IRISH SEA
AIRSPACE CHANGE PROPOSAL

PART D: Potential environmental impact of proposals affecting Southport, Formby, Ormskirk, Skelmersdale and surrounding areas

Introduction

1. This part of the consultation document provides details of potential environmental impacts of the proposed changes over Southport, Formby, and inland to Ormskirk, Skelmersdale and surrounding areas.

2. A beginner's guide to the UK airspace system can be found at Appendices C and D. These explain the basic principles of air traffic control and airspace structure in the UK.

3. See Part A for an overview of the proposal, details of the consultation process and details of how this consultation document is structured. Part B provides a full technical description for the whole proposal, and Part C provides details of potential environmental impact over Snowdonia National Park, Anglesey Area of Outstanding Natural Beauty (AONB) and Clwydian Range AONB. All parts of the document are available at www.consultation.nats.co.uk.

4. The proposal is split into five distinct sub-proposals, all of which are described in Part B. Of these, sub proposal 4 is relevant to the area around Southport, Formby, Ormskirk and Skelmersdale. This Part of the consultation document describes the potential environmental effects of these sub proposals on the above areas.

Proposal for Changes over Southport, Formby, Ormskirk, Skelmersdale and Surrounding Areas

5. Figure 1 shows traffic flying from the direction of Northern Ireland to land at Manchester. It shows this traffic flow crossing the Irish Sea heading in a south easterly direction before turning east towards a point referred to by air traffic control as MIRSI. This point is located approximately overhead Junction 26 on the M6. This traffic flow is primarily Belfast to Manchester aircraft, but also includes occasional flights from smaller airfields in Northern Ireland and transatlantic flights heading for Manchester. Traffic on this route will be descending from around 20,000ft above the Irish sea (around a point named PENIL), down to 6,000-7,000ft[1] at MIRSI (see Figure 1).

6. Aircraft on this route ordinarily stay within controlled airspace, in which NATS controllers manage the traffic, and therefore flights may regularly be seen in this airspace - for an overview of controlled and uncontrolled airspace see Appendices C and D.

[1] All heights are above mean sea level and therefore local terrain elevation will affect the height of an aircraft above the ground. The maximum elevation in the affected areas is around 250ft.

Current Airspace Restriction

7. The current airspace structure has controlled airspace down to 3,500ft above MIRSI and 5,500ft over the area west of that (immediately west of Ormskirk). However, further west and overhead Formby and Southport, the base of controlled airspace is Flight Level (FL) 175 (approximately 17,500ft)[2]. The area of this base of 17,500ft is shown in Figure 1 as Area A. The lack of controlled airspace effectively forms a barrier for the arriving traffic, and so instead of flying directly from the Irish Sea to MIRSI, they fly further south than they would otherwise need to, and approach MIRSI from an alignment overhead Crosby, Maghull and Rainford.

8. This is inefficient both in terms of the economic cost of fuel burnt and the environmental cost of CO_2 emissions from fuel burnt. Furthermore it pushes this traffic flow towards the Wallasey area. The airspace above Wallasey is a confluence of a number of major east/west and north/south routes and so is a particularly busy and complex area for controlling air traffic.

9. It is important that controllers are not overloaded, and so there is a limit on the number of aircraft that they can handle at any given time depending on the traffic flow being controlled. This limit is defined by how much interaction and workload there is associated with each flight. In order to stop this limit being reached, aircraft may be delayed on the ground until such time as they can be safely managed. The concentration of traffic in the vicinity of Wallasey (as described in paragraph 8 above) adds to this workload, and therefore adds to the likelihood that delay is required during busy periods to ensure safety.

10. The proposal includes lowering the airspace shown as Area A in Figure 1 from FL175 to FL85 (approximately 17,500ft to 8,500ft)[3]. This would allow the arrivals from Northern Ireland to follow a more direct track as they descend towards MIRSI, shortening the route as shown in Figure 2. This would, on average, shorten the route by approximately 1.8 nautical miles (nm) per flight.

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[2] For an overview of the relationship between Flight Levels and Altitudes please see Appendix D

[3] This is airspace associated with the L70 airway (spoken as 'lima seven zero')

Figure 1: Existing traffic flow from Northern Ireland to Manchester

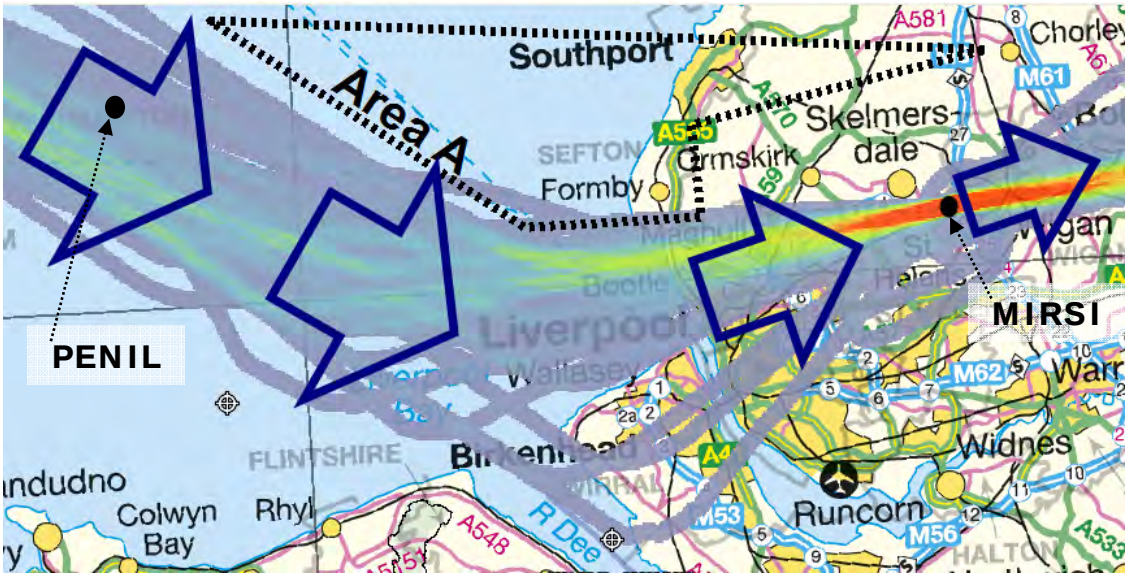
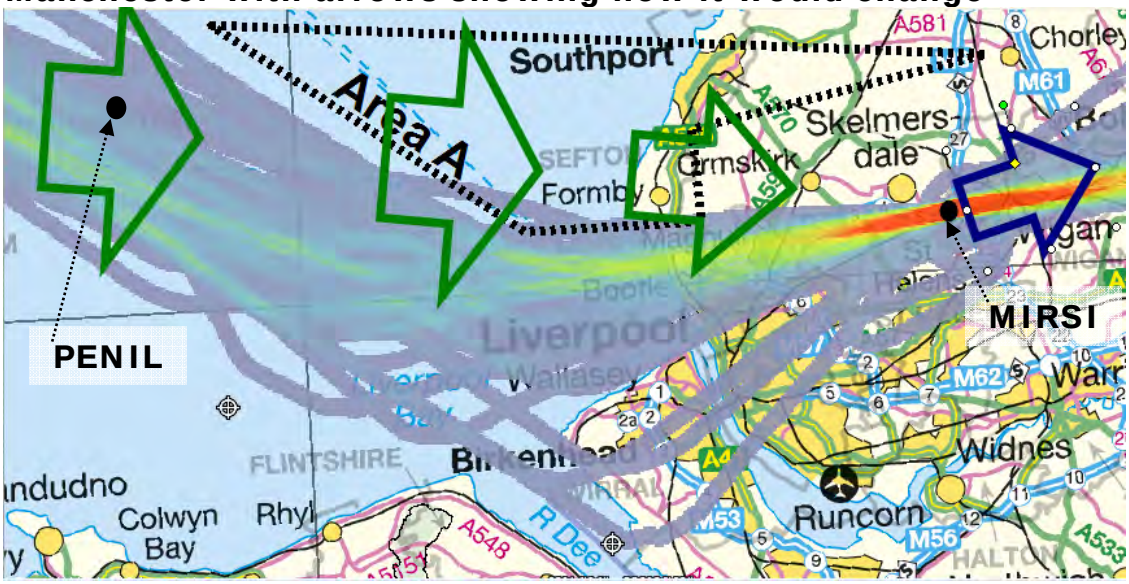


Figure 2: Existing traffic flow from Northern Ireland to Manchester with arrows showing how it would change



Benefits to Leeds Departures

11. The proposal would also have some smaller spin-off benefits for some departing flights from Leeds. Firstly, Leeds departures that currently route to Ireland via the Liverpool area have to plan a route that goes south of Area A, in case they have not climbed well enough to use the existing airspace above FL175 (approx 17,500ft) in this area. In practice, nearly all Leeds departures can achieve this level and therefore fly across Area A. However, because they have to plan on a longer route, they have to carry more fuel which in turn increases their weight. Carrying more weight requires that more fuel is burnt and so a longer planned route can increase fuel burnt, even if a shorter route is actually flown. Given the relatively small number of flights from Leeds routeing this way, and the relatively small benefit per Leeds flight, this benefit is not expected to be significant

in terms of the overall CO_2 efficiency of the system. Nonetheless it would be a benefit to individual flights from Leeds.

12. There are also very occasional flights from Leeds heading west over this part of the Irish Sea at levels below FL175 (approx 17,500ft). These currently have to follow the planned route south of Area A, and therefore have to carry more fuel as described above – carrying extra fuel means more fuel needs to be burnt because of the additional weight. Lowering Area A would enable these aircraft to benefit from planning and flying a shorter route over Area A, rather than to the south of it. However, there are very few aircraft that currently route this way. Analysis of a week's traffic from August 2010 identified no such Leeds departures, indicating that they are infrequent (see Appendix F).

Air traffic control flexibility

13. The area to the north east of this segment is a very busy area known as Wallasey sector. This sector is the confluence of a number of major routes and so is highly complex.

14. Wallasey sector already utilises the controlled airspace in Area A from FL175 upwards. This is used by traffic heading west towards Dublin and is also used flexibly to help keep aircraft safely separated during periods when the routes through Wallasey become particularly busy.

15. In addition to the MIRSI arrivals and occasional Leeds departure, the lowered airspace proposed for Area A would also be available for air traffic control to use flexibly. This would help deal with unexpected and/or high traffic volume scenarios. As such it would therefore help to reduce the complexity and enhance the overall efficiency of the Wallasey sector.

Times of usage

16. The Ministry of Defence (MoD) have primacy for utilising this airspace, as it is part of an area used for operations from BAE Warton. However, BAE Warton's demand for this airspace is relatively rare. Therefore this proposal, which has been agreed in principle by the MoD, is for NATS to utilise the airspace on a permanent basis, but with arrangements called "claw back" in place to allow MoD to take control of that area from NATS whenever BAE Warton operations require it.

17. Full technical details of this proposal can be found in Part B under Sub-Proposal 4.

Over-flight of Southport, Formby and Ormskirk and surrounding areas

18. Figures 3 and 4[4] show how the airspace above Southport, Formby, Ormskirk and Skelmersdale is already used at various levels. The density plots use colour coding to indicate the number of flights that used the airspace in the sample period. A key to the colour coding is shown on each Figure. Note that these diagrams do not capture all MoD flights as these are not always visible to our radar.

19. The proposal is not expected to affect the flights already seen in Area A and so the area would still be over-flown at all levels as it is today. However the proposal would mean an increase in overflights between FL85 and FL175 (approx 8,500ft to 17,500ft), particularly those heading towards MIRSI as described earlier in this document.

20. Aircraft would still route towards MIRSI (roughly overhead Junction 26 of the M6) at which point they would still need to be between 6,000 and 7,000ft (see paragraph 5). The proposal would mean that aircraft approaching MIRSI would approach on a line slightly further north than they do today, centred over Ormskirk, Skelmersdale and surrounding areas (see Figure 1 for the position of these towns relative to Area A). These flights would be descending from 9,000ft (the minimum level that would be used in Area A), towards 6-7,000ft at MIRSI. This traffic currently flies over Maghull and Rainford.

Over-flight of Crosby, Maghull and Rainford and surrounding areas

21. The traffic using the lowered airspace in Area A would no longer fly over the above areas on a regular basis. These areas would remain under other significant traffic flows, and therefore whilst the proposal would reduce the amount of over-flight of these areas, most over-flight would remain as today.

Traffic forecast

22. Forecast traffic numbers for the traffic flow arriving at MIRSI, that would utilise the lowered airspace, are provided in Figures 5 and 6. These are based on August 2010 traffic numbers grown to 2012 and 2017[5]. On average there would be one additional MIRSI arrival using the proposed airspace every 2-3 hours compared to leaving the airspace as it is today. Further details on aircraft types expected to use the airspace can be found in Tables 3 and 4 in Part B.

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[4] Figures 3 and 4 show density plots of daily usage rates based on analysis of 1 weeks' traffic across the region (sample period 01-07/08/2010).

[5] These figures have been calculated from a 31 day sample of flight data from August 2010 – see Appendix F. 2012 and 2017 scenarios are grown from 2010 based on the NATS UK forecast generated in September 2010. This forecasts that 2010 traffic would have grown by 9% and 26% respectively by 2012 and 2017.

23. As discussed in paragraphs 13-15, the lowered airspace proposed for Area A would also be used flexibly. This additional usage would not be systematic, and therefore it is not possible to predict usage patterns with any accuracy. However, NATS estimates that the proposal would mean approximately 10 additional flights through the FL85-FL175 (8,500ft-17,500ft) segment per day (in addition to the MIRSI arrivals discussed in paragraph 22).

Figure 3: Existing flights - all levels

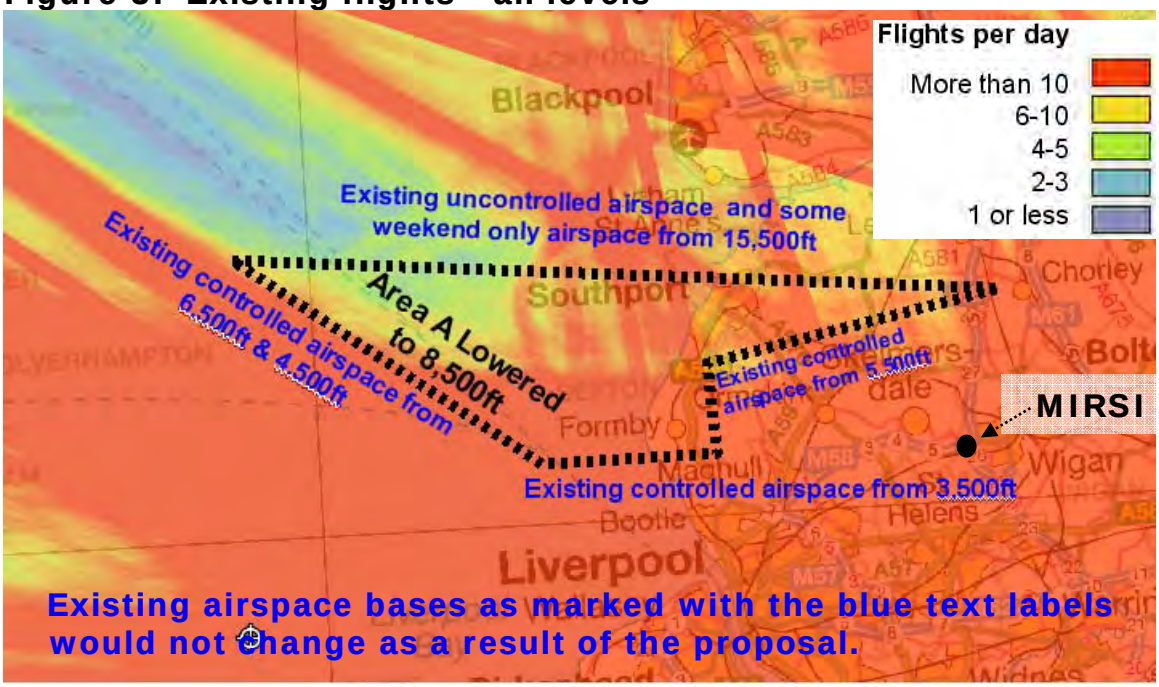


Figure 4: Existing flights 0- FL175 (approx 17,500ft)

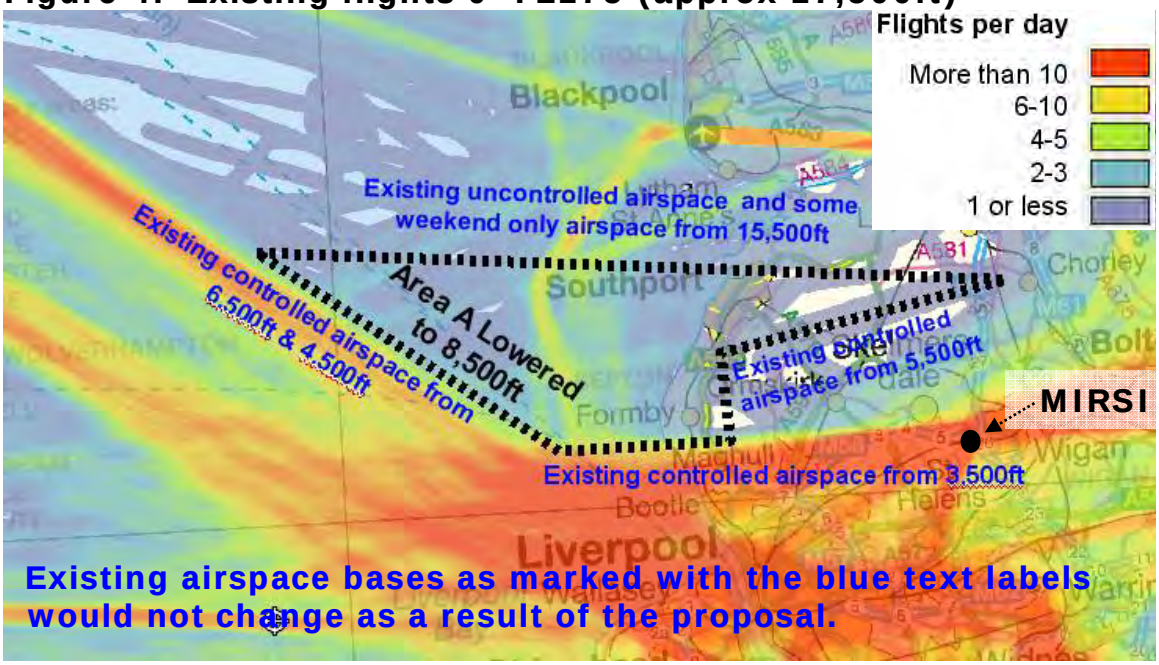


Figure 5: MIRSI arrivals from Northern Ireland area – forecast flights per hour 2012

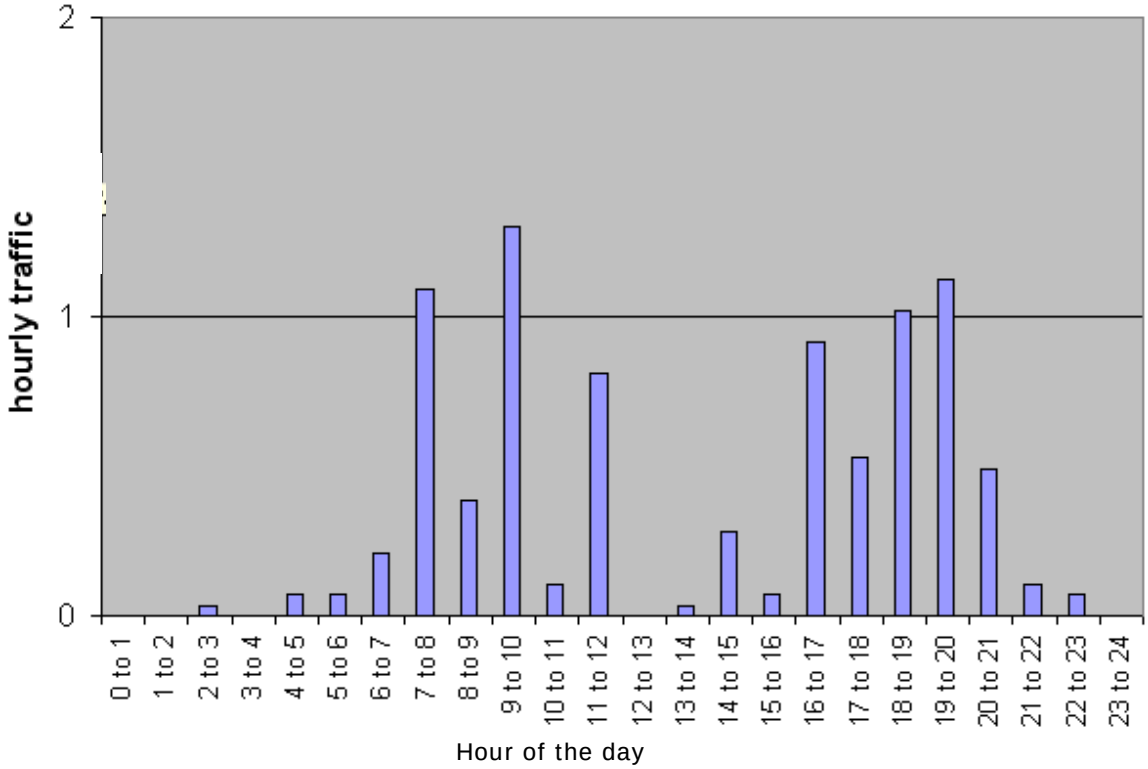
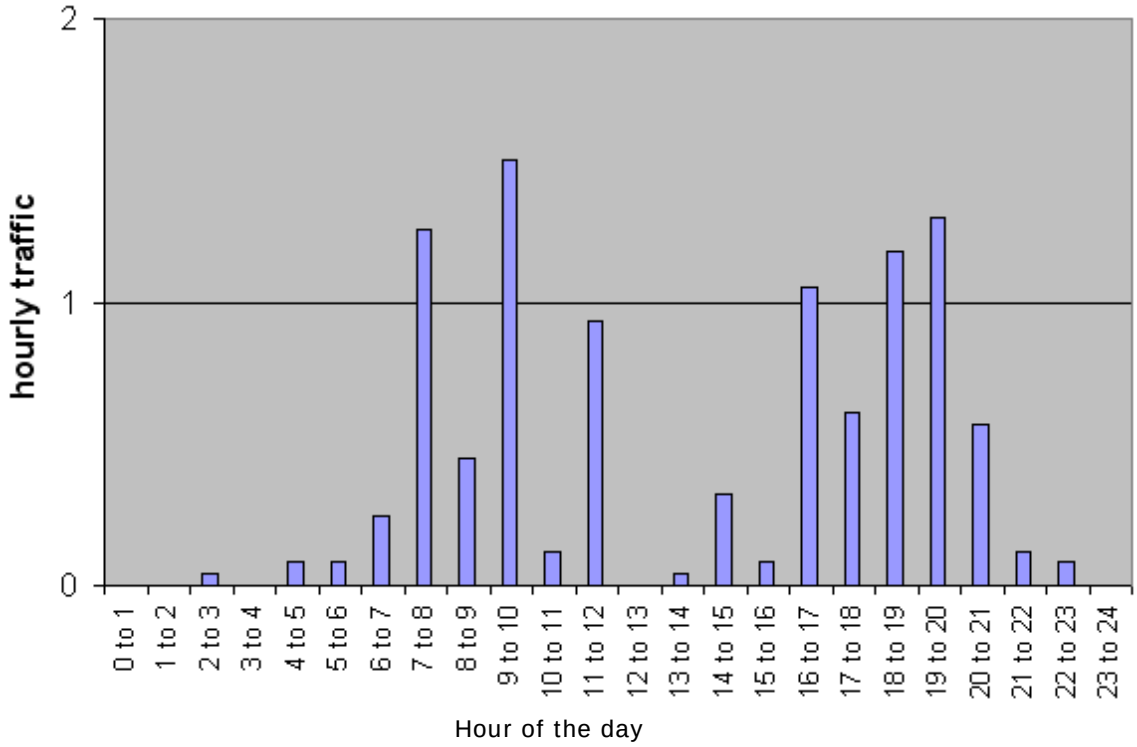


Figure 6: MIRSI arrivals from Northern Ireland area – forecast flights per hour 2017



Environmental effects – CO_2 exhaust emissions

24. It is estimated that the benefit described in paragraph 10 alone will result in a reduction in CO_2 emissions of an average of 35kg per aircraft. This would mean total savings for MIRSI arrivals of 110 tonnes per year in 2012 rising to 130 tonnes in 2017. Due to the limited benefit to Leeds departures, no analysis has been performed for the potential benefit to these flights. The proposed airspace change is not expected to increase CO_2 output for any flights.

25. Detail of the CO_2 analysis is available in Part B.

Environmental effects - noise

26. Whilst the additional flights may be audible, the noise will be beyond the range of the standard noise measures used for the CAA's airspace change process (see Part A Ref 1). This process requires that the "Leq" noise metric is to be produced for airspace changes affecting airspace below 4,000ft, and that the "SEL" noise metric is required for changes below 7,000ft and within 25km of the runway. These thresholds are set because changes beyond them are extremely unlikely to have any effect on the metrics. The proposed changes described in this part are all significantly beyond these thresholds.

27. Another measure of noise that is also sometimes used to illustrate noise impacts further from airports is the "Lmax" noise metric. NATS has previously used this to illustrate noise effects, but only up to 7,000ft. Lmax provides an indication of how loud an aircraft might sound at its loudest as it passes directly overhead. Noise results are presented in 'A' weighted decibels (dBA) which is a standard unit for measuring aircraft noise. Response to noise varies between individuals, and is often affected by local circumstances, such as background noise levels. However, we have drawn some broad parallels between Lmax noise levels from aircraft and those experienced from other everyday situations. These are shown in Table 1.

Table 1: Table of Lmax Equivalence to Typical Sounds

Typical sound	Approx noise (dBA)
Pneumatic drill, 23 ft away	95
Heavy diesel lorry at 25 miles per hour, 23 ft away	85
Car at 40 miles per hour, 23 ft away	70
Busy general office	60
Quiet office	50
Quiet bedroom, library	35

28. The most common aircraft type (40%) on the MIRSI arrival route from Northern Ireland is the Dash 8 which is a twin turboprop (propeller) aircraft. NATS has previously analysed the arrival Lmax for a Fokker 50 which is a twin turboprop of similar size and therefore its Lmax is broadly representative of a Dash 8[6]. This analysis showed that the arrival Lmax for the Fokker 50 was less than 55dBA at heights beyond 5,000ft above sea level. The sensitivity of Lmax noise modelling is not able to produce reliable results when the Lmax value is drops below 55 dBA, therefore where the modelling suggests results below this threshold it is simply stated as *less than 55* dBA; the actual low end of the range may be somewhat below 55dBA.

29. Whilst the Dash 8 is the most common individual type flying between Northern Ireland and MIRSI the remainder are predominantly jets of varying types, in particular Boeing 737 (300 series), Boeing 757 (200 series) and the Embraer E190. Lmax analysis for these particular types has not been undertaken, however, analysis of the Boeing 737 (800 series) is available[7] that gives a broad indication of the order of magnitude for the Lmax expected for a medium sized jet. At 6-7,000ft this analysis suggested an Lmax range of 63 for the worst case, down to less than 55dBA. At 7,000ft the worst case was 60dBA. (Note that Skelmersdale is beneath the lowest part of the arrival track and is approximately 250ft above sea level).

30. Whilst Lmax analysis is not available for the specific types that would use the Northern Ireland to MIRSI route, the available analysis does give an indication of the order of magnitude of the noise expected from individual aircraft. This suggests that at worst, a jet aircraft flying directly overhead would produce a noise level above that of a busy general office. Turboprop aircraft would appear somewhat quieter still. This noise impact for individual aircraft should be taken in the context of the number of additional MIRSI arrivals utilising the airspace as a result of the change which, as discussed in paragraph 22, is expected to be one aircraft every 2-3 hours. The tracks taken by these aircraft will also vary, meaning that the number of flights flying directly overhead any given location will be fewer still.

31. Note that it is not possible to predict the aircraft types or profiles for the expected 10 additional aircraft per day (approximately 2 per hour) expected to use the airspace flexibly (see paragraph 23). However, these would be spread between 9,000 ft and 17,000ft and so the expected noise impact from each would be less than that of the arrivals described above.

Environmental effects - tranquillity and visual intrusion

32. The CAA's airspace change process (see Part A Ref 1) has no formal guidance on the definition or measurement of tranquillity and visual intrusion.

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[6] This analysis used the ANCON noise model to analyse a London City arrival.

[7] This analysis used the ANCON noise model to analyse a Stansted arrival.

33. For the purposes of this consultation document, NATS considers visual intrusion is taken to relate to an individual's ability to detect the presence of aircraft (this interpretation is intentionally broad and does not indicate the degree to which the presence of aircraft is intrusive or causes offence). The information presented in this part of the consultation document, which describes where and how high aircraft may be, is provided to help stakeholders assess the potential impact the proposal may have (given the absence of a formal definition or measurement for tranquillity or visual intrusion).

34. Under current arrangements, aircraft are already potentially audible and visible from most locations beneath the proposed airspace. This will include aircraft that are already flying within the proposed airspace at levels below FL175 (17,500ft), as shown in Figures 3 and 4. The proposal will not significantly affect those aircraft already operating in or below the proposed airspace. However, paragraphs 18 to 23 describe how the proposal will mean more flights in Area A and the area to the west. Stakeholders may wish to consider the consequences of these changes on tranquillity and visual intrusion in their area.

Local Air Quality

35. Due to atmospheric mixing, aircraft emissions at heights above 3,000ft above ground level do not have any impact on the air quality at ground level. The heights of the changes proposed are all above 3,000ft. Hence no assessment of local air quality has been performed for this proposed change.

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