

## **ANNEX L TO ROUTE 4 PIR REPORT DATED APRIL 2017**

### **CAA Analysis of Complaint Data from non-aviation stakeholders**

What we did:

- We reviewed the categorisation of complaints by location as undertaken by GAL;
- For those locations with the most correspondents (rather than the number of complaints), we compared the identified location against the traffic patterns (as portrayed on radar track diagrams) displayed by the modified RNAV SID, the original RNAV SID and the original conventional SID. We limited our analysis to those locations that represented 90% of correspondents. The remaining locations represent few correspondents – they are either (a) close to other locations with a greater number of correspondents that we have commented upon, or (b) are in locations that are generally unaffected or will be experiencing an improvement in noise impact since the implementation of the modified RNAV SID. In this way we ensured that our analysis was proportionate but adequately considered the feedback from correspondents.
- We described the traffic patterns in relation to those locations, with the aim of identifying if the number of correspondents and the nature of their complaints identified any effects that would not be expected by a replication of a corrected conventional SID.
- We noted, where relevant, if those locations were likely to be experiencing an increase or decrease in noise levels as a result of the modified RNAV SID.

In considering these complaints, it is important to bear in mind that:

- They have been made against a background of increasing traffic levels at Gatwick Airport;
- All of the locations commented upon are sited beyond Gatwick Airport's 57 dB  $L_{Aeq}$  noise contour and therefore any change in noise impact would not be described as "significant";
- Aircraft can be tactically vectored from the SID at 4000ft and above and are therefore no longer required to adhere to the NPR beyond this altitude.

General conclusions:

- As would have been anticipated, the largest numbers of correspondents came from the most populated locations that have experienced an increase in noise levels since the implementation of the modified RNAV SID. A key factor in the increase in noise impact is the displacement of the traffic pattern in Segment 3 of the SID, i.e. the eastbound track after the turn.
- Less populated locations which are similarly affected by the displaced traffic pattern also generated correspondents, albeit on a much smaller scale.
- There were relatively few correspondents from those locations that are likely to be experiencing a decrease in noise impact;
- Some correspondents had expectations of not being overflown or experiencing any aircraft noise at all, or appeared to be complaining about aircraft that were not using Route 4.

### **GAL's Summary of Correspondence**

|                                      |               |
|--------------------------------------|---------------|
| Number of individual email addresses | 1,863         |
| Number of pieces of email feedback   | 16,964        |
| Feedback via letter                  | 72            |
| <b>Total feedback items</b>          | <b>17,036</b> |

84 individuals did not provide an address or location

| <b>Top 25 locations by feedback numbers – as summarised by GAL (Note: the sections highlighted illustrate 90% of the correspondents came from these locations/)</b> |                   |  |  |  |
|---|-------------------|--|--|--|
| <b>Location</b>   | <b>Complaints</b> | <b>Individual addresses (email &amp; postal)</b> | <b>Average complaints per address (as calculated by the CAA)</b> | <b>Cumulative % of correspondents (as calculated by the CAA)</b> |
| Horley  | 4,858             | 695  | 7.0  | 36%  |
| Newdigate   | 1,577             | 248  | 6.4  | 49%  |
| Outwood   | 3,512             | 201  | 17.5   | 59%  |
| Salfords  | 1,127             | 158  | 7.1  | 67%  |
| Capel   | 706               | 116  | 6.1  | 73%  |
| Sidlow  | 541               | 65   | 8.3  | 77%  |
| Meath Green   | 1,048             | 47   | 22.3   | 79%  |
| Bear Green  | 89                | 41   | 2.2  | 81%  |
| Norwood Hill  | 419               | 39   | 10.7   | 83%  |
| Reigate   | 316               | 34   | 9.3  | 85%  |
| Leigh   | 425               | 30   | 14.2   | 87%  |
| Redhill   | 80                | 23   | 3.5  | 88%  |
| Crowhurst   | 39                | 18   | 2.2  | 89%  |
| South Holmwood  | 244               | 15   | 16.3   | 89%  |
| Mynthurst   | 125               | 15   | 8.3  | 90%  |
| Brockham Park   | 680               | 9  | 75.6   | 91%  |
| Holmwood Common   | 38                | 8  | 4.8  | 91%  |
| Brockham  | 799               | 6  | 133.2  | 91%  |
| Betchworth  | 94                | 6  | 15.7   | 92%  |
| Horsehill, Horley   | 36                | 6  | 6.0  | 92%  |
| South Godstone  | 24                | 6  | 4.0  | 92%  |
| Coldharbour   | 18                | 6  | 3.0  | 93%  |
| Dorking   | 12                | 5  | 2.4  | 93%  |
| Haywards Heath  | 4                 | 4  | 1.0  | 93%  |
| North Holmwood  | 5                 | 2  | 2.5  | 93%  |

## CAA Commentary and Comparison of Correspondents' Location to Aircraft Traffic Patterns

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams  | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?   |
|---|---|--|
| Horley (695)                            | Most aircraft are above 4000ft by Horley. Aircraft are typically in the range of 5,000-7,000ft.   | <p>It is apparent that Horley is overflown more often than during the period of the original RNAV SID or the original conventional SID, principally by aircraft that have clearly been vectored from the SID and are heading eastwards.</p> <p>The concentrated pattern of traffic that remains on the SID has moved to the NPR centreline (i.e. southwards) and is therefore closer to, but not above, Horley.</p> <p>For these two reasons, Horley (particularly the north side of the town) is likely to experience an increase in noise and residents are likely to feel they are overflown more since the implementation of the modified RNAV SID.</p> <p>Horley is affected by an apparent increase in tactically vectored traffic overflying that location.</p> <p>For this location,</p> <p>Note: following advice from GAL that they have engaged with the air traffic service provider (NATS LTC) the number of tactically vectored aircraft that overfly Horley appears to have reduced. This is evident in the data provided by GAL in February 2017 and can be seen in the data provision section of the website.</p> |
| Newdigate (248)                         | Most aircraft are below 5000ft at Newdigate, with many of those also below 4000ft. Further details of the altitude of aircraft at this location is provided in the gate analysis at <a href="#">Annex M</a> | Since the implementation of the modified RNAV SID, there is degree of dispersion of traffic at Newdigate that is comparable with the dispersion evident from the original conventional SID. However, Newdigate was clearly overflown less often during the period of the original RNAV SID when traffic displayed a more concentrated pattern around the turn, further away from Newdigate, focused on the outer edge of the NPR monitoring swathe.  |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams                           | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?  |
|---|--|---|
|   |  | <p>With the modified RNAV design which has resulted in dispersion of traffic around the turn, it also appears to be the case that Newdigate is overflown more frequently than was the case with the original conventional SID.</p> <p>Newdigate is affected by both the reintroduction of dispersion around the turn plus the occurrence of occasional aircraft flying tighter turns and thereby flying over or close to that location. It is likely that Newdigate is experiencing an increase in noise impact as a result of the modified RNAV SID when compared with the original RNAV SID primarily due to the change in dispersion.</p> <p>It has been noted that:</p> <ul style="list-style-type: none"> <li>(1) One airline had a data base coding issue and its aircraft were turning too early, hence cutting the corner and flying over Newdigate. This was investigated by GAL and has since been resolved. The A380 flights have been flying two different Noise Abatement Departure Procedure profiles. One of these procedures has resulted in a low speed departure with the result that the aircraft are turning very tightly to head to the east and consequently overfly Newdigate. GAL has been engaged with the airline to determine why different profiles are being flown. As yet this remains unresolved; therefore the CAA is recommending that GAL continue further engagement with the operator to resolve this issue.</li> </ul> |
| Outwood (201)                           | Most aircraft are above 4000ft by Outwood. Aircraft are typically in the range of 5,000-7,000ft. | <p>It is apparent that whilst Outwood was overflown by some aircraft using the original conventional SID and the original RNAV SID, it is overflown more often currently, by aircraft using the modified RNAV SID. In each instance, the aircraft overflying Outwood have clearly been vectored from the SID and are heading eastwards.</p> <p>The concentrated pattern of traffic that remains on the SID has moved to the NPR centreline (i.e. southwards from where it had been previously) and is therefore closer to, but not directly overhead, Outwood.</p>  |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams                            | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?  |
|---|---|---|
|   |   | <p>Outwood is also affected by an increase in tactically vectored traffic overflying that location.</p> <p>For these two reasons, Outwood is likely to experience an increase in noise and residents are likely to feel they are overflown more often since the implementation of the modified RNAV SID.</p>  |
| Salfords (158)                          | Most aircraft are above 4000ft by Salfords. Aircraft are typically in the range of 5,000-7,000ft. | <p>Salfords is located on the NPR centreline. Since the implementation of the modified RNAV SID the concentration of traffic has been displaced southwards, and has become aligned with the NPR centreline and therefore the current concentration of traffic (after it completes the turn and then heads eastwards) is situated above Salfords.</p> <p>This compares with the traffic pattern from the original conventional SID which had an eastbound concentration approx. 800-1000m north of Salfords, and the original RNAV SID which had an eastbound concentration approx. 1500m north of Salfords. Whilst Salfords was overflown by some traffic during the original conventional SID and the original RNAV SID, this was tactically vectored aircraft. It is evident that the numbers of aircraft that currently overfly Salfords has increased since the modified RNAV SID was implemented.</p> <p>Salfords is affected by the realignment of the modified RNAV SID which has resulted in a concentration of eastbound traffic on the NPR centreline. It is likely that Salfords is experiencing an increase in noise impact as a result of the modified RNAV SID when compared to the both the original RNAV SID and the original conventional SID.</p> |
| Capel (116)                             | The majority are below 4,000ft by Capel; all aircraft are below 5,000ft by Capel.                 | Capel is located within the NPR monitoring swathe, to the west of the NPR centreline, in the first half of the turn. Since the implementation of the modified RNAV SID, there is degree of dispersion of traffic at Capel that is   |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams   | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?  |
|---|--|---|
|   |  | <p>comparable with the dispersion evident from the original conventional SID. However, Capel was <u>directly</u> overflown more often during the period of the original RNAV SID when traffic displayed a more concentrated pattern around the turn, focused on the outer edge of the NPR monitoring swathe. This concentrated traffic pattern was directly overhead Capel.</p> <p>With the modified RNAV design which has resulted in dispersion of traffic around the turn, Capel is still experiencing overflight but less concentrated than the original RNAV SID.</p> <p>Despite being directly overflown less frequently, it is likely that Capel is experiencing no change in noise impact as a result of the modified RNAV SID when compared with the original RNAV SID and the original conventional SID due to its location at a point that is relatively early in the departure procedure.</p>   |
| Sidlow (65)                             | Most aircraft are above 4000ft by Sidlow and the adjacent postcodes. Aircraft are typically in the range of 5,000-7,000ft. | <p>The summary of complaints prepared by GAL has combined a number of postcodes in the general vicinity of Sidlow, typically starting RH2 8**. These postcodes cover a number of locations such as Kinnerseley Manor and Duxhurst Lane that are west of Salfords, and generally close to KKE09, the waypoint on the modified RNAV SID.</p> <p>KKE09 is located on the NPR centreline and the postcodes associated with Sidlow are both north and south of this waypoint. Since the implementation of the modified RNAV SID the concentration of traffic has been displaced southwards, and has become aligned with the NPR centreline and therefore the current concentration of traffic after it completes the turn heads eastwards towards KKE09 (namely Sidlow and the associated postcodes).</p> <p>This compares with the traffic pattern from the original conventional SID which had an eastbound concentration approx. 800-1000m north of KKE09, and the original RNAV SID which had an eastbound concentration approx.</p> |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams   | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?   |
|---|--|--|
|   |  | <p>1500m north of KKE09. Sidlow itself was overflown by traffic during the original conventional SID; the original RNAV SID had the effect of moving the eastbound concentration north of Sidlow. It is evident that the number of aircraft that currently directly overfly Sidlow and the associated postcodes in the vicinity of KKE09 has increased since the modified RNAV SID.</p> <p>Sidlow and the associated postcodes are affected by the realignment of the modified RNAV SID which has resulted in a concentration of eastbound traffic on the NPR centreline. It is likely that these locations are experiencing an increase in noise impact as a result of the modified RNAV SID when compared to both the original RNAV SID and the original conventional SID.</p>   |
| Meath Green (47)                        | Most aircraft are above 4000ft by Horley. Aircraft are typically in the range of 5,000-7,000ft.  | Meath Green is located on the north side of Horley, on the edge of the southern boundary of the NPR monitoring swathe. Therefore all previous commentary about Horley is also applicable to Meath Green as the location is similarly affected.   |
| Beare Green (41)                        | Whilst there are a few aircraft below 3000ft passing Beare Green, the majority of aircraft are between 3000ft-5000ft. This is supported by the gate analysis at <a href="#">Annex M</a> which shows that the average altitude at Beare Green is approx 4000ft. | <p>Beare Green is located on the NPR in the second half of the turn. Since the implementation of the modified RNAV SID, there is degree of dispersion of traffic at Beare Green that is comparable with the dispersion evident from the original conventional SID. However, Beare Green was <u>directly</u> overflown less often during the period of the original RNAV SID when traffic displayed a more concentrated pattern around the turn, focused on the outer edge of the NPR monitoring swathe. This concentrated traffic pattern was to the west of Beare Green, and therefore aircraft were generally further away from that location whilst the original RNAV SID was in use.</p> <p>With the modified RNAV SID design, which has resulted in the reintroduction of dispersion of aircraft around the turn, Beare Green is experiencing more direct overflight than the original RNAV SID, but a similar amount of overflight when compared with the original conventional SID.</p> |



| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams   | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?   |
|---|--|--|
|   |  | <p>As a result of the dispersion around the turn, Beare Green is likely to be experiencing an increase in noise impact as a result of the modified RNAV SID when compared with the original RNAV SID but the impact is likely to be comparable to the original conventional SID which had a similar traffic pattern at that location.</p>  |
| Norwood Hill (39)                       | <p>Most aircraft are above 4000ft in the vicinity of Norwood Hill. Aircraft are typically 5000-7000ft at this location.</p>      | <p>The postcodes identified as “Norwood Hill” cover a number of smaller communities and individual locations in addition to Norwood Hill itself. These communities are located close to the southern boundary of the NPR monitoring swathe with some of them located outside the swathe whilst others are within the swathe.</p> <p>Similar to Horley and Meath Green, Norwood Hill appears to have an increase in direct overflights due to aircraft being tactically vectored from the modified RNAV SID. Equally, due to the general displacement of the traffic pattern southwards, aircraft are generally closer of Norwood Hill than they were with the original RNAV SID or the original conventional SID.</p> <p>This change in traffic pattern is consistent with a replication of the corrected conventional SID which aligns aircraft with the SID and NPR after completing the turn (other than those that are tactically vectored).</p> <p>The displacement of the traffic pattern southwards is likely to have increased the noise impact for this location.</p> |
| Reigate (34)                            | <p>Most aircraft are at or above 4000ft as they pass south of Reigate. Aircraft are typically in the range of 5000ft-7000ft.</p> | <p>Reigate is located beyond the northern limit of the eastbound track of NPR monitoring swathe. It was noted that approx 59% of the individual complaints from this location came from one person.</p> <p>As a result of traffic generally heading towards KKE09 after completing the turn and aligning with the NPR, the pattern of traffic has been displaced</p>   |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams                               | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?  |
|---|--|---|
|   |  | <p>southwards, away from Reigate following the implementation of the modified RNAV SID. This has resulted in very few direct overflights of Reigate (tactically vectored) and a displacement of the concentration of aircraft on Route 4 away from the location.</p> <p>This compares with the traffic pattern displayed by the original RNAV SID which displaced aircraft further northwards than the original conventional SID, towards Reigate. This would have resulted in a greater number of direct overflights and aircraft generally being closer to Reigate.</p> <p>This current pattern of aircraft on Route 4 is likely to have reduced the noise impact upon Reigate when compared with the original RNAV SID and the original conventional SID.</p>  |
| Leigh (30)                              | Most aircraft are at or above 4000ft by Leigh. Aircraft are typically in the range of 4,000-6,000ft. | <p>The postcodes identified as “Leigh” cover a number of smaller communities in addition to Leigh itself. These communities are located close to the northern boundary of the NPR monitoring swathe and include Bunce Common (which is located outside the swathe) and Shellwood Cross (which is located inside the swathe).</p> <p>There is evidence from the radar track diagrams that Leigh continues to be directly overflown by a few aircraft that are beyond the northern boundary of the NPR monitoring swathe, at or below 4000ft. However this pattern is similar to that evidenced by aircraft flying the original conventional SID.</p> <p>The modified RNAV SID shows that most aircraft are completing the turn and then continuing to turn (away from Leigh) towards KKE09 and to align with the NPR.</p> <p>The original RNAV SID was effectively directly above Leigh which resulted in an eastbound concentration of traffic passing above that location. That concentration above Leigh is no longer evident with the modified RNAV SID.</p> |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams   | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?  |
|---|--|---|
|   |  | <p>With the modified RNAV SID, Leigh itself is experiencing fewer direct overflights although as noted above, there are not only still some overflights of that location but the description of “Leigh” also covers locations such as Shellwood Cross which are within the NPR monitoring swathe and therefore would be expected to still be overflown by aircraft using the modified RNAV SID.</p>   |
| Redhill (23)                            | <p>Most aircraft are at or above 4000ft as they pass south of Redhill. Aircraft are typically in the range of 5000ft-7000ft.</p> | <p>Redhill is located beyond the northern limit of the eastbound segment of NPR monitoring swathe. It was noted that approx 63% of the individual complaints from this location came from one person</p> <p>As a result of traffic generally heading towards KKE09 after completing the turn and aligning with the NPR, the pattern of traffic has been displaced southwards, away from Redhill following the implementation of the modified RNAV SID. This has resulted in very few direct overflights of Redhill (tactically vectored) and a displacement of the concentration of aircraft on Route 4 away from the location.</p> <p>This compares with the traffic pattern displayed by the original RNAV SID which displaced aircraft further northwards than the original conventional SID, towards Redhill. This would have resulted in a greater number of direct overflights and aircraft generally being closer to Redhill.</p> <p>This current pattern of aircraft on Route 4 is likely to have reduced the noise impact upon Redhill when compared with the original RNAV SID and the original conventional SID.</p> |
| Crowhurst (18)                          | <p>Most aircraft are at or above 5000ft as they pass Crowhurst. Aircraft are typically above 6000ft.</p>                         | <p>Crowhurst is located beyond the eastern limit of the NPR monitoring swathe.</p> <p>Some complaints relate to arriving traffic rather than the departures on Route 4. However, it was noted that a number of the complaints referred to</p>   |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams  | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?   |
|---|---|--|
|   |   | <p>night noise and sleep disturbance.</p> <p>The current traffic pattern shows that aircraft have generally been displaced further southwards since the implementation of the modified RNAV SID, with the result that:</p> <ul style="list-style-type: none"> <li>• There appears to be an increase in direct overflight of Crowhurst;</li> <li>• The general concentration of eastbound traffic on the SID has moved closer to Crowhurst.</li> </ul> <p>Crowhurst was overflown by aircraft during the original RNAV SID and the original conventional SID, but the frequency appears to have increased as a result of the displacement of traffic southwards.</p> <p>This southwards displacement is consistent with the modified RNAV SID being a replication of a corrected conventional SID.</p>  |
| South Holmwood (15)                     | <p>Whilst there are a few aircraft below 3000ft passing South Holmwood, the majority of aircraft are between 3000ft-5000ft. This is supported by the gate analysis at <a href="#">Annex M</a> which shows that the average altitude at South Holmwood is approx 4000ft.</p> | <p>South Holmwood is located outside the NPR monitoring swathe in the second half of the turn. Since the implementation of the modified RNAV SID, there is degree of dispersion of traffic east of South Holmwood that is comparable with the dispersion evident from the original conventional SID.</p> <p>South Holmwood was <u>directly</u> overflown more often during the period of the original RNAV SID when traffic displayed a more concentrated pattern around the turn, focused on the outer edge of the NPR monitoring swathe. This concentrated traffic pattern was typically overhead South Holmwood.</p> <p>With the modified RNAV SID design, which has resulted in the reintroduction of dispersion of traffic around the turn, South Holmwood is experiencing fewer direct overflights than the original RNAV SID, but a similar amount of overflights when compared with the original conventional SID.</p> |

| Location (and number of correspondents) | Typical altitude of aircraft based on a review of radar track diagrams                                     | Description of modified RNAV traffic pattern – does the pattern give an indication why the complaints have arisen?   |
|---|--|--|
|   |  | <p>As a result of the dispersion around the turn, South Holmwood is likely to be experiencing a decrease in noise impact as a result of the modified RNAV SID when compared with the original RNAV SID but comparable to the original conventional SID which had a similar traffic pattern.</p>  |
| Mynthurst (15)                          | <p>Some aircraft are below 4000ft passing Mynthurst. Typically aircraft are between 4000ft and 6000ft.</p> | <p>Mynthurst is within the NPR monitoring swathe, located south of Leigh.</p> <p>The traffic pattern for the modified RNAV SID shows that as aircraft complete the turn and begin to align with the eastbound track of the NPR, there has been a change in dispersion southwards that has resulted in aircraft being generally closer to Mynthurst and that the location is being directly overflown more often.</p> <p>With the original conventional SID, traffic was dispersed around the turn and some overflights of Mynthurst were evident. During the original RNAV SID, the pattern of traffic was displaced further away from Mynthurst, with much fewer direct overflights evident.</p> <p>The change in traffic pattern since the implementation of the modified RNAV SID is likely to result in an increase in noise impact for Mynthurst, when compared with the noise impact from not only the original conventional SID but especially the original RNAV SID.</p> |