

## ANNEX M TO PIR REPORT DATED APRIL 2017

### Gate Analysis of Route 4 Departures

The purpose of the analysis was to investigate whether or not there had been a change in vertical profile of aircraft using Route 4, and to consider what impact any change in profile might have had upon locations beneath the pattern of traffic.

Using historic radar track data, a “gate” was placed across the Route 4 at three locations. The locations are illustrated in Figure 1. The first gate (located approximately across South Holmwood, Beare Green and Newdigate) is 6km wide, whilst the second and third gates (located at the waypoints KKE09 and KKE11 respectively) are 8km wide.

The resulting diagrams (Figures 2-10) show the altitude and lateral position of each aircraft as it flies “through” the gate, in the direction of travel. This produces a combined set of aircraft points that show the lateral and vertical spread of radar tracks and enable a comparison across the three SIDs. The diagrams produced for Route 4 clearly show how the lateral pattern of the departing aircraft has changed from the original conventional SID (Figures 2, 5 & 8), the original RNAV SID (Figures 3, 6 & 9) and the modified RNAV SID (Figures 4, 7 & 10).

Equally, the diagrams show that the range of altitudes has remained broadly the same for each SID, which would support a conclusion that the vertical profiles are largely unchanged.

A comparison of the average altitude (in feet, rounded to nearest 100) through each gate is as follows:

<b>Period</b>	<b>SID</b>	<b>Beare Green (Gate 1)</b>	<b>KKE09 (Gate 2)</b>	<b>KKE11 (Gate 3)</b>
July 2013	Original conventional	4,300	5,700	6,500
July 2015	Original RNAV	4,300	5,800	6,500
July 2016	Modified RNAV	4,000	5,500	6,200

This summary of average altitude indicates that the average vertical profile of aircraft using the modified RNAV SID is lower than the original RNAV SID and original conventional SID, by 300ft.

Whilst the reason(s) for this are not immediately apparent, it is important to consider if this might have an impact upon the noise levels for communities that are beneath Route 4. Use of noise

modelling has determined that for each gate, the resulting increase in noise levels based solely on the change in average altitude would be less than 1dB. This would indicate that for any communities experiencing an increase in noise levels following the implementation of the modified RNAV SID, the change is most likely due to the change in lateral traffic dispersion rather than any change in vertical profile.



Figure 1 - Location of Modified Route 4 gates

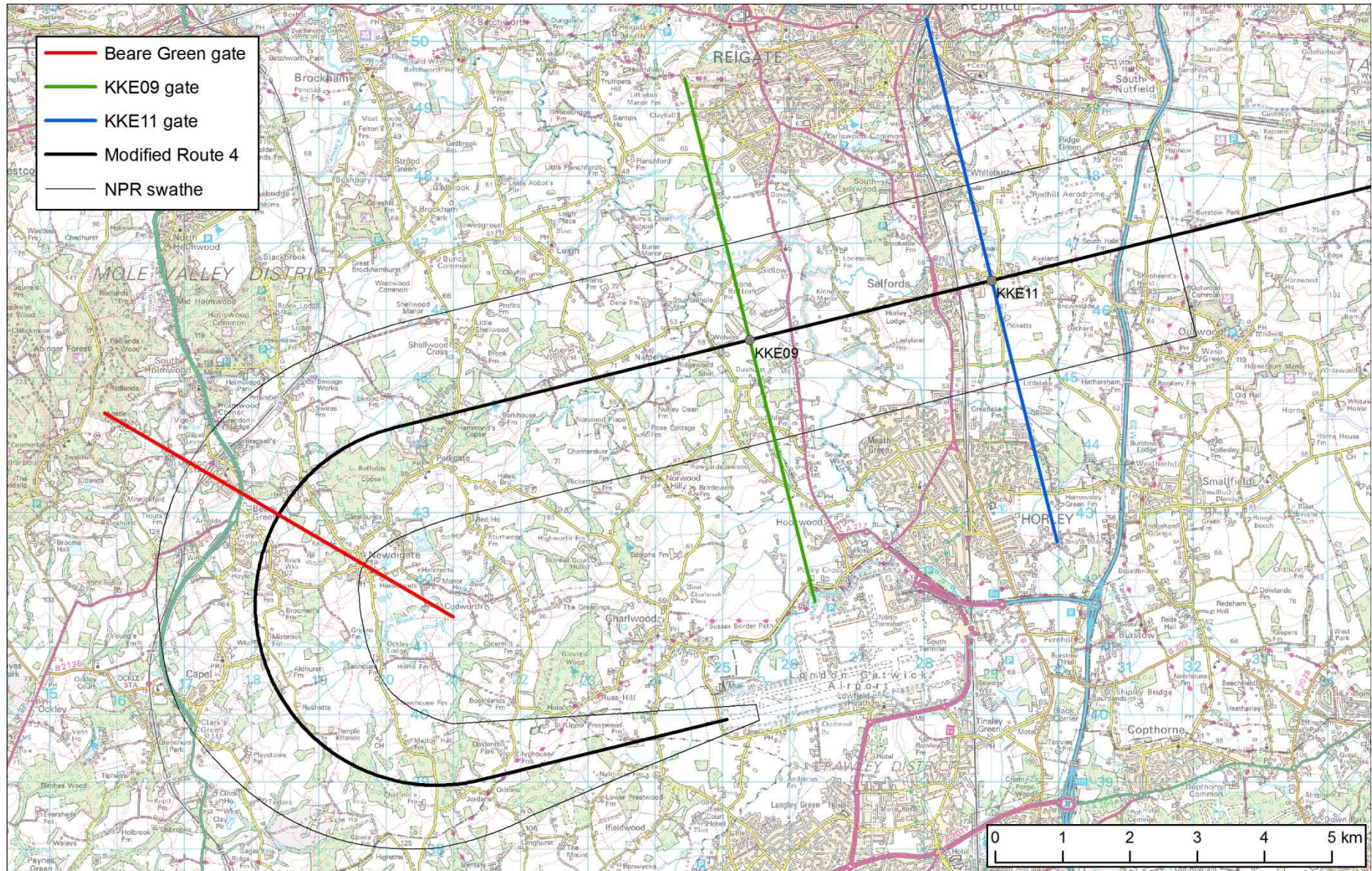




Figure 2 - Route 4 departures through Beare Green gate, July 2013

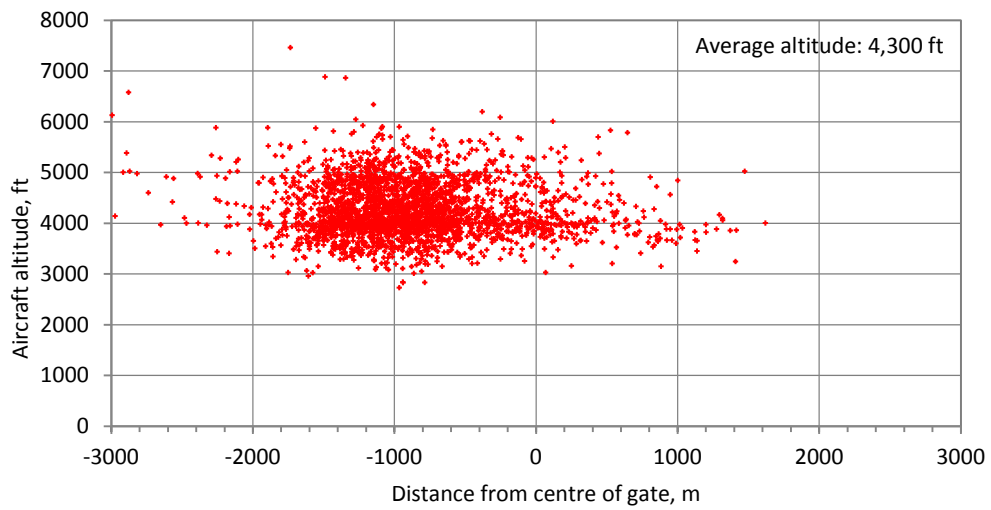


Figure 3 - Route 4 departures through Beare Green gate, July 2015

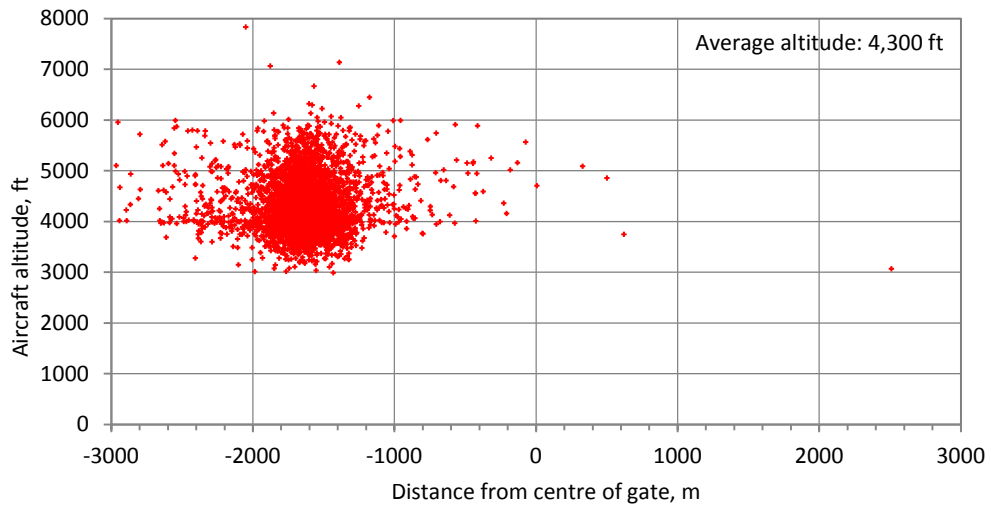


Figure 4 - Route 4 departures through Beare Green gate, July 2016

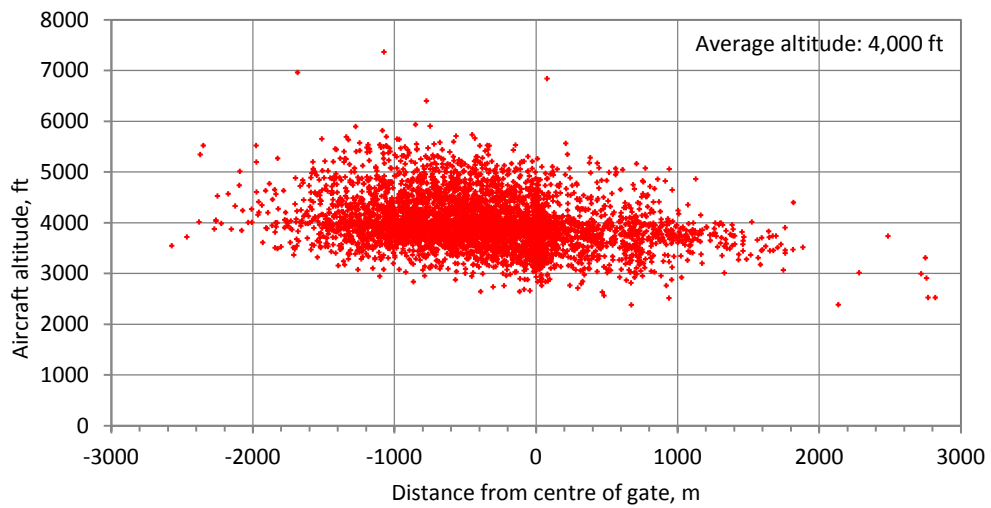


Figure 5 - Route 4 departures through KKE09 gate, July 2013

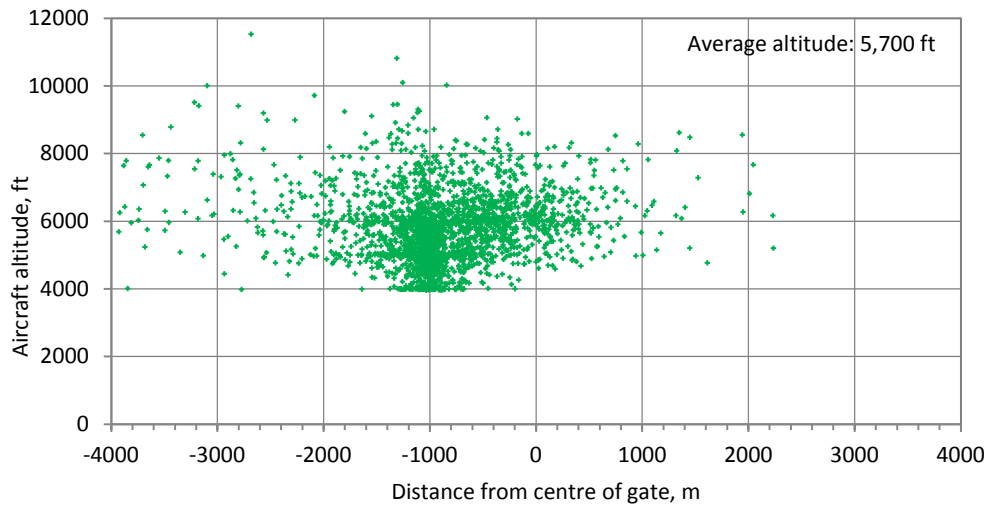


Figure 6 - Route 4 departures through KKE09 gate, July 2015

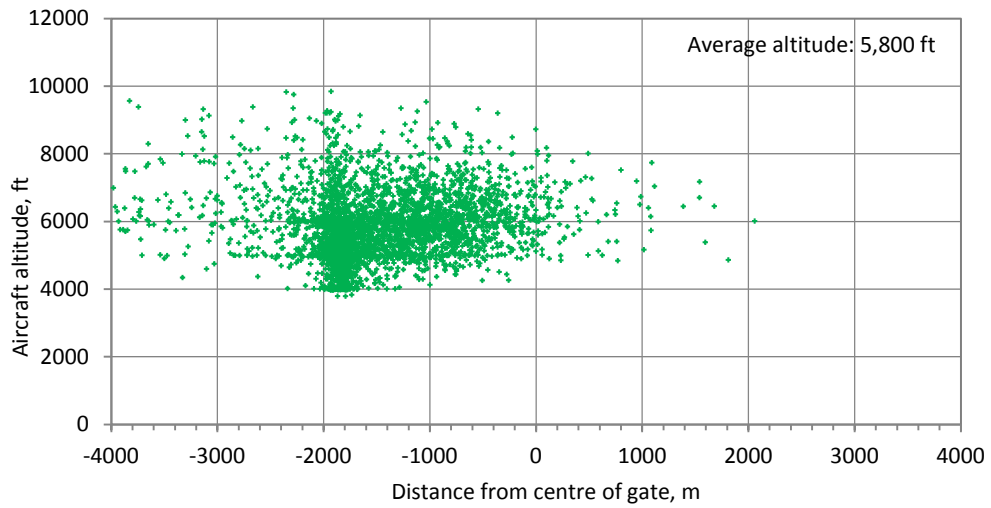


Figure 7 - Route 4 departures through KKE09 gate, July 2016

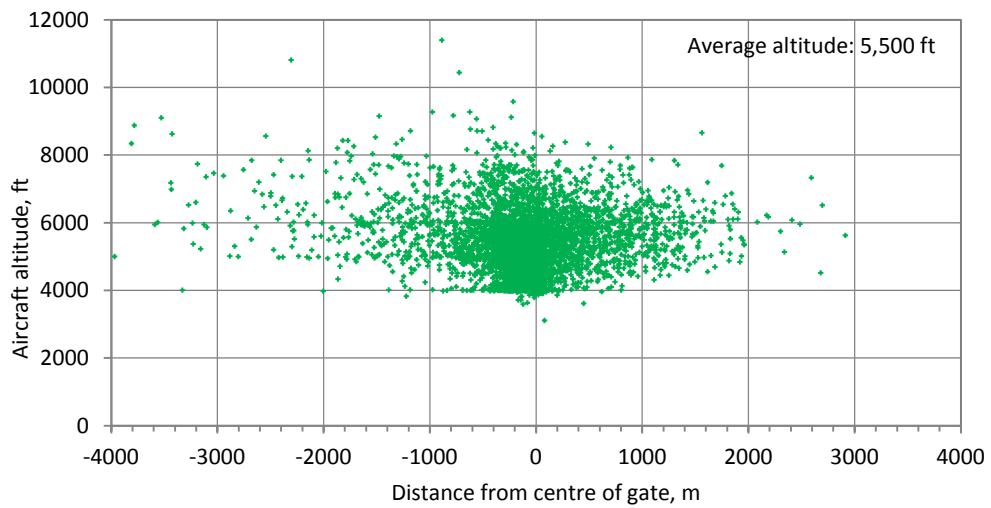


Figure 8 - Route 4 departures through KKE11 gate, July 2013

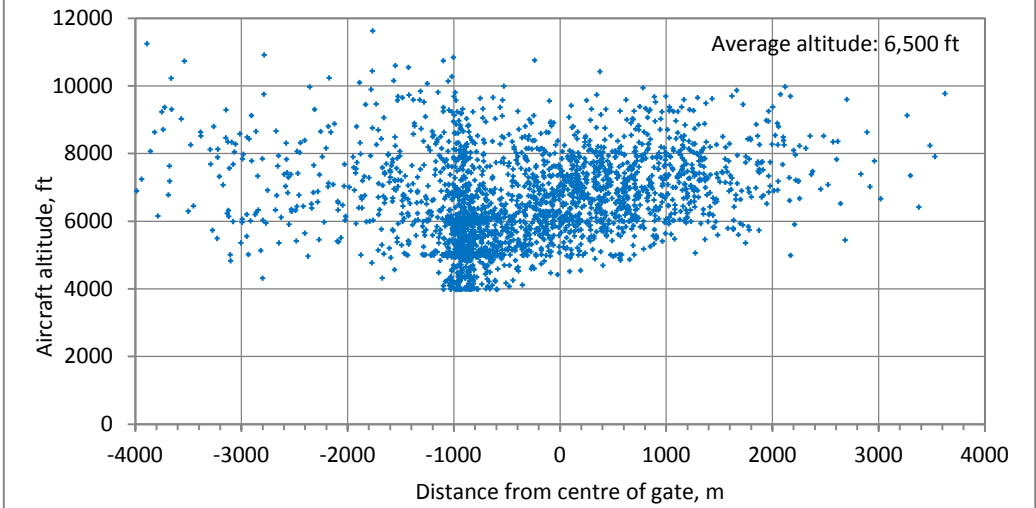


Figure 9 - Route 4 departures through KKE11 gate, July 2015

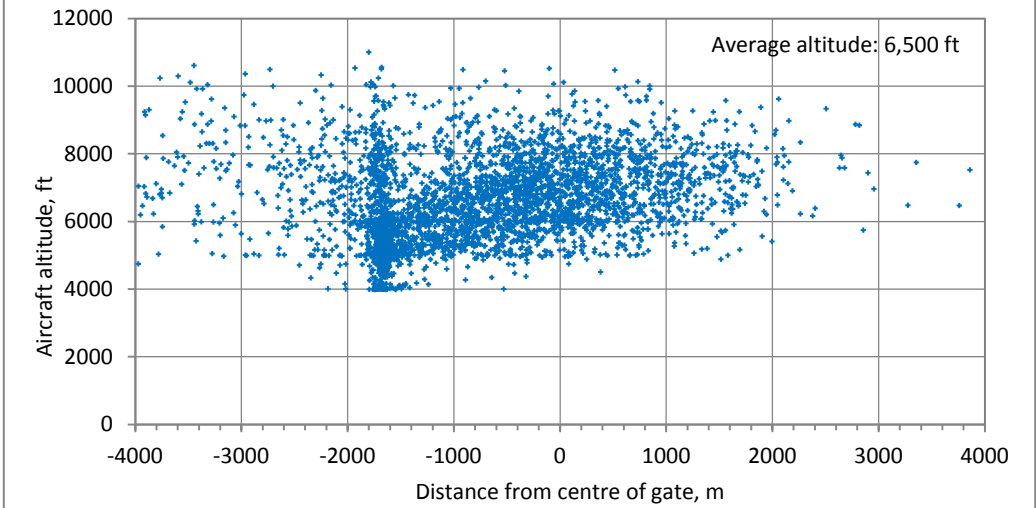


Figure 10 - Route 4 departures through KKE11 gate, July 2016

