Annex D – Complaints Analysis

CAA ANALYSIS OF COMPLAINT DATA FROM NON-AVIATION STAKEHOLDERS

Introduction.

1. This Annex is an analysis of complaint data submitted to London Luton Airport Operations Ltd (LLAOL) and directly to the CAA. This report considers the location of the complaint, the altitude of aircraft as they overfly, or fly close to the complaint location, and the impact of the change on that location. From complaints data received in the period February to September 2017 (relevant to the modified design), we have analysed the impacts of the locations from where the highest number of complaints were submitted to LLAOL. By restricting our analysis to these areas, we have been proportionate in our considerations, prioritising those locations that appear to have generated the greatest response from communities. Complaints directly made to the CAA also correlate with these areas. Combined numbers of complaints are shown later in Table 4.

2. LLAOL has analysed the complaint data by grouping it into postcode locations and showing the number of complaints from each postcode as shown on the complaints map provided to the CAA. The full set of data relating to complaints to LLAOL, is published in the monthly complaints data which is shown on the CAA website: complaints data , along with a map showing the locations of the complaints: complaints map. This map shows the main concentrations of locations of complaints and is the prime focus for this analysis.

2.1 From the complaints map where the highest number of complaints to LLAOL were evident, the following areas in Table 1 were subject to further analysis:

Table 1.

Location	Complaints	Number of Postcodes	Remarks
Flamstead	97	9	
Redbourn	149	12	
South Harpenden	3068	33	
Harpenden	1191	32	
Wheathampstead	186	19	
Sandridge	2107	33	
St Albans East	2036	139	
St Albans West	679	58	

Note: The complaints to LLAOL recorded here are taken from the Complaints Map (PIR report Annex L and M) and are based on areas depicted in the map at Annex M for the purposes of collating complaints from the geographical locations shown on the complaints map; (for this analysis, these locations are distinguished by red coloured hand-drawn shapes and circles by the CAA). The numbers in the small red circles show numbers of complaints to LLAOL, hence we have added up these numbers to show the total number of complaints in these hand-drawn locations. The numbers of complaints in Table 1 (above) and Table 4 (below) do not correlate to the numbers of complaints stated in the main report paragraph 130 which are based on postcode locations.

3. Complaints raised directly to LLAOL and the CAA were reviewed and commented upon in the main report. Feedback received via the survey monkey process is detailed in Annex E.

Analysis process

4. What we did:

- We have reviewed the complaints analysis undertaken by LLAOL.
- We have reviewed the complaints submitted directly to LLAOL.
- We have reviewed the complaints submitted to the CAA by stakeholders raising issues about the change proposal after implementation.
- For those Luton areas with the most complaints, we have compared the location against the traffic patterns (as portrayed on radar track diagrams and density plots) of the departure procedures before and after the change. This approach ensured that our analysis was not only proportionate but that it adequately considered the feedback from the majority of complainants.
- For the purposes of this analysis we have examined the track dispersion, track density plots and altitude band traffic samples from the period of the data collection samples (February – September 2017) as reviewed under this PIR in Annex C against the traffic patterns evident before the change was implemented.
- We have described the traffic patterns in relation to the relevant Luton areas of complaint with the aim of identifying whether or not the complainants identified any effects that were not expected at the time of implementation.

5. General conclusions:

- The impacts of the change are as expected and complainants have not raised any effects that were not expected. The implementation of this change has:
    - reduced direct overflight of Hemel Hempstead, Redbourn, the southern area of St Albans (south of the A1057) and some areas of northern St Albans (north of the A1057), (in the case of St Albans, probably due to radar vectoring);
    - reduced the amount of dispersion up to the St Albans to Harpenden Railway Line;
    - introduced a more concentrated traffic pattern as far as Hatfield and beyond.
- There has been a shift in the main core of the traffic pattern away from the densely populated areas of Hemel Hempstead and the southern extremities of St Albans (as far east as the St Albans to Harpenden railway line), although as a consequential effect, this has shifted the core traffic pattern closer to Redbourn by 0.75Nm (1400m), and slightly closer to Childwickbury, South Harpenden and Harpenden by approximately 300-400m by the time departures cross the A1081 heading east.
- There is no change in the traffic pattern directly over Wheathampstead (note the main core track of the traffic pattern (as it overflies Sandridge) is approximately 3.7km from Wheathampstead).
- There has been a negligible shift of the main core of traffic pattern in the vicinity of the northern area of Flamstead, the northern area of St Albans (east of the St Albans to Harpenden railway line and north of the A1057), Sandridge, Wheathampstead and Hatfield.
- Some locations are exposed to a greater concentration of traffic and therefore have experienced an increase in the number of aircraft flying overhead and consequential noise impacts. However, as a result of this concentration, other locations will have fewer aircraft overhead. This was what was expected in the CAA decision.

6. Complaints data:

Table 2 - Summary of correspondence to LLAOL

Period	Jul- Nov 2016	Feb – Sep 2017 (See Note)	Total
Number of individual enquiries/ complaints	1782	9722	11,504
Postcode Locations	322	709	1,031

Note: Complaints by postcode mapped by LLAOL as shown on the CAA website: Complaints mapped by postcode to LLAOL

Table 3 - Summary of correspondence to the CAA from 25 August 2015 to commencement of PIR review analysis (30 March 2019)

Number of enquiries/complaints	491
Number of individual complainants	338

7. Locations for complaints to LLAOL and the CAA

Table 4 below shows main locations of postcode complaints submitted to LLAOL and complaints submitted to the CAA via Form FCS1521 and External correspondence (including MP correspondence). These locations are then detailed in Table 5 to show the impacts on these areas.

Table 4 - Main locations by feedback numbers to LLAOL and the CAA

Luton Area (a)	Number of Enquiries/ complaints (and complainants) to the CAA where more than 5 complainants reside (b)	Number of Enquiries / complaints with postcodes to Luton		Remarks (e)
		Enquiries / Complaints (c)	Postcode Locations (d)	
Flamstead	Less than 5	97	9	
Redbourn	Less than 5	149	12	
South Harpenden	34 (23) See Note 1.	3068	33	
Harpenden		1191	32	
St Michaels Parish	10 (7)	11	2	
Wheathampstead	8 (8)	186	19	
Sandridge	173 (129)	2107	33	
St Albans	235 (136)	2036 east	139	
St Albans		679 west	58	

Note 1: Complaints from Harpenden and South Harpenden to the CAA were grouped together in our analysis, whereas complaints to LLAOL were distinguishable between Harpenden and South Harpenden.

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

Table 5 shows the main locations where complaints have originated. The typical altitude of departures flying over or close to these areas is highlighted, the proximity of the location in relation to the SID is described, then in columns 4 and 5, we describe the traffic patterns before and after the change (copied from Annex C), together with our conclusion of the associated impact of the change on these locations.

Table 5

Luton area (and number of complaints) **(1)**	**Typical altitude (amsl) of aircraft based on a review of radar track diagrams** **(2)**	**Location in respect departure procedures** **(3)**	**Description of traffic pattern before the change** **(4)**	**Description of traffic pattern after the change and the associated impact** **(5)**
Flamstead Complaints: 97 to LLAOL. Less than 5 to CAA.	**July 2015** Slide 7. Between 2,000 and 3,000 feet departures pass west of Flamstead flying a concentrated pattern along the NPR before commencing the turn towards St Albans. Slide 9. Between 3,000 and 4000ft, the majority of departures pass to the west of Flamstead with only a very few aircraft flying over Flamstead. Slide 11. Between 4,000 and 5000ft, the majority of departures pass to the west of Flamstead in a concentrated pattern. Two departures are seen flying directly above Flamstead. Slide 13. Between 5,000 and 6000ft, the majority of departures pass to the west of Flamstead with	Flamstead is located approximately 1.5km to the east of the NPR and lies under the eastern section of the NPR monitoring swathe. After the change, the NPR monitoring swathe has reduced in width to 2km wide, hence, most of Flamstead lies outside the revised swathe.	TRACK DISPERSION DIAGRAM The track dispersion diagrams are the most suitable set of diagrams to show the impact on Flamstead (Flamstead is not shown on the density plots). **2014 Aug departure diagram (Segment 2)** Slide 3 After departures cross the M1 J10, the traffic pattern reduces in width, and becomes concentrated along the NPR centreline. Some departures start to commence the left turn towards St Albans/Sandridge before reaching Flamstead resulting in aircraft flying over Flamstead. This could be due to ATC vectoring. From the density plot description: Slide 6 Towards the A5 between Markyate and Flamstead, the traffic pattern is concentrated along the NPR centreline, with departures	TRACK DISPERSION DIAGRAM The track dispersion diagrams are the most suitable set of diagrams to show the impact on Flamstead. (Flamstead is not shown on the density plots). **2017 Mar departure diagram (Segment 2)** Slide 4 The traffic pattern is similar to the 2014 conventional sample. After departures cross the M1 J10, the main core is concentred along the NPR centreline. Some departures start to commence the left turn towards St Albans/Sandridge before reaching Flamstead resulting in aircraft flying over Flamstead. From the density plot description: Slide 7 The traffic pattern is similar to the 2014 conventional SID sample.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	only a few aircraft flying over Flamstead. Slide 15. Between 6,000 and 7,000ft, the majority of departures reach this altitude band after flying past Flamstead to the west. **August 2017** Slide 8. Between 2,000 and 3,000 feet departures pass west of Flamstead flying a concentrated pattern along the NPR with the main concentration on the eastern side of the NPR before commencing the turn towards St Albans. Slide 10. Between 3,000 and 4000ft, the majority of departures. pass west of Flamstead with a few aircraft flying over Flamstead. Slide 12. Between 4,000 and 5000ft the majority of departures pass west of Flamstead, although the number of aircraft directly above Flamstead has increased. Slide 14. Between 5,000 and 6000ft, the majority of departures pass to the west of Flamstead with a few aircraft flying over Flamstead. Slide 16. Between 6,000 and 7,000ft, the majority of departures		also flying both east and west of the main core of traffic. Some departures start to commence the left turn towards St Albans/Sandridge before reaching Flamstead, resulting in flights over Flamstead.	Towards the A5 between Markyate and Flamstead, the main core of departures is concentrated along the NPR centreline, with some departures also flying either side of the main core of traffic. Some departures start to commence the left turn towards St Albans/ Sandridge before reaching Flamstead resulting in flights over Flamstead. **Associated Impact:** The traffic pattern is as expected. The pattern is similar to the track plot shown for the Trial SID, resulting in aircraft flying between Markyate and Flamstead in a comparable manner to the conventional SID. The track adherence is generally acceptable, there are some airlines that Luton should work with to see where some improvements could be made in achieving better compliance with the SID. We therefore conclude that the main core is in similar location as it was before the change in relation to Flamstead. Additionally, Flamstead is being overflown to a similar extent as it was before the change. This was what was expected when we made our decision in 2015. However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	reach this altitude band after flying past Flamstead to the west.			increase in traffic is likely to have led to a consequential increase in aircraft noise. However, this increase in traffic is not a result of the ACP.
Redbourn Complaints: 149 to LLAOL. Less than 5 to CAA.	**July 2015** Slide 9. Between 3,000 and 4000ft, the majority of departures pass to the south of Redbourn with only a very few aircraft flying over Redbourn. Slide 11. Between 4,000 and 5000ft, the majority of departures pass to the south of Redbourn, however the southern part of Redbourn is directly overflown in this band. Slide 13. Between 5,000 and 6000ft, the majority of departures pass to the south of Redbourn, although the southern half of Redbourn has direct overflight in this band. Slide 15. Between 6,000 and 7,000ft, the majority of departures pass south of Redbourn, although the southern part of Redbourn has direct overflight. **August 2017**	Redbourn is located immediately to the north of the NPR (before the change) and is directly below the northern half of the NPR monitoring swathe before the change. After the change, Redbourn is slightly further away from the NPR, however, only the southwest extremity lies below the revised 2km wide NPR monitoring swathe.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Redbourn. **2014 Aug departure diagram (Segment 3)** Slide 6 After passing the A5 between Markyate and Flamstead, the main core of departures turns left towards Sandridge and fly a wide turn, flying over the north-east of Hemel Hempstead (after the main core density changes from orange to yellow). Following the turn and by the time aircraft cross the St Albans to Harpenden railway line, aircraft establish on a direct track towards Brookmans Park. Departures are also widespread to the north and south of the main core in a less dense pattern (turquoise and purple patterns), flying over the northern area of Hemel Hempstead in the south and resulting in aircraft flying outside the NPR swathe. After passing the M1 to the northeast of Hemel Hempstead, aircraft complete the turn onto an easterly track, with a denser core (yellow) evident by the time aircraft cross the railway line; the main core of departures	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Redbourn. **2017 Aug departure diagram (Segment 3)** Slide 7 After passing the A5 between Markyate and Flamstead, the main core of departures commences the left turn towards Sandridge earlier than they did flying the conventional SID. They fly the turn passing north of Hemel Hempstead flying mid-way between Hemel Hempstead and Redbourn. The turn is completed by the M1 and compared with the conventional SID, the main core of departures is approximately 0.75NM (1400m) further north by the time it crosses the M1 eastbound than was the case, hence there is a distinct shift in the traffic pattern to the north towards Redbourn and away from Hemel Hempstead. After passing the M1, the main core of departures follows the SID eastbound nominal track to GWS12 (the railway line) where the next track change occurs.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	Slide 10. Between 3,000 and 4000ft, the majority of departures. pass south of Redbourn with a very few aircraft flying over Redbourn. Slide 12. Between 4,000 and 5000ft the majority of departures pass clear of Redbourn to the south, although there are a few aircraft directly above Redbourn (no doubt due to earlier radar vectoring). Slide 14. Between 5,000 and 6000ft, the majority of departures pass to the south of Redbourn, although there are a few aircraft flying directly over the southwestern extremity. Slide 16. Between 6,000 and 7,000ft, all departures pass to the south of Redbourn, with one track flying to the north. Direct overflight is no longer apparent.		continue to route towards Sandridge then Hatfield. During the wide turn north of Hemel Hempstead, by the time departures cross the M 1, widespread radar vectoring is evident when aircraft will be above 3000ft. On the north side of the traffic pattern, the main core is south of Redbourn and Harpenden, however, Redbourn and Harpenden are flown over by aircraft within the less dense traffic pattern (turquoise and purple).	Departures outside the main core of the traffic pattern (shown by the turquoise and purple patterns), are less dispersed around the turn, resulting in less flights over Hemel Hempstead, Redbourn, Harpenden and St Albans. **2017 Aug departure diagram (Segment 3)** Slide 8 The main core of departures is similar to that of March 2017, but with the increase in the August traffic sample, the main core is more noticeable with a denser pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. **Associated impact:** We conclude that there is less direct overflight of Redbourn, although the main core of traffic has moved closer to Redbourn by approximately 0.75NM (1400m) as departures cross the M1 heading east. It is therefore considered that there is likely to be a minor increase in noise exposure in Redbourn due to the main core being closer. However due to the reduction in direct overflight there will also likely be a reduction in the number of noisier direct overflight events. This was what was expected when we made our decision in 2015.

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				However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have led to a consequential increase in aircraft noise exposure. However, this increase in traffic is not a result of the ACP.
South Harpenden Complaints: 3068 to LLAOL 34 to CAA (combined with Harpenden).	**July 2015** Slide 9. Between 3,000 and 4,000 feet departures pass south of South Harpenden; however one departure turns off the normal routing and flies over Harpenden. Slide 11. Between 4,000 and 5000ft, the majority of departures pass to the south of Harpenden with only a very few aircraft flying over South Harpenden. Slide 13. Between 5,000 and 6000ft, the majority of departures pass to the south of Harpenden with only a few aircraft flying over South Harpenden. Slide 15. Between 6,000 and 7000ft, the majority of departures pass to the south of Harpenden with only a few aircraft flying over South Harpenden.	South Harpenden is situated immediately to the north of the nominal track of the SID before and after the change, although the average flight between the M1 and the St Albans to Harpenden railway line path is slightly closer to South Harpenden after the change.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Harpenden. **2014 Aug departure diagram (Segment 3)** Slide 6 After passing the A5 between Markyate and Flamstead, the main core of departures turns left towards Sandridge and fly a wide turn, flying over the north-east of Hemel Hempstead (after the main core density changes from orange to yellow). Following the turn and by the time aircraft cross the St Albans to Harpenden railway line, aircraft establish on a direct track towards Brookmans Park. Departures are also widespread to the north and south of the main core in a less dense pattern (turquoise and purple patterns), flying over the northern area of Hemel Hempstead in the south and resulting in aircraft flying outside the NPR swathe. After passing the M1 to the northeast of Hemel Hempstead, aircraft complete the turn	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Harpenden. **2017 Aug departure diagram (Segment 3)** Slide 7 After passing the A5 between Markyate and Flamstead, the main core of departures commences the left turn towards Sandridge earlier than they did flying the conventional SID. They fly the turn passing north of Hemel Hempstead flying mid-way between Hemel Hempstead and Redbourn. The turn is completed by the M1 and compared with the conventional SID, the main core of departures is approximately 0.75NM (1400m) further north by the time it crosses the M1 eastbound than was the case, hence there is a distinct shift in the traffic pattern to the north towards Redbourn and away from Hemel Hempstead. After passing the M1, the main core of departures follows the SID eastbound nominal

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	August 2017 Slide 10. Between 3,000 and 4,000 feet, all departures pass south of South Harpenden. Slide 12. Between 4,000 and 5000ft, the majority of departures. Pass to the south of South Harpenden, with a few aircraft flying over South Harpenden. Slide 14. Between 5,000 and 5000ft the majority of departures pass to the south of South Harpenden with only a few aircraft flying over Harpenden. Slide 16. Between 6,000 and 7000ft, the majority of departures pass to the south of South Harpenden with a few aircraft flying over Harpenden.		onto an easterly track, with a denser core (yellow) evident by the time aircraft cross the railway line; the main core of departures continue to route towards Sandridge then Hatfield. During the wide turn north of Hemel Hempstead, by the time departures cross the M 1, widespread radar vectoring is evident when aircraft will be above 3000ft. On the north side of the traffic pattern, the main core is south of Redbourn and Harpenden, however, Redbourn and Harpenden are flown over by aircraft within the less dense traffic pattern (turquoise and purple).	track to GWS12 (the railway line) where the next track change occurs. Departures outside the main core of the traffic pattern (shown by the turquoise and purple patterns), are less dispersed around the turn, resulting in less flights over Hemel Hempstead, Redbourn, Harpenden and St Albans **2017 Aug departure diagram (Segment 3)** Slide 8 **Associated impact:** The main core of departures is similar to that of March 2017, but with the increase in the August traffic sample, the main core is more noticeable with a denser pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. We conclude that South Harpenden is being overflown to the same extent as it was before the change, however, the main core of the traffic pattern is approximately 300m to 400m closer to South Harpenden (at the point departures cross the A1081 main road from St Albans to Harpenden) after the change. It is therefore considered that there will likely be a minor increase in noise exposure as a result of the airspace change. This was what was expected when we made our decision in 2015.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				It should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have also contributed to a consequential increase in aircraft noise exposure. However, this increase in traffic is not a result of the ACP.
Harpenden Complaints: 1191 to LLAOL. 34 to CAA (combined with South Harpenden)**.**	The altitudes of departure flying adjacent to Harpenden may be considered to be the same as that for South Harpenden.	Harpenden is situated slightly further to the north of the nominal track of the SID before and after the change, although the average flight between the M1 and the St Albans to Harpenden railway line path is slightly closer to Harpenden after the change by approx. 300m.	The descriptions of the traffic patterns relating to the proximity of South Harpenden are the same relating to Harpenden although Harpenden is slightly further away from the main core of the traffic pattern.	The descriptions of the traffic patterns relating to the proximity of South Harpenden are the same relating to Harpenden although Harpenden is slightly further away from the main core of the traffic pattern. **Associated impact:** The main core of departures is similar to that of March 2017, but with the increase in the August traffic sample, the main core is more noticeable with a denser pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. We conclude that Harpenden is being overflown to the same extent as it was before the change, however, the main core of the traffic pattern is approximately 300m to 400m closer to Harpenden (at the point departures cross the A1081 main road from St Albans to Harpenden) after the change. It is therefore considered that there will be a minor increase in noise exposure. This was what was expected when we made our decision in 2015.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				It should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have also contributed to a consequential increase in aircraft noise exposure. However, this increase in traffic is not a result of the ACP.
St Michael Parish Complaints: 11 to LLAOL. 10 to CAA.	**July 2015** Slide 9. Between 3,000 and 4,000 feet departures pass over Childwickbury. Slide 11. Between 4,000 and 5000ft St Michaels Parish is completely overflown. Slide 13. Between 5,000 and 6000ft, St Michaels Parish is completely overflown. Slide 15. Between 6,000 and 7000ft, St Michaels Parish is completely overflown. **August 2017** Slide 10. Between 3,000 and 4,000 feet, departures pass over St Michaels Parish. Slide 12. Between 4,000 and 5000ft, departures fly over St Michaels Parish, with a few aircraft flying over South Harpenden.	St Michaels Parish lies below the actual traffic pattern both before and after the change. Childwickbury is situated under the nominal track of the SID before and after the change, and also under the average flight path.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Childwickbury **2014 Aug departure diagram (Segment 3)** Slide 6 After passing the A5 between Markyate and Flamstead, the main core of departures turns left towards Sandridge and fly a wide turn, flying over the north-east of Hemel Hempstead (after the main core density changes from orange to yellow). Following the turn and by the time aircraft cross the St Albans to Harpenden railway line, aircraft establish on a direct track towards Brookmans Park. Departures are also widespread to the north and south of the main core in a less dense pattern (turquoise and purple patterns), flying over the northern area of Hemel Hempstead in the south and resulting in aircraft flying outside the NPR swathe. After passing the M1 to the northeast of Hemel Hempstead, aircraft complete the turn onto an easterly track, with a denser core	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Childwickbury. **2017 Aug departure diagram (Segment 3)** Slide 7 After passing the A5 between Markyate and Flamstead, the main core of departures commences the left turn towards Sandridge earlier than they did flying the conventional SID. They fly the turn passing north of Hemel Hempstead flying mid-way between Hemel Hempstead and Redbourn. The turn is completed by the M1 and compared with the conventional SID, the main core of departures is approximately 0.75NM (1400m) further north by the time it crosses the M1 eastbound than was the case, hence there is a distinct shift in the traffic pattern to the north towards Redbourn and away from Hemel Hempstead. After passing the M1, the main core of departures follows the SID eastbound nominal track to GWS12 (the railway line) where the next track change occurs.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	Slide 14. Between 5,000 and 5000ft departures fly over St Michaels Parish, with a few aircraft flying over South Harpenden Slide 16. Between 6,000 and 7000ft, the majority of departures pass to the south of South Harpenden with the Parish of St Michaels being overflown.		(yellow) evident by the time aircraft cross the railway line; the main core of departures continue to route towards Sandridge then Hatfield. During the wide turn north of Hemel Hempstead, by the time departures cross the M 1, widespread radar vectoring is evident when aircraft will be above 3000ft. On the north side of the traffic pattern, the main core is south of Redbourn and Harpenden, however, Redbourn and Harpenden are flown over by aircraft within the less dense traffic pattern (turquoise and purple).	Departures outside the main core of the traffic pattern (shown by the turquoise and purple patterns), are less dispersed around the turn, resulting in less flights over Hemel Hempstead, Redbourn, Harpenden and St Albans **2017 Aug departure diagram (Segment 3)** Slide 8 The main core of departures is similar to that of March 2017, but with the increase in the August traffic sample, the main core is more noticeable with a denser pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. **Associated impact:** We therefore conclude that St Michaels Parish is being overflown to the same extent as it was before the change and there is a shift in the main core of traffic (by approximately 300-400m towards the north by the time departures cross the A1081). Therefore, there is likely to be a minor change in noise exposure as a result of the ACP. This was what was expected when we made our decision in 2015. However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				increase in traffic is likely to have led to a consequential increase in aircraft noise. However, this increase in traffic is not a result of the ACP.
Wheathampstead Parish Complaints: 186 to LLAOL. 8 to CAA.	**July 2015** Slide 9. A few departures are between 3,000 and 4,000 feet but these departures fly over Sandridge which is approximately 1.87nm (3.47km) from Wheathampstead. Slide 11. A large number of departures are between 4,000 and 5000ft, the main core being over Sandridge, with radar vectored traffic between Sandridge and Wheathampstead. No direct overflight. Slide 13. Ditto 5-6000. Very few direct overflights. Slide 15. Ditto 6-7000. Very few direct overflights. **August 2017** Slide 10. A few departures are between 3,000 and 4,000 feet. Slide 12. A large number of departures are between 4,000 and 5000ft,but these departures fly over Sandridge which is approximately 3.7km from Wheathampstead.		TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Wheathampstead, although when viewing the track dispersion diagrams, single aircraft tracks are seen overflying Wheathampstead. **2014 Aug departure diagram (Segment 4)** Slide 6 After passing the St Albans to Harpenden railway line, the main core of the departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield. To the north of the main core of departures, aircraft are vectored over southern Harpenden, Welwyn Garden City and the north of Hatfield. Wheathampstead is overflown by traffic vectored by ATC.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on Wheathampstead, although when viewing the track dispersion diagrams, single aircraft tracks are seen overflying Wheathampstead. **2017 Mar departure diagram (Segment 4)** Slide 7 After passing the St Albans to Harpenden railway line, the main core of departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield. Where the main core flies over Hatfield, there is an approximately 0.4 km southern shift in the track density pattern. To the north of the main core of departures, aircraft are vectored over southern of Harpenden, Welwyn Garden City and the north of Hatfield. However, Harpenden is now less flown over, but, Hatfield and Welwyn Garden City

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	Slide 14. Ditto 5-6000. Very few direct overflights. Slide 16. Ditto 6-7000. Very few direct overflights.			continue to be flown over by the same extent as was evident before the change. Note: the flights over Harpenden and Welwyn Garden City, which, are located to the north of the nominal track of the SID design, are as a result of radar vectoring and not a direct result of the SID design. Wheathampstead is overflown by traffic vectored by ATC to a similar extant as was evident before the change. The main core of the concentrated pattern is similar to that before the change and the change has had no impact on Wheathampstead. **2017 Aug departure diagram (Segment 4)** Slide 8 The main core of departures is similar to that of March 2017, but the increase in the traffic sample is more noticeable with a denser (orange) pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. Wheathampstead is overflown by traffic vectored by ATC to a similar extent as was evident before the change. The main core of the concentrated pattern is similar to that before the change. **Associated Impact:**

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				We therefore conclude that Wheathampstead is being overflown to the same extent as it was before the change and there is little shift in the main core of traffic. Therefore, there is unlikely to be noticeable change in noise exposure as a result of the ACP. This was what was expected when we made our decision in 2015. However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have led to a consequential increase in aircraft noise. However, this increase in traffic is not a result of the ACP.
Sandridge Parish Complaints: 2107 to LLAOL. 173 to CAA.	**July 2015** Slide 9. A few departures are between 3,000 and 4,000 feet. Slide 11. A large number of departures are between 4,000 and 5000ft. Slide 13. Ditto 5-6000. Slide 15. Ditto 6-7000. **August 2017** Slide 10. A few departures are between 3,000 and 4,000 feet.	The parish lies below the Rwy 26 SIDs to BPK, with the village of Sandridge directly below the departure flight path before and after the change.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on the parish of Sandridge. **2014 Aug departure diagram (Segment 4)** Slide 6 After passing the St Albans to Harpenden railway line, the main core of the departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on the parish of Sandridge. **2017 Mar departure diagram (Segment 4)** Slide 7 After passing the St Albans to Harpenden railway line, the main core of departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	Slide 12. A large number of departures are between 4,000 and 5000ft. Slide 14. Ditto 5-6000. Slide 16. Ditto 6-7000.		To the north of the main core of departures, aircraft are vectored over southern Harpenden, Welwyn Garden City and the north of Hatfield.	Where the main core flies over Hatfield, there is an approximately 0.4 km southern shift in the track density pattern. To the north of the main core of departures, aircraft are vectored over southern of Harpenden, Welwyn Garden City and the north of Hatfield. However, Harpenden is now less flown over, but, Hatfield and Welwyn Garden City continue to be flown over by the same extent as was evident before the change. Note: the flights over Harpenden and Welwyn Garden City, which, are located to the north of the nominal track of the SID design, are as a result of radar vectoring and not a direct result of the SID design. **2017 Aug departure diagram (Segment 4)** Slide 8 The main core of departures is similar to that of March 2017, but the increase in the traffic sample is more noticeable with a denser (orange) pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. We therefore conclude that Sandridge is being overflown to the same extent as it was before the change and there is little shift in the main core of traffic. Therefore, there is unlikely to be

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				noticeable change in noise exposure as a result of the ACP. This was what was expected when we made our decision in 2015. However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have led to a consequential increase in aircraft noise. However, this increase in traffic is not a result of the ACP.
St Albans Complaints: 2035 (east) 679 (west) to LLAOL. 235 to CAA	**July 2015** Slide 9. Between 3,000 and 4,000 feet a few departures fly over St Albans, however, the majority pass north of St Albans. Slide 11. Between 4,000 and 5000ft, the majority of departures pass to the north of St Albans, however, there are a considerable number of aircraft flying over St Albans. Slide 13. Between 5,000 and 6000ft, the majority of departures pass to the north of St Albans, however, there are a considerable number of aircraft flying over St Albans.	St Albans is situated immediately to the south of the nominal track of the SID before and after the change, but is under the flightpaths before the change, but less so after the change.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on St Albans. **2014 Aug departure diagram (Segment 4)** Slide 6 After passing the St Albans to Harpenden railway line, the main core of the departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield. To the north of the main core of departures, aircraft are vectored over southern Harpenden, Welwyn Garden City and the north of Hatfield.	TRACK DENSITY DIAGRAM The track density diagrams are the most suitable set of diagrams to show the impact on St Albans. **2017 Mar departure diagram (Segment 4)** Slide 7 After passing the St Albans to Harpenden railway line, the main core of departures follows the SID nominal track over Sandridge and continues towards Hatfield and then Brookmans Park. To the south of the main core of departures, aircraft vectored by ATC are dispersed across all of St Albans and Hatfield. Where the main core flies over Hatfield, there is an approximately 0.4 km southern shift in the track density pattern.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
	Slide 15. Between 6000-7000ft, there is considerable overflight of St Albans **August 2017** Slide 10. Between 3,000 and 4,000 feet, the majority of departures pass north of St Albans, however a few aircraft fly over St Albans (less than the 2015 conventional SID pre-implementation sample). Slide 12. Between 4,000 and 5000ft, the majority of departures pass to the north of St Albans. There are only very few aircraft flying over St Albans (7 discernible tracks visible in this sample). Slide 14. Between 5,000 and 5000ft, the majority of departures pass to the north of St Albans. There are only very few aircraft flying over St Albans. Slide 16. Between 6,000 and 7000ft, the majority of departures pass to the north of St Albans. There are very few aircraft flying over St Albans.			To the north of the main core of departures, aircraft are vectored over southern of Harpenden, Welwyn Garden City and the north of Hatfield. However, Harpenden is now less flown over, but, Hatfield and Welwyn Garden City continue to be flown over by the same extent as was evident before the change. Note: the flights over Harpenden and Welwyn Garden City, which, are located to the north of the nominal track of the SID design, are as a result of radar vectoring and not a direct result of the SID design. **2017 Aug departure diagram (Segment 4)** Slide 8 The main core of departures is similar to that of March 2017, but the increase in the traffic sample is more noticeable with a denser (orange) pattern along the nominal track of the SID as the main core is now orange for the entire length of the traffic sample beyond Hatfield. **Associated impact:** **Northern St Albans (north of A1057).** We conclude that the area north of the A1057 of St Albans is being overflown to the same extent as it was before the change and therefore is unlikely to be noticeable change in noise exposure as a result of the change.

Luton area (and number of complaints) (1)	Typical altitude (amsl) of aircraft based on a review of radar track diagrams (2)	Location in respect departure procedures (3)	Description of traffic pattern before the change (4)	Description of traffic pattern after the change and the associated impact (5)
				However, it should be noted that between 2014 and 2017 overall aircraft movements have increased by around 30% and this increase in traffic is likely to have led to a consequential increase in aircraft noise. However, this increase in traffic is not a result of the ACP. This was what was expected when we made our decision in 2015. **Southern St Albans (south of A1057):** We conclude that the area south of the A1057 of St Albans has experienced little change in direct overflight and therefore there is unlikely to be a noticeable change in noise exposure as a result of the change. This was what was expected when we made our decision in 2015.