Doncaster Sheffield Airport

Airspace Change Proposal for the Introduction of RNAV (GNSS) Departure and Approach Procedures

ANNEX E TO PART B

PEEL

European Commission

Doncaster Sheffield Airport

Robin Hood

ANNEX E TO PART B:

Runway 20 Easterly Departure ROGAG 1A

Contents

1. Runway 20: Departures to the east (to ROGAG)

1.1. The proposed RNAV SID is referred to as the ROGAG 1A and reflects as closely as practicable the intended ground track of the existing ROGAG PDR named the ROGAG 20.

1.2. ROGAG is a position in the Route Network (on eastbound ATS Route L603) in the region of Bardney (east of Lincoln). It is specified by NATS En-Route Limited (NERL) as the position at which aircraft departing from DSA to the east must join the Route Network.

1.3. The existing ROGAG 20 PDR uses the GAM VOR (situated on Retford (Gamston) aerodrome) as the ground-based navigational aid to define the route to ROGAG. The GAM VOR is being withdrawn by NATS in 2019 in accordance with agreed CAA Policies (see Part A of the Consultation Document.)

1.4. During the period June/July 2016, which encompassed a busy summer period, some 440 departing aircraft used the ROGAG 20 PDR.

1.5. Figure 1 on the next page shows historic tracks of aircraft departing from Runway 20 on the ROGAG 20 PDR over the June and July period. It also depicts (in magenta) the intended nominal ground track of the PDR as published. The tracks end at the point aircraft pass 7,000 feet amsl. As the climb performance of individual aircraft is different it can be seen that the plots end at different distances from take-off

1.6. It can be seen that there is a substantial difference between the intended track of the PDR procedure (magenta line) and the actual tracks of departing aircraft (green lines). Most tracks are south of the intended PDR before overshooting the turn and resuming course to the GAM VOR (part of the route to ROGAG). PDRs are not as strictly defined and are thus open to interpretation. It is likely unregulated RNAV overlays were in use by the airlines which served as an interpretation of the PDR. It is not possible in PANS-OPS design terms to replicate the defined PDR as the angle of bank required is too demanding as is evidenced by the NTK data.

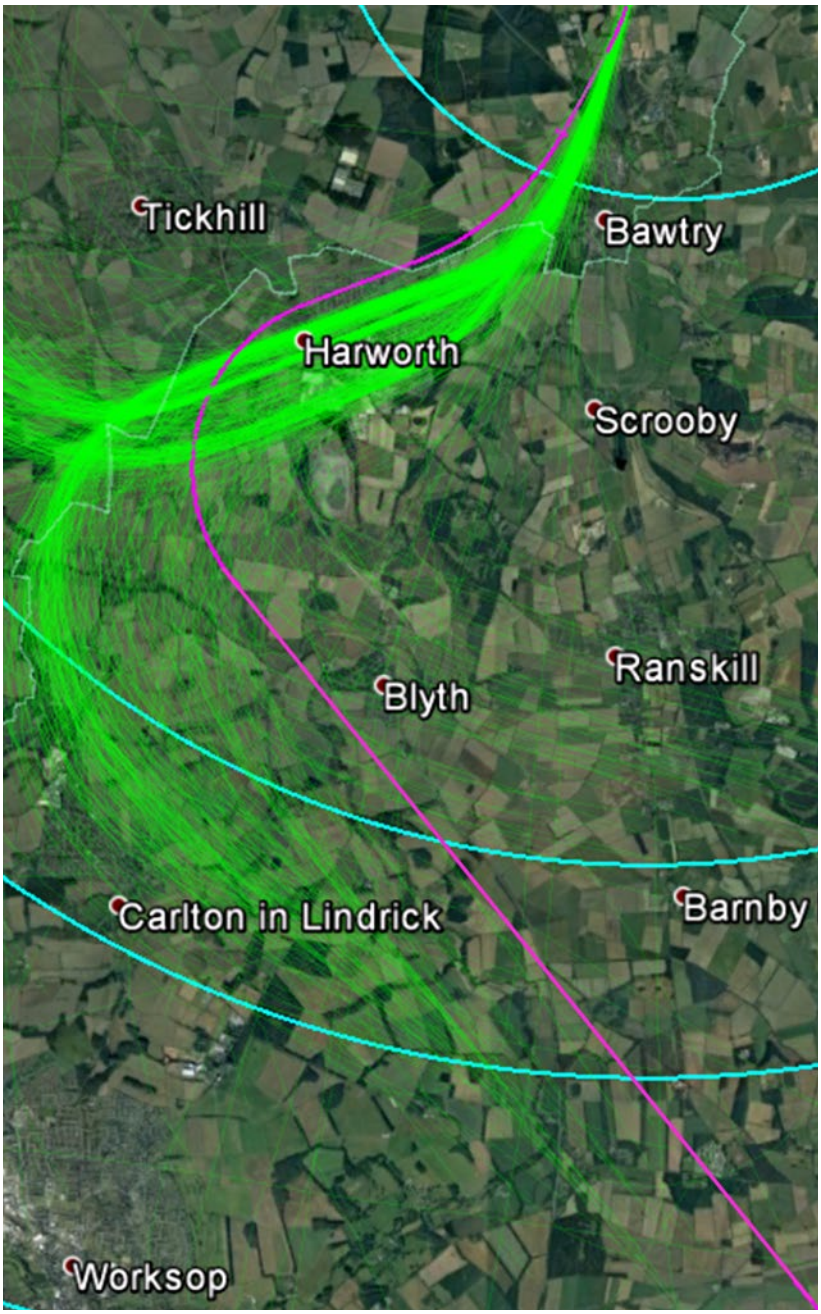


Figure 1: Runway 20 – Historic departure tracks for the period June-July 2016 via ROGAG

2. The ROGAG 1A SID procedure

2.1. The ROGAG 1A procedure is described as follows:

Climb straight ahead to intercept a course of 209° to CNS02, right to CNW05, left to CNS11, left to CNS22, left to CNS29 - ROGAG

2.2. A schematic diagram of the SID is shown in Figure 2 below and diagrams of the SID overlaid on Google Earth are shown at Appendix A1 and Appendix A2 respectively.

2.3. The SID deviates by 10° to the right at 0.5NM after departure to keep traffic away from Bawtry, which lies on the immediate extended centreline of the airport. Due to obstacle limitations and aircraft performance, aircraft are not permitted to deviate by more than 15° after departure. The initial deviation only occurs after 0.5NM to allow aircraft to stabilise and adjust to the deviation allowing for better repeatability.

2.4. A variety of angles of bank were considered to achieve the first turn within regulatory requirements and the optimum track over the ground was sought for environmental purposes, 10° was considered optimum for the scenario.

2.5. The subsequent turns take into account the communities of Bircotes, Harworth and Styrrup by moving the SID to the north of the current tracks. As aircraft turn towards ROGAG the proposed flight path seeks to pick the best route between the communities of Langold, Blyth, Carlton in Lindrick and Costhorpe.

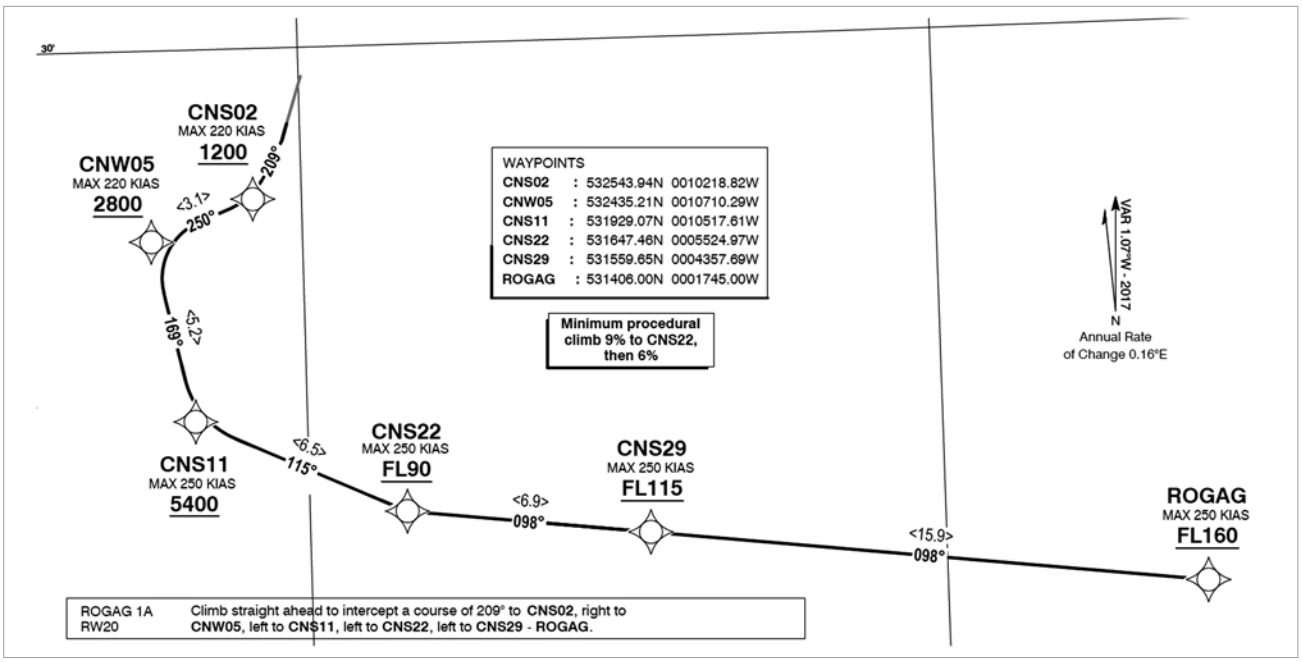


Figure 2: Schematic of ROGAG 1A SID

2.6. Vertical constraints

2.6.1. The vertical profile of the proposed departure aims to ensure aircraft are kept, as far as possible, within controlled airspace as the airspace outside the control zone and area is heavily used by General Aviation, including gliders (not necessarily in contact with DSA ATC). While the regulations allow SID designs to leave controlled airspace, the proposed designs have ensured that the SIDs are contained inside of DSA airspace until CNS22, see Section 2 of Part B of the Consultation Document.

2.6.2. As with the ROGAG 1B proposal, the vertical profile takes into consideration the same requirements for the Scampton Restricted Area (R313).

Note: Further reference to the ROGAG Airspace Proposal in Part B, Section 3 highlights elements to the SID proposal.

3. Differences between the ROGAG 20 PDR and the ROGAG 1A SID

3.1. Diagrams showing the proposed ROGAG 1A overlaid on the actual tracks of aircraft operating on the previous ROGAG 02 are shown in Appendices A1 and A2.

3.2. Appendix A2 shows the impact of the interpreted PDR (NTK green swathe) versus the intended route (magenta) with the proposed SID (yellow). The NTK tracks impacted the communities of Bawtry, Bircotes and Harworth more than was intended in the defined PDR. The proposed ROGAG 1A SID, being an RNAV-1 procedure will ensure improved track adherence thereby providing some relief to these communities in the initial two segments of the departure.

3.3. The proposed SID has had to be extended to ensure containment within controlled airspace beyond position CNS22. The segment of the SID that extends south before turning back to CNS22 and ROGAG is the furthest south the design can accommodate to provide the additional track miles whilst ensuring minimal impact to communities.

4. Other options considered

4.1. Do nothing:
This option cannot be considered as the current ROGAG 20 PDR is predicated on the GAM VOR, which is being withdrawn. The PDR, without the ground-based navigational aid, cannot be flown.

4.2. Replicate the existing ROGAG 20 PDR with a SID:
This option is not feasible as the angle of bank to achieve the required turns of either the published PDR or the tracks actually flown would not meet regulatory approval.

4.3. Radical New Design:
Not many options were available due to the outlying communities and the desire by DSA to avoid them where possible. The available airspace to meet the climb and environmental criteria did not lend itself to an entirely radical new design.

5. Environmental assessment

5.1. The more predictable and repeatable design will reduce the overflight of a number of communities affected today, particularly Bawtry and Styrrup. The optimum flight path has been chosen to avoid overflight of these communities below 4,000 ft as the aircraft turn for ROGAG.

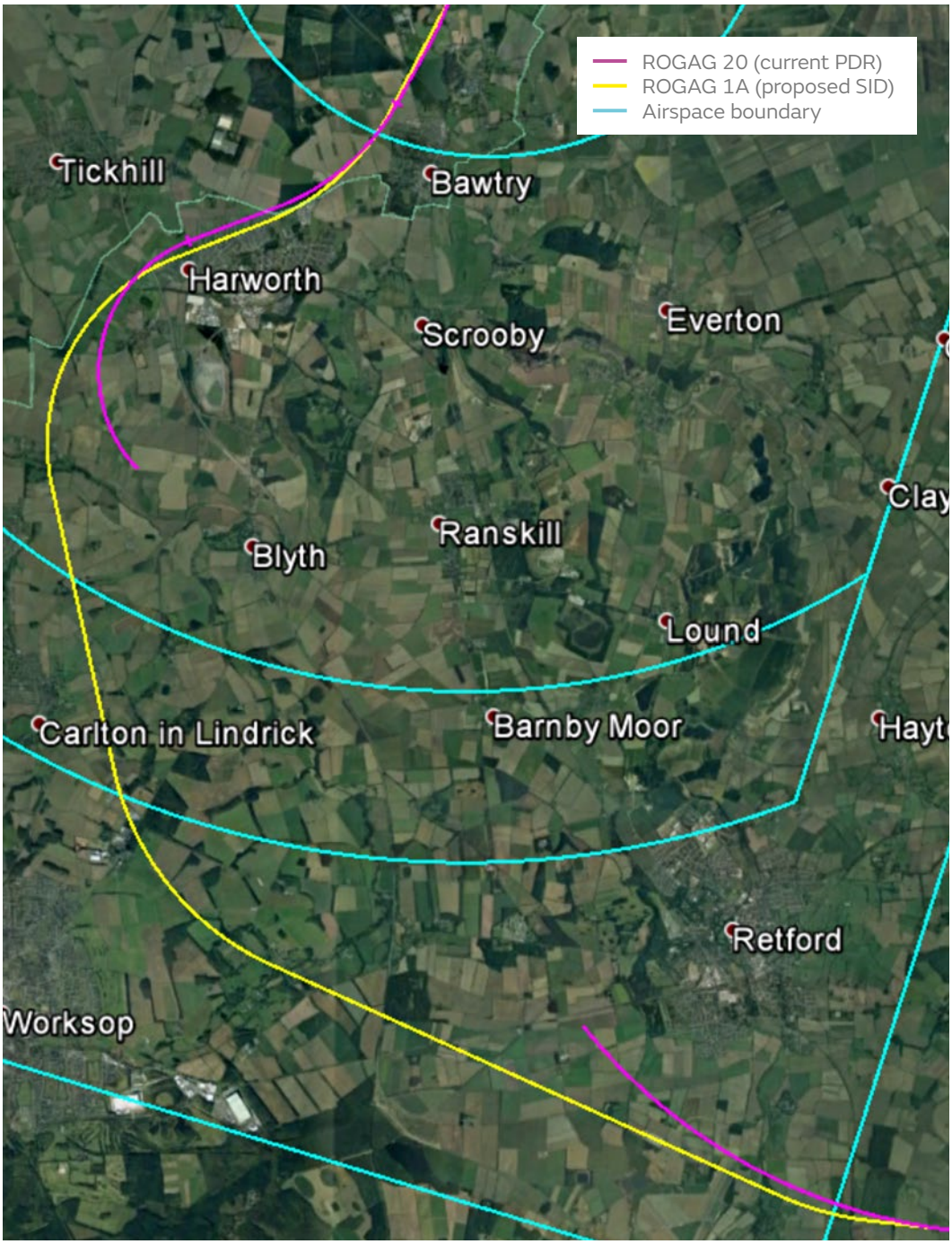
5.2. The Airport Noise Contours are specific to each runway rather than each individual SID and are therefore detailed in Part A Section 4.

5.3. It is anticipated that the speed limits for the initial turns of the SID (not above 220KIAS[01]), together with a specified track towards ROGAG, will reduce the spread of aircraft tracks around the turn thereby reducing the number of people affected by departing aircraft on this route.

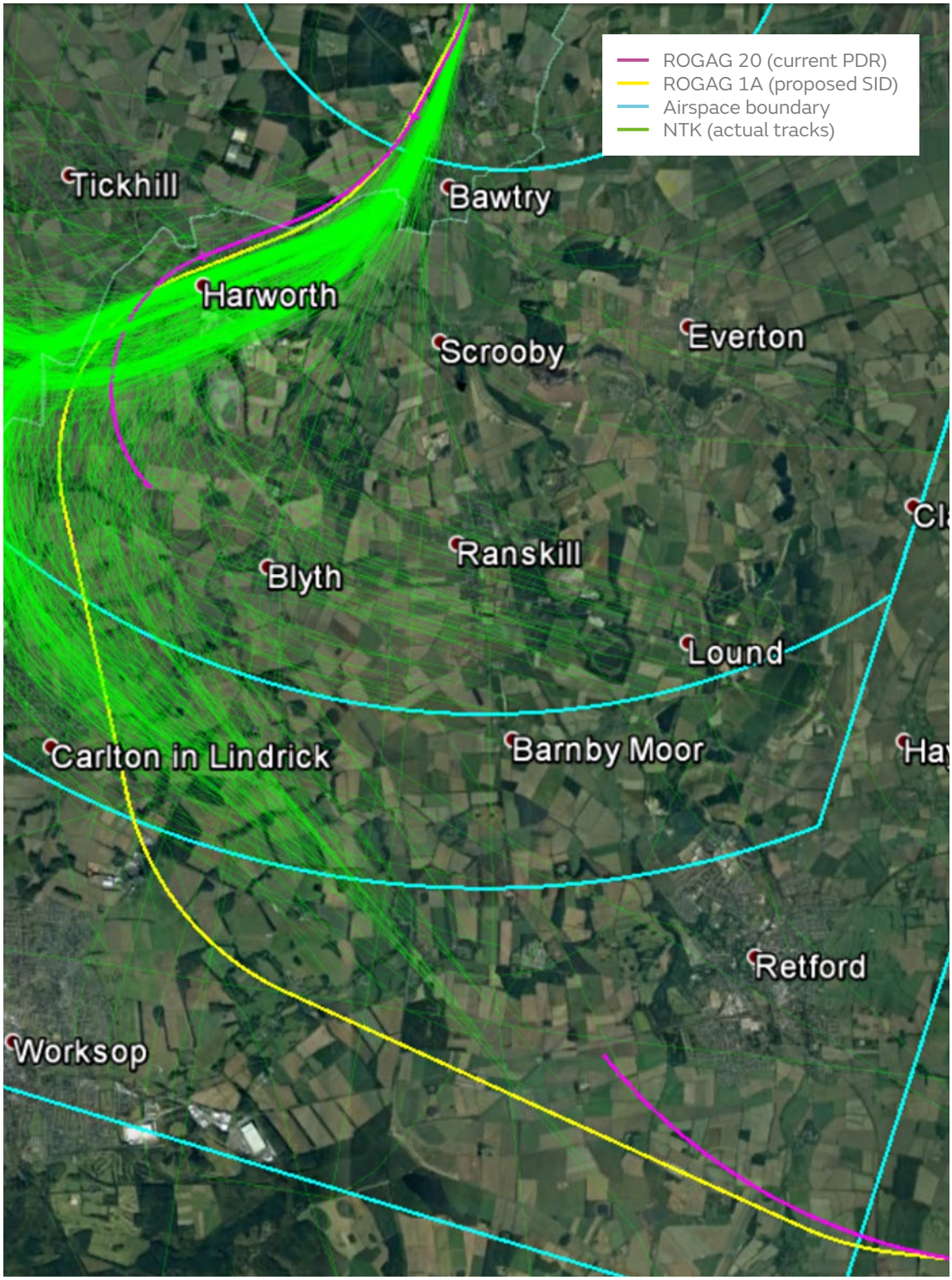
5.4. Appendix A3 shows the 80 and 90 dB(A) departure footprints of the existing flown PDR and the proposed SID. The area and population affected for the proposed SID within these footprints reduces against the population counts of the flown PDR.

5.5. Therefore, it is concluded that the impact of the proposed SID procedure brings an overall environmental benefit to communities on the ground as well as to improved flight profiles for aircraft operators.

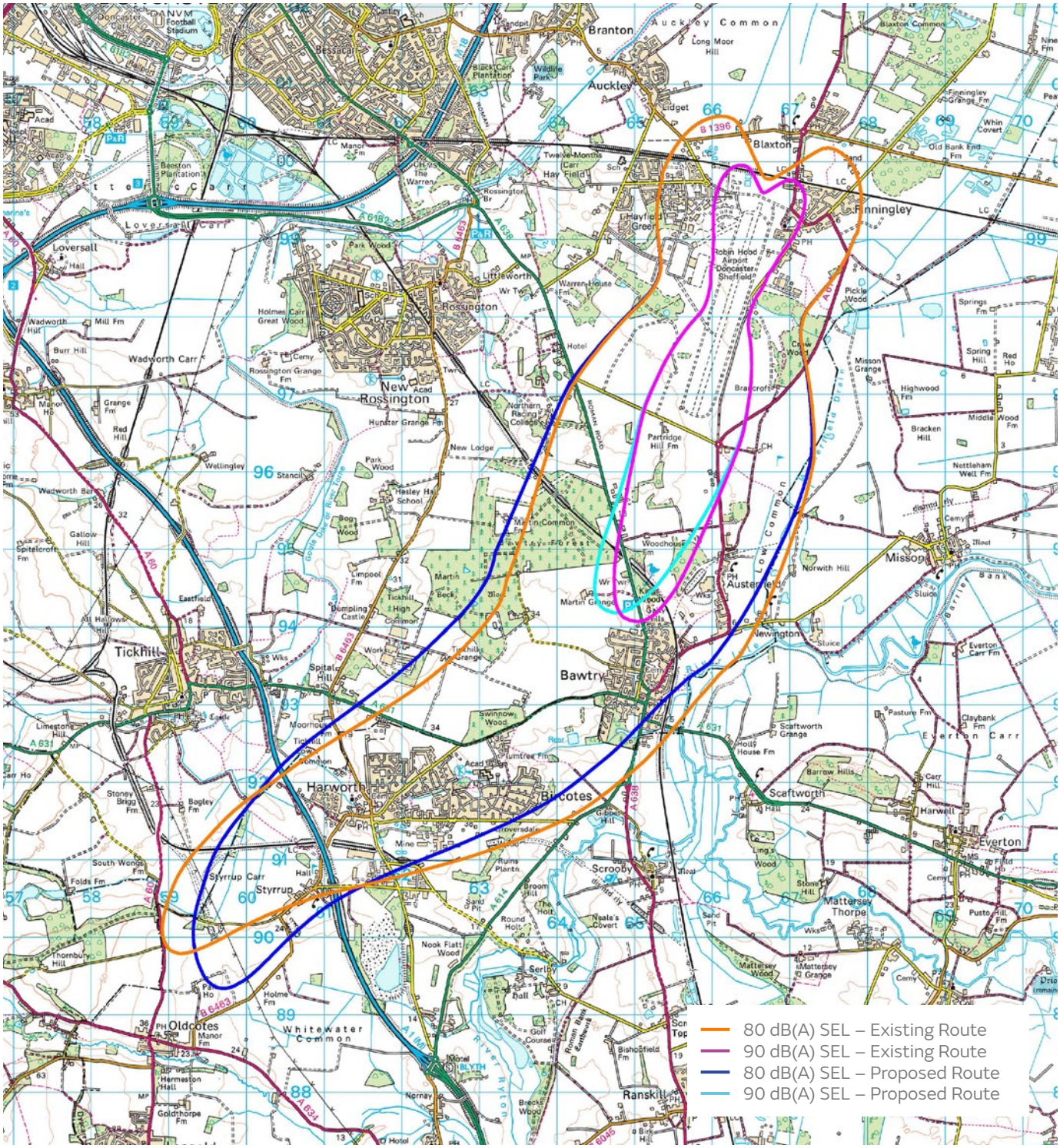
01 Indicated Airspeed is the airspeed shown on the flight-deck instrument. At sea level, and an atmospheric pressure of 1013.2 mb, and with no wind effect, the airspeed indicated is the true speed of the aircraft relative to the surface. As the aircraft climbs, the air density decreases and the indicated speed will be less than the True Air Speed (TAS). However, when it comes to controlling the aircraft, because the flight characteristics of the aircraft also alter with reduction in atmospheric density, the indicated airspeed is of greater importance than the true airspeed. This is why control speeds are given as KIAS (Knots-Indicated Airspeed, i.e. Nautical Miles per Hour).



Appendix A1: Diagram of the ROGAG 20 PDR and ROGAG 1A SID



Appendix A2: ROGAG 1A SID and historic tracks of aircraft interpreting the ROGAG 20 PDR



Appendix A3: Departure swathes for ROGAG 20 PDR and the ROGAG 1A SID

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