primary metric in the event that the contour areas increase.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 27: Operational Noise - Noise Envelope - Criteria to trigger 2nd round of noise envelope.
The 2038 proposals for the envelope are to apply nine years after opening, 2038, 382,000 commercial movements or 384,600 total **RBBC Noise 27: Operational Noise - Noise Envelope -** movements – whichever occurs first.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 28: Operational Noise - Noise Envelope - Removal of exemptions.
The clauses around airspace change and low carbon aircraft (appendix 14.9.7 section 6.5 and 6.6 and para 8.1.4) to be removed.

If clauses are to remain then following clause to be added.

In the event that the health / annoyance noise exposure response functions change then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area.

For example if the LOAEL that GAL have proposed at 51 dB $L_{Aeq,\ 16hr}$ is subsequently defined as 48 dB $L_{Aeq,\ 16hr}$ then the area currently assigned to the 51 dB $L_{Aeq,\ 16hr}$ would be assigned to the 48 dB $L_{Aeq,\ 16hr}$.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 29: Operational Noise - Noise Envelope - Health clause if carbon and FASI clauses to remain.
The following clause is to be added to the noise envelope control document if the FASI and carbon exemptions (appendix 14.9.7 section 6.5 and 6.6 and para 8.1.4) remain in noise envelope.

*In the event that the health / annoyance noise exposure response functions change then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area. e.g. i*f the LOAEL that GAL have proposed at 51 dB $L_{Aeq,\ 16hr}$ is subsequently defined as 48 dB $L_{Aeq,\ 16hr}$ then the area currently assigned to the 51 dB $L_{Aeq,\ 16hr}$ would be assigned to the 48 dB $L_{Aeq,\ 16hr}$.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 30: Operational Noise - Noise Envelope – Update to Project Objective
Project noise objective (para 14.9.190) needs to include: *The benefits of future technological improvements with regards to noise will be shared fairly between the industry and local communities.*

This is in line with the Airports NPS para 5.60, and CAP 1129.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 31: Operational Noise - Noise Envelope – Enforcement of the Envelope.
Significant amount of work required around the enforcement mechanism, e.g. have CAA agreed to role proposed by GAL

Enforcement role needs to be by local planning authority, with appropriate powers to enforce against the airport.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 32: Operational Noise - Noise Envelope – Airport Sanctions and compensation to residents in event of breach.
If the noise envelope is breached in the previous 12 months then the airport is not permitted to declare further capacity for additional air traffic movements from the airport or release new slots as opposed to the 24 months currently proposed.

Given the rate at which the airport forecast to grow the current scheme means significant growth could have occurred with the problem on going, given at present the only requirement is for the airport to produce an action plan.

In the event of a breach there also needs to be a compensation payment to the local community paid direct to residents within the actual contour area.

Agreed via DCO / Noise Envelope Document.

RBBC Noise 33: Operational Noise - Air Noise - TAG Assessment - Under estimate of health cost.
Applicant to undertake a sensitivity test using updated exposure response functions e.g. 2018 WHO ERFs, to ascertain the potential variability in the TAG assessment methodology. Assessment to also include noise ERFs for mental health, wellbeing and quality of life.

GAL to also undertake a noise survey to examine community annoyance before and after airport expansion works. Survey to be designed with academic partners in a similar vein to the UK SONA study but focused solely on Gatwick.

First assessment completed to inform the DCO process.
Second assessment work completed as part of the development works secured for example via s106.

RBBC Noise 34: Operational Noise - Air Noise - Community Annoyance – Compensation.

Annual contribution of £1,300 (with annual CPI uplift) towards the council tax of all residential households within the 54 dB $L_{Aeq, 16hr}$ actual contour.

Payment made following the publication of the actual contours for the previous year.

Payments would be made only to residential properties built and addresses registered at the commencement of the project.

DCO requirement / s106.

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
RBBC Noise 1	Piling techniques	C	N	Hydraulic piling techniques to be used for any sheet piling work taking place in the vicinity of residential premises. At this stage clarification sought as to why noisier vibratory piling needs to be used on the A23 London Road and A23 Brighton Road works. Noise assessment has assumed the use of vibratory piling, therefore CoCP/ CEMP needs to be updated to prohibit the use of noisier percussive piling as currently no restriction on its use.	
RBBC Noise 2	Working hours near residential	C	N	Working near residential premises on Horley Gardens Car Park B, Car Park Y, Longbridge Roundabout: Core hours 08:00 to 18:00 mon to Fri and 08:00 to 13:00 Sat. No working Bank Holidays or Sundays. Mobilisation upto 1 hour before and after core hours, with mobilisation activities defined as set out in main text of response. Note Mobilisation does	RBBC working hours, Thames Tideway DCO

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				NOT include lorry movements into or out of sites. Timings and definition of mobilisation need to be updated in Code of construction practice.	
RBBC Noise 3	Extended working hours near residential	C	N	Extended hours on Saturday limited to 17:00 NOT 22:00. Timings updated in code of construction practice.	RBBC working hours / Thames Tideway DCO
RBBC Noise 4	Night Time Working near residential	C	N	Code of construction practice needs to be clear that any overnight works (after 22:00) will need to be notified to the relevant local planning authority including on the strategic road network, and the authority needs to be notified well in advance of such works. Update to CoCP.	
RBBC Noise 5	Raised night time SOAEL to be justified	C	N	Applicant needs to supply evidence from road noise monitoring late at night (01:00 to 04:00) that there are no breaks in road traffic noise to validate	Applicability of BS5228

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				decision to raise LOAEL /SOAEL to 60 dB. Info provided prior to DCO. If not provided SOAEL remains at 55 dB with consequential follow on for insulation.	
RBBC Noise 6	Securing mitigation measures assumed in construction noise modelling in the CoCP	C	N	CoCP needs to be updated to reflect fact that: Equipment selected and use of such equipment will need to achieve BPM as defined in BS5228 BPM Noise Mitigation Measures. Equipment will need to achieve a minimum 5db reduction over standard equipment (para 14.9.49 chapter 14). For example 5dB reduction applied to sheet piling, breakers, bulldozer, compactors, cranes, dump trucks, dumpers, excavators, graders, loaders etc. Noise barriers including minimum heights need to be specified in CoCP including on:	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				A23 Brighton Road Bridge – along the southern side of the utilities diversion bridge. A23 London Road Bridge – along the eastern side of the temporary footpath. Airport Way Rail Bridge – on the northern side of the eastbound carriageway. Car Park X – along the southern site boundary. Needs to be specified in CoCP.	
RBBC Noise 7	Noise Insulation / Temporary Rehousing Trigger levels	C	N	Noise trigger levels to be updated within CoCP so more clearly defined. Values in RBBC noise table 1 to be applied in CoCP, with possible extension of the 'Any day' values to the 6pm to 10 pm period subject to GAL response.	Thames Tideway development (Off site mitigation and compensation policy)
RBBC Noise 8	Alternative night time accommodation if daytime temperature over 27 C.	C	N	Code of construction practice updated to offer residents where noise levels between 22:00 and 07:00 fall between the LOAEL and the SOAEL (or above the SOAEL) the option of overnight	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				accommodation with air conditioning (at no cost) where overnight working is planned on two or more consecutive nights and where daytime temperatures are forecast to be at or above 27 C. Specified in CoCP	
RBBC Noise 9	Road Traffic noise in noise important area / Area above SOAEL	O	N – as levels remain above SOAEL	Installation of a noise barrier (2m minimum) from the Longbridge roundabout to the proposed new junction with the A23 London Road. Requirement in DCO	
RBBC Noise 10	Road Traffic noise in noise important area / Area above SOAEL	O	N – as levels remain above SOAEL	Installation of low noise road surface on A23 London Road and airport way to the M23. Requirement in DCO / Specified for the road surface in the CoCP.	
RBBC Noise 11	Fixed Plant – methodology checks / changes	O	N - potentially	Use of BS 4142 needs to be clarified especially in relation to night noise. Clarification and agreement – then in CoCP	BS 4142:2014+A1:2019

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
RBBC Noise 12	Ground Noise modelling – number of issues including lack of noise contours.	O	N	A number of issues with the ground noise model discussed in main text suggests a major reworking of this section is needed. Production of ground noise contour maps ($L_{Aeq,T}$ and L_{Amax}) for the assessment years as done for road traffic noise and air noise. slow transition case needs to be modelled as any ground noise insulation scheme should be based on the realistic worst case as a precautionary measure. Produced to inform DCO application.	
RBBC Noise 13	Ground Noise Insulation. Properties at risk of noise impact from DCO not insulated before opening.	O	N	Houses that need insulation should be identified prior to the commencement of the project opening (currently 2029) and insulated, not after the project has opened. Commitment to annual monitoring of the combined air noise and ground noise levels at specified locations to	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				check no additional properties would qualify for noise insulation. Commitments in the noise insulation scheme.	
RBBC Noise 14	Air Noise: Underestimate of potential Health Impact.	O	N	Sensitivity analysis to examine the impact of the WHO night time LOAEL of 40 dB $L_{Aeq\ 8hr}$ compared to 45 dB $L_{Aeq\ 8hr}$ as used in the current work, including in the health assessment. Study to inform level of underestimation of health impact.	
RBBC Noise 15	Air Noise (Night). Need for a night movement cap in the DCO.	O	N	A movement cap in the core (23:30 to 06:00) night period of 11,200 movements over the 218 day summer period and 3,250 movements in the winter period. As a minimum the current DfT night noise regime (December 2023) needs to be transposed into the DCO as a requirement, stating that movements in the core night period 23:30 to 06:00 will not exceed this level.	Current (2023) DfT Night Noise Policy at Designated airports.

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				DCO Requirement	
RBBC Noise 16	Air Noise Insulation scheme (Day) – need to reflect government policy and recent DCO decisions.	O	N	Inner zone noise insulation scheme needs to be extended from the 63 dB $L_{Aeq\ 16h}$ standard mode contour at present to the full single mode easterly and westerly 60dB $L_{Aeq\ 16h}$ noise contour of the expanded airport. Agreed at examination and included in Noise insulation scheme.	Revised Draft Airports National Policy Statement, October 2017 / Manston Decision.
RBBC Noise 17	Air Noise (Night) Insulation Scheme. Needs to be based on event based metric (one awakening contour).	O	N	Inner zone noise insulation contour at night also based on ONE event awakening contour. Agreed at examination and included in Noise insulation scheme.	DfT night noise comment on 'averaging' metrics / Proposed Noise insulation policy at Heathrow
RBBC Noise 18	Air Noise Insulation Scheme – Overheating Risk.	O	N	Noise insulation measures also need to include an over heating risk assessment and include appropriate mitigation measures. In noise insulation scheme	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
RBBC Noise 19	Air Noise Insulation Scheme – Mitigating overheating risk where identified.	O	N	Insulation scheme needs to cover the cost of both active (e.g. air conditioning) and passive measures such as blinds. In noise insulation scheme	
RBBC Noise 20	Air Noise Insulation Scheme – on going repair / replacement / servicing.	O	N	The insulation scheme needs to cover the on going repair / replacement costs of the ventilators, given a key part of the airports mitigation strategy. In noise insulation scheme.	
RBBC Noise 21	Air Noise Insulation Scheme – monitoring post installation to conform effectiveness..	O	N	Noise insulation scheme to include post installation monitoring to ensure measures provided work in practice to reduce internal noise to an acceptable level. In noise insulation scheme.	
RBBC Noise 22	Air Noise: Noise Envelope – need to use central case as control point.	O	N	Envelope needs to be based on central case not slow transition case as proposed.	Airports NPS para 5.60/ CAP 1129

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				Via DCO and noise envelope document.	
RBBC Noise 23	Air Noise: Noise Envelope. Noise climate not allowed to deteriorate.	O	N	Noise improvements need to be locked in at each envelope review stage so there is an ongoing reduction in the area of the noise envelope and it is not allowed to increase contrary to current proposals. Noise Envelope Document	Airports NPS para 5.60/ CAP 1129
RBBC Noise 24	Air Noise: Noise Envelope. Additional Primary control metric to cover full year not just summer.	O	N	Additional Primary control noise contour at night based on annual average (L_{night}) night contours to manage noise outside of summer period. DCO / Noise Envelope Document	CAP 1129
RBBC Noise 25	Air Noise: Noise Envelope. Additional primary night metric based on events to protect health.	O	N	Additional primary control noise contour at night based on an event metric i.e. the area of the 1 event 'awakening' contour DCO / Noise Envelope Document	CAP1129

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
RBBC Noise 26	Air Noise: Noise Envelope. Control metric to prevent noise deterioration at worst affected properties	O	N	60 dB $L_{eq,\ 16\ hour}$ or 63 dB $L_{eq,\ 16\ hour}$ and night time 55 dB dB $L_{eq,\ 8\ hour}$ need to be primary metric for noise envelope or capable of being promoted to a primary metric in the event that the contour areas increase. DCO / Noise Envelope Document	
RBBC Noise 27	Air Noise: Noise Envelope. Criteria to trigger 2nd round of noise envelope.	O	N	The 2038 proposals for the envelope apply nine years after opening, 2038, 382,000 commercial movements or 384,600 total movements – whichever occurs first. DCO / Noise Envelope Document	
RBBC Noise 28	Air Noise: Noise Envelope. Removal of exemptions	O	N	Clauses around airspace change and low carbon aircraft (appendix 14.9.7 section 6.5 and 6.6 and para 8.1.4) to be removed. If clauses are to remain then following clause to be added. In the event that the health / annoyance noise exposure response	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				functions change then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area. For example if the LOAEL that GAL have proposed at 51 dB $L_{Aeq, 16hr}$ is subsequently defined as 48 dB $L_{Aeq, 16hr}$ then the area currently assigned to the 51 dB $L_{Aeq, 16hr}$ would be assigned to the 48 dB $L_{Aeq, 16hr}$. DCO / Noise Envelope Document.	
RBBC Noise 29	Air Noise: Noise Envelope. Health clause if carbon and FASI clauses to remain	O	P – if implemented	Clause to add if FASI and carbon exemptions remain in noise envelope. In the event that the health / annoyance noise exposure response functions change then within five years the noise envelope contours will be updated to reflect these changes which may necessitate a reduction in the noise contour area. e.g. if the LOAEL that GAL have proposed at 51 dB $L_{Aeq, 16hr}$ is subsequently defined as 48 dB $L_{Aeq, 16hr}$ then the area currently assigned	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
				to the 51 dB $L_{Aeq, 16hr}$ would be assigned to the 48 dB $L_{Aeq, 16hr}$. DCO / Noise Envelope Document.	
RBBC Noise 30	Air Noise: Noise Envelope. Update to project objective.	O	N – if implemented	Project noise objective (para 14.9.190) needs to include: The benefits of future technological improvements with regards to noise will be shared fairly between the industry and local communities. DCO / Noise Envelope Document.	Airports NPS para 5.60/ CAP 1129
RBBC Noise 31	Air Noise: Noise Envelope. Enforcement of Envelope.	O	N	Significant amount of work required around the enforcement mechanism, e.g. have CAA agreed to role Enforcement role needs to be by local planning authority, with appropriate powers to enforce against the airport. DCO / Noise Envelope Document.	
RBBC Noise 32	Air Noise: Noise Envelope.	O	N.	If noise envelope breached in previous 12 months airport not permitted to declare further capacity for additional air traffic movements from the airport	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
	Airport Sanctions and compensation to residents in event of breach.			or release new slots as opposed to the 24 months currently proposed. Given rate airport forecast to grow, current scheme means significant growth could have occurred, with the problem on going given the only requirement is for the airport to produce an action plan. In event of breach needs to be a compensation payment to the local community paid direct to residents within the actual contour area. DCO / Noise Envelope Document.	
RBBC Noise 33	Air Noise: TAG Assessment. Under estimate of health cost.	O	N	Sensitivity test undertaken using updated exposure response functions. GAL to undertake noise survey to examine community annoyance before and after airport expansion works. Survey to be designed with academic partners in a similar vein to the UK SONA study but focused solely on Gatwick.	

Summary of impacts – Noise Reigate and Banstead BC					
Ref	Description of Impact	Construction (C) / Operation (O)	Negative (N) /Neutral (Neu) /Positive (P)	Required mitigation and how to secure it (change/requirement/ obligation)	Policy context
RBBC Noise 34	Air Noise: General. Community Annoyance. Compensation in line with GALs 2014 proposals	O	N	Annual contribution of £1,300 (with annual CPI uplift) towards the council tax of all residential households within the 54 dB $L_{Aeq, 16hr}$ actual contour. Payment made following the publication of the actual contours for the previous year. Payments would be made only to residential properties built and addresses registered at the commencement of the project. DCO requirement / s106	GALs 2014 Runway 2 Consultation. Exemption of air noise from nuisance action.

Tandridge District Council – Noise and vibration impacts and mitigation

INTRODUCTION

1. In our Relevant Representation (RR-4487) we highlighted that we had significant concerns about the effects of noise on the Tandridge District. This Local Impact Report does consider other forms of noise but air noise has the single greatest impact on the District. We are concerned about the impacts and how they will be controlled through the noise envelope; mitigated by operational planning; and the effectiveness of the noise insulation scheme at preventing exposure to noise and at the same time not increasing adverse health effects due to degradation in indoor air quality and overheating episodes.

2. In drafting this Local Impact Report we have considered the information presented thus far. In our Relevant Representation we noted our concern with the way in which some of this was produced and that understanding of the impacts could have been improved through further studies, including the provision of single mode operation noise contours for the assessment years for each of the primary and secondary metrics. These contours would have helped inform how the residents would experience the sound on a given day. Therefore, we consider that at this time our ability to properly understand the impacts is restricted due to the limitations of the Promoter's (Gatwick Airport) work and the information made available.

3. We continue to believe that in addition to what the Promoter describes as the primary metrics (the day L_{Aeq16h} and the night L_{Aeq8h}), the secondary metrics, including the Number of events above 65 L_{Asmax} (day) and Number of events above 60 L_{Asmax} (night), the number of overflights may be equally important when considered singly or in conjunction. Furthermore, the number of awakenings are at least as important as the L_{Aeq8h} and need to be given equal weight .

4. As we explain in more detail later the District lies below the final approach and a number of noise preferential routes and so it is impacted whichever mode of runway operation occurs.

5. We have also considered the way in which the information has been presented. In some cases we disagree with the expression of the impact, for example the way additional awakenings has been described. We also consider that due to the uncertainties around the baseline forecasting the impact of growth may be understated.

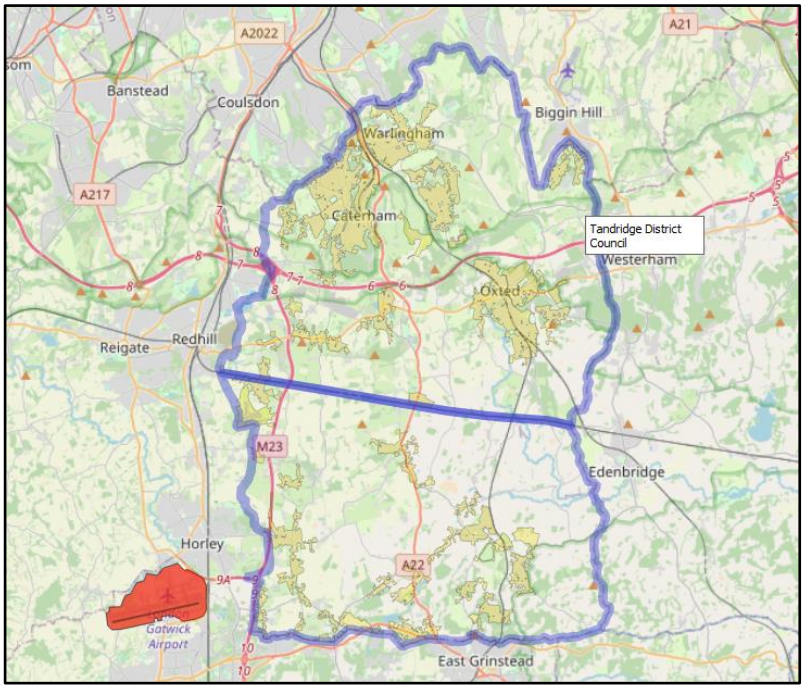
6. While the impacts have been expressed by the Promoter on the basis only of the additional amount of impact arising as a result of the northern runway, we consider that the baseline growth, which is uncontrolled through any other process, also needs to be taken into consideration. This is consistent with the Environmental Impact Assessment Regulations 2017 and the toxicological dose response to noise adopted within the UK. Were this a chemical agent that were causing harm rather than noise then an additional dose that caused even greater harm in addition to that already being caused would not be permitted.

7. Due to these factors this has presented difficulty in assessing the likely impact and we have made reasonable endeavours based on the information presented but given the partial nature cannot attest that all impacts have been identified or satisfactorily described.

THE DISTRICT IN RELATION TO THE PROPOSAL.

8. To help understand the effects of noise on the District Figure TD1 below shows the boundary of the District in relation to the airport. The airport is shown in red at the bottom left of the figure. The main towns and villages are highlighted in pale yellow to clearly distinguish them from the rural areas of the District. The rural areas are also populated but with a lower density. The East - West bisecting rail line is highlighted.

Figure TD1: The District In Relation to the airport.



9. The boundary of the project extends to and includes the junction of the spur road with the M23 as shown in TD2a below. There is a small incursion into the District, the boundary of which is shown in blue if Figure TD2b):

Figure TD2a Project boundary at M23 junction

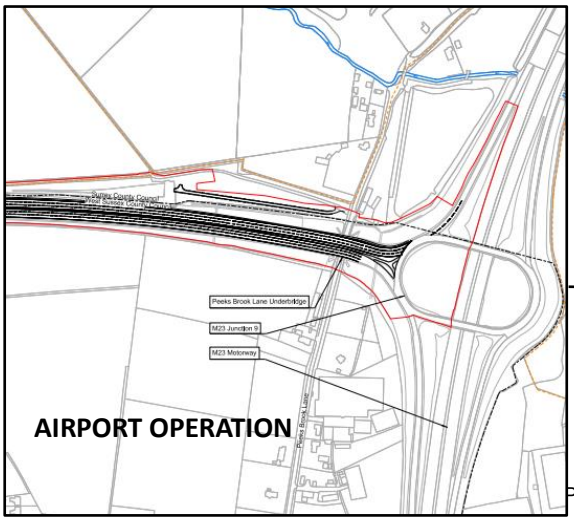
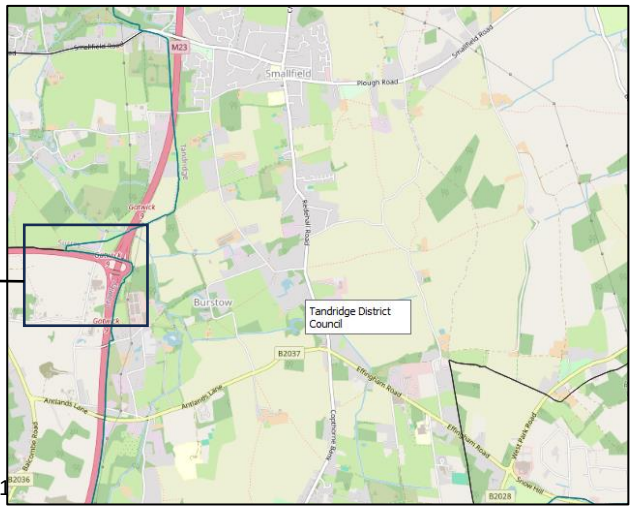


Figure TD2b District Boundary & Junction



10. Arriving and departing aircraft use specific routes dependent on the wind direction. The airport operates in two modes: Easterly and Westerly. The aircraft radar tracks for operation in these directions is shown in Figures TD3 -6 below. (Source : [redacted]

Figure TD3: The track for a typical 24 hour Westerly Operation.

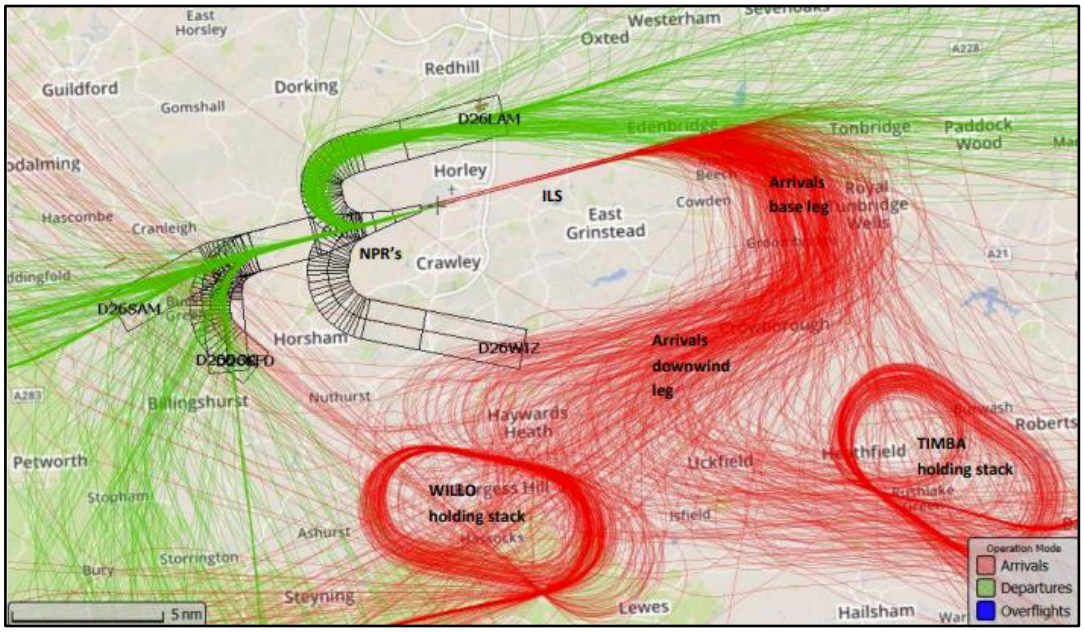


Figure TD4: The density for a typical 24 hour Westerly Operation.

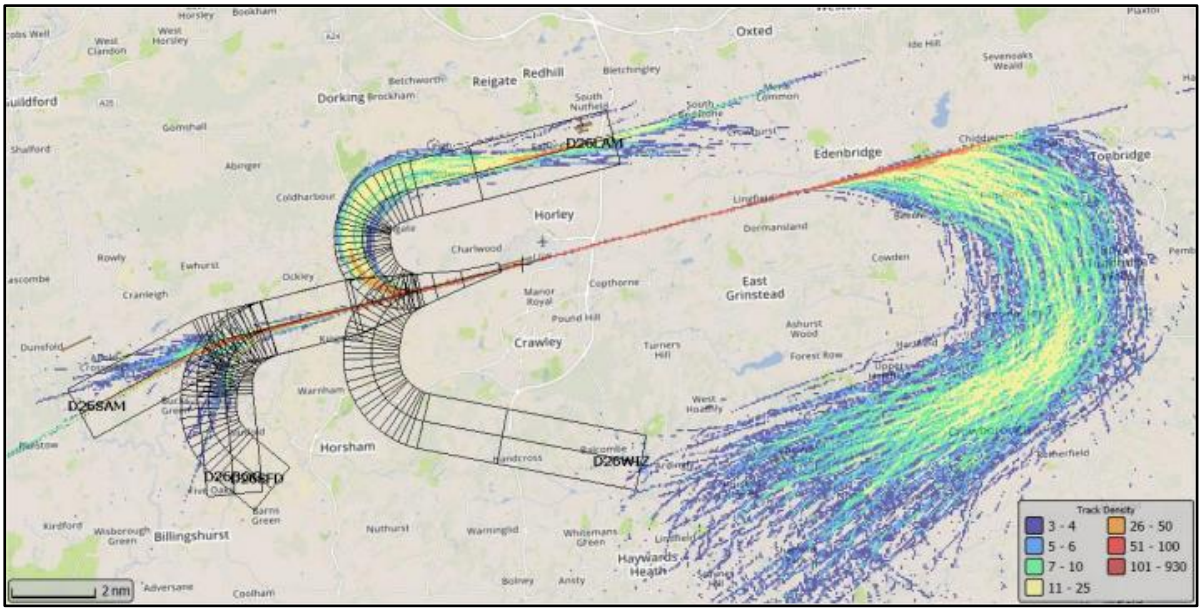


Figure TD5: The track for a typical 24 hour Easterly Operation.

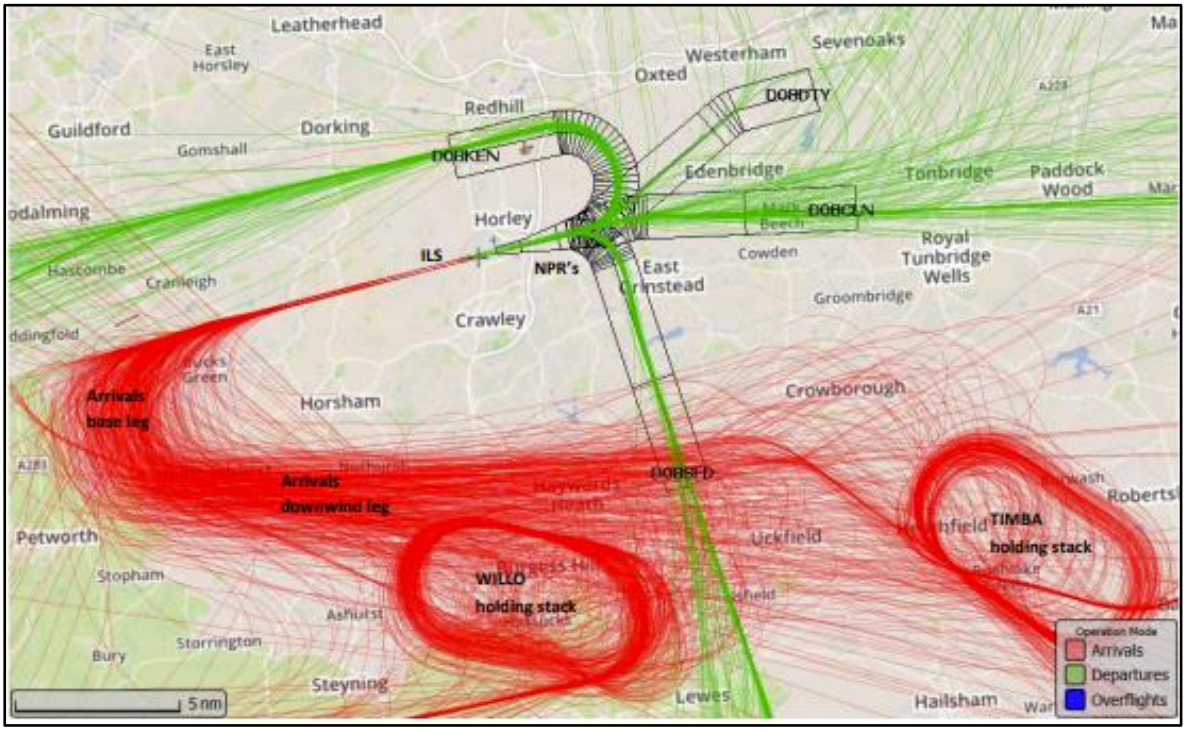
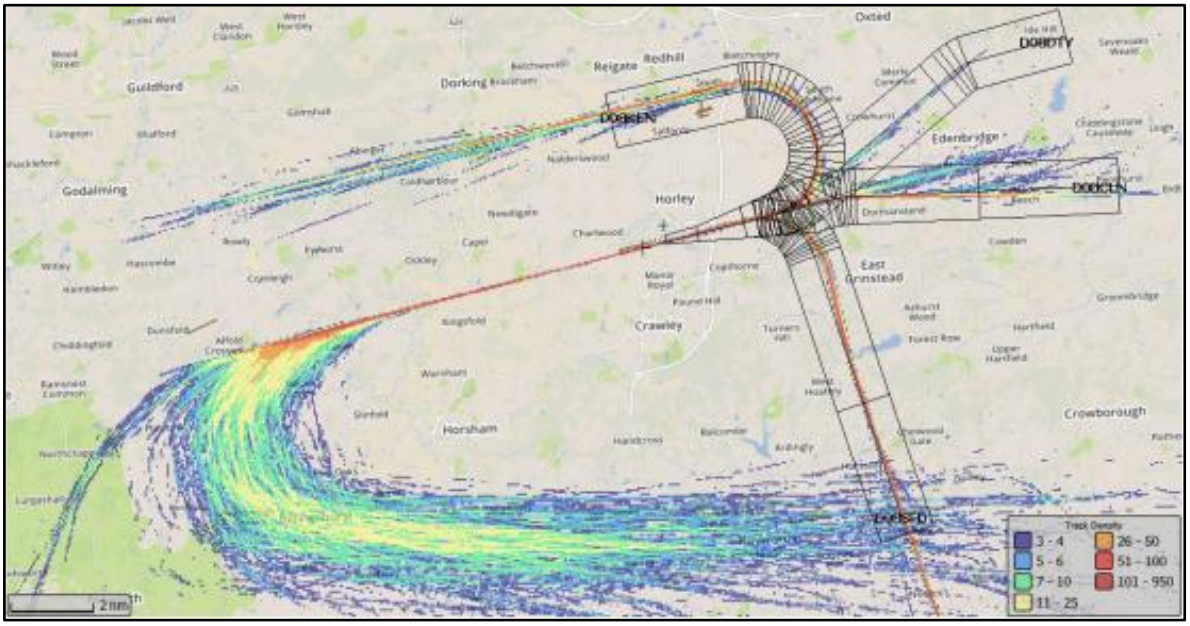
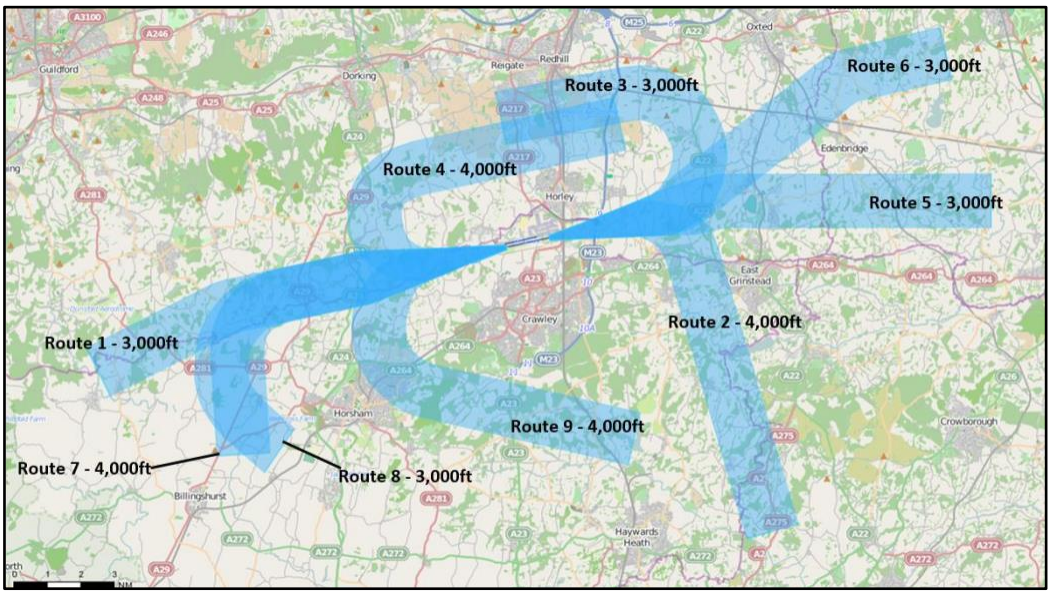


Figure TD6: The density for a typical 24 hour Easterly Operation.



11. The defined noise preferential (and hence standard instrument departure) routes dictate where the noise will be experienced. Their location is shown in Figure TD7 below.

    Figure TD7: The Standard Instrument Departure Routes (S.I.D.) for Gatwick:



12. The altitude shown on each route is the minimum release height that Air Traffic Control at the Gatwick Control Tower can release an aircraft from the S.I.D.. The release is a conscious decision of Air Traffic Control and is not at the request of the pilot or the airlines.

13. The actual airport operations for each of the routes, as they relate to the area of Tandridge district is explained below:

    In brief for Westerly Operations:
    Departures

    - There are no departures across Tandridge district.
    - However, route 4 wraps around to the North of the airport parallel to the runway and the aircraft fly over the Tandridge area.

    Arrivals

    - All arrivals fly over the Tandridge district as this is the final approach. The majority of the aircraft approach from Sussex and Kent. There are two holding stacks called Willo and Timba over Sussex that provide a queuing mechanism to hold aircraft in flight when there is congestion.

    In brief for Easterly Operations:
    Departures

    - Aircraft depart along the Noise Preferential Routes 3,6,5,2 (from North to South)

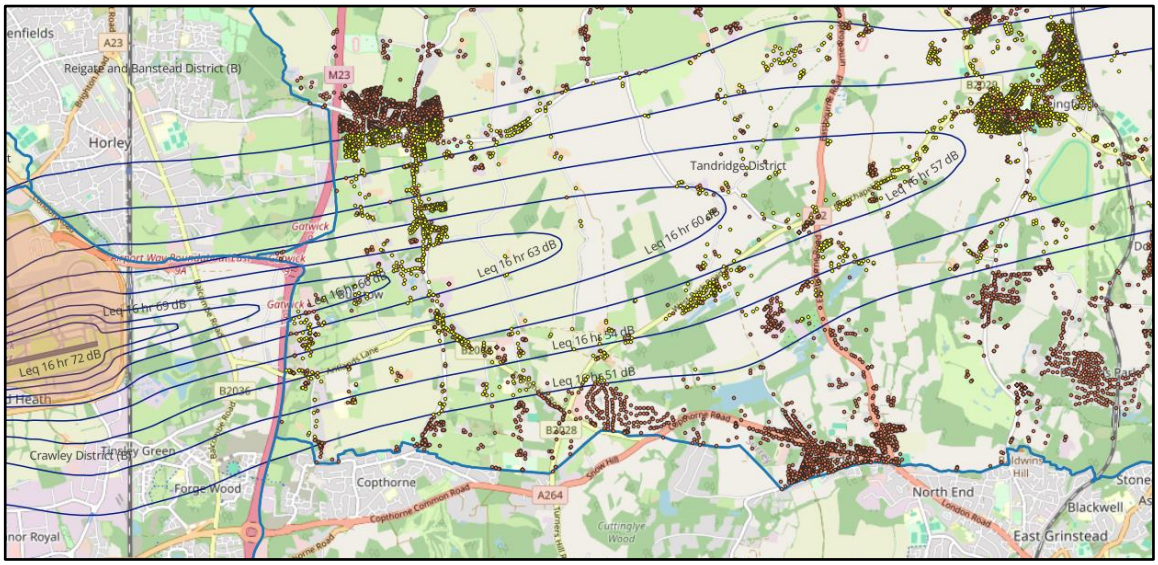
Arrivals

- Arrivals do not interact with the airspace over Tandridge.

The Extent of Noise Across the District

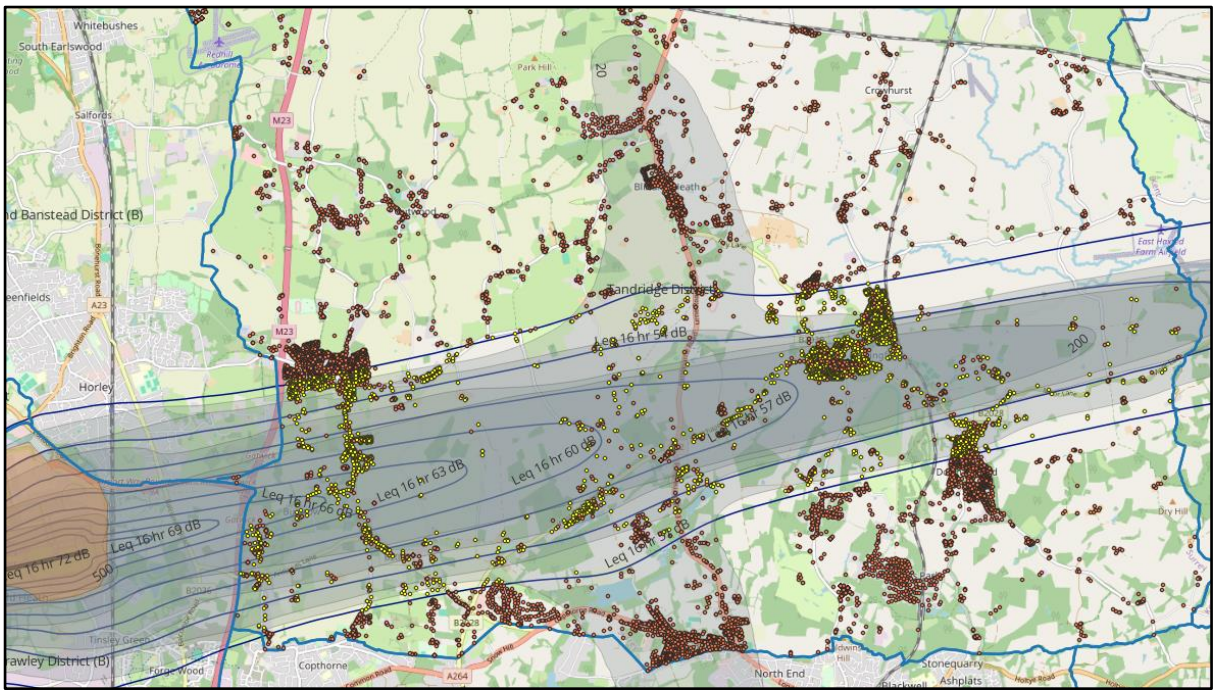
14. The nearest residential properties to the airport are in Burstow at 1.1 miles (1.8 km) East of the airport boundary. The 2019 noise contours are shown in Figure TD8 below. There are approximately 3850 properties that are within all the plotted contours and will experience noise from aircraft (this is plotted to the 51 dB $L_{Aeq,\ 16h\ day}$ contour). It is not presently possible to plot noise thresholds below this level as they are not available.

Figure TD8: 2019 Noise Contours and Residential Properties.



15. However, when taking into consideration the N65 it can be seen how the Leq is less sensitive to aircraft events during the day (the original L_{Aeq} is shown in blue and the grey shows the extent of the N_{65}).

Figure TD9: The 2019 $L_{Aeq,16h\ day}$ vs N_{65} contours.



16. It can be seen that the effect of air noise according to these metrics is restricted to the area South of the rail line and extends fully East to West of the District

17. Generally, the further the aircrafts are from the airport the greater the dispersal and the higher the altitude.

CATEGORIES OF NOISE CONSIDERED BY THIS LOCAL IMPACT REPORT

18. Gatwick Airport Ltd have specified categories of noise for consideration. These are shown below and this element of the Tandridge District Council local impact report considers the impacts of noise from the following:

    - Construction
    - Road Traffic: construction and operational
    - Ground Noise
    - Fixed Plant Noise
    - Air Noise

Gatwick Study Area

19. The study area for all ground noise (ground, fixed plant and construction noise) and the sensitive receptors is defined in Environmental Statement Chapter 14 - [APP-039 / 14.4.15]. Figure 14.4.2 [APP-063]. There is no specific receptor area defined for Tandridge District as it is considered to be outside the location of SOAEL and well within the LOAEL range for all forms of ground noise.

20. In considering the more widespread effects associated with air noise, a much larger study area is defined up to 20km (12 miles) from the airport for air noise and overflights were considered to 56 km (35 miles). This study area incorporates the Tandridge District with the exception of a small part at the North East tip which is outside the air noise study area but there are no effects near this location.

21. According to the Environmental Statement, air noise as measured by the primary and most of the secondary metrics affects a swathe to the south of the East – West rail line connecting Sevenoaks and Redhill. This is due to arriving and departing aircraft, the tracks of which are shown in Figures TD 3 and 5 previously.

22. However, when reviewing overflights (those aircraft below 7,000' that can be seen overhead within an angle of 48.5 degrees) then the influence of the airport extends to the M25 albeit at comparatively low numbers. It is recognised that this is not an absolute measure of noise but it gives an impression of how aircraft feature in that area.

23. In addition to providing air noise contours for different scenarios a number of Representative Community Locations are selected to show, at that location, the changes in noise (see Environmental Statement: Chapter 14 - [APP-039] para 14.4.57. The location designated in Tandridge for this is the Lingfield Primary School.

CONSIDERATION OF INDIVIDUAL NOISE SOURCES

Road Traffic Noise

Introduction

24. Chapter 14 Noise and Vibration [APP-039] provides a detailed assessment of road traffic noise. Modelled results are contained within the Environmental Statement Appendix 14.9.4: Road Traffic Noise Modelling [APP-174].

25. The assessment considers road traffic noise associated with the development and noise arising from construction traffic. In accordance with the procedure in the Design Manual for Roads and Bridges (DMRB) the assessment limits the study area and as such there are no modelled impacts within the Tandridge District.

Impact: Neutral

26. There are no predicted demonstrable effects of noise from road traffic associated with construction or operation phases during the day or night within the Tandridge District.

Change: None

Construction Noise

Introduction

27. ES Appendix 14.9.1 Construction Noise Modelling [APP-171] presents results of construction noise modelling in terms of the number of properties predicted to experience construction noise levels between LOAEL and SOAEL and the number of properties predicted to experience construction noise levels exceeding SOAEL.

28. We note that the LOAELS and SOAELS are set based on the standards offered in British Standard BS5228. This is based on industry and professional opinion and is not based on exposure response functions. As such it does not describe the effects on individuals as set out in the table of Planning Practice Guidance Noise Hierarchy Table.

29. No locations within the Tandridge District have been identified as having been affected in accordance with this criteria and the nearest location of construction relating to the M23 spur and some works along the M23 are predicted to occur during the day period according to Table 2.1.2 of ES Appendix 14.9.1: Construction Noise Modelling [APP-171]. The work is restricted to the day period and with the existing residual noise no significant impacts are noted as occurring from the construction.

30. We conclude that due to the distance from the main works it is not anticipated that there will be any impact from the construction noise either on airport or from works along the road. It is possible that some construction noise may be noticeable occasionally during the day but the effects remain at the lower end of the LOAEL range.

Impact: Neutral

Change Needed: None

Ground noise

31. Ground noise is dominated by the use of the End Around Taxiways (EATs), Engine Ground Running (EGR), taxi-ing and engine testing.

32. No effects are predicted to occur within the Tandridge District Council area.

33. However, due to the changing nature of the airport we consider that full ground noise modelling is required to better understand the ground noise and predict how changes on airport may result in impacts on the surrounding communities.

Impact: Neutral

Change Required:
A DCO requirement providing for annual predictive modelling of future ground noise and annual confirmation modelling of actual ground noise.

Fixed Plant Noise

Introduction

34. It is considered that airport derived fixed plant noise would have an impact closer to airport and as such there is no further comment on this.

35. **Impact: Neutral**

36. **Change: None**

Air Noise

Introduction

37. This section reviews, comments on and proposes alternative metrics and thresholds to those proposed by Gatwick in relation to day and night time effects of noise which are based on National Aviation Policy..

Gatwick have specified LOAELS and SOAELS for air noise and ground noise[15] as follows:

Issue	LOAEL	SOAEL
Day	$L_{eq,\ 16\ hour}$ day 51 dB	$L_{eq,\ 16\ hour}$ day 63 dB
Night	$L_{eq,\ 8\ hour}$ night 45 dB	$L_{eq,\ 8\ hour}$ night 55 dB

Source: Chapter 14: Noise and Vibration [APP-039] Table 14.4.6 Air Noise LOAELs and SOAELs.

Consideration of Thresholds for Daytime Effects (07:00 to 23:00)

38. The Survey of Noise Attitudes 2014 (SoNA)[16] provides the basis for much of the UK determination as to thresholds of effects including the daytime LOAEL and SOAEL, based on annoyance, used in aviation policy.

[15] CH. 14 Para 14.4.83 [APP-039]

[16] [redacted]

39. However it is recognised that:

    - it was not designed to determine impacts below 51 dB $L_{Aeq\ 16hr}$;
    - the majority of the respondents were located around Heathrow (which has a different context to Gatwick);
    - it does not take account of vulnerable groups; and
    - it is predicated on studies at airports where there is stable operation.

40. Therefore, the exposure response function upon which the above thresholds have been based may underestimate the effects of annoyance around Gatwick as it continues to grow rapidly and proposes to do so even without the Northern Runway Project. This is relevant to perceived annoyance as populations will tend to react more negatively when there is an expectation that matters will become worse.

41. Notwithstanding, SoNA continues to provide a valuable source of information and has been the subject of a series of reviews and the data recently re-examined to inform UK research to which we refer elsewhere.

42. Whilst there is a wealth of information produced by the World Health Organization the need to improve the UK research into aviation noise is acknowledged and as reported in response to the House of Lords Select Committee[17], the Department for Transport has commissioned further research into two domestic cross-sectional studies – an Aviation Night Noise Effects Study and an Aviation Noise Attitudes Study – following international best practice. These include elements of research into the effect of non-acoustic factors in this area. It is hoped that the findings of that report will be available to inform any decisions in relation to this application to ensure the most recent science can be applied to the protection of public health.

43. While national aviation policy cites daytime LOAEL of 51dB $L_{Aeq\ 16h}$ based on SoNA, it is believed that there is sufficient uncertainty around this figure to merit further research to refine the daytime LOAEL (and SOAEL) locally and to determine the factors that are driving health and annoyance based responses. This may (or may not) be fulfilled by the work referred to in paragraph 42.

44. It is also considered reasonable that any airport operator anticipating expansion would have carried out such work, and would repeat it at appropriate intervals, to inform the Environmental Statement to monitor community response during the change phase on commencement of the dual runway operation and at regular intervals thereafter, especially given the scale of the operations and potential impacts of Gatwick. This would allow the community impacts to be far better understood and inform appropriate mitigation and compensation.

45. The reliance on a daytime SOAEL of 63 dB $L_{Aeq\ 16h}$ based on the annoyance exposure response functions of SoNA may result in the health effects associated with daytime exposure being underestimated.

[17] Government Response to the House of Lords Science and Technology Committee Report: The neglected pollutants: the effects of artificial light and noise on human health

46. While stated aviation policy is clear about the 63 dB $L_{Aeq\ 16h}$ SOAEL, emerging policy promotes the 60 dB $L_{Aeq\ 16h.}$ The Green Paper: "Aviation 2050: The future of UK Aviation"[18] consultation and the Manston Airport Decision[19] both refer to the need for insulation at 60 dB $L_{Aeq\ 16h}$.

47. We note that the Government is also encouraging airports to offer insulation below the SOAEL so as to reduce total adverse effects of the population at noise levels below the 60 $L_{Aeq\ 16h}$ and we recognise that since the Preliminary Environmental Information Report Gatwick have extended their noise insulation scheme to 54 dB $_{LAeq,\ 16h}$ although the amount offered is reduced proportionately based on banding.

48. However, for that percentage of the population below the SOAEL who are highly annoyed, they are still highly annoyed even though the proportion of the population reduces. Therefore, those people are as badly affected as a greater proportion of the population experience higher noise levels. Therefore should receive the same amount of mitigation as a person who is above the SOAEL. Failure to do so may be leading to increased health inequality where the effects are as great for people at lower noise levels but who are still displaying a stress induced health response.

49. The Tandridge District Council considers that due to these factors the greatest protection should be afforded from 60dB $L_{Aeq\ 16h}$ in the context of the development of an airport and that the offering of noise insulation at this level should be equivalent to that currently proposed for the inner zone of the noise insulation scheme. The noise mitigation offered below this level should be improved.

Impact: Negative

Change Required: A DCO requirement based on the following:

50. This is in the context of a planned airport expansion:
The maximum levels for adverse effect thresholds during the day shall be as stated below unless new evidence comes to light reducing the levels (but not increasing). Where new evidence emerges of the need to reduce these levels then the Promoter shall within 12 months of the publication, seek permission from the Local Planning Authority to amend the noise insulation scheme to apply those standards and update any schemes that are dependent on these thresholds.

    (i) The day time LOAEL of 51L_{Aeq16h} is considered as an interim figure until and unless such time as local, national or reliable international work is completed that identifies a lower threshold and the noise insulation scheme is refined accordingly. The figure most protective of health or annoyance, whichever is the lower, shall take precedent.

    (ii) The day time threshold of 60 dB L_{Aeq16h} shall be used as the basis of the most protective mitigation measures for daytime exposure until and unless such time as local, national or reliable international work is completed that identifies a lower threshold and the noise insulation scheme is refined accordingly. The figure most protective of health or annoyance, whichever is the lower, shall take precedent.

[18] Aviation 2050 – the Future of UK Aviation

[19] Article 9 Manston Development Consent Order

(iii) The Promoter funds a local study to improve local understanding of the threshold effects under both steady and non steady state circumstances to be supervised by a third party independent of the airport and with a steering board including representatives from the Joint Local Authorities and the United Kingdom Health Security Agency.

Consideration of Thresholds for Nighttime Effects (23:00 to 07:00)

51. In relation to the effects of nighttime exposure, while there is an element of annoyance, the impact on sleep and the effect on health is more significant. Furthermore, exposure to night noise can result in loss of productivity and impair learning. There is increasing recognition of the importance of reducing the exposure to night noise in UK policy so as to reduce adverse impacts[20,21,22].

Discussion on Proposed LOAEL

52. The existing night time 45$L_{Aeq\ 8hr}$ LOAEL is based on the thresholds cited in the UK Airspace Policy (Department for Transport 2017). We consider that beyond this the impacts and mitigation should be assessed to 40$L_{Aeq\ 8hr}$ as a sensitivity analysis to compare against the World Health Organization value under the Night Noise Guidelines 2009. Whilst this needs to be adopted by the UK Government and there has been a reluctance to adopt other standards because they are based on annoyance for which non acoustic factors influence the results, this is a health based standard and research has found that there is no difference internationally in the impact of health effects indicating that international health derived information is reliable for the UK context.

Discussion on Proposed SOAEL

53. The 55 dB $L_{Aeq,\ 8\ hour,\ night}$ as set by Government policy proposed by Gatwick is consistent with the World Health Organization Night Noise Guidelines 2009 (this was described as an interim target). The WHO states that at more than 55 dB "the situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep disturbed. There is evidence that the risk of cardiovascular disease increases".

54. However, in 2019 following a substantial review, the Environmental Noise Guidelines for the European Region[23] were revised and a guideline of 40 dB L_{night} recommended. It was noted that at this level this may not be fully protective of health. It also noted the uncertainty in predicting noise levels lower than 40dB (not that there was no effect but that below this level it was increasingly difficult to research and that no reliable data was available at this time).

55. CAP 2161 Survey of Noise Attitudes 2014: Aircraft Noise and Sleep Disturbance[24] (2021) provides additional analysis of the Survey of Noise Attitudes to examine the effects of aircraft noise on sleep disturbance. It can be considered to provide UK derived exposure response functions for sleep disturbance.

56. At 48 dB $L_{Aeq,\ 8h,\ night}$ there is a sharp increase in the percentage of respondents who were highly sleep disturbed. Therefore, based on UK derived research it is recommended that the 48 $L_{Aeq,\ 8h}$ night is used for the extent of the night period inner zone insulation as this is more protective of health and there is a substantial change in response to the noise at this exposure level.

[20] Overarching Aviation Noise Policy 2023
[21] Aviation Policy Framework 2013 Paras 3.34 to 3.35
[22] Government Consultation Outcome on Night Flight Restrictions
[23] [redacted]
[24] [redacted]

Impact: Negative

Change Required: Inclusion of Requirement in DCO based on the following:

57. The maximum levels for adverse effect thresholds during the night shall be as stated below unless new evidence comes to light reducing the levels (but not increasing). Where new evidence emerges of the need to reduce these levels then the Promoter needs to revise and implement an updated noise insulation scheme:

    (i) Commencement of mitigation for night : 40dB $L_{Aeq\ 8h}$
    (ii) Largest mitigation package commences at night: 48 dB $L_{Aeq\ 8h}$

Awakenings and Sleep State Changes
Introduction

58. A sleep awakening or arousal may not necessarily result in a conscious awakening but a change between sleep states that can result in harm. Changes in sleep states occur naturally throughout the night. However, the effect of additional awakenings caused by external stimuli such as aircraft noise interferes with these patterns.

59. The precedent work on this is that by Basner and Samel (2006)[25] and later incorporated into the WHO Night Noise Guidelines 2009[26]. Basner found that the probability of an awakening increased with increasing indoor maximum noise level, L_{ASmax}, and could be approximated to a second-indoor order polynomial with first reactions occurring at an LASmax, of 32.7 dB. In short, the louder the individual external aircraft noise event, the fewer the number of events required to cause awakening.

60. The quieter the noise the more the events were required. This takes account of all aircraft noise events and their relative loudness unlike the N above (Number of events above 65 dB for day and 60 dB for night) contours and the LAmax events.

61. Basner's recommendation was that there is no more than one additional newly experienced awakening, dependent on approach this might be considered an unacceptable exposure level but at present it is being adopted as a SOAEL, for example, it is understood that at Heathrow this is accepted as SOAEL and was cited as such in it's Preliminary Environmental Information Report for the Third Runway.

62. The Survey of Noise Attitudes 2014: Aircraft Noise and Sleep Disturbance, Further Analysis, CAP 2251[27] provides further information on awakenings around Gatwick, Stansted and Heathrow. It finds that the value of additional awakenings gives greater weight to the number of events than the $L_{Aeq\ 8h}$ and as a such is more representative of night noise effects. It notes that for the awakenings metric, a small number of loud events results in fewer awakenings than more frequent but less noisy overflights. This is directly relevant to the way Gatwick operates as it utilises the full 8 hour night period (as well as having higher levels of summer flights than any other airport under the night noise quota period).

[25] Basner, M., Samel, A., & Isermann, U. (2006). Aircraft noise effect on sleep: application of the results of a large polysomnographic field study. *The Journal of the Acoustical Society of America, 119*, 2772-2784
[26] WHO (2009) Night Noise Guidelines for Europe ISBN 978 92 890 4173
[27] [redacted]

63. The work provides exposure response factors for awakenings, however, it identifies there are response differences between the three major airports. Figure 5 of the CAP 2251 displays the curve for the average summer night awakening against noise exposure. Notably, the curve for Gatwick is steeper than that for Heathrow and Stansted. That is, at same levels of exposure as at other airports, then there is a greater response from the community around Gatwick.

64. There may be a host of reasons for this, including inadequate noise insulation of properties or the fact that Gatwick has the greatest number of overnight aircraft movements for the summer season approximating to 3½ times that of Heathrow and 1½ times that of Stansted[28].

65. The night period is controlled with the night noise regime. However, this focusses on the 6.5 hour period from 23:30 to 06:00 whereas the health effects are considered across the 23:00 to 07:00 night.

66. The business models for the major airlines at Gatwick requires optimising the number of turnarounds and routes. This tends to cause peak periods prior to the night noise quota commencing and as soon as it expires. Together with the comparatively high number of movements in the night quota period this results in pressure on the whole of the night period and it is in the early morning that Gatwick are seeking to improve their capacity through the Northern Runway Project.

67. From the perspective of population being highly sleep disturbed, Table 4 of CAP 2251 highlights that with one summer night additional awakening the percentage of highly sleep disturbed individuals jumps from 8% to 15%. This is consistent with how SOAEL has been derived for other metrics in UK context.

68. Notably Table 4 also reports that 0.5 to 1.0 awakenings gives rise to 8% highly sleep disturbed. As this is comparable to the LOAEL for other exposure response factors, there is a strong argument that 0.5 awakenings is a LOAEL (although effects are noted lower than this). On that basis and in accordance with UK noise, planning and aviation policy then we expect Gatwick to take this into consideration, quantify those effects and reduce exposure at this level too.

Impact: Negative

Change Required: Inclusion of Requirement in DCO

69. For awakenings, the following thresholds need to be defined and included as a requirement within the DCO:

    The maximum levels for adverse effect thresholds for awakenings shall be as stated below unless new evidence comes to light reducing the levels (but not increasing). Where new evidence emerges of the need to reduce these levels then the Promoter shall within 12 months of the publication, seek permission from the Local Planning Authority to apply those standards and update any schemes that are dependent on these thresholds in accordance with any conditions the Local Planning Authority may set.

    (i) LOAEL for awakenings: 0.5 additional awakenings for the average summer night

    (ii) SOAEL for awakenings: 1 additional awakening for the average summer night"

[28] [redacted]

AN OVERVIEW OF DISTRICT WIDE IMPACTS

Primary Metrics Daytime Noise Exposure

70. The daytime noise exposure is represented by the $L_{Aeq, 16h}$ day metric. Compared to 2019, the 2032 noise contours without the Northern Runway would reduce, even with the anticipated increase in air traffic movements. This is true under the both the slow transition and central case fleet mix.

71. However, in both slow and central case transition with the Northern Runway, the contours expand. With the central case fleet the contours do not exceed the 2019 baseline. However, with the slow transition fleet the contours do increase beyond the 2019 baseline bringing another 40 properties within the 60 dB $L_{Aeq, 16h\ day}$ (which has precedence by permission and emerging policy statements).

72. In subsequent study years the contours are seen to narrow but elongate. The effect is a reduction in exposure of properties either side of the 60 dB $L_{Aeq, 16h}$ day contours but under slow transition fleet there are newly affected properties further from the airport.

73. Mitigation is offered through the noise insulation scheme in ES Appendix 14.9.10: Noise Insulation Scheme [APP-180]. The scheme covers schools (Lingfield Secondary School being the only qualifying school) and residential buildings. The scheme is not considered to be adequate and the scheme is discussed itself from paragraph 95 onwards.

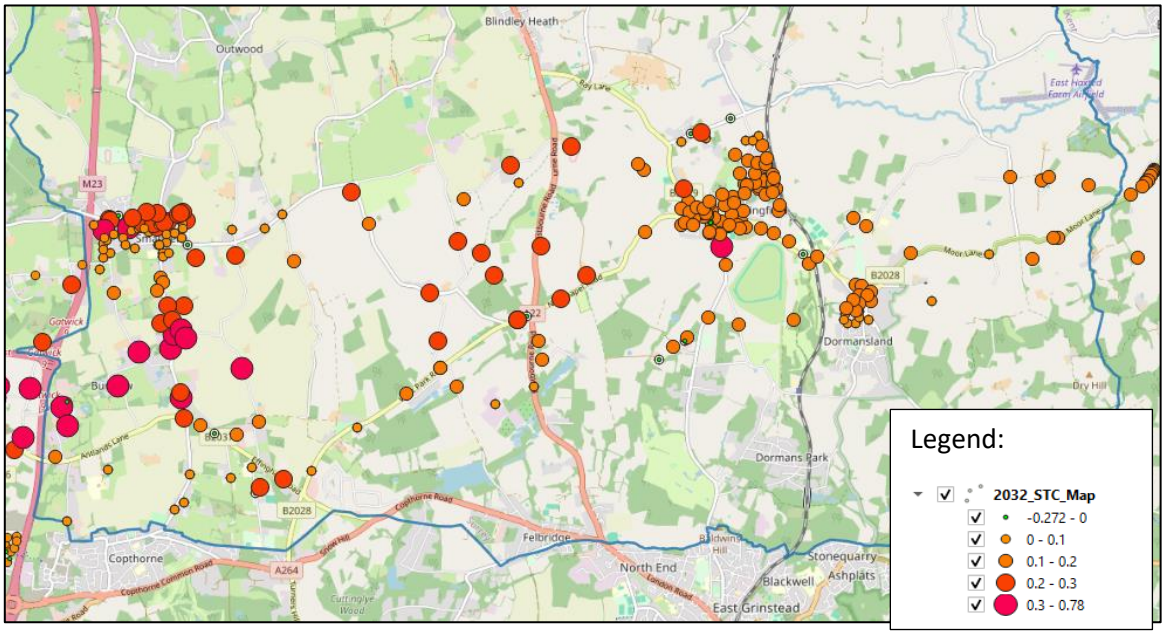
Consideration of Night Impacts

74. Night noise has greater impact on health. The primary metric is the LAeq, 8h night and Gatwick propose insulation at 55 dB vs 48dB that this document proposes. Due to the enlarged area a substantially greater number of people would be protected from night noise.

Figure TD9 Night Noise Contours in 2032 with Slow Transition Fleet

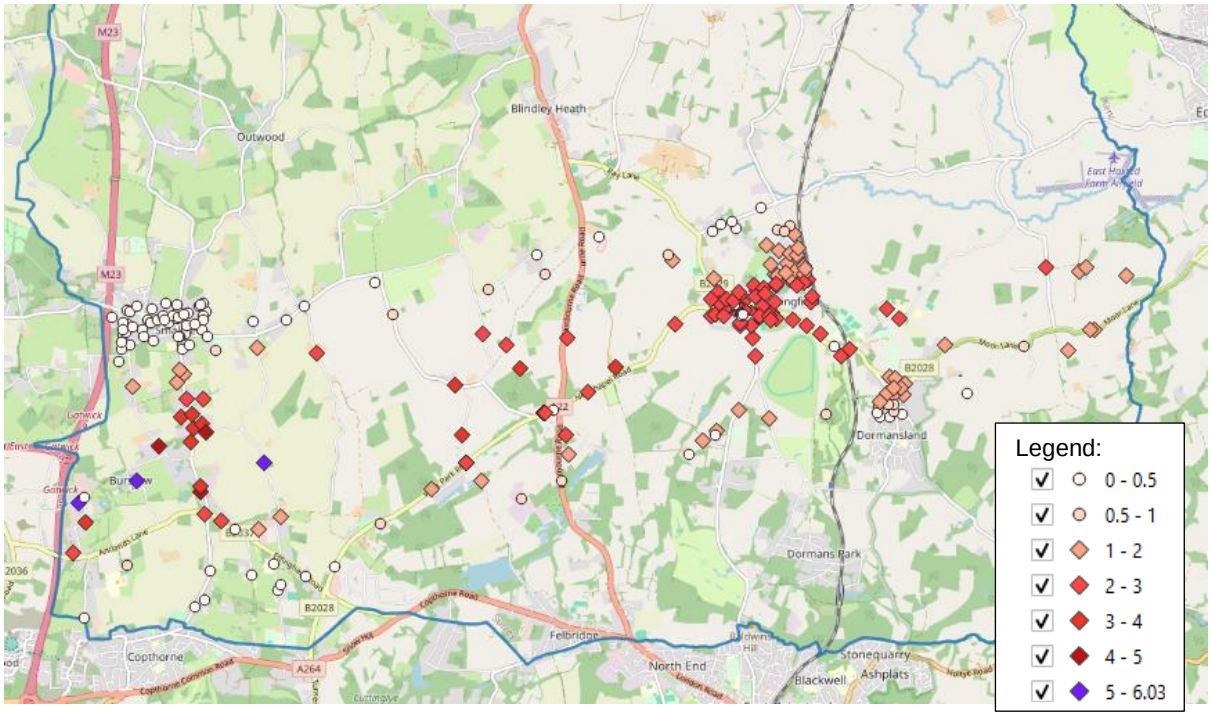
Awakenings

75. The difference in awakenings with slow transition fleet is shown in Figure TD 10 below.
Figure TD 10 Slow Transition Fleet, Base Case vs Northern Runway, 2032



76. The Northern Runway increases additional awakenings over much of the District and these appear marginal except when reviewed in light of the total awakenings as shown in TD 11 below.

TD 11 Total Awakenings, 2032 Slow Transition Fleet with Northern Runway Project



77. Description.
    The suggested SOAEL is one additional awakening. The above diagram shows the range of 0 to 6.03 additional awakenings as a result of aviation noise.

78. Round markers are n indication of noise levels below the SOAEL whereas the diamond markers show postcode areas where noise levels are above the SOAEL. The darker the colour the greater the number of additional awakenings.

79. The above diagrams suggest that:

    - For Smallfield area the total awakenings remain below the SOAEL but the main contribution arises due to the Northern Runway Proposal.

    - The highest number of additional awakenings occurs in the Burstow area and unsurprisingly the greatest increase is in this area as well.

    - Extending East the total number of awakenings can be seen to decline to 2-3 awakenings to the Eastern most point of the Borough. Lingfield experiences anywhere between 1 and 3 additional awakenings.

    - Dormansland also has between 1 and 2 awakenings directly as a result of aviation noise and also experiences an increase as a result of the Northern Runway Proposal in addition to the effect already experienced which at between 0.1 and 0.2 additional awakenings may be a SOAEL.

80. The data also points to potential errors in the modelling due as there are zero awakenings immediately adjacent areas with between 1 and 3 awakenings. This may be due to the way the post code data is modelled but it seems very unusual.

LOCATION REVIEW

81. Based on the information provided by Gatwick we have sought to interpret effects on individual locations.

Consideration of individual locations

82. In the tables below we have only fully compared two years, the 2019 baseline and the 2032 worst case.

83. The same analysis could not be performed for 2029, 2038 or 2047 because the overflight data was not presented by the Promoter. The primary metrics were presented for all years using slow transition fleet. The figures for the central case fleet were also presented and these had the effect of reducing the contours anywhere between 100 and 550 metres with the contours being narrower parallel to the flight path than along it.

84. In considering overflights therefore regard was had to the 2019 Base case Drawing 14.6.7 [APP-063] vs 2032 Drawing 14.9.31 [APP-065]. Limited interpretation could be performed due the way the information was presented and referenced. Nonetheless individual locations are examined below and these will also be relevant to other locations that have similar exposure.

Burstow

85. Table below provides a summary for Burstow. Slow Transition Fleet (STF) would have been used except some of the 2032 STF data was missing

Location	Metric	Year				Change
		2019	2032	2038	2047	
Burstow	$L_{Aeq8hr\ night}$	60-63	60-63	60-63	60-63	-
	$L_{Aeq16hr\ day}$	66-69	66-69	66-69	No data**	-
	Overflights	>200	>200	No data	No data	-
	N60	50-100	50-100	50-100*	50-100	-
	N65	200-500	200-500	200-500	200-500	-
	Awakening	3.1-5.9	3.2-6.03	No data	No data	Small increase

Note:
*Central case fleet used as no data for the slow transition fleet
** day is the same dataset as night
2019 and 2032 are the only years for which this range of overflight data was presented by the Promoter and relates to departure overflights.

86. In summary for Burstow: This is 1.8km from the end of the runway. It is directly under the arrival and departure route. It probably experiences some of the worst exposure to air noise of any location to the East of the airport. Even with central transition case fleet for 2032 there is limited benefit implying that the increase in flights eradicates any benefits of quieter fleet. Although sensitivity to road noise is lower than that of aircraft noise, there needs to be further consideration of the cumulative effects of both sources of noise and whether practically anything further can be done about it.

87. In order to understand the magnitude of overflights, Table 14.12.1: Daily Overflights at Landscape Assessment Locations [APP-039] provides information at defined landscape locations. Hever Castle is directly in line with the route for the departures that will affect Burstow and this experiences 308 overflights from Gatwick flights in 2019.

88. The figures quoted for 2032 are "all daily overflights" as the Promoter does not provide comparable Gatwick Daily overflight data in this table. However, it would be expected that this airspace up to 7,000' would be reserved for Gatwick aircraft and not incidental overflights. Taking a cumulative effect it can be seen that in the baseline case there are 325 flights in 2032 and with the NRP there are 390 overflights. This suggests that between 2019 and 2032 with project there will be approximately an additional 26% increase in overflight at that location and consequently along the approach / departure route.

89. In consideration of the outdoor space, the World Health Organization set a level at 55 LAeq for outdoor living areas as an upper limit as it causes "serious annoyance during daytime and evening." The levels exceed this resulting in a deterioration in the amenity of the area. Practically, for existing residents, there is little that can be done about this except for ensuring adequate noise insulation.

90. Burstow falls within the existing noise insulation scheme. Part of Burstow falls within the area of the new noise insulation scheme inner zone. The remainder is within the outer zone noise insulation

scheme.

Impact: Negative

Change Required:

- Improvement to Noise Insulation Scheme as specified in that section

Smallfield

91. Smallfield is on the periphery the Westerly final approach and the Easterly Departure route. It is considered to be representative of a number of locations in similar contour locations.

92. Table below provides a summary for Smallfield:

Location	Metric	Year				Change
		2019	2032	2038	2047	
Smallfield	$L_{Aeq8hr\ night}$	45-48	c42-45-48	c42-45-48	c42-45-48	Marginal reduction
	$L_{Aeq16hr\ day}$	<51-51-54	C48-51-54	C48-51-54	No data**	Marginal reduction
	Overflights	Cusp of <1 and>200	Cusp of <1 and>200	No data	No data	Marginal reduction
	N60	10-20-50	<10-10-20	<10-10-20*	<10-20-50	Increase post 2038
	N65	<20-20-50-100	<20-20-50-100	<20	<20-20-50	Increase post 2038
	Awakening	0.27-0.37	0.3-0.4	No data	No data	Marginal increase approaching proposed LOAEL

Note:
*Central case fleet used as no data for the slow transition fleet
** day is the same dataset as night
2019 and 2032 are the only years for which this range of data was presented by the Promoter.

93. Between the base year 2019 and the predicted worst year, 2032, there is a marginal improvement in the night period but this remains largely unchanged thereafter.

94. The same is true for the day period. Notably for the N60 night time events then there is an improvement but a deterioration from the year 2047 onwards. The same is true for the N65 daytime events.

95. Generally this implies that Smallfield has a reasonably constant exposure and experiences little change.

96. Should the proposals for the threshold effects for awakenings (48 $L_{Aeq,\ 8h}$) be adopted then it would be reasonable to seek proposals for home adaptation in this location for exposure reduction through

noise insulation, ventilation and overheating in accordance with inner zone proposals. This would improve the quality of life for the people living in this location.

97. As this assessment is representative of a number of other locations that are not described herein this approach needs to be extended to include the sparsely populated rural community. Special attention needs to be given to Dormansland which, given the principle of avoidance, is considered be included within the noise insulation scheme.

Impact: Negative

Change Required:

- Improved noise insulation scheme
- Due to uncertainty in the modelling consideration of targeted insulation to bedrooms. For those within 20% of the 0.5 awakening and 48 $L_{Aeq,\ 8h\ night}$ to protect health and ensure that adverse effects are reduced so far as practicable.

98. South Nutfield

South Nutfield is selected here as locations of this nature are not otherwise represented.

Location	Metric	Year			
		2019	2032	2038	2047
South Nutfield	$L_{Aeq8hr\ night}$	-	-	-	-
	$L_{Aeq16hr\ day}$	-	-	-	No data**
	Overflights	51-100	51-100	No data	No data
	N60	-	-	-	-
	N65	-	-	-	-
	Awakening	-	-	-	-

99. South Nutfield does not appear within the contours for any of the primary noise metrics ($L_{Aeq16h\ day}$ or $L_{Aeq8h\ night}$) nor the N60 and the N65 events.

100. However, it is shown as being overflown between 51 and 100 events per day in both scenarios. Some of this traffic is anticipated as being from the Westerly Departure route 4 wrapping around. It is possible that some of this traffic is also associated with Route 3 Easterly departure.

101. There is no change to exposure with project and it remains at the lower end of the LOAEL range and therefore no further mitigation is likely. Nonetheless, it is probable that overflights would be noticeable visually and aurally.

Impact: Neutral

Change: None sought.

Lingfield

Given the number of awakenings it is expected that Lingfield benefits from the most generous noise insulation scheme.

THE NOISE INSULATION SCHEME (NIS).

102. This section refers to mitigation. Mitigation is the reduction of exposure and should not be confused with compensation. Compensation is a payment for loss, damage or injury. In this case compensation is derived due to individuals having aircraft noise being thrust upon them with no other means to seek redress.

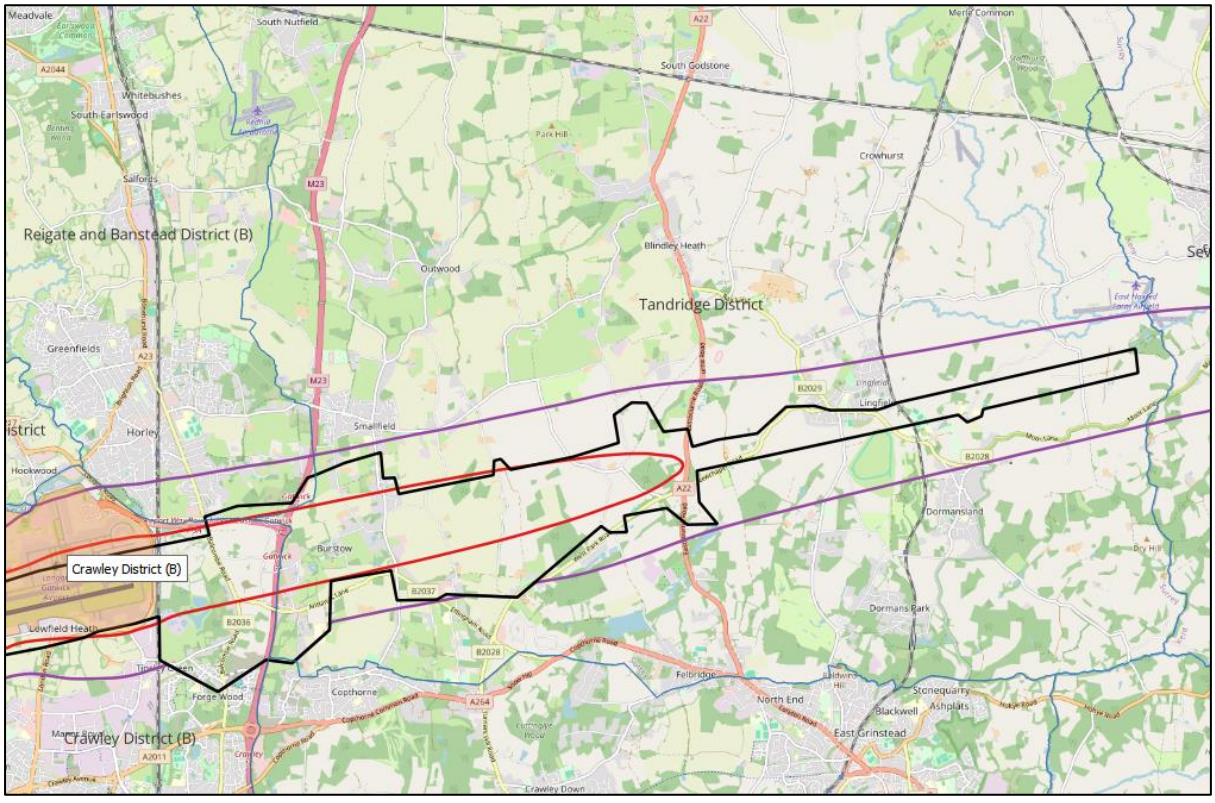
103. Apart from quieter aircraft, improved operational practice, safeguarding land around the airport from development in accordance with the principles of the International Civil Aviation Organisation Balanced Approach, the only means to reduce exposure at the locations within Tandridge is to provide noise insulation or where the effect of the noise is so great to offer to purchase properties and assist with relocation.

104. The noise insulation scheme must be workable, effective at permanently reducing exposure and cover all the reasonable costs that might otherwise be borne by the individual property owner for the life of the property. This is important to ensure the costs of the project are not in the long term transferred to private individuals. It is only because it is not possible to contain the noise at source on airport that mitigation is controlled off airport. Were the controls on airport then the responsibility for the operational, maintenance and renewal cost would be borne by the airport operator.

105. Any mitigation scheme must not as a result in the creation of other health effects as a consequence of it's adoption, for example, poor indoor air quality, annoying or sleep disturbing internal plant derived noise levels and overheating.

106. Figure TD 12 shows the existing and proposed extent of the Noise Insulation Schemes where:
- Black is the existing scheme
- Red is the extent of the inner zone
- Purple is the extent of the outer zone

Figure TD12: Noise Insulation Scheme extents



107. The original scheme is shown in black and it offered a maximum value of works of £4300+VAT. The new inner zone presently offers up to a maximum of £20,000 (VAT is not mentioned and could) toward the value of acoustic ventilators and improving the envelope of the building to the resistance of the passage of sound. The outer zone offers packages in 3dB bands.

108. Firstly the extent of the inner zone which provides the most recompense is based on values for the night and day period that are considered to be set too high and need to be reduced. Therefore, this affords inadequate protection to the impacts of exposure to night time effects of noise on health and modelled contours need to be used based on those we propose.

109. The amount offered whilst more generous than the existing scheme is less than that offered elsewhere and takes no account of whether that amount is sufficient to assist adapt individual dwellings within this location. For example some dwellings may be more expensive due to listing or because they comprise flats or Houses in Multiple Occupation.

110. The outer zone needs to be redefined to provide to the extent of the LOAELs proposed for both day and night periods and a proportionate amount of money used to ensure that for those people affected, the effects are mitigated as far as is practicable.

111. As noise contours are used to define these zones, due to the inherent uncertainty, variability associated with them and that the lines do not represent a sheer cut off in human response, rather a given point on a graded scale (and the effects will persist below the contour to varying degrees) then we consider to ensure that significant effects are avoided the Promoter should extend the inner zone beyond the 48 $L_{Aeq\ 8h}$ night contour to the 45 contour and then adjust the scheme to pragmatically incorporating physical boundaries, for example around the built up areas. We note the existing scheme appears to adopt this principle but for some reason this is disregarded in the new scheme.

112. The noise insulation scheme provides for insulation and acoustic ventilators for background ventilation. However, the scheme does not take into consideration the potential for overheating. As the scheme relies on insulation and having windows closed to achieve exposure reduction the proposal is likely to exacerbate overheating with resultant health impacts including risk of increased morbidity and mortality. For health protection purposes the noise insulation scheme needs to be extended to include an overheating assessment with mandatory passes for Design Summer Year 1,2 and 3 against epochs 2050 and results for 2080 as an informative. To ensure good design the scheme must ensure that it provides for a good quality living environment and not simply prevent the worst of the overheating events.

113. All maintenance, repair, end of life replacement and running costs of any works must be borne by the Promoter.

114. The Promoter must produce and adopt single mode contours that are then used as the basis for the noise insulation scheme and not the average mode contours. As there is evidence that the N_{65} day figures extend beyond the L_{Aeq} contours and this is likely to be particularly pronounced under single mode operation then this metric should be incorporated into the noise insulation scheme.

115. The one awakening contour should be used as the outer limit of the inner zone.

116. The scheme should reflect change in noise levels as well as absolute levels and do so across all metrics.

117. Where people are exposed above the SOAEL, the effects will become progressively worse. The noise insulation package offers a maximum amount of money in adapting the property. It is entirely consistent, up to the point where compulsory purchase is likely to be necessary, that with increasing noise levels above the current inner zone that a further zone is defined affording more protection so as to ensure that people most affected have the mitigation proportionate to the increased effect.

118. A property purchase scheme needs to be defined at an appropriate level and for properties that are exposed to very high levels of noise.

119. There are no proposals to regularly conduct research to determine how effective the scheme is at protecting people from noise exposure and that it is not resulting in adverse effects on their health or wellbeing.

Impact: Negative

Change Required: DCO requirement and change to control documents.

Proposed Changes:

A Requirement based on the following:

On completion of each adaptation of a property undertake regular follow up survey with the residents to:

a) Determine the residents satisfaction with the scheme and it is achieving the intended goal
b) Determine whether the scheme is contributing to other health effects and identify how they can be avoided

The survey shall be formulated to the satisfaction of the Local Planning Authority in consultation with such other bodies as it considers appropriate.

The full survey data, results and Promoter's, or independent third party analysis and recommendations shall be provided to the Local Planning Authority, within eight weeks of the end of the calendar year (or such other deadline as may be agreed in writing with the Local Planning Authority) together with a report of recommendations for actions to improve the scheme and a timetable to implement the changes.
(This shall be implemented in accordance with the proposal or any amendment made by the LPA)

A Requirement based on the following:

For the total noise impact at any location:

The inner zone of the noise insulation scheme shall be extended to the extent of the

- 48 $L_{Aeq\ 8h\ night}$
- 60 $L_{Aeq\ 16hr\ day}$
- One awakening
- Or whichever is the greater the area protected by the above

The outer zone mitigation should extend across the ranges:

- 51-60 $L_{Aeq\ 16hr\ day}$
- 40-48 $L_{Aeq\ 8h\ night}$
- 0.5 -1 awakening

(Each of these is expressed across the worst consecutive 92 day period, normally expected to be the summer)

Requirement:
The noise insulation scheme

(i) The inner zone financial cap for adaptation is increased to a minimum of £30,000 excluding VAT and such further amount as is appropriate to ensure it provides for all measures to manage exposure to noise including insulation, ventilation and cooling.
(ii) The airport remain responsible for the maintenance and operational costs of any systems installed
(iii) The scheme is to include full overheating assessments and tested against Design Summer Year 1,2 and 3 for the 2050 epoch as mandatory and 2080 as an informative. The internal temperature design specification shall be to ensure that overheating does not occur and that where practicable the property is designed to optimise thermal comfort, not simply prevent overheating.

CUMULATIVE EFFECTS.

120. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) specifies the scope and requirements of the environmental impact assessment in Regulations 4(2). Schedule 4 provides further advice on information to be included in the Environmental Statement. This includes a requirement for a consideration of, amongst other things, cumulative effects.

121. The promoter has considered the cumulative effects of other nearby actual or prospective development and stated these in conjunction with the claimed capacity offered by the project.

122. However, it has not considered the cumulative effect of what it states is baseline growth only and the proposed additional capacity.

123. In other words the environmental statement does not consider the cumulative impact of the project alongside the impact as a result of the stated baseline and in that way. As some baseline effects already likely to exceed the SOAEL, for example of awakenings, then, the additional amount is not appropriately weighted. The total population effects are underestimated.

124. Response to different noise sources varies. The response to aircraft noise is far greater than to road traffic or rail noise. Noise sources have been considered individually, eg air noise and ground noise. Expressing the noise using similar metrics would have aided interpretation.

125. The absence of ground noise contours would also make apparent any changes year on year.

Impact: Negative

Change: The cumulative effects need to be properly stated and used to inform an updated TAG assessment.

NOISE ENVELOPE

126. The Council continues to have serious concerns about the noise envelope and that as proposed it does not fulfil the purpose for which it is intended and nor does it fulfil the majority of characteristics stated in CAP 1129[29] :

> *... A noise envelope should as a minimum:*
> 1. *be clearly defined*
> 2. *be agreed among stakeholders*
> 3. *be legally binding*
> 4. *not be compromised by the lack of up-to-date understanding of the relationship between annoyance and the exposure to aircraft noise*
> 5. *take account of new technology*
> 6. *have proportionate aims which are appropriate for the airport to which it applies i.e. to permit growth, maintain a status quo, or manage a reduction in noise impact.*

127. We note that these are a minimum criteria and that other criteria may well be appropriate and reasonable to include as design parameters for the noise envelope.

128. A clear aim has not been agreed with the stakeholders and the noise envelope as proposed allows the noise climate around the airport to deteriorate whilst growth occurs and there is no certainty in the longer term (especially in the third noise envelope period) that the limits will not be relaxed by the airport as there is an increase in ATMs. This is contrary to the Government Aviation Policy of sharing the benefit of the improvements in technology with the local community and the ICAO Balanced Approach.

129. The noise envelope is predicated on an area under a noise contour expressed in km^2 and the area not being exceeded. However, for certainty the limits of the noise envelope, if bound by the contour must be the physical extent of that contour in a baseline year taking into account the uncertainties associated with the modelling. It is possible for an area to remain broadly the same or shrink but new or additional people be affected as it moves subtly. The boundary of a noise contour cannot change without approval. To agree to an area, while helpful in some respects undermines the rationale for a noise envelope in achieving certainty.

130. To ensure the noise envelope is workable, enforceable and provide certainty, limitations must be set across all times of the year, any operational seasons eg summer and winter and even hours of the day and night. To be effective the disparate controls that exist under other regimes need to be incorporated into noise envelope, for example the night noise regime including the existing quota count and ATMs.

131. In addition we do not consider that the noise envelope as proposed achieves the aim of avoiding exposure as required by the Noise Policy Statement for England: the area of the noise envelope is predicted to increase; and where an exceedence occurs there is a delay in remedying it resulting in exposure that could have been prevented if appropriate measures and controls were in place. There is also the possibility of a breach /compliance cycle with no resolution and recurring breaches.

[29] Noise envelopes CAP1129

132. The noise metrics (as defined in the noise envelope) need to be agreed with the local authorities, including monitoring and reporting of operational metrics, for example detailed fleet quota count information and ATMs by period. This will provide assurance that there is a reasonable prospect of achieving the limit and allow action to be taken accordingly at an early stage if it appears that noise targets will be missed.

133. Growth can practically only be controlled by restricting slot release and slots should only be released on the attainment not only of achievement of noise metrics but also progress in installing noise insulation in the properties worst affected.

134. The noise envelope has inadequate sanctions and enforcement model to ensure that the processes are complied with in delivering the noise envelope as well as achieving compliance with stated limits. There is no local accountability and oversight despite the local authorities seeking a role in the process and having experience and expertise in regulation of this type.

135. The Promoter has elected to maintain a slow transition fleet for the extent of the noise envelope. Central case fleet should be adopted as this is more stringent and will encourage the airport to work with airlines to achieve the transition and incentivise the airlines as well.

COMPENSATION

136. By virtue of a number of different statutes the aircraft ground and air noise operations are exempted from claims of nuisance provided certain operational requirements are met. However since the granting of planning permission for the airport and significant infrastructure (specifically the North terminal and associated works) the airport has continued to grow with increasing air traffic and increasing impact on the individuals in the community. The expectation of the scale of the airport operations at the time the permission was granted could not have ben envisaged to be anywhere near that observed in present day.

137. Affected individuals have no redress for the impacts they are suffering and have experienced the progressive increases in effects across the community as a result of increase in utilisation of the airport.

138. Whilst the nuisance case Coventry vs Lawrence had regard to prescription it raises some interesting points in this regard.

139. The judgements states that "a defendant can have a right to carry on an activity that would otherwise be a nuisance, both in common law (by a claimant agreeing to the activity) or by immunity under statute (for example, under section 76 of the Civil Aviation Act 1982 and section 158 of the Planning Act 2008)".

140. In deciding the appropriateness of injunctive proceedings or award of damages it states: "The existence of a planning permission which expressly or inherently authorises carrying on an activity in such a way as to cause a nuisance can be a factor in favour of the court refusing an injunction and compensating the claimant in damages."

141. The DCO needs to codify the common law right to compensation and this should be done in a positive way to the benefit of the residents so that there is the minimum of effort on their part to obtain compensation.

142. The principles and amounts of compensation should be related to levels of exposure to the individuals from the LOAEL to a value in excess of the threshold of the noise insulation scheme to a level to be agreed.

143. A compensation scheme does not replace the need for good airfield practice to prevent or where this is not possible minimise nuisance to the local community. Where detailed operational practices are not complied with by an airline operator there must be a formal enforcement mechanism with sanctions in place to remedy poor practice.

144. It is important that the threshold for sanctions does not relate to nuisance but to breach of agreed operational standards and limits. This will provide for effective enforcement and for all parties to have a clear understanding of what is expected and required. Ideally, existing controls should be incorporated into the noise envelope regime.

145. The above points are not exhaustive by any means but examples.

Tandridge District Council: Summary of impacts – Noise					
Ref	**Description of Impact**	**Construction (C) / Operation (O)**	**Negative (N) /Neutral (Neu) /Positive (P)**	**Required mitigation and how to secure it (change/requirement/ obligation)**	**Policy context**
TDC Noise 1	Air Noise: Underestimation of Potential Health Impacts	O	Negative	Conduct sensitivity analysis against time 40 dBL_{Aeq8h} as being representative of UK interpretation of the WHO night value.	NPSE
TDC Noise 2	Greater number of people exposed to noise as a result of TAG assessment not incorporating most recent health data	Prior to commencement	Negative	Complete TAG assessment with recent data and feed this through to the costs and mitigation response	
TDC Noise 3	Approximately 3300 properties (population statistics not known) exposed to levels of noise that could be resulting in ill health and annoyance according to recent data and in some cases for which there is no stated aviation policy.	Operation	Negative	Improved offer on the noise insulation scheme extending the inner zone requirements to one additional awakening.	Emerging
TDC Noise 4	Anyone who receives noise insulation is likely to experience poor indoor air quality and overheating with resultant adverse health effects	Operation	Negative	The airport operator amends the mitigation scheme to include overheating assessment and suitable ventilation and cooling to facilitate windows closed during periods under high ambient temperature and when noise exposure is greatest. The airport operator is to become responsible for purchase repair, maintenance, and costs	Sustainable development, NPSE

				of running systems.See recommendation under para 112 & 119.	
TDC Noise5	Increasing deleterious health effects	Operation	Negative	The airport operator needs to undertake studies to determine the effectiveness of the noise insulation scheme; and whether it is contributing to any adverse health effects and adapt it accordingly – see para 119	
TDC Noise 6	No-one has any certainty that air noise will be controlled and limited.due to the deficiencies of the air noise envelope thereby resulting in potential for greater exposure and uncertainty in land use planning	Operational	Negative	The air noise envelope needs to be substantially redesigned, to achieve the aims set out in CAP 1129 and thereby offer a degree of protection. This includes all those issues set out in paras 126 to 135 inclusive.	Aviation Policy Framework
TDC Noise 7	Loss of amenity – both public space and individually at property	Operational	Negative	An appropriate compensation scheme needs to be defined for individuals whose use of their property is permanently affected as well as communities for loss of or deterioration in leisure spaces.	
TDC Noise 8	Impacts are underestimate	Operational	Negative	All cumulative impacts must be taken into consideration including, for example awakening where even the baseline levels in 2019 are above the emerging SOAEL so that even a minor increase is concerning. The combined effects of different sources of noise need to be represented cumulatively to reflect people's lived experience of noise.	Environmental Impact Assessment Regulations 2017. Noise Policy Statement for England

TDC Noise 9	Inability to understand, control and mitigate ground noise due to lack of ground noise modelling	Operational	Negative	A ground noise needs to be developed to show the extend of predictive impacts and how these are being managed on airport.	
TDC Noise 10	Lack of understanding of effects as there is no single mode noise modelling for different scenarios	Operational	Negative	Noise data needs to be presented on basis of single mode to understand how noise is affecting the community and allow appropriate mitigation to be determined.	

Glossary

Term	Description
ATM	Air Traffic Movement
A-Weighting	Environmental noise measurements and levels are usually expressed using a variation of the decibel scale, which gives less weight to low frequencies and very high frequencies. This system was derived to correspond to the reduced sensitivity of the human hearing mechanism to these frequencies.
Background Noise	Background noise is the noise without the proposed changes in the use of the airport.
BPM	Best Practicable Means
CAA	Civil Aviation Authority
CEA	Cumulative Effects Assessment
EIA	Environmental Impact Assessment
ES	Environmental Statement
ICAO	International Civil Aviation Organization
$L_{Aeq,\ 16\ hours}$	The L_{Aeq} over the daytime and evening period 07:00 to 23:00 hours, for aircraft noise for an average summer day between 16 June and 15 September.
$L_{Aeq,\ 8\ hours}$	The L_{Aeq} over the night period 23:00 to 07:00 hours, for aircraft noise for an average summer night between 16 June and 15 September.
$L_{Aeq,\ T}$ - Equivalent Continuous Sound Level	The L_{Aeq} level gives a single figure to describe a sound that varies over a given time period, T. It is the A-weighted steady sound level that would result in the same sound energy at the receiver as occurred in practice with the varying level. It is derived from the logarithmic summation of the sound signal and so unlike a conventional (linear) average it gives additional weighting to higher levels.
L_{Asmax}	The highest value of the sound level over the specified period. It is sometimes referred to as 'peak' noise level. However, the term 'peak' has a special meaning in acoustics and the expression 'maximum' is preferable to avoid confusion.
LOAEL	Lowest Observed Adverse Effect Level. The level at which increasing effects can be seen in a population and is often used to define a range of noise exposures that have increasing effect in a defined population until such time as they become a SOAEL. For more information see the Planning Practice Guidance Noise Hierarchy Table.
N_{60} night	Numbers of aircraft during an average summer night where the noise from an aircraft event at ground level is above 60 dB L_{Asmax}
N_{65} day	Numbers of aircraft during an average summer day where the noise from an aircraft event at ground level is above 65 dB L_{Asmax}
NIS	Noise Insulation Scheme
NOEL	No Observed Effect Level. The level at which no effect is observed in a defined population.
NPPF	National Planning Policy Framework
NPRs	Noise Preferential Routes
NPSE	Noise Policy Statement for England
NSR	Noise Sensitive Receptor
Overflight	An aircraft overflying a receptor on the ground at a height of less than 7,000 ft above the ground and at an angle of at least 48.5 degrees from the horizontal, as defined by CAP1498.
PEIR	Preliminary Environmental Information Report
SID	Standard Instrument Departure

SOAEL	Significant Observed Adverse Effect Level. This is the level at which exposure causes more serious effects in a population and it should be avoided by either relocating development to another location or reducing exposure in a given location as a result of development. Exposure reduction should start with good acoustic design and insulation used as a last resort. For more information see the Planning Practice Guidance Noise Hierarchy Table.
SoNA	Survey of Noise Attitudes
Standard Mode	Year on year the proportion of aircraft taking off to the east and to the west varies according to wind conditions. Standard mode contours take the 20 rolling average runway modal split; in 2018 this was 75% west / 25% east for the Leq period. At night a 10 year average is used, and in 2018 this was 76% west / 24% east.
UAEL	The Unacceptable Exposure Level. This is a term introduced by the NPPF recognising that noise may have such substantial effects that the exposure cannot be reasonably mitigated and that as a result exposure cannot continue or be permitted to occur. For more information see the Planning Practice Guidance Noise Hierarchy Table.
WebTAG	Web based Transport Appraisal Guidance: https://www.gov.uk/guidance/transport-analysis-guidance-webtag\
WHO	World Health Organization