



# Aviation & Met Radar Impact Assessment

**Scout Moor II  
Further Environmental Information**

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June 2026



# SCOUT MOOR II AVIATION AND MET RADAR IMPACT ASSESSMENT

**FINAL REPORT**

10 June 2026



Document information

GENERAL INFORMATION

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## TABLE OF CONTENTS

|                                                                                |           |
|--------------------------------------------------------------------------------|-----------|
| <b>1 INTRODUCTION .....</b>                                                    | <b>6</b>  |
| 1.1 Document purpose.....                                                      | 6         |
| 1.2 Background and Scope.....                                                  | 6         |
| 1.3 Impact of wind farms on aviation .....                                     | 7         |
| <b>2 ASSESSMENT METHODOLOGY REVIEW .....</b>                                   | <b>9</b>  |
| 2.1 Approach.....                                                              | 9         |
| 2.2 Overview of tools and data sources.....                                    | 9         |
| 2.2.1 NATS wind farm safeguarding maps .....                                   | 9         |
| 2.2.2 Radio Mobile line-of-sight analysis .....                                | 12        |
| 2.2.3 Aeronautical Information Publications (AIP) Charts.....                  | 13        |
| 2.2.4 Other data sources .....                                                 | 13        |
| <b>3 ASSESSMENT RESULTS.....</b>                                               | <b>14</b> |
| 3.1 Potential impact on communication and navigation systems.....              | 14        |
| 3.2 Potential impact on surveillance systems .....                             | 14        |
| 3.2.1 Introduction.....                                                        | 14        |
| 3.2.2 Results of the standard line-of-sight (LoS) analysis .....               | 14        |
| 3.2.3 Sensitivity analysis .....                                               | 23        |
| 3.3 Airspace structure in vicinity of Scout Moor II.....                       | 29        |
| 3.4 Potential impact on instrument flight procedures and traffic patterns..... | 31        |
| 3.4.1 Introduction.....                                                        | 31        |
| 3.4.2 Manchester Airport (EGCC) .....                                          | 32        |
| 3.5 MoD operational considerations.....                                        | 36        |
| 3.6 General Aviation activity in the region.....                               | 37        |
| 3.7 Met Office radar assessment.....                                           | 38        |
| 3.8 Aviation lighting scheme.....                                              | 41        |
| <b>4 OPERATIONAL IMPACT ANALYSIS AND MITIGATIONS.....</b>                      | <b>43</b> |
| 4.1 Impact on communication and navigation aids.....                           | 43        |
| 4.2 Impact on surveillance services and Air Traffic Control operations.....    | 43        |
| 4.2.1 Primary Surveillance Radar .....                                         | 43        |
| 4.3 Impact on Instrument Flight Procedures (IFPs) .....                        | 44        |
| 4.4 Impact on military operations and low-flying activity .....                | 44        |
| 4.5 Impact on General Aviation (GA) and airspace users.....                    | 44        |
| 4.6 Impact on meteorological radar.....                                        | 45        |
| 4.7 Summary of key results .....                                               | 46        |
| <b>5 STAKEHOLDER CONSULTATION .....</b>                                        | <b>47</b> |

|                                                  |           |
|--------------------------------------------------|-----------|
| 5.1 Introduction .....                           | 47        |
| 5.2 UK National Air Traffic Service (NATS) ..... | 47        |
| 5.3 Manchester Airport Group (MAG) .....         | 47        |
| 5.4 Manchester Barton Aerodrome .....            | 47        |
| 5.5 Ministry of Defence (MoD) .....              | 48        |
| 5.6 UK Met Office .....                          | 48        |
| <b>6 CONCLUSIONS AND NEXT STEPS .....</b>        | <b>49</b> |
| <b>7 REFERENCES .....</b>                        | <b>51</b> |
| <b>8 ANNEX 1 – GLOSSARY .....</b>                | <b>52</b> |

## TABLE OF FIGURES

|                                                                                                                                      |    |
|--------------------------------------------------------------------------------------------------------------------------------------|----|
| Figure 1 – NATS wind farm safeguarding map for PSR coverage at 180m AGL .....                                                        | 10 |
| Figure 2 – NATS wind farm safeguarding map for SSR .....                                                                             | 10 |
| Figure 3 – NATS wind farm safeguarding map for communication sites .....                                                             | 11 |
| Figure 4 – NATS wind farm safeguarding map for navigation sites .....                                                                | 12 |
| Figure 5 – Manchester Airport PSR coverage at 180m AGL .....                                                                         | 14 |
| Figure 6 - Line-of-sight profile from Manchester PSR to Scout Moor Wind Farm Highest and Lowest Turbines .....                       | 15 |
| Figure 7 – LJA PSR coverage at 180m AGL .....                                                                                        | 16 |
| Figure 8 - Line-of-sight profile from Liverpool John Lennon Airport PSR to Scout Moor II Wind Farm highest and lowest Turbines ..... | 17 |
| Figure 9 – NATS St Anne’s enroute PSR coverage at 180m AGL .....                                                                     | 18 |
| Figure 10 - Line-of-sight profile from St Anne’s PSR to Scout Moor Wind Farm Highest and Lowest turbines .....                       | 19 |
| Figure 11 – BAE Warton PSR coverage at 180m AGL .....                                                                                | 20 |
| Figure 12 - Line-of-Sight profile BAE Warton PSR to Scout Moor Wind Farm Highest and Lowest turbines .....                           | 21 |
| Figure 15 – Leeds Bradford airport PSR coverage at 180m AGL .....                                                                    | 22 |
| Figure 16 - Line-of-sight profile Leeds Bradford PSR to Scout Moor wind farm Highest and Lowest turbines .....                       | 23 |
| Figure 17 – Manchester Airport PSR Worst Case Coverage .....                                                                         | 24 |
| Figure 18 – LJA PSR Worst Case Coverage .....                                                                                        | 25 |
| Figure 19 – NATS St Anne’s PSR Worst Case Coverage .....                                                                             | 26 |
| Figure 20 – BAE Warton PSR Worst Case Coverage .....                                                                                 | 27 |
| Figure 22 – Leeds Bradford Airport PSR Worst Case Coverage .....                                                                     | 28 |
| Figure 23 – Location of SMII Wind Farm relative to local airspace structures .....                                                   | 29 |
| Figure 24 – Location of SMII relative to Military Low Flying and Transit Areas .....                                                 | 31 |
| Figure 25 – Manchester Airport Arrival Route in proximity to SMII .....                                                              | 32 |
| Figure 26 – Manchester Approach Chart for LOC/DME RWY 23R .....                                                                      | 35 |
| Figure 27 – UK Met Office Weather Radar Locations .....                                                                              | 39 |
| Figure 28 – Hameldon Hill radar coverage at 180M AGL .....                                                                           | 40 |
| Figure 29 - Line-of-sight profile Hameldon Hill PSR to Scout Moor II wind farm highest and lowest turbines .....                     | 41 |

Figure 30 – Proposed aviation reduced lighting scheme .....42

Figure 31 – Summary of key impact assessment results .....46

# 1 INTRODUCTION

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## 1.1 Document purpose

The purpose of this document is to assess the potential impact of the proposed Scout Moor II wind farm on aviation operations and whether it is feasible for these to be mitigated to an acceptable level. The document also assesses the potential impact on UK MET office radars as these can be impacted in similar ways to aviation radars.

In July 2025 Cubico UK Development (Wind 1) Limited (Cubico) submitted duplicate full planning applications to Rochdale Metropolitan Borough Council (RMBC) and Rossendale Borough Council (RBC) for a wind farm development comprising 17 wind turbines (up to 180m in height). An aviation impact assessment was conducted for the 17-turbine layout to accompany the planning application. Following feedback from consultees and subsequent discussions, a revised scheme is to be submitted now comprising of 12 wind turbines (up to 180m in height). This document is an update to the original aviation impact assessment to account for the reduced 12-turbine layout and latest feedback from consultees.

The Scout Moor II wind farm is located near Edenfield Road, Rochdale, just to the west of the existing Scout Moor Wind Farm (SMWF) comprising of 26 turbines with a tip height of 100m. The wind farm is located near to aviation infrastructure and facilities and therefore an assessment of its potential influence on aviation operations is necessary. This includes analysing possible effects on radar systems, controlled airspace, and flight safety.

The purpose of this assessment is to evaluate the impact of Scout Moor II on aviation using a combination of Aeronautical Information Publications (AIPs), Radio Frequency (RF) modelling, previous assessments and publicly available information. This report focusses on determining whether the new turbines would obstruct radar line-of-sight, interfere with air traffic control systems, or impact flight operations. Where a potential technical impact is identified, an assessment of resulting operational impact is made. The operational assessment is made based on the information in the AIP and review from our team of experts including former air traffic controllers, ATM engineers and private pilots. The assessment also considers the regulatory guidelines and standards defined by the UK Civil Aviation Authority (CAA). Where an operational impact is predicted, the feasibility of options to mitigate the impact to an acceptable level are also assessed.

## 1.2 Background and Scope

The existing SMWF, situated northwest of Rochdale, is a significant onshore wind energy project, initially developed in 2008. With a capacity of 65 MW, SMWF provides renewable energy to approximately 40,000 homes. As part of a broader policy initiative to increase onshore renewable energy capacity in the UK, Cubico is proposing to develop another wind farm in this location taking advantage of the available wind resource. The proposed development area spans local authority boundaries in Rochdale and Rossendale.

The Scout Moor II proposal involves the installation of up to 12 turbines with tip heights of 180 metres and rotor diameters of 163 metres. These turbines, as identified by the proposed Infrastructure Layout are positioned within proximity to several aviation infrastructure components, which raises potential concerns regarding their impact on radar systems, air traffic control, and aviation safety.

Key stakeholders, including NATS, Manchester Airport, Manchester Barton Airport, Liverpool John Lennon Airport, the Ministry of Defence (MoD), and the UK MET Office have been identified due to the likely technical impacts on radar and operational systems in the vicinity. Notably, Primary Surveillance Radar (PSR) at Manchester Airport, Liverpool John Lennon Airport, and St Anne's, as well as the Hameldon Hill MET radar, are predicted to detect false returns from the proposed Scout Moor II turbines, which could lead to operational impacts or risks with the delivery of air traffic services. If these are established by the service provider mitigation measures may be required.

The proposed Scout Moor II wind farm has prompted the need for an Aviation Impact Assessment, to be submitted alongside a broader Environmental Impact Assessment (EIA) required for planning approval. This report evaluates the potential aviation risks associated with Scout Moor II using industry standards and guidelines such as CAP 764 [1] and CAP 670 [2] from the UK Civil Aviation Authority. The assessment also draws upon EUROCONTROL guidance [4][19] and NATS wind farm self-assessment maps [3] to ensure compliance and mitigate potential operational hazards.

The purpose of this assessment is to ensure that Scout Moor II does not compromise aviation safety or air traffic services, and that any operational impacts identified can be mitigated through technical or operational solutions. The assessment results and subsequent consultations with key stakeholders will inform the development of these solutions to facilitate the project's advancement whilst ensuring the continued safe operation of aviation infrastructure.

### 1.3 Impact of wind farms on aviation

#### Radar systems

There are two principal types of ground-based radar used in civil aviation for the purposes of Air Traffic Control (ATC). They are PSR (or "primary radar") which detects both non-cooperative and cooperative aircraft and SSR (or "secondary radar") which only detects cooperative aircraft. A non-cooperative aircraft does not carry any dedicated equipment specifically designed to interact with the ground-based radar systems. A cooperative aircraft carries a transponder which is designed to interact with the ground radar signal and send back replies with data on the aircraft.

CAP 670 [2] states that PSR is normally the minimum level of equipment necessary to provide a Radar Control (ie Radar Separation Service), Traffic Service or Deconfliction Service. However, due to the lack of altitude and aircraft identity information provided by a PSR, it can only be used on its own when the local traffic density and complexity is low enough to be compatible with the Air Traffic Controller (ATCO) workload needed to manually establish and maintain correlation of aircraft horizontal position with aircraft altitude and identity. SSR or other surveillance technologies (which provide aircraft altitude and identity information) are therefore commonly used to safely accommodate increases in traffic complexity and density. The EUROCONTROL Specification for ATM Surveillance System Performance [4] states that wherever possible cooperative surveillance systems should be deployed to support the full range of air traffic environment in Europe, provided that aircraft to which the service is provided are suitably equipped. In particular, where a 3NM or 5NM radar (or more generally surveillance) separation service is provided this will typically be predicated on the basis that aircraft are transponder equipped and a cooperative surveillance system is used.

While CAP 670 [2] does not preclude services supported only by cooperative surveillance systems, SUR13A.102 states that a means of non-cooperative surveillance is still necessary for the detection of non-cooperative targets in areas at least where the environment is not fully cooperative ie that not all aircraft carry a transponder.

It is widely acknowledged that the main impact of wind farms is on primary radar systems. PSR is designed to detect radar reflections from objects within its field of view. Other objects that are not of interest (eg buildings) may also reflect the radar signal. In order to suppress this unwanted 'clutter' from the radar screen the radar will filter out any radar returns from stationary objects. As the tips of turbine blades move at an equivalent speed to an aircraft and have a similar or greater Radar Cross Section (RCS) than an aircraft, they are frequently either detected as a potential target or can raise the background signal thresholds in the radar processor such the PSR is desensitized in that area and no aircraft returns are shown thereby affecting the probability of detection performance of the radar.

Some modern PSRs also have more sophisticated means of managing radar clutter and specifically wind farm clutter. For example, the Terma Scanner 4002 is one such modern radar that has already been implemented in multiple sites in the UK to support wind farm mitigation. It uses a higher frequency compared to many other

existing aviation PSRs meaning that it has a higher resolution and has a sophisticated radar data processing and tracker capability specifically designed to mitigate the impact of wind turbine clutter while maintaining an acceptable probability detection level.

### **Communication and navigation systems**

While it is commonly accepted that the main impact of wind farms is on aviation PSRs, wind farms can potentially also create interference and degrade the signal quality of aviation communication and navigation systems if they are situated too close. CAP670 [2] provides guidance and technical safeguarding criteria to protect these assets from interference.

### **Instrument flight procedure design**

Wind farms can act as a physical obstruction to aviation operations just like any other tall structure. There are well defined rules that aircraft follow in order to remain clear of obstructions and there are requirements laid down by the UK CAA defining when obstructions need to be lit for the purposes of aviation safety. Instrument Flight Procedures (IFPs) defining specific routes flown by aircraft also have requirements for ensuring minimum clearances from any obstacles in the vicinity of the flight path.

## 2 ASSESSMENT METHODOLOGY REVIEW

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### 2.1 Approach

The approach to the technical assessment was as follows:

- Identify aviation Communication, Navigation and Surveillance (CNS) systems, MET radar and published instrument flight procedures in proximity to Scout Moor II.
- Check to see if Scout Moor II falls within any technical safeguarding zones for aviation Communication, Navigation and Surveillance (CNS) systems as defined in CAP 670 [2].
- Check to see if Scout Moor II falls within any technical consultation zones for CNS equipment as defined by the wind farm safeguarding maps published by NATS.
- Check to see if Scout Moor II infringes any of the obstacle clearance protection limits associated with currently published IFPs.
- Assess whether Scout Moor II is in line-of-sight of any aviation primary radars or MET office weather radars.

Where potential technical impacts were predicted by the assessment above an operational assessment was then carried out. This considered the extent of the technical impact, its impact on the performance of the affected asset and how this affected the overall operations using the asset. Information on the general aviation operations was derived from the UK Aeronautical Information Publications (AIPs), publicly available information on General Aviation activity and hotspots, and the operational understanding of our staff.

### 2.2 Overview of tools and data sources

#### 2.2.1 NATS wind farm safeguarding maps

The NATS wind farm safeguarding maps were consulted to identify any potential technical impacts between the proposed windfarm and critical aviation infrastructure. These maps are designed to outline safeguarding zones for key facilities, such as:

##### ■ Radar Installations

The safeguarding maps were used to determine whether the turbines could fall within areas that could affect radar systems, including primary surveillance radars (PSRs) and secondary surveillance radars (SSRs). This information supports the evaluation of potential technical impacts on radar performance.



**FIGURE 1 – NATS WIND FARM SAFEGUARDING MAP FOR PSR COVERAGE AT 180M AGL**

The PSR safeguarding map above provided by NATS illustrates the radar coverage of NATS PSR at 180m above the terrain ie at the tip height of the proposed Scout Moor II wind turbines. The red shaded area indicates where there is theoretical visibility from one or more PSR, therefore indicating that a wind turbine at this height could have a potential technical impact on NATS PSR. The map illustrates that Scout Moor II is expected to be visible to NATS PSR.



**FIGURE 2 – NATS WIND FARM SAFEGUARDING MAP FOR SSR**

The Secondary Surveillance Radar (SSR) safeguarding map above illustrates the 15 nautical mile (~28 km) safeguarded zones around SSRs as well as the safeguarded zones for Height Monitoring Units (HMU). These

areas are identified as regions where potential interference with SSR operations may be assessed in greater detail by NATS.

In this case, the Scout Moor II wind farm is located outside all SSR safeguarded zones, indicating that the development does not fall within the predefined areas of concern for SSR infrastructure. Consequently, no direct safeguarding assessment would typically be required for SSR impact, reducing the likelihood of operational concerns related to aircraft transponder-based surveillance in this context.

### ■ Communication and Navigation Aids

The safeguarding maps provided an overview of the locations of key communication and navigation aids in relation to the proposed turbine layout. This informed the assessment of whether the turbines could interfere with or degrade the operation of these facilities.



**FIGURE 3 – NATS WIND FARM SAFEGUARDING MAP FOR COMMUNICATION SITES**

The Air-Ground-Air (AGA) communication safeguarding map displays 10 km safeguarded zones surrounding AGA communication sites. These zones represent areas where potential interference with aviation communication infrastructure would be subject to further assessment.

In this instance, the Scout Moor II wind farm is situated outside all AGA safeguarding zones, indicating that it does not fall within the areas of concern for air-to-ground communication systems. As a result, no direct safeguarding assessment is expected for AGA infrastructure, and no operational impact is anticipated concerning aviation voice communication services.



**FIGURE 4 – NATS WIND FARM SAFEGUARDING MAP FOR NAVIGATION SITES**

The enroute navigation aids safeguarding map highlights 10 km safeguarded zones around key navigational facilities. These zones indicate areas where proposed developments, such as wind farms, may require further assessment due to potential interference with navigational signals. In this case, the Scout Moor II wind farm is located just outside one of these safeguarded zones. As a result, no direct safeguarding assessment is expected for navigation infrastructure, and no operational impact is anticipated concerning aviation navigation services.

### 2.2.2 Radio Mobile line-of-sight analysis

Radio Mobile, a propagation simulation software, was employed to perform a detailed line-of-sight (LoS) radar analysis. This tool can import a detailed representation of terrain, allowing the calculation of radar visibility from various locations. The analysis incorporates:

- **Terrain data:** The software incorporated high-resolution terrain data to account for topographical features, ensuring accurate modelling of potential obstructions between the radar and turbine locations.
- **Simulation of radar beam coverage** and obstructions caused by the turbine layout and topography.
- **Radar sensor heights:** The radar sensor heights used in this assessment were based on radar data already held. Where data was missing, an average antenna height of 15 metres Above Ground Level (AGL) was used. However, a sensitivity analysis was also conducted, where increased antenna heights were also used to check the sensitivity of the results to key input parameters and to also consider worst case conditions.
- **Cross-sectional profile modelling:** For each radar-turbine pair, a cross-sectional profile was generated to illustrate the terrain elevation, radar antenna height, and turbine tip height along the line-of-sight path. This allowed a visual and analytical assessment of whether turbine structures would be visible above the local horizon from the radar location and helped validate predictions of radar detectability under different configurations.
- **Antenna pattern elevation angle range used in simulation:** -5° to 45°.
- **Radar radial range used in simulation:** 0.01km to 110km.

### 2.2.3 Aeronautical Information Publications (AIP) Charts

The UK AIP charts were used to inform the assessment of potential impacts on airspace, navigation, and aviation operations. These charts provided relevant data for evaluating civilian and military aviation considerations, including:

- **instrument flight procedures for aerodromes**
- **navigation aids**
- **enroute airspace and traffic corridors**
- **day and night low-flying operations**
- **military and tactical concerns**
- **airspace classification and General Aviation (GA) activity.**

### 2.2.4 Other data sources

In addition to the primary tools listed above, the following supplementary data sources were consulted:

- **Civil Aviation Authority (CAA) Publications:** To identify hotspots for General Aviation (GA) activity, glider operations, and other relevant airspace uses.

Section 7 has a full list of reference documents consulted for this assessment.

### 3 ASSESSMENT RESULTS

#### 3.1 Potential impact on communication and navigation systems

Scout Moor II does not fall in any of the technical safeguarding areas defined in CAP670 [2]. It also does not fall in any of the consultation zones defined by the NATS wind farm safeguarding map. Scout Moor II is therefore not expected to have any technical or operational impact on aviation communication and navigation systems.

#### 3.2 Potential impact on surveillance systems

##### 3.2.1 Introduction

Scout Moor II does not fall in any of the technical safeguarding areas defined in CAP670 [2]. It also does not fall in any of the SSR consultation zones defined by the NATS wind farm safeguarding map. According to the NATS safeguarding maps, Scout Moor II will be visible to aviation PSR. Scout Moor II is therefore likely to have a technical impact on aviation PSR and this is investigated further through a line-of-sight analysis below.

##### 3.2.2 Results of the standard line-of-sight (LoS) analysis

Following the methodology listed in section 2 for this assessment, the following results were obtained.

##### Manchester Airport PSR

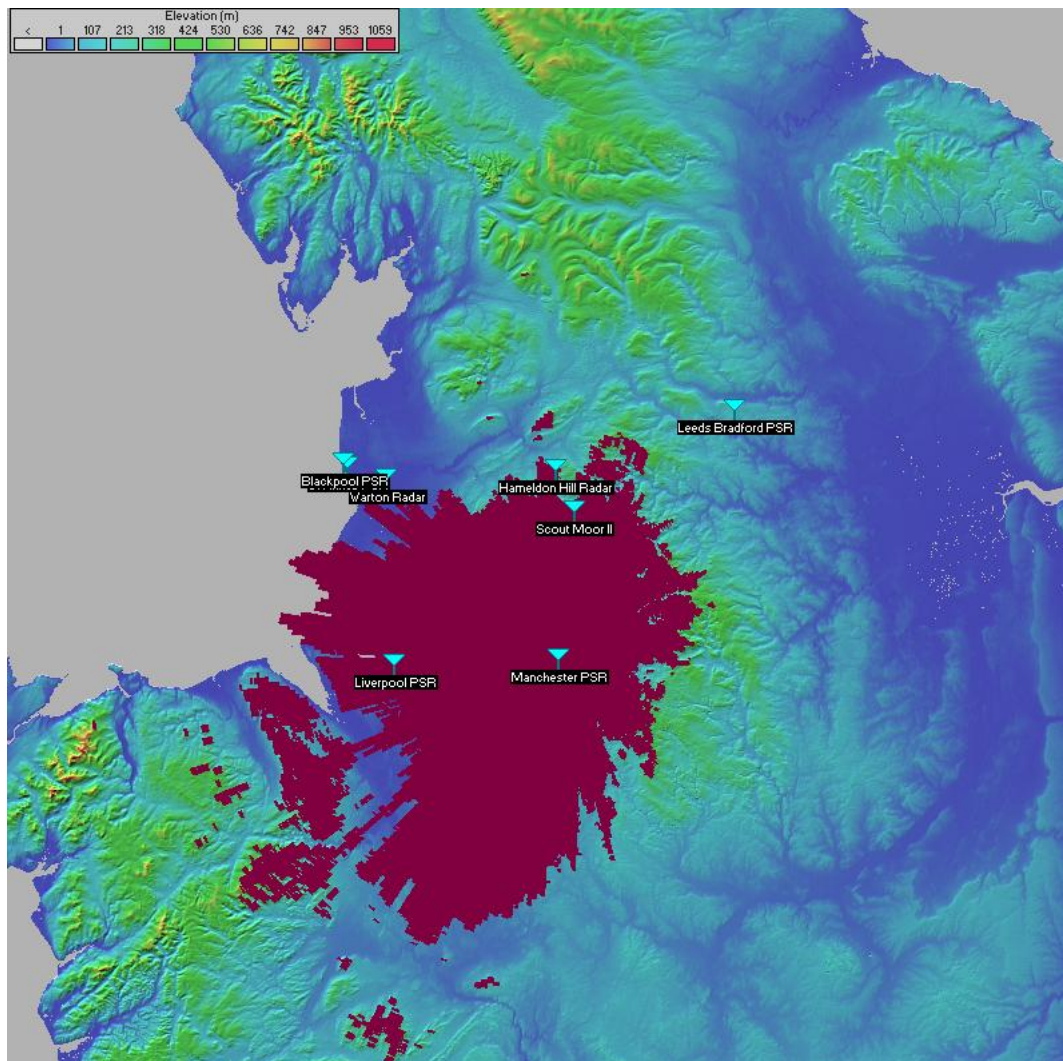
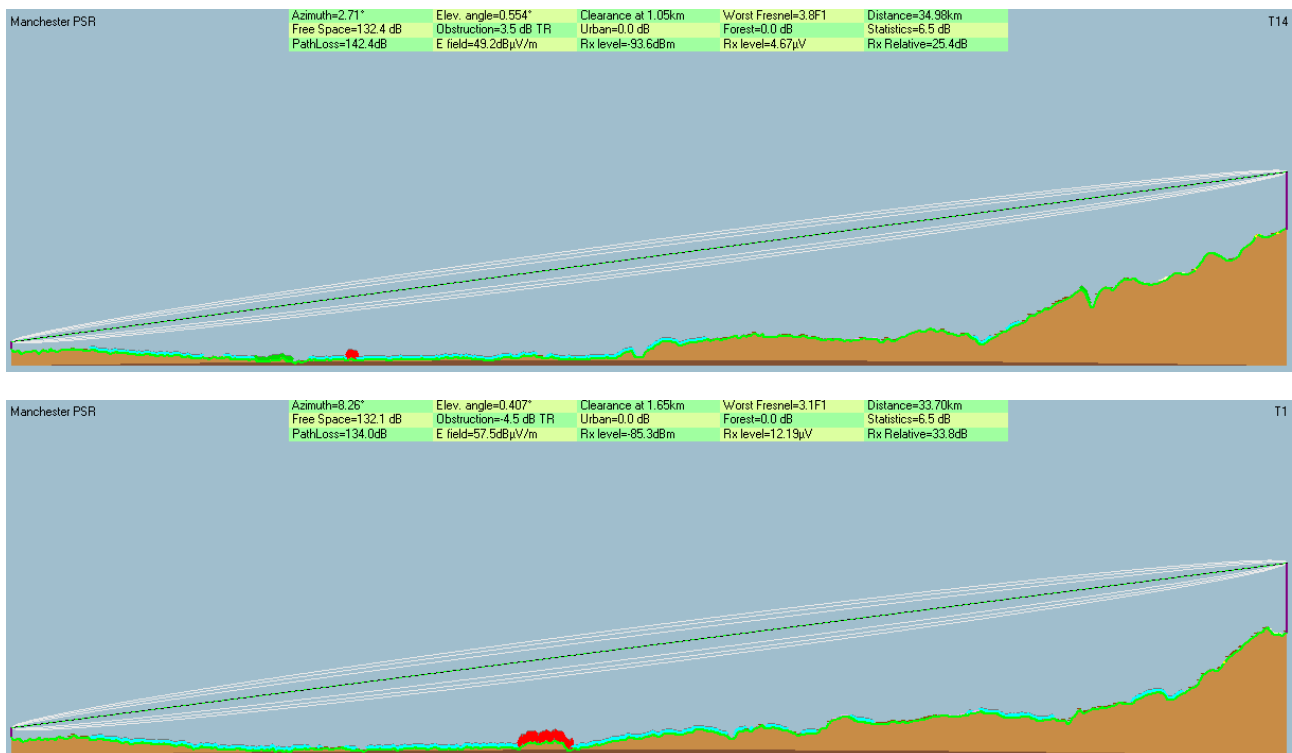


FIGURE 5 – MANCHESTER AIRPORT PSR COVERAGE AT 180M AGL



**FIGURE 6 - LINE-OF-SIGHT PROFILE FROM MANCHESTER PSR TO SCOUT MOOR WIND FARM HIGHEST AND LOWEST TURBINES**

Manchester Airport's PSR has coverage of the Scout Moor II wind farm area at 180 m AGL, extending broadly across the site. There is consistent radar coverage of the wind farm, especially in the southern region, and the visibility remains relatively robust throughout.

To confirm this, a line-of-sight analysis between Manchester PSR and the turbine area was carried out using Radio Mobile (Figure 6 - Line-of-sight profile from Manchester PSR to Scout Moor Wind Farm Highest and Lowest Turbines). The profile demonstrates a clear line-of-sight from the radar to the turbine tips, with no intervening terrain obstruction.

These results confirm that turbines across the site would be visible to the Manchester PSR, with minimal terrain shielding. This supports the conclusion that the turbines are likely to create radar clutter, which could degrade PSR performance depending on the type of radar installed. Discussions in January 2026 with NATS staff responsible for surveillance and air traffic control services at Manchester confirmed that Scout Moor II is expected to generate clutter and false returns on the PSR at Manchester Airport. In turn this is expected to result in an operational impact on their ability to monitor and manage low level GA aircraft routing around the Manchester controlled airspace and the impact will therefore need to be mitigated. Following a recommendation by NATS a Technical and Operational Assessment (TOPA) has also been commissioned to confirm the extent of the impact and to explore feasible mitigation measures, such as radar blanking or in-fill solutions. More detail on the TOPA is provided in section 5.2.

Liverpool John Lennon Airport PSR

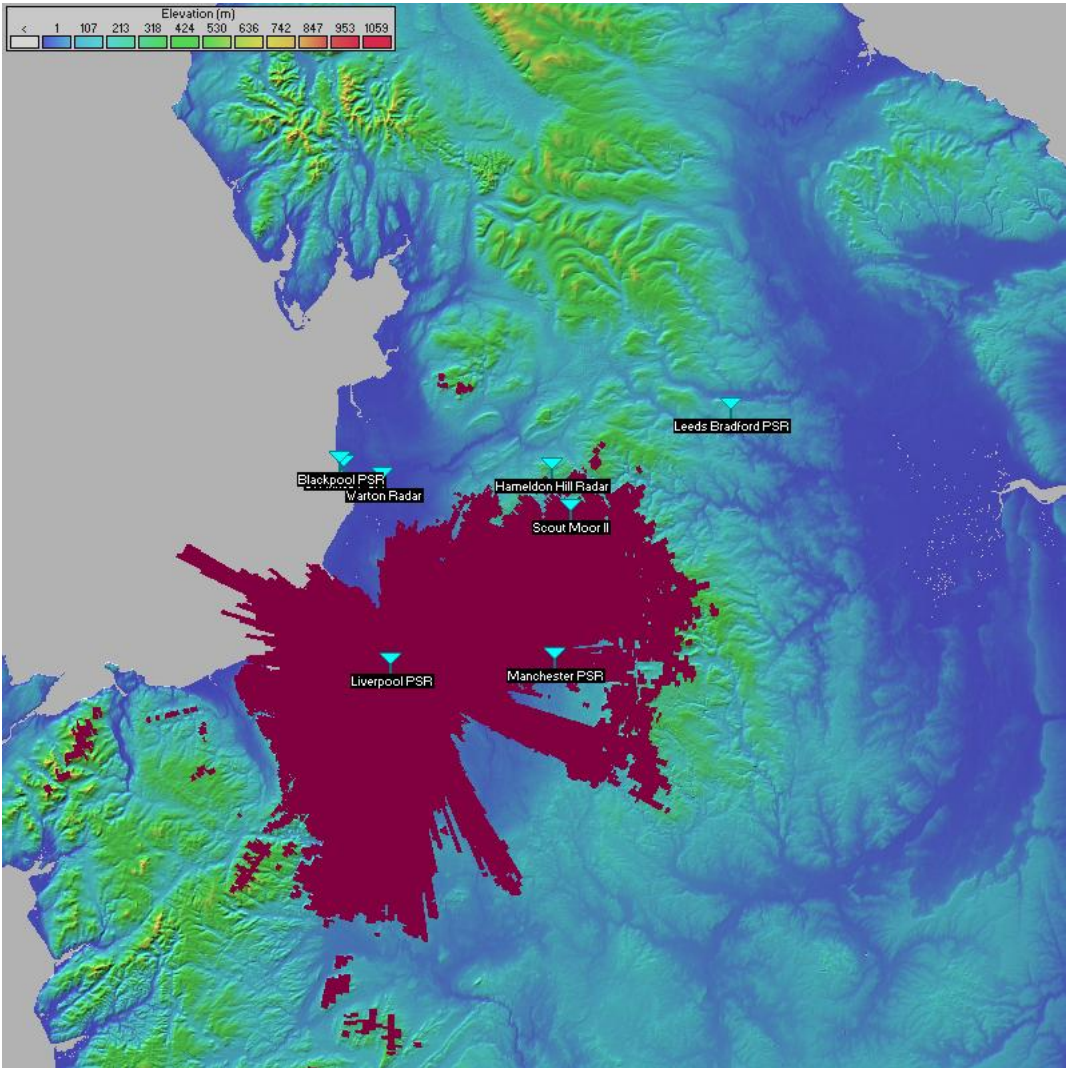
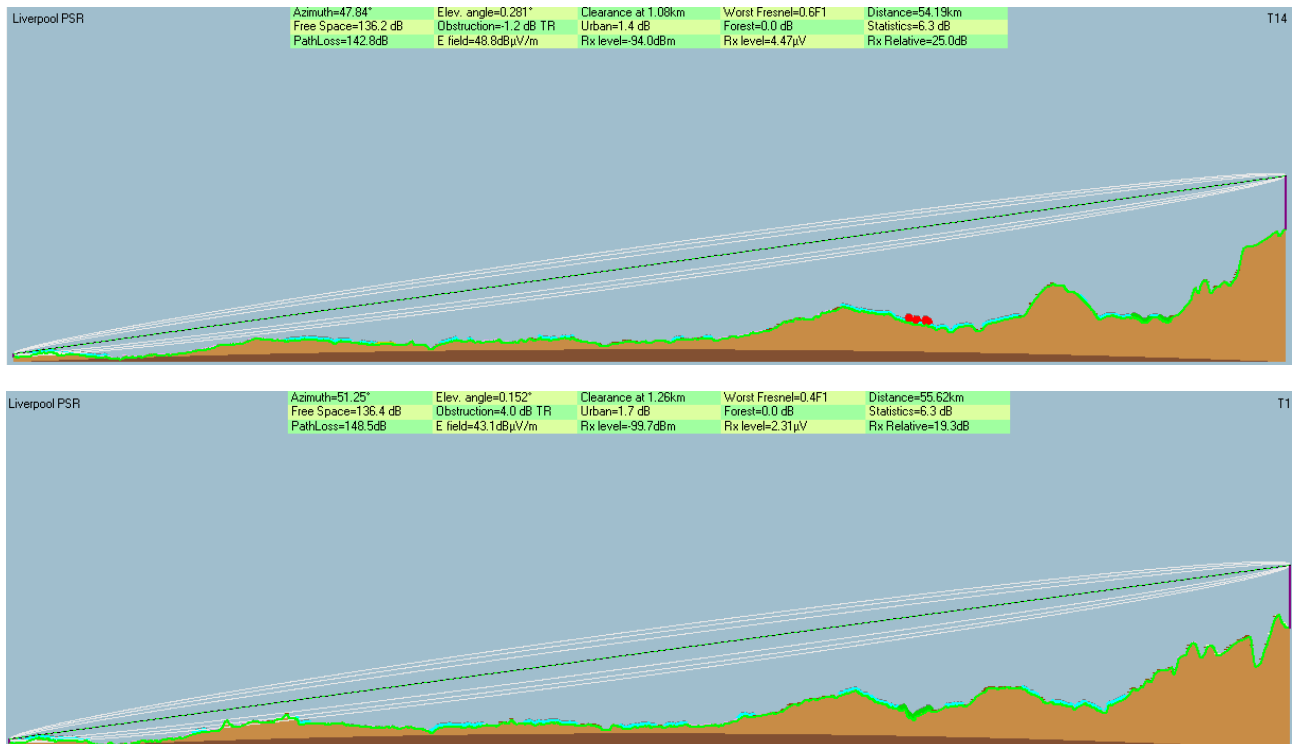


FIGURE 7 – LJLA PSR COVERAGE AT 180M AGL



**FIGURE 8 - LINE-OF-SIGHT PROFILE FROM LIVERPOOL JOHN LENNON AIRPORT PSR TO SCOUT MOOR II WIND FARM HIGHEST AND LOWEST TURBINES**

The line-of-sight analysis indicates that parts of the Scout Moor II wind farm may fall within the coverage of the Liverpool John Lennon Airport PSR at a turbine tip height of 180 m AGL, though just at the outer edge of its coverage. As shown in Figure 8 - Line-of-sight profile from Liverpool John Lennon Airport PSR to Scout Moor II Wind Farm, the Radio Mobile profile suggests that turbine tips would be visible to the radar above intervening terrain though there could be some interference with the Fresnel zones which would limit the amount of power reaching the turbines and therefore limiting the coverage.

Although the coverage of Scout Moor II may be limited there could still be a technical impact on the radar and therefore a further analysis is conducted in the operational impact section (section 4) to determine whether clutter mitigation or procedural changes would be necessary.

St Anne’s PSR

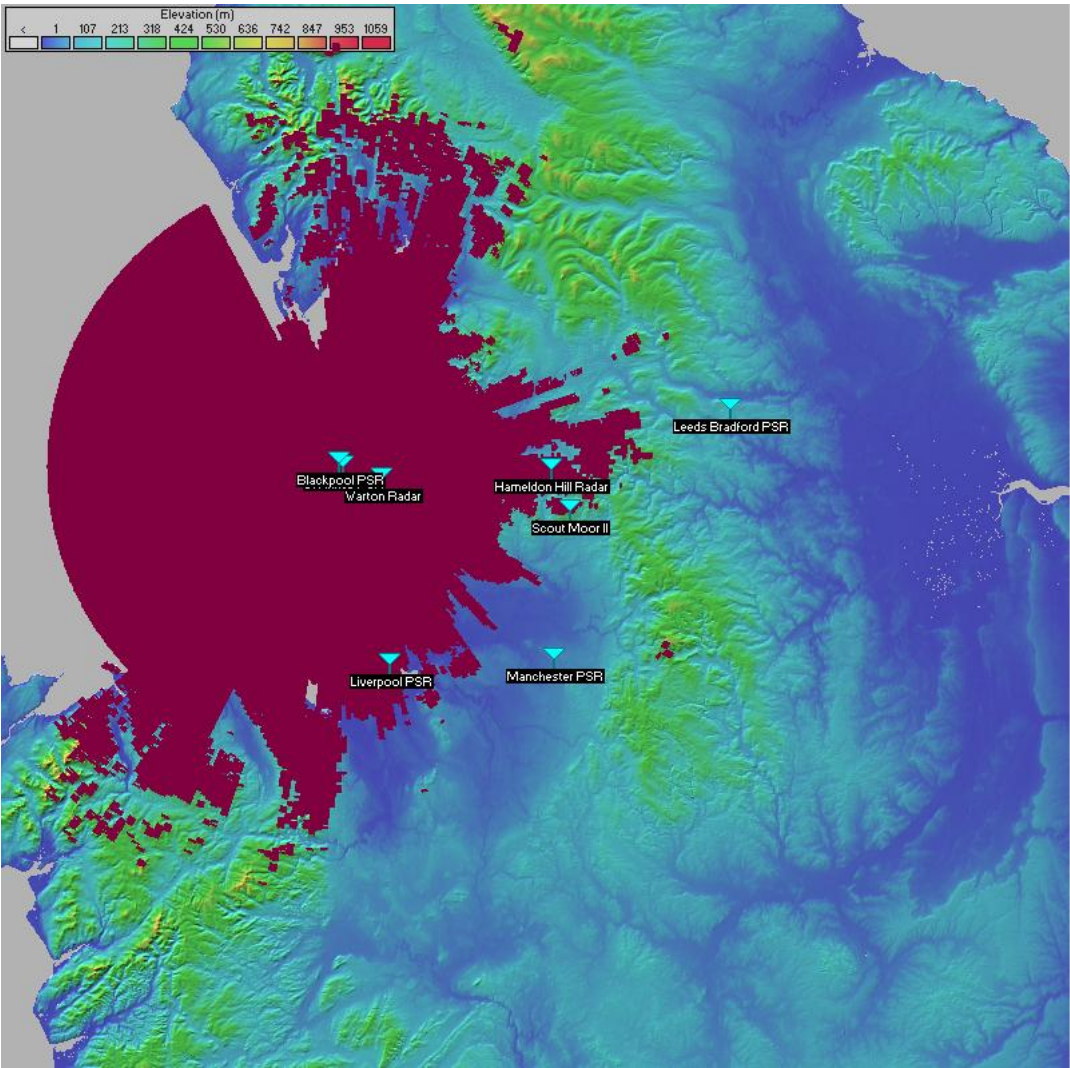
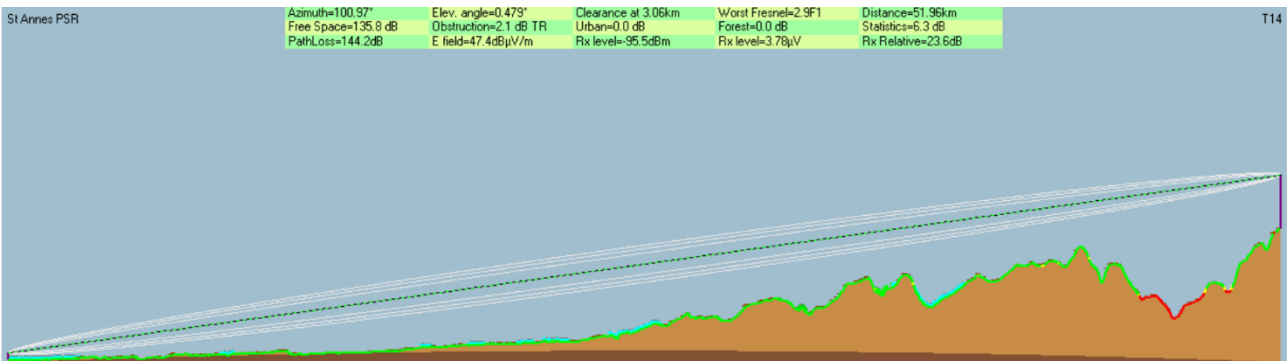
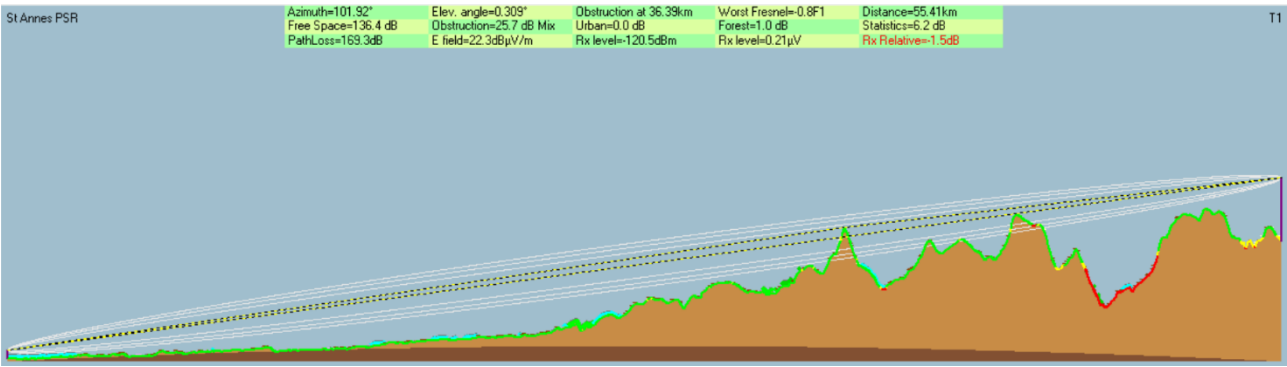


FIGURE 9 – NATS ST ANNE’S ENROUTE PSR COVERAGE AT 180M AGL





**FIGURE 10 - LINE-OF-SIGHT PROFILE FROM ST ANNE'S PSR TO SCOUT MOOR WIND FARM HIGHEST AND LOWEST TURBINES**

The St Anne's radar shows Scout Moor II wind farm may fall within the coverage of the St Anne's Airport PSR at a turbine tip height of 180 m AGL, though just at the outer edge of its coverage. Figure 10 indicates that some turbines, particularly those located on higher ground to the east of the site, would be within line-of-sight, while elevated terrain between the radar and the site creates some shielding, on those located lower. To investigate further a Radio Mobile elevation profile (Figure 10) was reviewed, confirming the presence of multiple intermediate terrain features that would obstruct radar visibility to some of the turbines.

Although the coverage of Scout Moor II may be limited there may still be a technical impact on the radar and therefore a further analysis is conducted in the operational impact section (section 4) to determine whether clutter mitigation or procedural changes would be necessary.

Warton

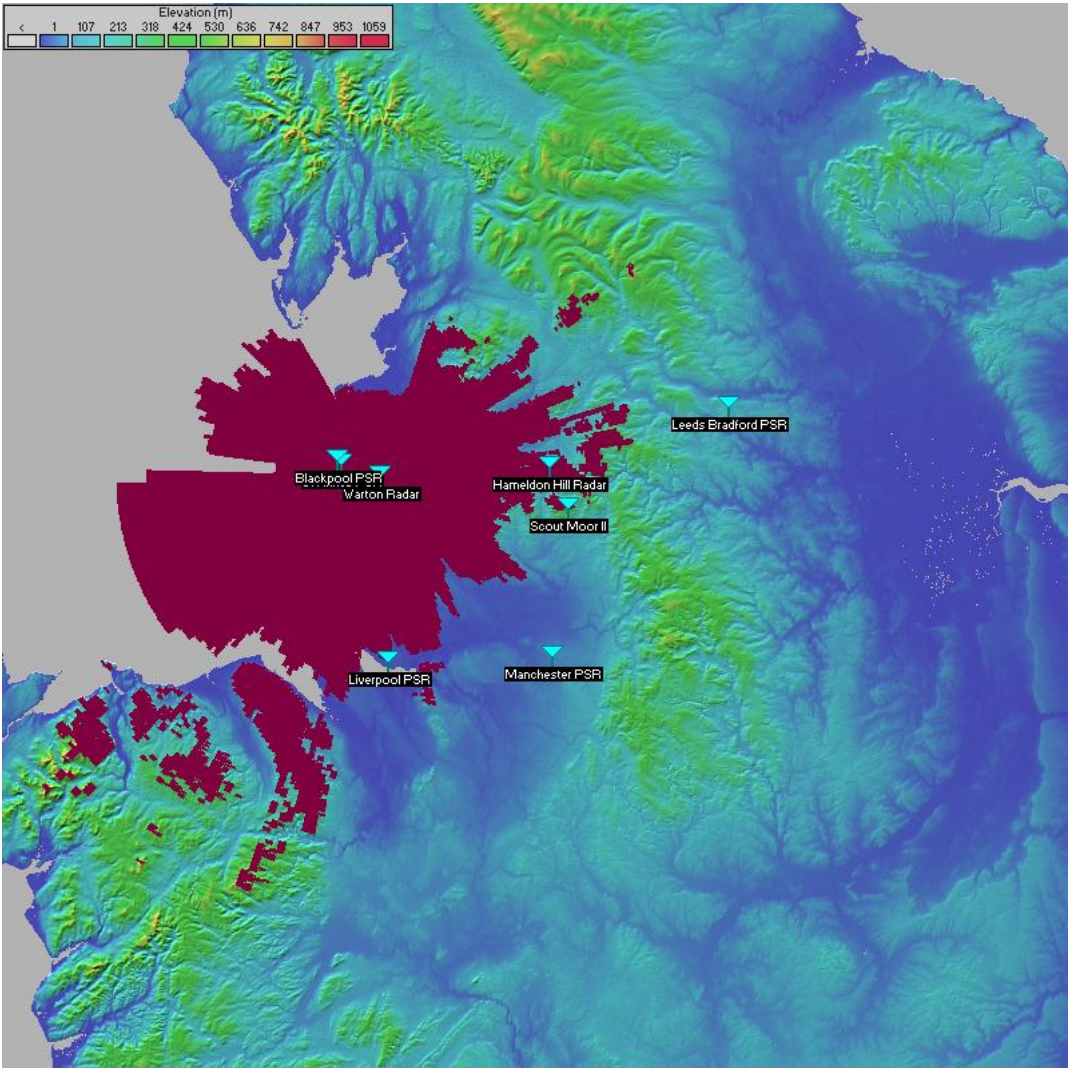
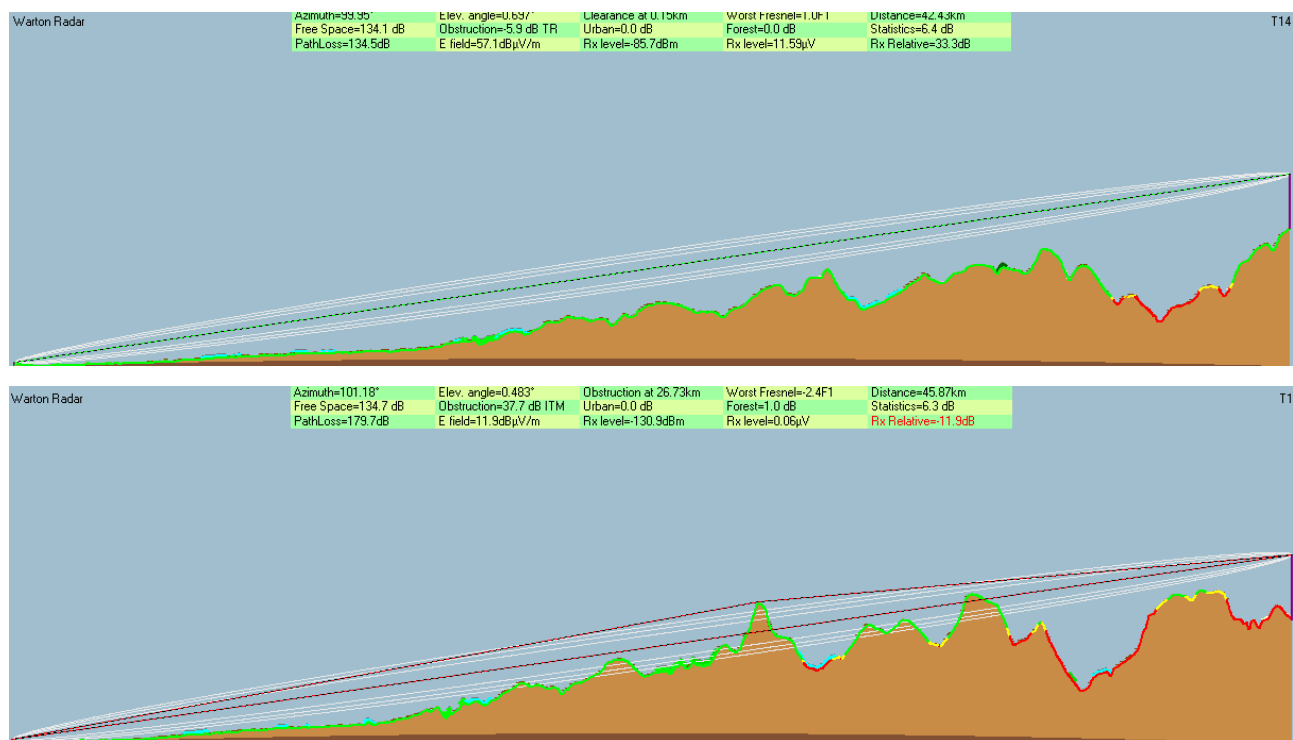


FIGURE 11 – BAE WARTON PSR COVERAGE AT 180M AGL



**FIGURE 12 - LINE-OF-SIGHT PROFILE BAE WARTON PSR TO SCOUT MOOR WIND FARM HIGHEST AND LOWEST TURBINES**

The BAE Warton indicates that Scout Moor II Wind Farm is just on the outer edge of coverage, with visibility influenced by the intervening terrain. As shown in Figure 12, the Radio Mobile profile indicates that some turbines, particularly those located on higher ground to the east of the site, would be within line-of-sight, while terrain features in the central corridor obstruct the radar's view of others. As some turbines will be visible to the PSR at BAE Warton the potential technical impact is assessed further in the operational impact section of this report (section 4).

Leeds Bradford PSR

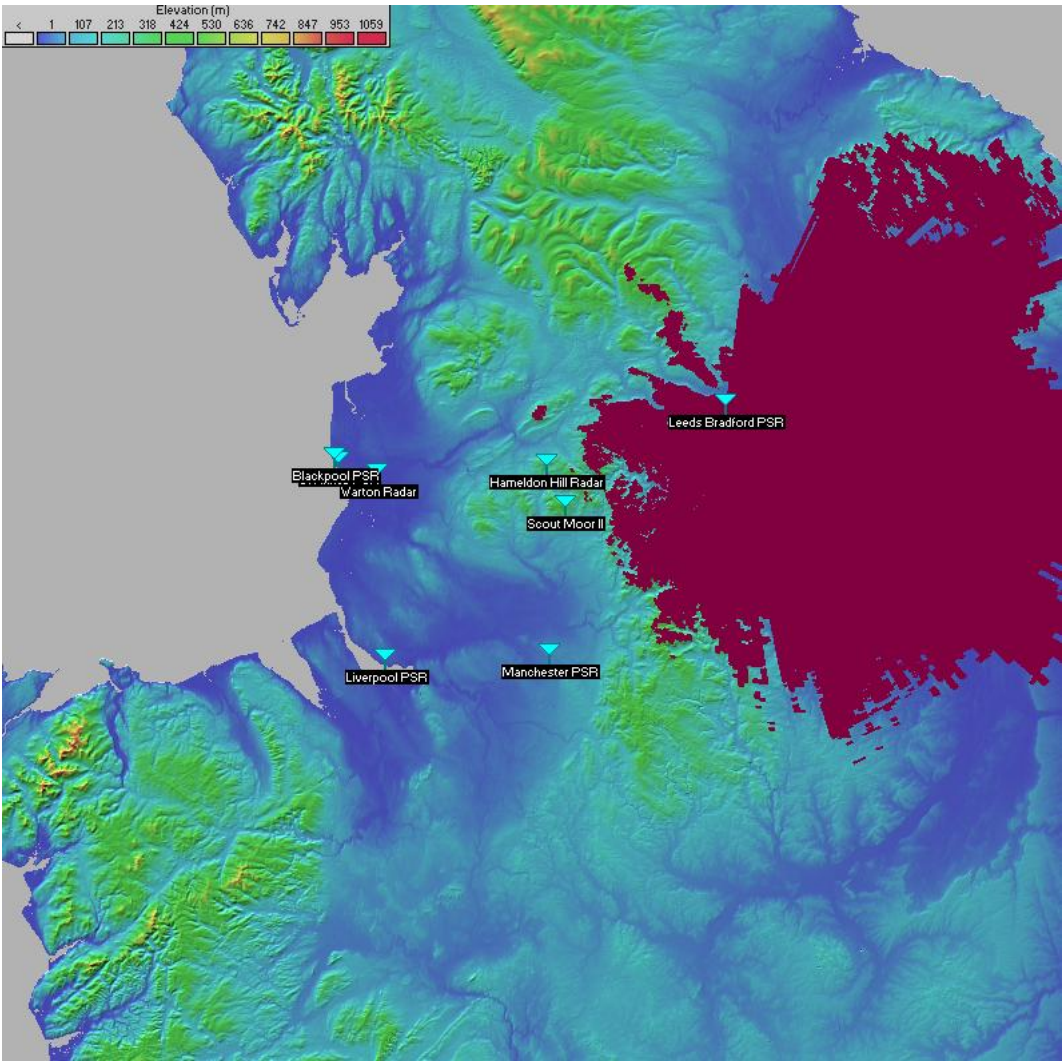
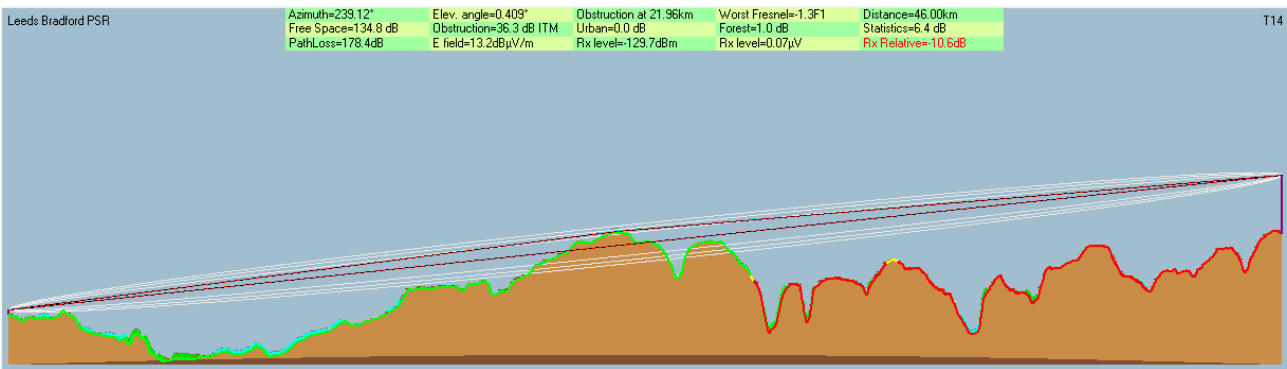
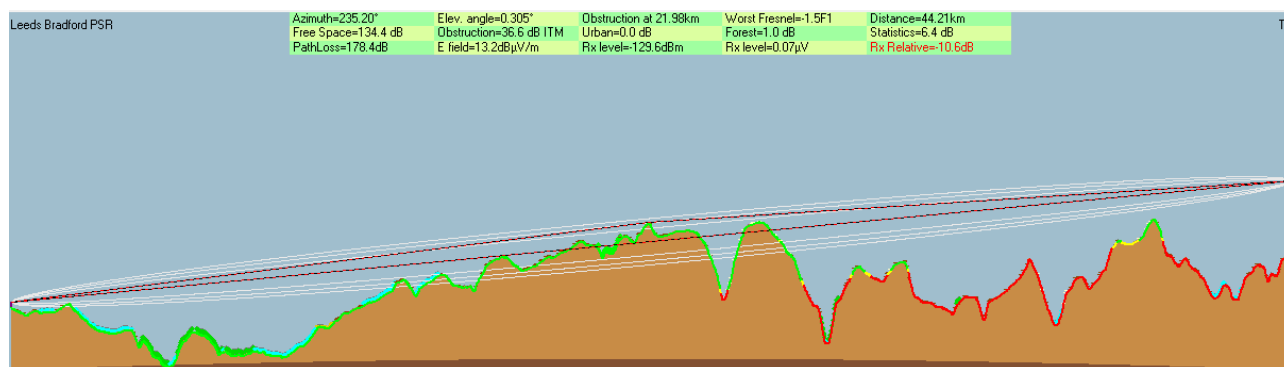


FIGURE 13 – LEEDS BRADFORD AIRPORT PSR COVERAGE AT 180M AGL





**FIGURE 14 - LINE-OF-SIGHT PROFILE LEEDS BRADFORD PSR TO SCOUT MOOR WIND FARM HIGHEST AND LOWEST TURBINES**

The line-of-sight analysis for Leeds Bradford PSR indicates that the radar has no visual coverage of the proposed Scout Moor II wind farm at the assessed target height. As shown in Figure 14, the Radio Mobile profile reveals that multiple terrain features lie above the direct path from the radar to the wind farm, fully obstructing visibility across the entire site.

Given the elevated and complex topography along the path, radar beams at lower elevation angles are blocked before reaching the site. As a result, Leeds Bradford PSR is not expected to be impacted by the Scout Moor II wind farm, as it cannot directly detect the turbines. No radar clutter or interference is anticipated from the Scout Moor II wind farm, and no mitigation measures should be required for this radar installation.

### 3.2.3 Sensitivity analysis

To assess the sensitivity of the results to key input parameters and also to account for potential variation in radar propagation characteristics, the assessment was repeated with increased antenna height values and greater elevation angle ranges. The sensitivity analysis therefore represents a potential worst-case scenario for radar visibility of the proposed Scout Moor II wind farm.

In this analysis, **the following variables have been adjusted to reflect a potential worst-case scenario:**

- **Radar Sensor Heights:** As part of the sensitivity analysis, radar sensor heights were increased from their default values to 25 metres AGL. This adjustment reflects possible variations in actual radar infrastructure and to account for variations in RF propagation (eg due to atmospheric conditions) to ensure robustness in the conclusions of the line-of-sight modelling.
- **Elevation Angle Range:** Expanded to assess a broader range of potential turbine interference:
  - Minimum (°): -10 (reduced from the original value of -5° to capture alternative antenna patterns or vertical tilt).
  - Maximum (°): 65 (increased from the original value of 45° to capture alternative antenna patterns or vertical tilt).

This worst-case assessment is designed to **identify the maximum potential for radar interference**, providing a conservative analysis for stakeholder engagement.

3.2.3.1 Results

Manchester PSR

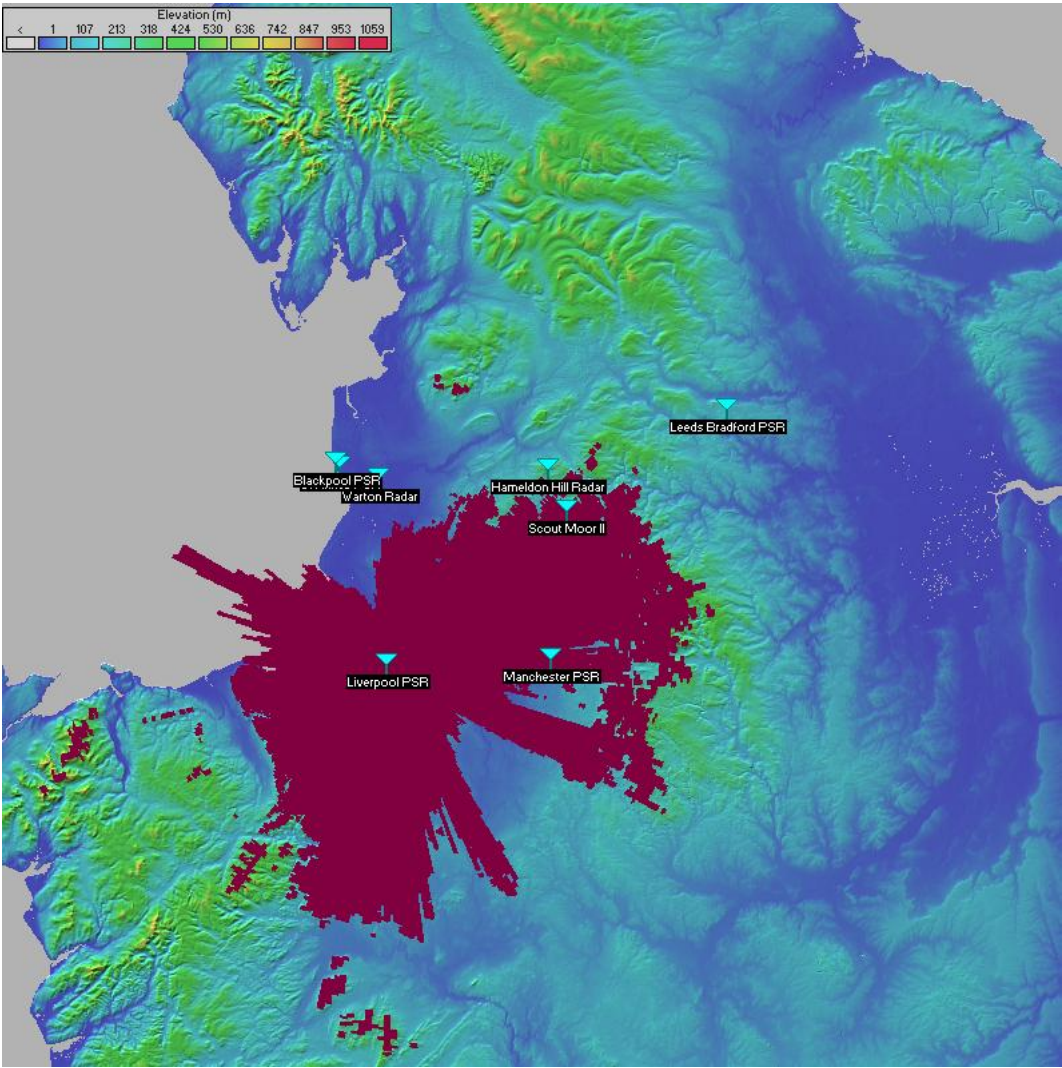


FIGURE 15 – MANCHESTER AIRPORT PSR WORST CASE COVERAGE

Liverpool PSR

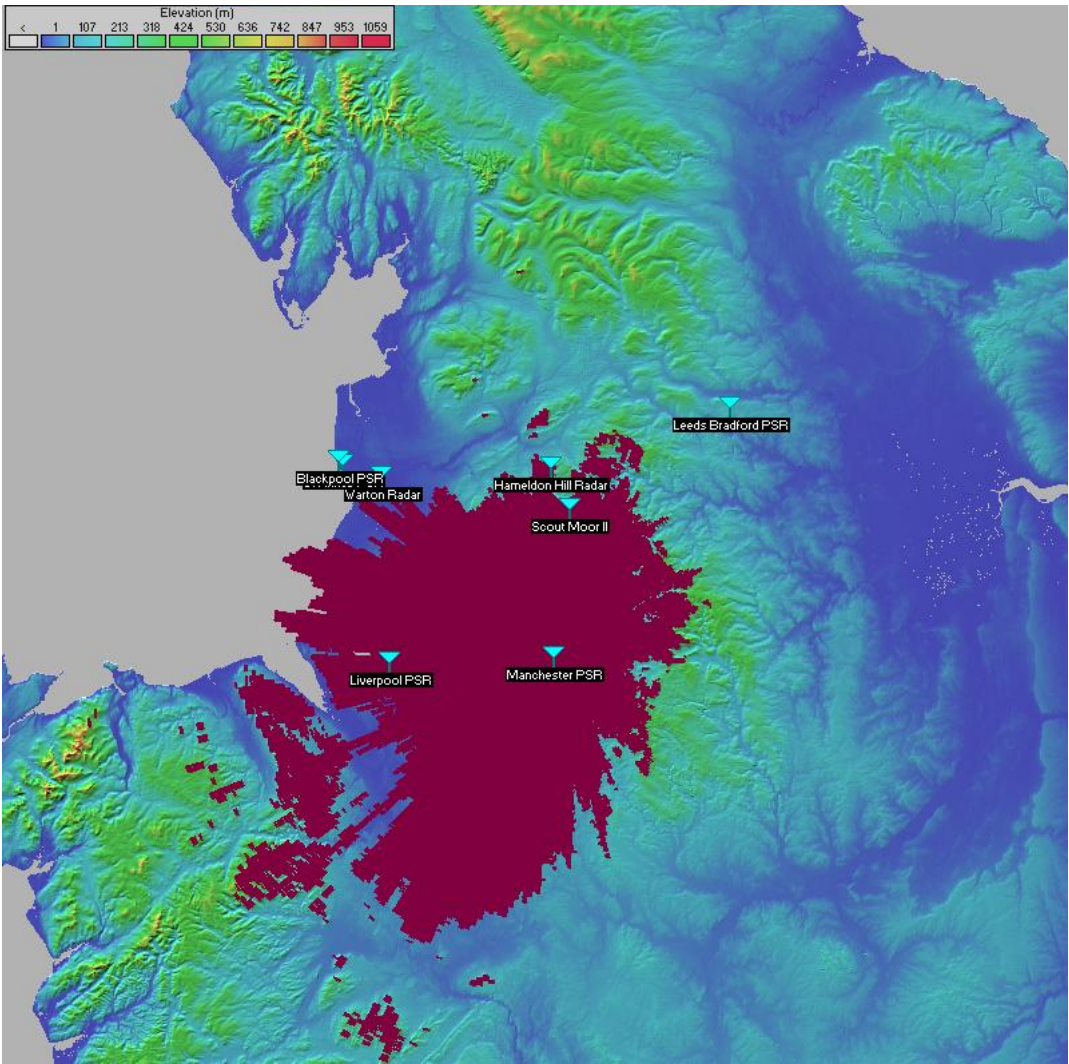


FIGURE 16 – LJA PSR WORST CASE COVERAGE

St Anne's PSR

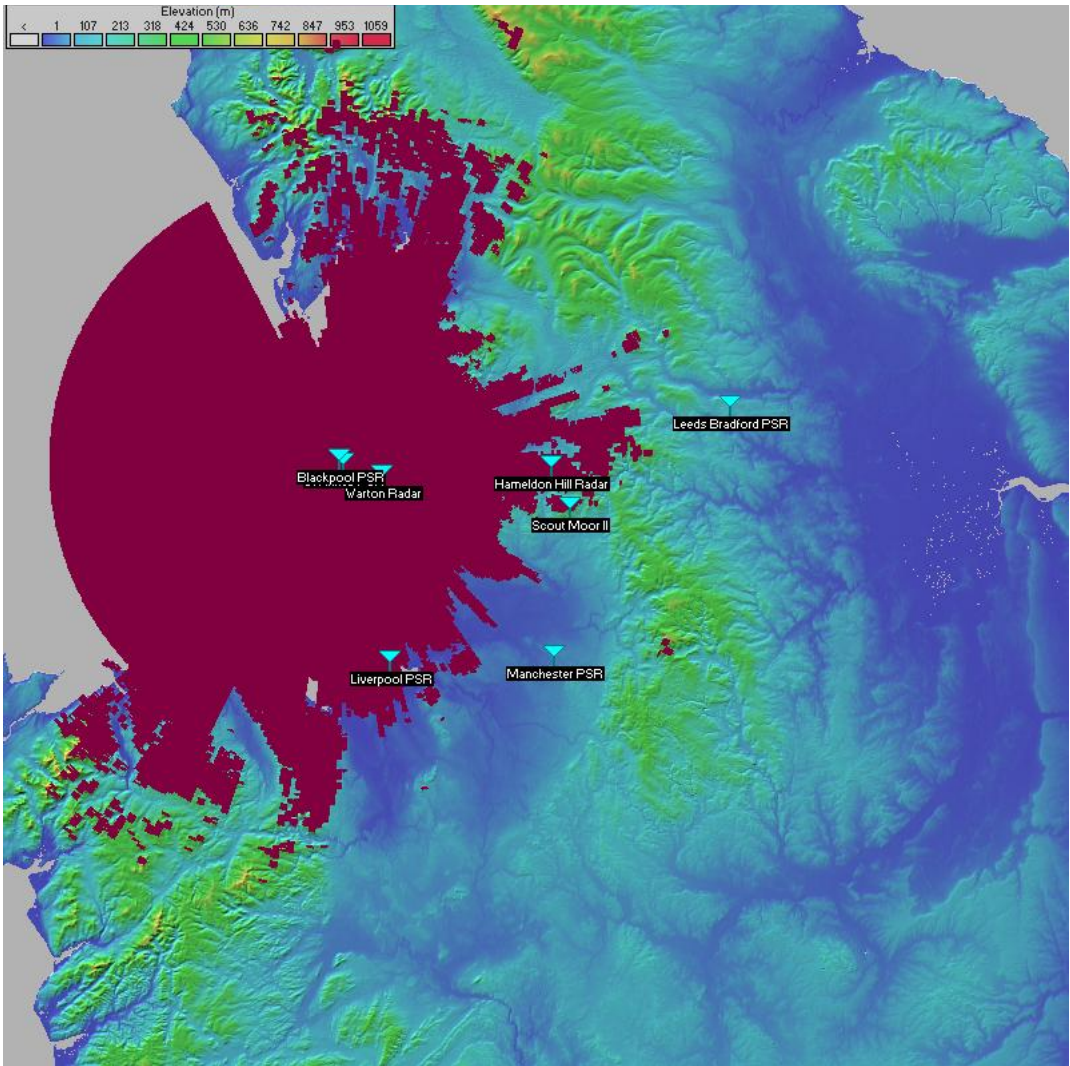


FIGURE 17 – NATS ST ANNE'S PSR WORST CASE COVERAGE

Warton

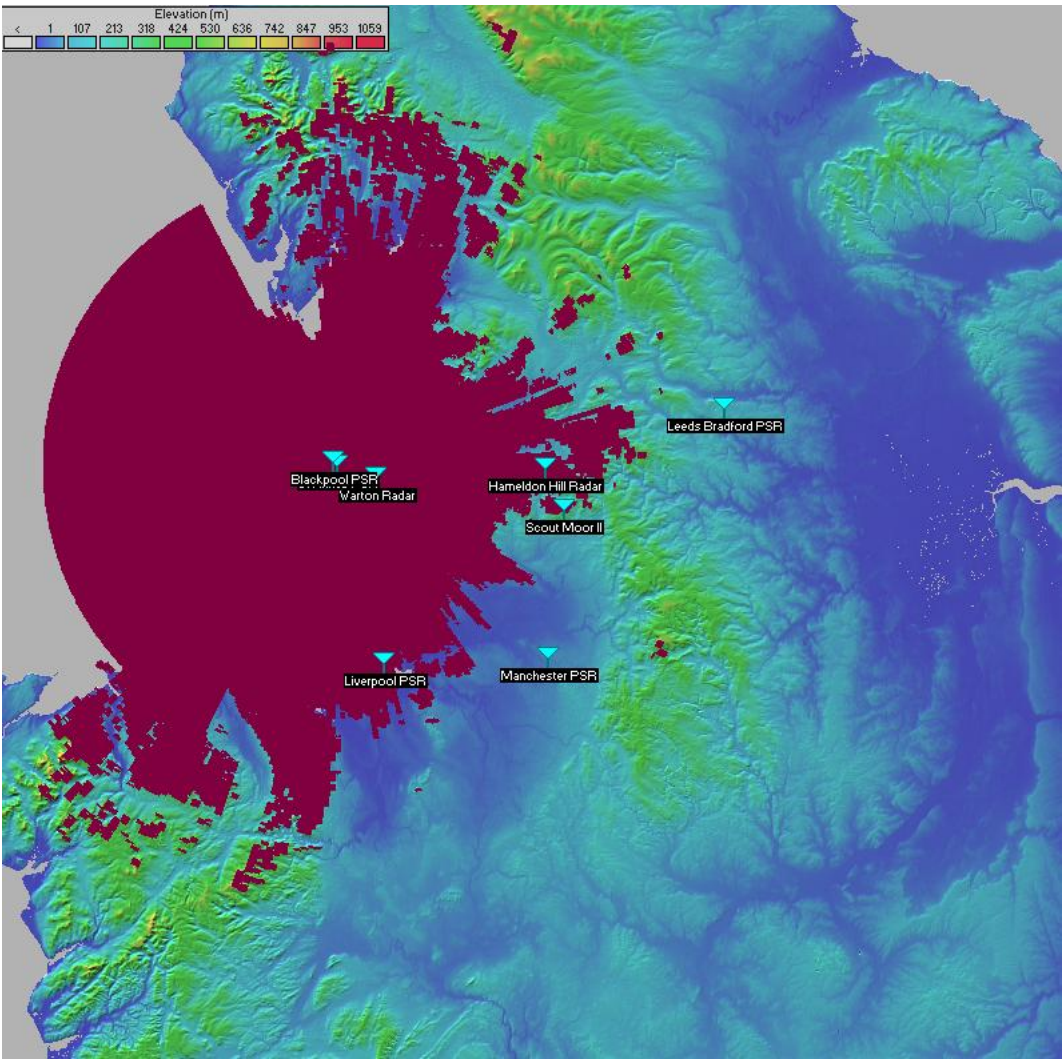
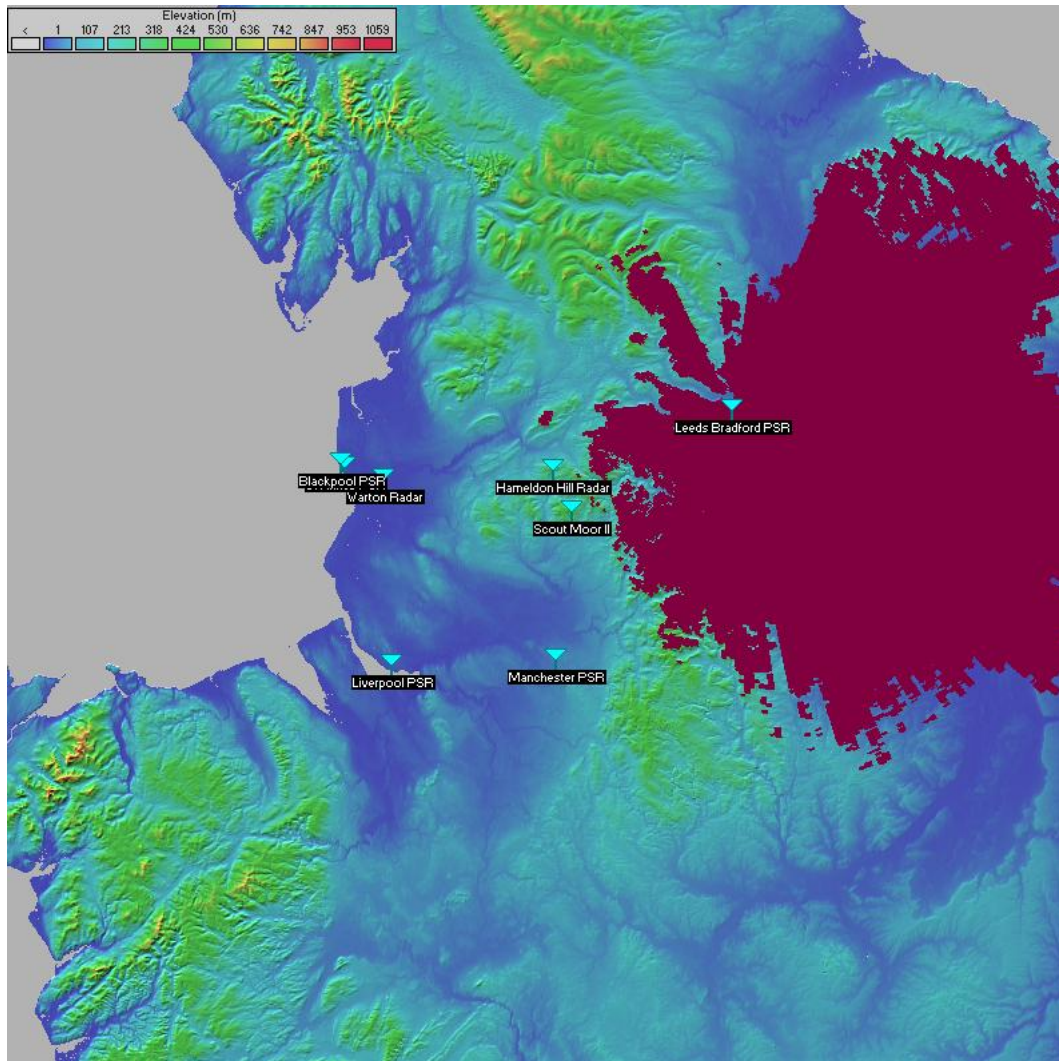


FIGURE 18 – BAE WARTON PSR WORST CASE COVERAGE

## Leeds Bradford PSR



**FIGURE 19 – LEEDS BRADFORD AIRPORT PSR WORST CASE COVERAGE**

### 3.2.3.2 Conclusion

The worst-case scenario sensitivity analysis shows that the assessment results are not sensitive to the key input parameters of antenna height and elevation range. It therefore also reinforces the initial findings above, confirming that the Scout Moor II wind farm is likely to be visible to Manchester and Liverpool's PSRs, and partially visible to St Anne's, and Warton's PSRs. The potential operational impact of these technical impacts is therefore assessed further in section 4.

### 3.3 Airspace structure in vicinity of Scout Moor II

The Scout Moor II wind farm is situated beneath the Manchester Terminal Manoeuvring Area (TMA) 1, classified as Class A airspace from 3,500 feet AMSL to Flight Level 195. Class A airspace restricts operations to Instrument Flight Rules (IFR) flights equipped with transponders, with air traffic controllers maintaining separation between aircraft using surveillance systems. TMAs are established around major airports where high volumes of air traffic are anticipated, further emphasizing the importance of maintaining uninterrupted radar performance.

Below 3,500ft the airspace is classified as Class G uncontrolled airspace. Aircraft in this airspace fly on a “see and avoid” principle and are responsible for their own separation from other airspace users. However, they may still request radar derived Flight Information Services from an air traffic service provider.

In addition, the surrounding areas include sections of Class D airspace, which permit both Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) operations. These classifications require robust radar surveillance to support operations within both controlled and uncontrolled airspace.



FIGURE 20 – LOCATION OF SMII WIND FARM RELATIVE TO LOCAL AIRSPACE STRUCTURES

The nearest licensed aerodromes to the proposed development are:

- Manchester Barton (23km)
- Manchester (33km)
- Warton (42km)
- Leeds Bradford (42km)
- Blackpool (53km)
- Liverpool (56km)

The nearest unlicensed aerodromes/airstrips/helipads have been identified as:

- Middlebank Top Farm airstrip (5km)
- Cribden End Farm airstrip (6km)
- Royal Blackburn Hospital (15km)
- Bleak Hey Nook (16km)
- Crook's Heights Farm (19km)
- Manchester Royal Infirmary helipad (20km)
- Salford Royal Hospital helipad (20km)
- Higher Barn Farm airstrip (22km)
- Botany Bay Helipad (23km)
- Crosland Moor airfield (24km)
- Bryn Gates airfield (29km)
- Haydock Park Racecourse (32km)
- Kenyon Hall Farm airstrip (32km)
- Carr Valley Microlight airfield (35km)

There is no indication that the airspace in the immediate vicinity of the Scout Moor II wind farm is an area of high general aviation activity and it is not a known general aviation hotspot or chokepoint [6].

The proposed Scout Moor II wind farm is located in within the MoD-designated Bolton Southport Transit area (as documented in UK Aeronautical Chart ENR 6-76: Chart of UK areas of intense air activity and aerial tactics areas [8]) which restricts military aircraft to a minimum of 1,000ft above the ground except for light helicopters and light propeller aircraft. These aircraft must not be flown closer than 500ft to any person, vessel, vehicle or structure; additionally at night this is further restricted by requiring that they must be flown at a height of more than 500ft above ground level.



#### Avoidance Areas

- In the Avoidance Areas, military low flying does not normally take place unless the flights are in connection with an airfield located within such an area.
  - Military low flying does not normally take place within Class A and Class C airspace.
- Where AAAs and the Avoidance Areas overlap, military aircraft will not normally operate below 2000 feet except in connection with an airfield situated in the area.

#### Transit Areas

Military aircraft are not permitted to fly in Transit Areas below 1000 feet above the surface except helicopters and light propeller driven aircraft. These areas are designed to permit the easy transit of military aircraft between one low flying area and another.

**FIGURE 21 – LOCATION OF SMII RELATIVE TO MILITARY LOW FLYING AND TRANSIT AREAS**

## 3.4 Potential impact on instrument flight procedures and traffic patterns

### 3.4.1 Introduction

The AIPs of Manchester [9], Manchester Barton [10], Liverpool John Lennon [11], Leeds Bradford [12], and Blackpool [13] airports, and BAE Warton [14] aerodrome were reviewed to identify if the proposed Scout Moor II wind farm was in close proximity to any published flight procedures.

Scout Moor II is not in close proximity to any published IFPs for Leeds Bradford, Blackpool or BAE Warton. There are no published IFPs for Manchester Barton. Scout Moor II is in proximity to Standard Arrival Routes (STARs) for Liverpool John Lennon and Manchester airports. Of these two, Manchester airport is the closest to Scout Moor II and is also the busier airport with its own Terminal Manoeuvring Area (TMA) airspace which Scout Moor II is situated in. Due to height of the aircraft following the Liverpool John Lennon Airport departure routes, and the fact the base of controlled airspace is at 3,500ft AMSL above the proposed Scout Moor II wind farm, Scout Moor II has no impact. Therefore only Manchester Airport is analysed in more detail in the section

below as the airport most likely to have an impact from Scout Moor II. In addition, MoD concerns are also analysed further due to the proximity of Scout Moor II to a designated military transit route. Finally, the impact of General Aviation (GA) activities is also considered.

### 3.4.2 Manchester Airport (EGCC)

#### 3.4.2.1 Standard Terminal Arrival Routes

This section evaluates the potential impact of the proposed Scout Moor II windfarm on Manchester Airport's Standard Terminal Arrival Routes (STARs). The windfarm is located to the north-northeast of Manchester, near significant STAR waypoints and holding patterns. The evaluation considers vertical clearance, lateral proximity, and radar coverage impacts.

#### LAKEY 1M, SETEL 1M, and TILNI 1M (EGCC-7-1 in[9])

Although the ROSUN waypoint lies relatively close to the Scout Moor II wind farm, it is sufficiently separated both vertically and laterally, with a minimum vertical clearance of 6,347 feet above the maximum turbine tip height of 653 metres AMSL. Aircraft arriving from the north, northeast, and east via STARs such as LAKEY 1M, SETEL 1M, and TILNI 1M typically arriving at ROSUN at FL070 (7,000 feet SPS).

ROSUN is a designated holding fix within the Manchester Terminal Manoeuvring Area, and maintaining reliable radar coverage in its vicinity is important. While the turbines do not pose a physical obstruction, any radar clutter or reduced tracking performance of the Manchester PSR due to the wind turbines in this region could have an impact on operations as it is an area that aircraft would regularly fly through.

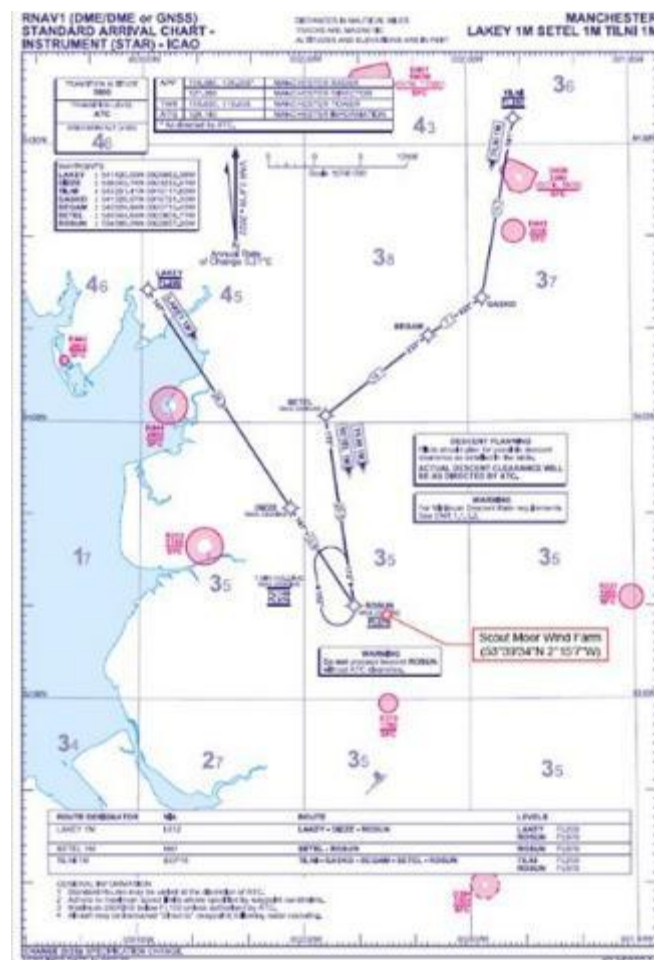


FIGURE 22 – MANCHESTER AIRPORT ARRIVAL ROUTE IN PROXIMITY TO SMII

**LIBSO 1M and OTBED 1M (EGCC-7-2 in References)**

Similarly, the LIBSO 1M and OTBED 1M STARs route aircraft from the east and southeast toward Manchester, converging at GOLES before continuing via POL to ROSUN. Aircraft typically descend through FL170 at GOLES and to a minimum altitude of FL070 by POL, maintaining a minimum vertical separation of over 4,800 feet from the maximum turbine tip height of 2,143 ft AMSL. Lateral separation is also sufficient to avoid any infringement of protected airspace or published procedures.

There is no operational impact along these routes; however, the proximity of the wind farm to the POL–ROSUN segment may result in turbine visibility to nearby radar systems. This could introduce clutter into an area of airspace routinely used by aircraft and monitored by primary surveillance radar.

**MAKUX 1M, MALUD 1M, AXCIS 1M, and PENIL 1M (EGCC-7-3 in [9])**

The MAKUX 1M, MALUD 1M, OKTEM 1M, and PENIL 1M STARs guide traffic toward Manchester from the northwest routing aircraft via intermediate waypoints such as GOBBI, BRAVU, and WAL before converging at MIRSI. Aircraft will arrive at MIRSI at FL070, and on departing the hold are handed over to air traffic control for vectoring toward final approach. The Scout Moor II wind farm lies well to the northeast of these STAR tracks, and at no point does the arrival flow route toward or near the turbine envelope. Given the maximum turbine tip height of 2,143 ft AMSL, vertical separation remains well in excess of 8,000 feet throughout this segment, and the lateral distance is substantial.

There is no technical or operational impact on these STARs. The routing remains geographically and procedurally distinct from the location of the proposed wind farm, and the turbines do not encroach upon any relevant obstacle protection surfaces or surveillance-critical segments of the arrival flow. No radar clutter or interference is expected in association with these procedures.

**ELVOS 1M and LESTA 1M**

The ELVOS 1M and LESTA 1M STARs route aircraft into Manchester from the south and southeast converging at TNT before terminating at DAYNE. These procedures are geographically distant from the Scout Moor II Wind Farm, with significant lateral separation and no proximity to the turbine envelope. There is no expected impact associated with these routes.

**3.4.2.2 Summary of Manchester Airport STARs analysis**

A review of Manchester Airport's STARs, including LAKEY 1M, SETEL 1M, TILNI 1M, LIBSO 1M, OTBED 1M, MAKUX 1M, MALUD 1M, OKTEM 1M, PENIL 1M, ELVOS 1M, and LESTA 1M, indicates no direct operational or obstacle-related impact from the proposed Scout Moor II wind farm. All procedures maintain substantial vertical separation from the turbine envelope, with aircraft typically operating above FL070 (7,000 ft SPS) and the turbines reaching a maximum elevation of only 2,143 ft AMSL. Lateral separation is also sufficient in all cases, with the development located outside the protected airspace envelopes associated with each STAR.

However, STARs that route via POL and ROSUN—including those originating from LAKEY, SETEL, TILNI, LIBSO, and OTBED—pass closest to the proposed wind farm. While the wind farm turbines do not pose a physical obstruction, any radar clutter or reduced tracking performance of the Manchester PSR due to the wind turbines in this region could have an impact on operations as it is airspace used to manage inbound flows into the Terminal Manoeuvring Area that aircraft would regularly fly through.

STARs from the south and east; including MAKUX 1M, MALUD 1M, OKTEM 1M, PENIL 1M, ELVOS 1M, and LESTA 1M; are geographically and procedurally distinct from the wind farm location, and no impact on surveillance or routing is anticipated.

**3.4.2.3 Standard Instrument Departures**

This section evaluates the Standard Instrument Departure (SID) procedures for Manchester Airport in relation to the proposed Scout Moor II wind farm. The analysis considers potential impacts on departure paths, climb gradients, and radar visibility to ensure the safe and efficient operation of these procedures.

The evaluated SIDs include ASMIM, KUXEM, EKLAD, LISTO, POL, SONEX, DESIG, and SANBA procedures. These procedures guide aircraft through controlled airspace, with precise altitude and gradient requirements designed to safely transition departing traffic away from the airport.

#### **ASMIM 1S 1Z, KUXEM 1R 1Y, EKLAD 1R 1Y**

The ASMIM 1S/1Z, KUXEM 1R/1Y, and EKLAD 1R/1Y SIDs route aircraft to the west after departure from the airport. These procedures are geographically distant from the Scout Moor II Wind Farm, with no intersection of protected airspace or obstacle surfaces. There is no expected impact associated with these departures.

#### **LISTO 2S 2Z**

The LISTO 2S and 2Z SIDs route aircraft southbound from Manchester on a south track from the POL VOR after departure from Runway 05L & 05R. These tracks pass well to the east of the Scout Moor II wind farm, with no overlap of protected departure corridors or obstacle clearance surfaces. There is no expected impact associated with these procedures.

#### **POL 5R 4s 1Y 1Z**

The POL 5R, 5S, 4S, 1Y, and 1Z SIDs direct departures northbound toward the POL VOR. These routes remain geographically distant from the Scout Moor II wind farm and maintain significant lateral and vertical separation throughout the climb profile. There is no expected impact associated with these departures.

#### **SONEX 1R/1Y, DESIG 1S/1Z**

The SONEX 1R/1Y and DESIG 1S/1Z SIDs route aircraft east and northeast following departure from Manchester, these departure tracks remain geographically distant from the Scout Moor II wind farm and do not traverse any areas near the turbine envelope. There is no expected impact associated with these procedures.

#### **LISTO 2R 2Y (Restricted Use)**

The LISTO 2R and 2Y SIDs, designated for restricted use, route aircraft southeast toward LISTO and HON VOR following departure from Runways 23R and 23L. These procedures remain well clear of the Scout Moor II wind farm, with no proximity to turbine locations or safeguarded airspace. There is no expected impact associated with these departures.

#### **SANBA 1R 1Y**

The SANBA 1R and 1Y SIDs route jet aircraft to the west and southwest via SANBA after departure from Manchester. These departure paths remain geographically distant from the Scout Moor II wind farm, with no interaction with safeguarded airspace or climb gradients near the turbines. There is no expected impact associated with these procedures.

#### **3.4.2.4 Summary of Manchester Airport SIDs analysis**

A review of the Standard Instrument Departure (SID) procedures at Manchester Airport, including ASMIM 1S/1Z, KUXEM 1R/1Y, EKLAD 1R/1Y, POL 5R/5S/4S/1Y/1Z, SONEX 1R/1Y, DESIG 1S/1Z, LISTO 2R/2Y, and SANBA 1R/1Y, indicates no expected impact arising from the proposed Scout Moor II wind farm. All departure tracks remain well separated laterally and vertically from the turbine envelope, with climb gradients and route segments positioned at significant distance from the development area.

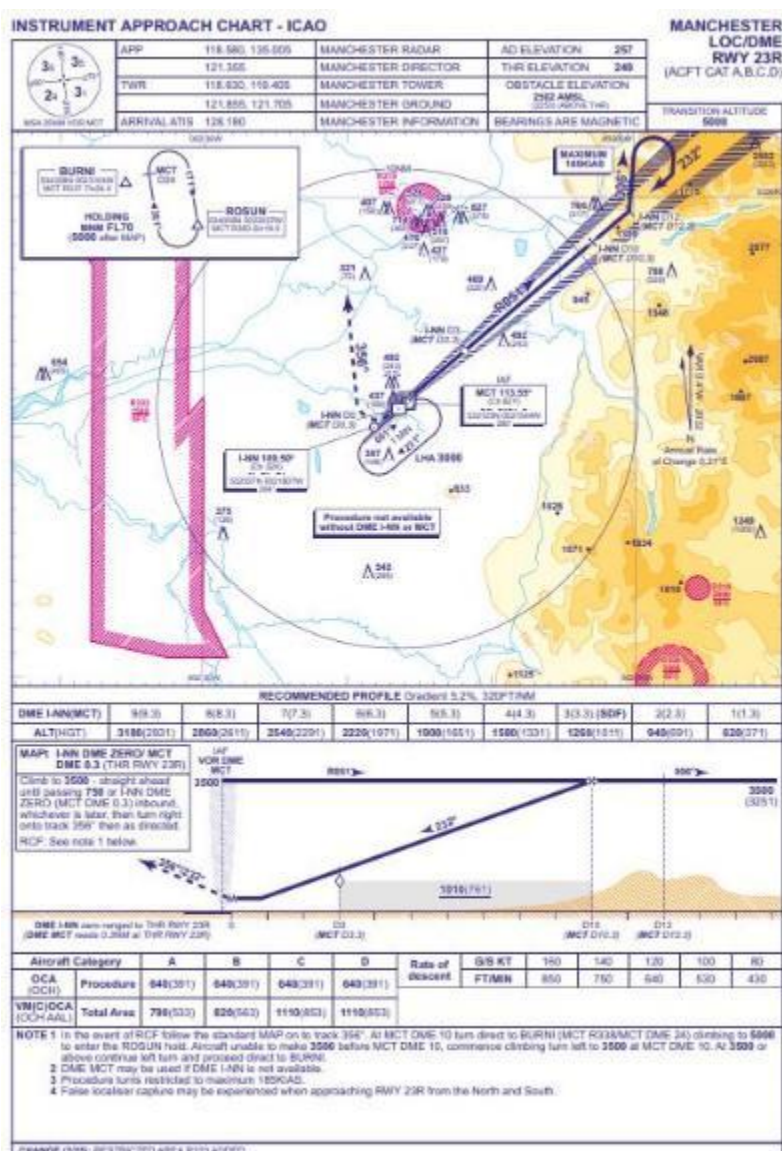
The Scout Moor II turbines do not intersect any protected SID obstacle clearance surfaces or route structures. Furthermore, there is no anticipated degradation to radar coverage along these procedures, given the geographic separation between the departure corridors and the location of the wind farm.

In conclusion, the proposed turbines do not present any operational, technical, or surveillance-related concerns in relation to Manchester Airport's published SID routes.

The Instrument Approach Charts (IACs) for Manchester Airport detail precision and non-precision approach procedures for various runways. These charts are essential for ensuring safe and efficient aircraft descent and landing operations. The analysis focuses on assessing the potential impact of the proposed Scout Moor II windfarm on approach paths, holding patterns, obstacle clearance, and navigational aid performance.

The key aspects reviewed include glide slope gradients, holding pattern configurations, missed approach procedures, and relevant altitudes near the Scout Moor location.

The LOC/DME RWY 23R approach procedure guides aircraft from the east toward final approach using the MCT VOR/DME & I-NN DME as a primary navigation reference, with a final descent beginning from 3,500 feet AMSL. The Scout Moor II wind farm lies to the north of the inbound track and is not located beneath or near any segment of this approach. With the turbines positioned well outside the lateral confines of the protected approach corridor, there is no expected impact to obstacle clearance or navigational integrity. The turbines also do not affect the MCT VOR or DME signal paths. Therefore, the proposed development does not present any operational or technical concerns in relation to this instrument approach.



**FIGURE 23 – MANCHESTER APPROACH CHART FOR LOC/DME RWY 23R**

### **VOR/DME RWY 23R (MCT)**

The VOR/DME RWY 23R approach guides aircraft inbound from the east via the MCT VOR/DME. Although ROSUN and the Scout Moor II wind farm are shown to the north of the arrival path, they lie well outside the protected airspace and obstacle clearance area associated with this procedure. With adequate lateral and vertical separation maintained throughout, there is no expected impact on the safe execution or surveillance integrity of this approach.

### **RNP RWY 23L**

The RNP approach to RWY 23L guides aircraft, descending along a defined RNAV path toward MAPt at RWY 23L. The Scout Moor II wind farm lies well to the northwest of this procedure, with no proximity to the approach path or protected airspace. As such, there is no expected impact on obstacle clearance or navigation system performance.

### **Summary of other charts**

The remaining charts for RWY 23R and RWY 23L include ILS/DME, LOC/DME, VOR/DME, and RNAV (RNP) approaches with varying configurations. Across these procedures, missed approach points and holding patterns—such as those at DAYNE (FL070) or BURNI—occur at altitudes well above the maximum turbine tip height of 2,200ft AMSL, maintaining adequate obstacle clearance. Vertical and lateral separation is consistently sufficient to avoid infringement of protected airspace. As a result, there is no expected impact to the safe execution, navigational integrity, or surveillance support of any published instrument approach to Manchester Airport.

### **Comparison and context**

When compared to STARs and SIDs for Manchester Airport, IFPs operate at lower altitudes, increasing reliance on navigational aids and radar coverage near the airport. Unlike STARs and SIDs, IACs are more sensitive to terrain and obstacle clearance near the MAPt and holding patterns. However, sufficient separation exists in all cases.

#### **3.4.2.6 Summary of Manchester Airport IFP analysis**

The analysis of relevant Manchester AICs indicates no direct obstacle conflicts with the proposed Scout Moor II wind farm. Vertical and lateral separations ensure safe operations across all reviewed approaches.

### **3.5 MoD operational considerations**

As indicated in Figure 21 above the proposed wind farm is located adjacent to one area that is largely avoided by military aircraft during both day and night operations, as shown in the UK Day Low Flying System (DLFS) and UK Night Low Flying System (NLFS) maps. The site lies within Low Flying Area 8 and within the MoD-designated Bolton Southport Transit area, which is typically used to facilitate military flights transiting to\from an airfield to low flying routes. In this transit area military aircraft are restricted to a minimum of 1,000ft above the ground except for light helicopters and light propeller aircraft. These aircraft must not be flown closer than 500ft to any person, vessel, vehicle or structure; additionally at night this is further restricted by requiring that they must be flown at a height of more than 500ft above ground level.

While the Scout Moor II Wind Farm does not lie within a core low flying training area, its location has a potential to present a physical obstacle to military aircraft. In recognition of this, and following consultation with the MoD, an aviation lighting scheme has been developed (see section 3.8) to ensure that obstacle clearance is maintained at night and in conditions of reduced visibility, and that the turbines can be accurately charted for effective deconfliction.

The MoD has confirmed that, subject to the provision of appropriate aviation lighting and the submission of sufficient positional data, it raises no objection to the proposed development. The Scout Moor II wind farm is therefore not expected to result in unacceptable impacts on military low-flying operations.

### **3.6 General Aviation activity in the region**

There is no indication that the airspace in the immediate vicinity of the wind farm is an area of high general aviation activity and it is not a known general aviation hotspot or chokepoint [6]. However, the wider region around the proposed Scout Moor II wind farm encompasses a variety of General Aviation (GA) operations, including transit through the North West Transit Corridor (NWTC), arrivals to Barton Aerodrome, and operations near Liverpool and Manchester's controlled airspace. These areas form a complex airspace environment where interactions between GA and commercial traffic require sufficient radar monitoring and situational awareness. This section evaluates the potential impacts of the wind farm on GA activity, focusing on airspace structures and radar performance.

#### **North West Transit Corridor (NWTC)**

The EGR323 North West Transit Corridor (which replaced the former Manchester Low-Level Route) is a 4-nautical-mile-wide Class G corridor that allows GA aircraft to transit VFR through the surrounding controlled airspace without requiring individual ATC clearance, provided they comply with specified conditions. The NWTC is a critical transit route for GA operations, running north-south through surrounding controlled airspace and facilitating access to and from Barton Aerodrome and adjacent airspace. Aircraft in the NWTC must remain at or below 1,500 feet QNH to avoid conflict with Manchester and Liverpool departures and arrivals, which operate at a minimum of 2,000 feet in the controlled airspace above.

The NWTC's confined vertical structure and proximity to Liverpool and Manchester airports make it highly susceptible to infringements into controlled airspace, particularly from early climbs or late descents. It is important that effective radar coverage is maintained in this region to ensure situational awareness for pilots and ATC at Liverpool and Manchester. Any turbine-induced radar blind spots could complicate defensive controlling strategies, especially for aircraft transitioning between the NWTC, Barton Aerodrome and the surrounding Class G airspace. However, it is noted that Scout Moor II is not located in the NWTC and will therefore not impact the monitoring of GA traffic in this area,

#### **Manchester Barton ATZ**

The Barton Aerodrome Traffic Zone (ATZ) extends two nautical miles from the aerodrome and up to 2,000 feet above aerodrome level. Beneath the Manchester CTA and adjacent to the Manchester CTR, Barton's airspace supports a mix of GA activity, including flight training, circuits, and recreational operations. Aircraft climbing above 2,000 feet must coordinate with Manchester ATC to avoid infringing controlled airspace.

Local visual reference points, such as Thelwall Viaduct and Winter Hill Mast, are critical navigation aids for managing transit into and out of the Barton ATZ. The proposed Scout Moor II wind farm lies outside the ATZ and there are no radar services provided at Barton Aerodrome. Scout Moor II is therefore not expected to impact operations at Barton Aerodrome.

#### **Liverpool controlled airspace**

The Liverpool CTR (surface to 2,500 feet QNH) and CTA (various bases starting at 2,000 feet) overlap with key GA transit routes, including the coastal corridor between Blackpool and Caernarfon. Airspace infringements commonly occur near the northeast and southeast corners of the CTR, often as a result of pilots exiting the NWTC and climbing prematurely above 1,500 feet.

Liverpool ATC relies on defensive controlling and Frequency Monitoring Codes (5060 on 119.855 MHz) to manage traffic near the CTR boundaries. These measures depend on effective radar monitoring to pre-empt potential conflicts. The Scout Moor II wind farm does not lie within Liverpool's controlled airspace or the NWTC and is therefore not expected to impact operations at Liverpool.

### **Manchester controlled airspace to the east (area of the Pennines)**

The eastern edge of the Manchester CTR and CTA-3 includes critical GA transit routes near visual reporting points (VRPs) such as Dovestone Reservoir, Glossop, and Whaley Bridge. The area is heavily utilized by light aircraft and helicopters navigating the Pennines' terrain and transitioning to adjacent controlled airspace. Class D airspace in this region extends from the surface to 3,500 feet QNH, overlaid by the Manchester TMA.

Airspace infringements in this region are often caused by pilots flying too close to the CTR boundary, mismanaging altimeter settings, or operating without contacting Manchester Radar. Defensive controlling and Frequency Monitoring Codes help mitigate these risks, enabling Manchester ATC to intervene proactively. However, Scout Moor II's proximity to visual reference points such as Dovestone Reservoir emphasises the need for good radar coverage and performance to maintain situational awareness and prevent conflicts with GA traffic at lower altitudes.

### **Summary of General Aviation impacts**

There are no known areas of critical GA activity or hotspots in the immediate vicinity of Scout Moor II. However, the Scout Moor II wind farm is situated near areas of high GA activity, including the NWTC, Barton ATZ, and key transit routes near the Pennines. While the wind farm is not expected to interfere with GA operations directly, wind turbines could impact radar monitoring, air traffic controller situational awareness and defensive controlling strategies in the following ways:

- Effective radar performance near the VRPs and the Manchester CTA controlled airspace boundary is essential for managing overlapping GA and commercial traffic particularly for traffic descending into Manchester airport.
- Prevention of GA aircraft infringing into Manchester airport controlled airspace.

## **3.7 Met Office radar assessment**

In addition to assessing potential impacts on aviation radars, the potential impact on MET Office weather radars (that use similar technology to aviation PSR) was also assessed. Similar to aviation stakeholders, the UK MET Office is a statutory consultee. The nearest safeguarded MET Office radar to the proposed Scout Moor II site is the Hameldon Hill weather radar, and Scout Moor II falls within its defined consultation zone.

**Consultation zone and line-of-sight assessment****FIGURE 24 – UK MET OFFICE WEATHER RADAR LOCATIONS**

The proposed development site lies within the consultation zone for the Hameldon Hill weather radar. This zone is designed to ensure that any potential impacts on radar services, particularly those related to weather forecasting and meteorological monitoring, are carefully considered.

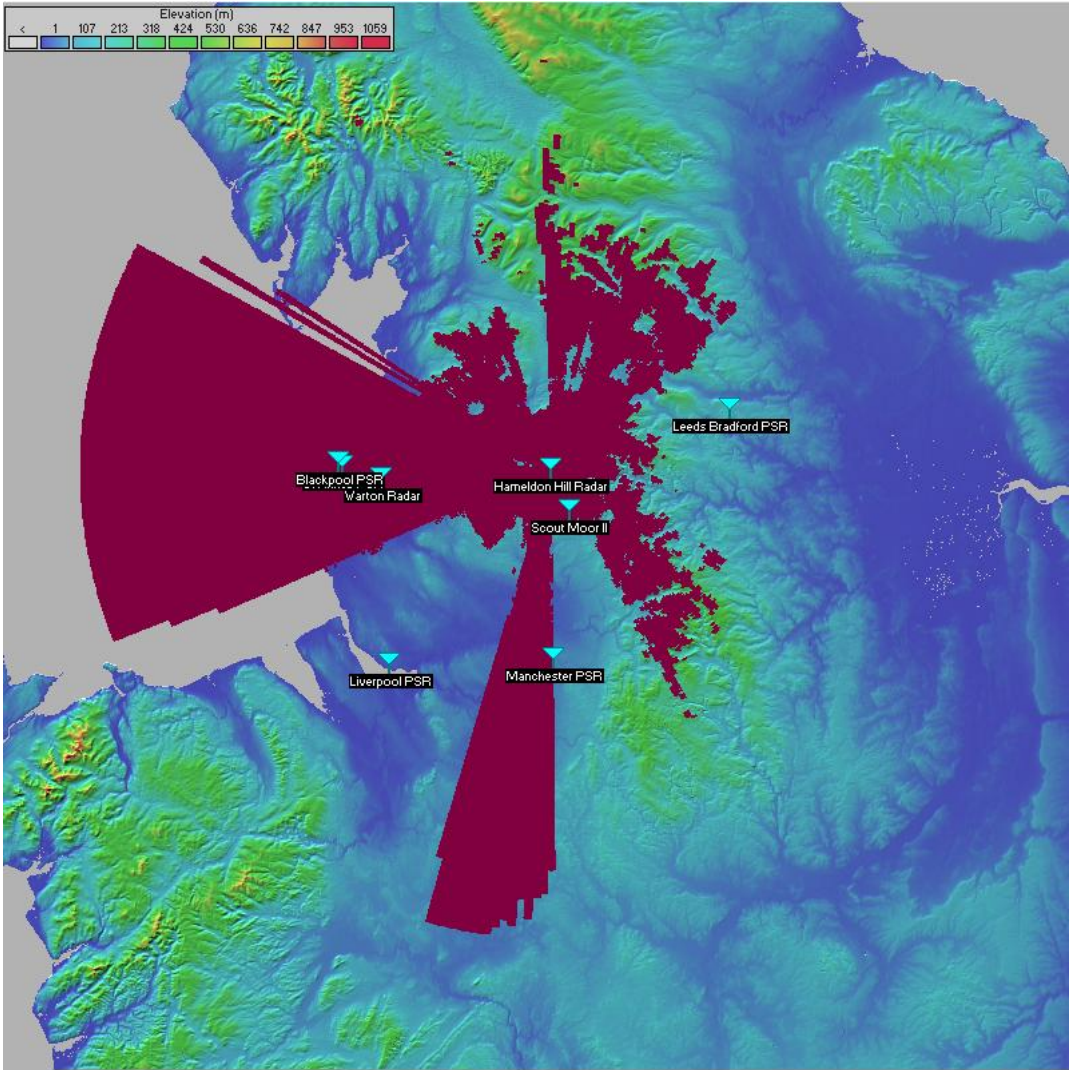
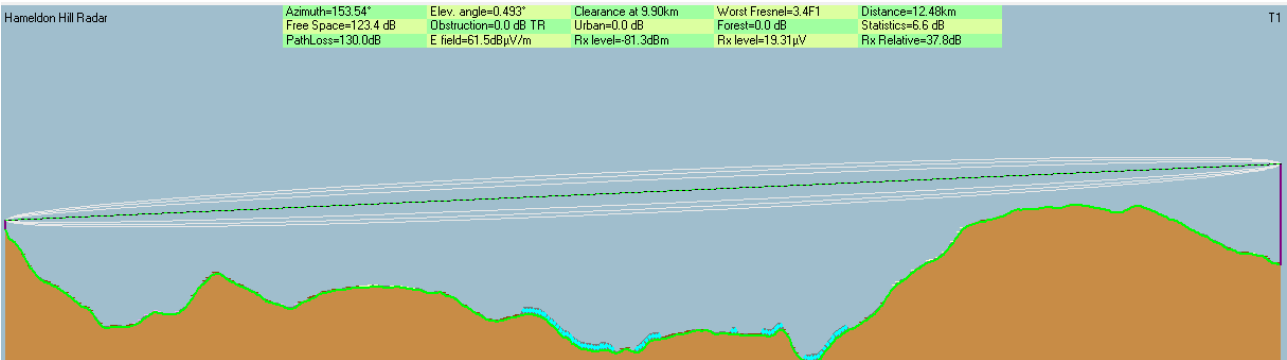
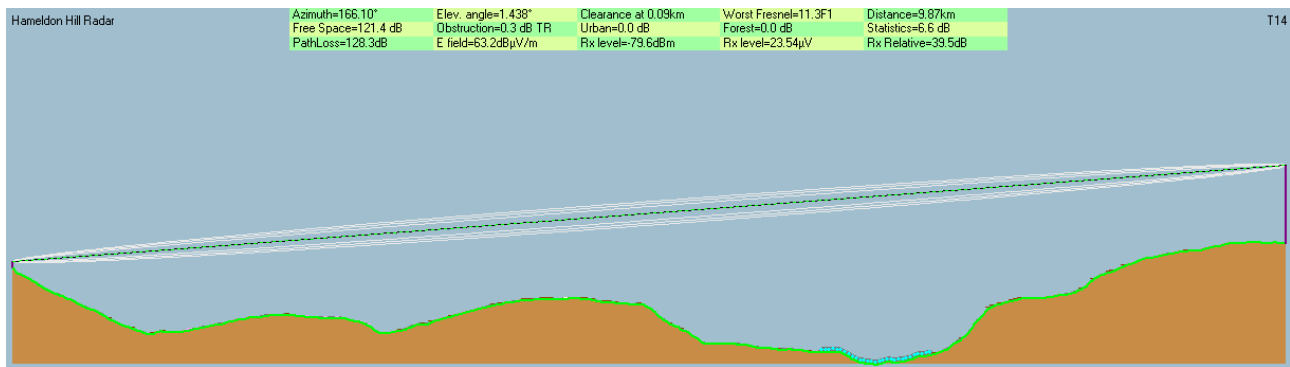


FIGURE 25 – HAMELDON HILL RADAR COVERAGE AT 180M AGL

Based on the line-of-sight analysis displayed for the Hameldon Hill radar, the results confirm that the proposed Scout Moor II wind farm location falls within the radar's coverage area. The visualisation demonstrates line-of-sight from Hameldon Hill across the surrounding region, extending beyond the wind farm site. The terrain in the vicinity, while moderately elevated, does not appear to obstruct the radar's view of the turbine locations.





**FIGURE 26 - LINE-OF-SIGHT PROFILE HAMELDON HILL PSR TO SCOUT MOOR II WIND FARM HIGHEST AND LOWEST TURBINES**

The Hameldon Hill radar has 5 vertical beam elevations centred on: 0.5, 1, 2, 3 and 4 degree elevations. The width of the beam is one degree in both the horizontal and vertical directions. Based on the line-of-sight (LoS) assessment the turbines would be visible to the Hameldon Hill radar in multiple vertical beam elevations therefore impacting its technical performance.

### 3.8 Aviation lighting scheme

As the Scout Moor II turbine tip heights will be greater than 150m there is a CAA requirement to mark the wind farm with aircraft obstacle lights as a collision avoidance measure in the interests of aviation safety. During Cubico's stakeholder consultation (section 5.5) the MoD in particular highlighted they would request turbines to be fitted with MoD accredited visible or infrared lighting. In contrast, as part of the Scout Moor II planning application, the visual impact arising from the aviation lighting will need to be assessed. This assessment will follow NatureScot's Guidance on Aviation Lighting Impact Assessment. The existing light conditions in the area surrounding the proposed wind farm are anticipated to be a mix of medium district brightness (E3) and intrinsically dark (E1). Therefore there is a need to agree an aviation lighting strategy that balances the needs for minimising the visual impact while maintaining aviation safety.

The proposed location is near an existing wind farm at Scout Moor. However, as the turbines in the existing wind farm are less than 150m tip height there is no requirement for aviation lighting. Therefore, the Scout Moor II light scheme will be considered as a standalone scheme.

The aviation lighting scheme proposed by Cubico is designed to ensure aviation safety considering the needs of both civil and military, commercial and general aviation, while also minimising light pollution to the population local to the wind farm. To this extent it considers the guidance contained in UK CAA CAP 764 Edition 7 [1]. In balancing these two requirements it is considered appropriate to use a reduced lighting scheme with not all turbines being lit with visible lights. This can be acceptable where the nighttime use of the airspace is only very rarely low flying VFR (Visual Flight Rules) traffic with no NVGs (Night Vision Goggles). It is noted that low-level military flying is restricted in the vicinity of the wind farm (section 3.5) and military and emergency services utilise NVGs when flying at night. It is also noted that the location of Scout Moor II is not a known general aviation hotspot or chokepoint [6]. Both visible and infrared lights will be attached to the wind turbines to make them visible to aircraft in the vicinity of the wind farm. Infrared lights will be installed on all turbines to meet military requirements for low flying at night as they will be using NVGs. As infrared lights will be installed on all turbines the number of visible lights will be minimised as far as possible while still meeting UK CAA requirements. The proposed design for visible lights is based on ensuring the corners and perimeter of the wind farm can be identified from all directions, and that any change in direction of the perimeter of the wind farm can be recognised. The visible lights will be operated by a control device such that the lights are only turned on after sunset night or when light levels fall below 500 LUX. Automatic dimming will also be used, in line with CAA policy, to reduce light intensity to 10% of the peak intensity when visibility in all directions is greater than 5km.

Following consultation with the CAA an aviation reduced lighting scheme based on the principles above was submitted [20] for the original 17-turbine design which received approval from the CAA on 13<sup>th</sup> June 2025 [21]. This scheme included eight visible lights.

Due to the reduction in the number of turbines from 17 to 12 the proposed lighting scheme has been updated and will be re-submitted to the CAA for approval. The scheme follows the same principles described above, is still based on eight visible lights and is illustrated below.

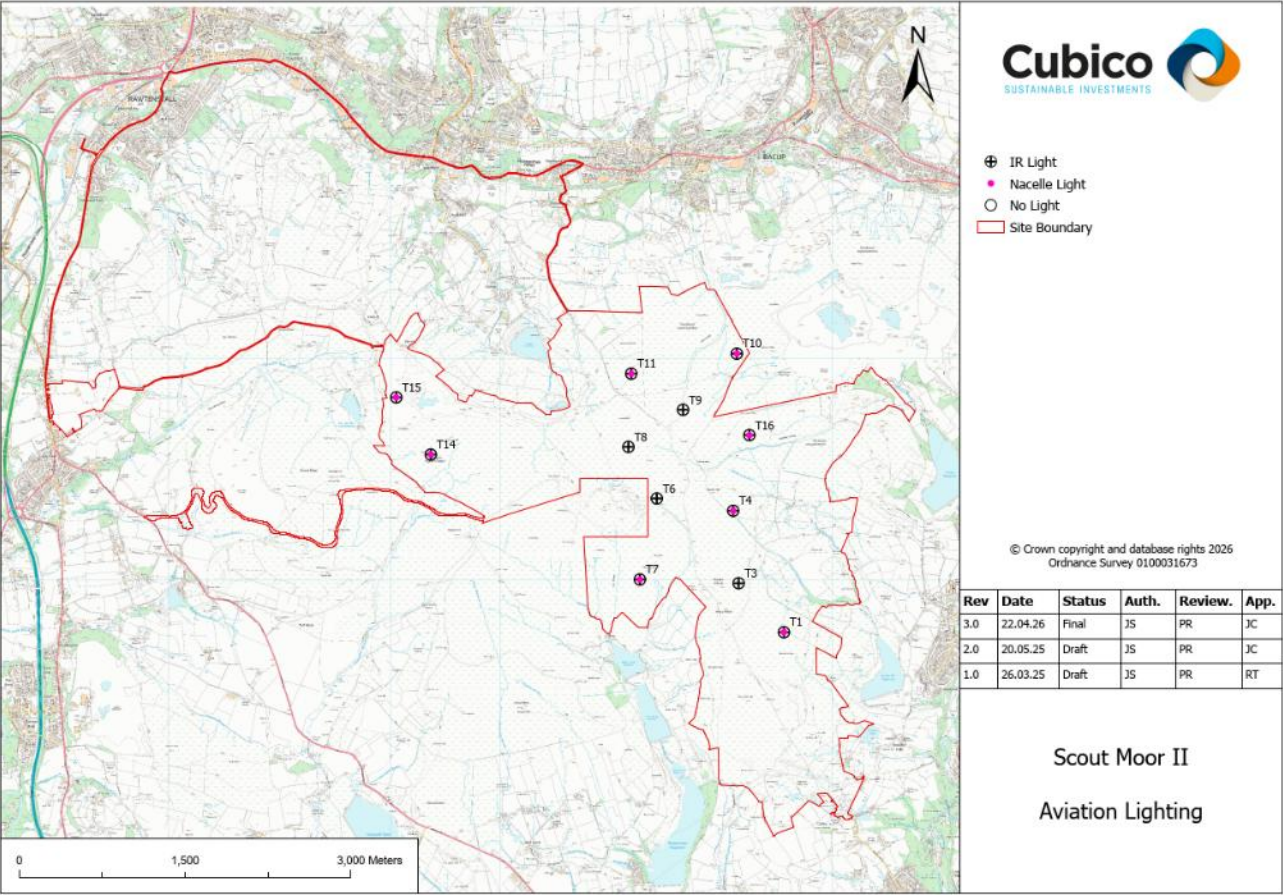


FIGURE 27 – PROPOSED AVIATION REDUCED LIGHTING SCHEME

## 4 OPERATIONAL IMPACT ANALYSIS AND MITIGATIONS

The assessment of the proposed Scout Moor II wind farm has considered its potential effects on aviation operations, including primary and secondary surveillance radar (PSR and SSR), communication and navigation aids, instrument flight procedures, military operations, and general aviation activity. Based on the findings, whilst some technical impacts on certain PSRs and meteorological radar have been identified, **the operational impact on aviation is expected to be minimal**, as discussed below.

### 4.1 Impact on communication and navigation aids

The analysis of aerodrome communication sites and navigation aids has determined no anticipated impact on their functionality and therefore **no operational impact**. The proposed wind farm site is located more than 10km from any aerodrome, significantly reducing the risk of interference with any aerodrome-based communication systems. Furthermore, no direct impact on enroute navigation aids has been identified, as the turbine locations do not obstruct the critical signal paths of any VOR, DME, or ILS installations used for aircraft navigation.

### 4.2 Impact on surveillance services and Air Traffic Control operations

#### 4.2.1 Primary Surveillance Radar

The line-of-sight analysis has confirmed that the proposed Scout Moor II turbines are located within the main coverage area of Manchester Airport PSR, while potential visibility from the St Anne's, Liverpool and BAE Warton radars is limited to the outer margins. The presence of wind turbines in the PSR line-of-sight can create clutter, shadowing, or false returns, which may degrade radar performance.

The operational significance of this impact is reduced by the fact that the majority of aircraft in the vicinity are expected to be transponder-equipped which is required for flying in controlled airspace, enabling them to be detected by Secondary Surveillance Radars, which are not predicted to be affected by turbine interference.

However, the airspace and traffic analysis identified that the area around Scout Moor II is a complex airspace which includes GA activity. Primary radar has a greater role to play in providing radar-based services to GA that may not be transponder equipped, ensuring efficient coordination between GA and commercial aircraft and VFR\IFR traffic, and preventing infringement of GA traffic into controlled airspace. Therefore, it will be important to ensure a good level of primary radar performance is maintained and any impacts on performance are mitigated. From the assessment in section 3 NATS, Manchester Airport and the MoD will be managing operations in the vicinity of Scout Moor II and therefore the impacts on their PSRs are of most relevance (ie St Anne's, Manchester Airport and BAE Warton). If there is a technical impact, it is highly likely it will need to be mitigated if an operational impact is demonstrated. The extent of the impact and need for mitigation will be determined following further detailed consultation to confirm the current radar technology in use, any wind farm mitigation solutions that may already have been applied and feedback from air traffic controllers on the actual impact on operations.

If mitigation is needed, there are a range of measures that are now commonly used to mitigate the impact of wind farms on aviation primary radar. These include:

- blanking the affected area
- using data from another unaffected radar that covers the same area (including installation of new radar to provide the data)
- implementing an in-fill radar that is unaffected by the wind farm and just provides data over the wind farm to replace the affected data
- replacing the existing radar with a new wind farm tolerant radar.

In recent years, NATS have been supporting the installation of a Terma Scanter 4002 primary radar as an in-fill or standalone wind farm mitigation solution. The Terma Scanter is a high-resolution X-band primary radar with an operational range of up to 45NM and built in wind farm mitigation capabilities. It is operationally deployed

at multiple airports across the UK and is able to filter out clutter created by wind turbines while maintaining a good level of detection performance. NATS also has the ability to provide radar data from its network of radars where unaffected radar data may already exist covering the Scout Moor II site. In addition, nearly all the major radar manufacturers now offer primary radar products on the market with some level of wind farm mitigation capability.

Therefore, in the event that it is confirmed to be necessary, it is highly likely that a suitable technical mitigation can be agreed that mitigates the impact of Scout Moor II on existing aviation primary radars such that there will be no impact on aviation operations.

### 4.3 Impact on Instrument Flight Procedures (IFPs)

It was identified that the main risk of impact of Scout Moor II would be on the Manchester Airport IFPs. A review of Standard Instrument Departures (SIDs), Standard Arrival Routes (STARs), and Instrument Approach Charts (IACs) for Manchester Airport has been conducted to assess any potential impact of the proposed wind farm on existing procedures.

#### ■ Manchester Airport:

- The analysis confirms **no direct impact** on STARs, SIDs, or approach procedures at Manchester Airport.
- The wind farm is located outside of the terminal airspace structure, and the **minimum safe altitudes for arrival and departure routes remain unaffected**.
- Radar-based surveillance coverage of these procedures is expected to be maintained despite potential PSR interference, as SSR provides the main data for aircraft tracking for controlled airspace. As discussed above mitigations also exist for the predicted impact on PSR.

Based on the review, Scout Moor II is not considered to impact any existing IFPs and therefore **no operational impact** is predicted.

### 4.4 Impact on military operations and low-flying activity

The site is **not within a Military Aerodrome Traffic Zone (MATZ)** or other restricted military airspace. As summarised above Scout Moor II does not impact any published military IFPs. The wind farm is within designated military Low Flying Area 8 and transit area used to facilitate military flights. In this transit area military aircraft are restricted to a minimum of 1,000ft above the ground except for light helicopters and light propeller aircraft. These aircraft must not be flown closer than 500ft to any person, vessel, vehicle or structure; additionally at night this is further restricted by requiring that they must be flown at a height of more than 500ft above ground level. The Ministry of Defence has confirmed that it **raises no objection** to the proposed development subject to the installation of MoD approved infrared lighting and that the turbines are accurately charted for effective deconfliction. This is to ensure that obstacle clearance is maintained at day, night and in conditions of reduced visibility. The proposed aviation lighting scheme takes into account these considerations. and therefore Scout Moor II is not expected to impact military operations.

### 4.5 Impact on General Aviation (GA) and airspace users

The assessment of GA activity in the area has indicated **no major concentration of GA operations in the immediate vicinity of the proposed wind farm location and it is not known as a general aviation hotspot or chokepoint**. However, there are a variety of GA operations in the wider area around the proposed wind farm site. For example, whilst the North West Transit Corridor (NWTC) is located to the south-west, its operational use is distinct from the wind farm area, meaning **no direct impact on NWTC traffic is expected**.

Additional considerations include:

- Manchester Barton ATZ is located at a sufficient distance from the wind farm, reducing any risk of interaction with circuit traffic or transiting GA aircraft.

- The Pennines to the east of Manchester see some GA transit flights, but these typically operate above the turbine tip heights, making interference unlikely.
- The majority of aircraft operating in controlled airspace are transponder-equipped, mitigating the impact of any PSR degradation.
- Some non-transponder-equipped GA aircraft may operate in Class G airspace, but the overall GA density in the area is low, meaning **minimal operational impact is expected**.

Although no direct impact on GA operations is anticipated the wider level of GA operations, the overall complexity of the surrounding airspace with the Manchester TMA and multiple aerodromes means that it will be important to maintain sufficient primary radar coverage in the airspace around Scout Moor II. This will ensure efficient, effective and safe coordination between GA and commercial aircraft where required and help prevent GA infringements in controlled airspace. Similar to the discussions above it will therefore be necessary to mitigate any impact on PSR used to provide services to GA aircraft in the vicinity of Scout Moor II, but there are a range of mitigation solutions capable of being deployed.

#### 4.6 Impact on meteorological radar

The Hameldon Hill radar, operated by the UK MET Office, provides critical meteorological data, particularly for precipitation monitoring and severe weather and flood forecasting. The line-of-sight analysis has confirmed that the turbines will be visible to the radar in multiple vertical beam elevations. The wind turbines will therefore be detected by the MET Office radar causing unwanted clutter. Consultation with the UK MET Office has confirmed that wind turbines have detrimental effects on the performance of the radar. The Met Office has previously advised that impacts are more readily mitigated where wind-farm interaction is limited to lower elevation beams, for example through the application of data filtering techniques. However, where wind turbines interact with higher elevation beams and/or are located within approximately 18 km of a weather radar [15], the potential for impacts on data quality increases, particularly for rainfall estimation near ground level.

It is highly likely that the proposed Scout Moor II wind farm will have an impact on the operation and use of the Hameldon Hill radar for UK weather forecasting which may not be capable of being sufficiently alleviated by the standard data filtering techniques currently applied by the UK MET Office. Although the impact of 12 - turbines compared to the original 17 is expected to be less, further consultation will be required with the UK MET Office to seek alternative mitigation options.

Current national policy states that collaboration and co-existence between the energy, aviation, defence and related weather forecasting sectors should be strived for [18]. This is acknowledged by the UK MET office which recognises that increase in wind turbine contamination is unavoidable for NetZero. Weather radars (like any primary based radar) have to deal with unwanted clutter such as ground, birds, buildings, electromagnetic interference. Wind turbines are just another source of unwanted clutter for weather radars. The UK MET Office has also conducted its own R&D activities to investigate the impact of wind farms and innovative mitigation solutions [15][16]. In 2018 the MET Office completed an upgrade of its weather radar network to improve its capability, reliability and the range and resolution of the data collected. The increased range and resolution of data collected increases the possibilities of developing advanced data processing techniques to support wind farm mitigation as has been seen with the development of new wind farm tolerant aviation primary radars.

Existing mitigation options that could be discussed with the UK MET Office include (but are not limited to) the following (noting that several of these are highlighted in the UK MET Office presentation [15]):

- Use redundancy in the UK MET Office radar network to accommodate impact of SMII on Hameldon Hill by replacing the impacted data with data from another existing weather radar.
- Operational curtailment to turn off Scout Moor II turbines under certain weather conditions when uncluttered weather data is required (this approach has been used in America [17]).
- Application of new data processing techniques (eg as suggested in [15]).
- Application of radar stealth technology to wind turbine blades.
- Move a weather radar to avoid wind turbine impacts.

- Install a new weather radar or data sensor to provide uncluttered data to mitigate impact on Hameldon Hill.

Given current national policy, and the recognition that increase in wind turbine contamination is unavoidable for NetZero, any mitigation solution could, subject to discussions with stakeholders, also facilitate the implementation of other wind farms and support the wider UK strategic ambitions for NetZero [18]. Further consultation with the UK MET Office to identify suitable mitigation options will be undertaken potentially also drawing upon the support and expertise of the Department of Energy Security and Net Zero.

## 4.7 Summary of key results

The technical assessments have identified **some level of impact on aviation PSR and UK MET office weather radar** requiring mitigation to maintain performance to a level that will not impact operations. The radars with the most significant impact that will need mitigating are Manchester Airport PSR and the MET Office Hameldon Hill weather radar, with limited impact identified in relation to the BAE Warton PSR, St Anne's PSR and Liverpool PSR and. The impact of wind farms on aviation PSR is well understood and there are several options for mitigation that have already been implemented at other sites in the UK. Once a technical mitigation has been agreed and implemented, no impact on aviation operations is anticipated. The predicted impact on the UK MET office weather radar is highly likely to affect the quality of MET office forecasting and mitigation will be required. Mitigation options have been identified but further consultation is required with the MET Office to investigate the feasibility of these options.

**No technical or operational impact is expected on communication and navigation aids, IFPs, or general aviation movements.** An aviation lighting scheme has been agreed with the UK CAA and once this is installed on the Scout Moor II wind farm, **no operational impact is anticipated on MoD aviation activities.**



**FIGURE 28 – SUMMARY OF KEY IMPACT ASSESSMENT RESULTS**

## 5 STAKEHOLDER CONSULTATION

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### 5.1 Introduction

This section summarises the status of consultation to date with the key aviation, military and meteorological stakeholders that are most likely to be impacted based on the analysis above. In each case consultation is ongoing with continued attempts by Cubico to maintain dialogue and obtain advice. Cubico are anticipating further engagement with these consultees in the future. This consultation is separate from the analysis contained in the report which has been carried out independently. This report is therefore not dependent on the consultation but the feedback from the consultation to date is useful to validate the results of this report.

### 5.2 UK National Air Traffic Service (NATS)

Initial dialogue has been held with NATS in September 2024. Through this, NATS indicated Scout Moor II would likely impact their St Anne's enroute radar and the Manchester Airport radar. On 28<sup>th</sup> November 2024, NATS were subsequently commissioned to undertake a Technical and Operational Assessment (TOPA) to confirm the impact and to give indication on the potential for mitigation that would also consider any advance in mitigation technology since the original Scout Moor I wind farm was implemented. The TOPA was received on 8<sup>th</sup> January 2025. This confirmed that there was a predicted technical impact on the St Anne's and Manchester Airport PSRs that would require mitigation. No impact was predicted on any other radars for which NATS are responsible and no impact was predicted on any navigation or communication infrastructure.

Following submission of the planning application, NATS undertook a revised Technical Operational Assessment (TOPA), issued in August 2025. The findings within the revised TOPA were unchanged. A technical impact on the St Anne's and Manchester Airport primary surveillance radar is anticipated, with the operational impact considered by Prestwick Centrale ATC and Swanwick Centre ATC. Although the TOPA assessment was based on a scheme compromising 17 turbines the results are expected to be similar for the revised 12-turbine scheme.

In January 2026 a meeting was held between NATS and Cubico. During the meeting NATS confirmed that their main concern was on the technical impact of Scout Moor II on the Manchester Airport primary radar which they operate for the benefit of Manchester Airport. They confirmed that this would have an operational impact on the ability of Manchester Airport air traffic controllers to prevent and manage infringement of GA aircraft in controlled airspace. NATS also highlighted infill radar as a potential mitigation solution but stated that this required a more detailed feasibility assessment.

### 5.3 Manchester Airport Group (MAG)

Initial dialogue has been held with the Manchester Airport Group (MAG) responsible for safeguarding at Manchester Airport. In this dialogue MAG noted they would also have to consult with NATS as the provider of air traffic control services at Manchester Airport. Subsequently when NATS were commissioned to undertake a TOPA they were requested to include Manchester Airport in the assessment. In the latest correspondence in September 2025, MAG confirmed that the proposed development lies within the Airport's outer aerodrome safeguarding zone and maintained its objection on the basis of the conclusions of the NATS TOPA highlighted in section 5.2 above. At this point the mitigation solution proposed by NATS for Manchester Airport has not yet been discussed in detail with MAG and further consultation with MAG is expected to be required.

### 5.4 Manchester Barton Aerodrome

Manchester Barton Aerodrome was consulted following the submission of the initial planning application for Scout Moor II. Manchester Barton Aerodrome formally responded in August 2025 in which they confirmed that the proposed development site fell outside their designated safeguarding area and, as such, provided no comments or objections.

## 5.5 Ministry of Defence (MoD)

Initial dialogue has been held with the MoD through the submission of a wind farm pre-application consultation form in September 2024. A formal written response was received on 14 November 2024. This confirmed that Scout Moor II was predicted to be detectable by the Air Traffic Control PSR radar at BAE Warton. BAE Warton is a civil aerodrome with published military aerodrome charts and the radar at Warton is safeguarded by the Defence Infrastructure Organisation (DIO) on behalf of the MoD. The MoD have assessed that the detection of Scout Moor II by the ATC PSR may impact radar performance and military air traffic operations. However, the MoD stated that a full assessment of potential operational impact, including low flying operations, could only be completed at the time the planning application is submitted. The MoD also noted that they would request turbines to be fitted with MoD accredited visible or infrared aviation safety lighting.

Following submission of the Environmental Impact Assessment (EIA) Scoping Report for Scout Moor II, there was a further dialogue with the MoD to confirm updated details for the proposed wind farm. Subsequent to this the MoD provided a formal response to the EIA Scoping Report which was in line with its original formal response.

In August 2025 the MoD was further contacted following submission of the initial planning application. In the formal response received in September 2025, the MoD confirmed that the 17-turbine development had been assessed using the submitted location data (Grid References) and raised no objection to the proposal subject to specific conditions. The MoD noted that the proposed development falls within Low Flying Area 8 and that the turbines have potential to introduce a physical obstruction to low flying aircraft. To address this impact the MoD require the development to be fitted with aviation safety lighting and sufficient data needs to be submitted to ensure that the structures can be accurately charted to allow deconfliction.

## 5.6 UK Met Office

Dialogue has been held with the UK MET Office initially through the submission of a wind farm safeguarding pre-planning application form in September 2024. Subsequent to this there was an ongoing email dialogue. Through this the MET Office has confirmed that the proposed turbines would be likely visible to the Hameldon Hill radar within the radar's two lowest beam elevations (ie at 0.5 and 1.0 degree) and would likely result in some degradation of the quality of MET Office services derived from the data. They also highlighted that a key requirement of the weather radar is to provide advance warning of severe weather and real-time information. This is important to the continued operation of military and civilian aviation as well as to forecasters as part of the UK Weather Radar Network, including input to flood forecasting, and as such the MET Office is a Category 2 Responder. They stated that they currently only offer a ready to deploy mitigation for wind farms impacting the lowest beam elevation through data processing\data cleansing techniques although research is being conducted into more advanced data processing techniques.

In September 2025, the Met Office formally objected to the proposed development, citing unacceptable interference with the performance of its Hameldon Hill Weather radar. The Met Office advised that turbines structures, specifically extending into the second radar beam would result in degradation of radar-derived data. While no mitigation measures were proposed within the response, the Met Office requested continued consultation as the scheme progresses.

In November 2025 a meeting was held between the UK MET Office and Cubico to discuss the potential impacts of Scout Moor II on the Hameldon Hill weather radar in more detail as well as potential mitigation measures. At the conclusion of the meeting it was agreed to further review the potential mitigation measures alongside technical discussions between the MET Office, Cubico and the developers of other proposed wind farms in the vicinity of Scout Moor II.

## 6 CONCLUSIONS AND NEXT STEPS

An independent technical and operational assessment of the impact on aviation operations has been conducted for the proposed Scout Moor II wind farm. In addition, this assessment has considered the impact on MET Office weather radars. This assessment has also been compared to feedback received through consultation with key stakeholders. The feedback received to date is consistent with the results of this assessment.

The technical assessment has identified **some level of impact on aviation PSR and UK MET Office weather radar** that is highly likely to require mitigation to maintain performance to a level that will not impact operations. The assessment indicates that the Manchester Airport Primary Surveillance Radar (PSR) and the Met Office Hameldon Hill weather radar represent the radars with the most significant potential impacts requiring mitigation. This has been confirmed through the stakeholder consultations that have been conducted. In addition, more limited but nonetheless identifiable interactions have been identified in relation to the NATS St Anne's PSR and BAE Warton PSR, which have been considered within the assessment. The impact of wind farms on aviation PSR is well understood and there are several options for mitigation that have already been implemented at other sites in the UK. The typical mitigation options include the use of a data feed from an unaffected radar, the upgrade of an existing radar to improve its wind farm mitigation capabilities, or the installation of an 'in-fill' radar with wind farm mitigation capabilities. Once a technical mitigation has been agreed and implemented **no impact on aviation operations is anticipated**.

The predicted impact on the UK MET office weather Hameldon Hill radar is **highly likely to affect the quality of MET office forecasting and mitigation will be required**. In some cases, the UK MET Office is able to implement its own mitigation by removing affected data where a wind farm only impacts the lowest beam elevation. However, it has been shown that Scout Moor II will also impact higher beam elevations. Alternative mitigation options have been identified which align with the general options proposed by the MET Office for mitigating the impact of wind farms on weather radars. It is therefore highly likely that technical solutions exist but further consultation is required with the MET Office to investigate the feasibility of the different options.

While specific mitigation solutions have not yet been agreed initial discussions have been held with NATS and the UK MET Office on potential mitigation options for Manchester Airport PSR and Hameldon Hill weather radar respectively.

In conclusion:

- A technical impact has been identified on existing aviation PSR.
  - In the event that mitigation is needed, it is highly feasible that mitigation options exist and can be agreed with the impacted aviation stakeholders such that there will be no impact to aviation operations.
  - A mitigation option has been proposed by NATS for the Manchester Airport PSR but it requires a more detailed feasibility assessment.
- A technical impact has been identified on multiple vertical beam elevations of the UK MET Office weather radar at Hameldon Hill.
  - It is highly likely that the technical impact will have a significant adverse effect on the quality of MET Office forecasting and mitigation will be required.
  - The existing data cleansing approach currently offered by the MET Office to mitigate the impact of wind farms on their weather radar is not a suitable mitigation for Scout Moor II.
  - Alternative mitigation solutions have been discussed directly with the MET Office and these discussions are ongoing.
- If the UK Government is to realise its Net Zero ambitions, there will need to be an increasing number of onshore wind farms within the UK at heights similar to Scout Moor II such that wind turbine contamination of UK MET Office radars will be unavoidable.

- There is a need for continued collaboration and co-existence between the aviation, defence and energy industries as set out in the latest draft of the Department for Energy Security and Net Zero Overarching National Policy Statement for Energy [18].

Next steps:

- Cubico will continue to engage with the MoD, NATS, MAG, UK MET Office and potentially Department of Energy Security and Net Zero to finalise agreement on suitable mitigation measures.
- Discussion on mitigation solutions will consider long-term strategic objectives, solutions that may be different to those deployed historically, and those which could enable other future wind farm development.

## 7 REFERENCES

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## 8 ANNEX 1 – GLOSSARY

| Acronym      | Definition                                 | Explanation                                                                                                                                             |
|--------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AGA</b>   | Air-Ground-Air                             |                                                                                                                                                         |
| <b>AGL</b>   | Above Ground Level                         |                                                                                                                                                         |
| <b>AIP</b>   | Aeronautical Information Publications      |                                                                                                                                                         |
| <b>AMSL</b>  | Above Mean Sea Level                       |                                                                                                                                                         |
| <b>ASMIM</b> |                                            | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                       |
| <b>ATC</b>   | Air Traffic Control                        | Coordinate the movement of aircraft on the ground and in the air.                                                                                       |
| <b>ATCO</b>  | Air Traffic Controller                     | Certified professional responsible for managing and directing the safe and efficient movement of aircraft, both in the air and on the ground.           |
| <b>ATM</b>   | Air Traffic Management                     | Overall system and processes used to ensure the safe, efficient, and orderly flow of air traffic across the entire airspace.                            |
| <b>ATZ</b>   | Aerodrome Traffic Zone                     | Defined area of controlled airspace established around an aerodrome (airport or airfield) to protect aircraft operating in the vicinity of the airfield |
| <b>AXCIS</b> |                                            | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                       |
| <b>BRAVU</b> | Waypoint                                   | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.                    |
| <b>BURNI</b> |                                            | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                       |
| <b>CAA</b>   | Civil Aviation Authority                   | National regulatory body responsible for overseeing and regulating civil aviation within a specific country.                                            |
| <b>CAP</b>   | Civil Aviation Publications                | Official document or manual issued by a CAA to provide guidance, regulations, procedures, or standards related to civil aviation operations.            |
| <b>CNS</b>   | Communication, Navigation and Surveillance | Three foundational components that support Air Traffic Management (ATM) systems.                                                                        |
| <b>CTA</b>   | Control Area                               | Enroute airspace, linking terminal and upper airspace.                                                                                                  |
| <b>CTR</b>   | Control Zone                               | Around an airport, extending from the surface                                                                                                           |
| <b>DAYNE</b> |                                            | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                       |

| Acronym      | Definition                   | Explanation                                                                                                                                 |
|--------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DESIG</b> |                              | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                           |
| <b>DLFS</b>  | UK Day Low Flying System     | Structured framework established to facilitate military low-level flying training during daylight hours.                                    |
| <b>DME</b>   |                              | Approach procedure guide                                                                                                                    |
| <b>EGCC</b>  |                              | Manchester Airport ICAO code                                                                                                                |
| <b>EGGP</b>  |                              | Liverpool John Lennon Airport ICAO code                                                                                                     |
| <b>EGNH</b>  |                              | Blackpool International Airport ICAO code                                                                                                   |
| <b>EGNM</b>  |                              | Leeds Bradford Airport ICAO code                                                                                                            |
| <b>EGNO</b>  |                              | Warton Aerodrome ICAO code                                                                                                                  |
| <b>EGPK</b>  |                              | Prestwick Airport ICAO code                                                                                                                 |
| <b>EIA</b>   |                              | Environmental Impact Assessment                                                                                                             |
| <b>EKLAD</b> |                              | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                           |
| <b>ELVOS</b> |                              | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                           |
| <b>GA</b>    | General Aviation             | All civil aviation operations that are not part of scheduled commercial air services or military aviation.                                  |
| <b>GOBMI</b> | Waypoint                     | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.        |
| <b>GOLES</b> | Waypoint                     | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.        |
| <b>HMU</b>   | Height Monitoring Units      | Ground-based system used to assess the altitude-keeping performance of aircraft.                                                            |
| <b>HON</b>   |                              | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                           |
| <b>IFP</b>   | Instrument Flight Procedures | Standardised sequences of flight manoeuvres designed to guide aircraft safely and efficiently when operating under Instrument Flight Rules. |
| <b>IFR</b>   | Instrument Flight Rules      | Aviation regulations that govern the operation of aircraft in conditions where visual navigation is not safe or possible.                   |
| <b>ILS</b>   | Instrument Landing System    | Precision radio navigation system that provides aircraft with both lateral and vertical guidance during the approach and landing phases.    |

| Acronym         | Definition                      | Explanation                                                                                                                                                                                  |
|-----------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>KUXEM</b>    |                                 | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                                            |
| <b>LAKEY 1M</b> |                                 | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                          |
| <b>LESTA 1M</b> |                                 | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                          |
| <b>LIBSO 1M</b> |                                 | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                          |
| <b>LISTO</b>    |                                 | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                                            |
| <b>LJLA</b>     | Liverpool John Lennon Airport   | Liverpool John Lennon Airport                                                                                                                                                                |
| <b>LOC</b>      |                                 | Approach procedure guide.                                                                                                                                                                    |
| <b>MAG</b>      | Manchester Airport Group        | Owens and operates three UK airports – Manchester, London Stansted and East Midlands.                                                                                                        |
| <b>MAKUX 1M</b> |                                 | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                          |
| <b>MALUD 1M</b> |                                 | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                          |
| <b>MATZ</b>     | Military Aerodrome Traffic Zone | Designated airspace surrounding a military aerodrome, primarily established to provide protection to military aircraft                                                                       |
| <b>MCT</b>      |                                 | Primary navigation reference                                                                                                                                                                 |
| <b>MIRSI</b>    | Waypoint                        | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.                                                         |
| <b>MOD</b>      | Ministry of Defence             | Ministerial Department of the Government of the United Kingdom                                                                                                                               |
| <b>MW</b>       | MegaWatts                       | 1,000,000 Watts                                                                                                                                                                              |
| <b>NATS</b>     | National Air Traffic Services   | UK's provider of Air Traffic Services                                                                                                                                                        |
| <b>NLFS</b>     | UK Night Low Flying System      | Structured framework established to facilitate military low-level flying training during nighttime hours.                                                                                    |
| <b>NWTC</b>     | North West Transit Corridor     | Restricted Area EGR323 North West Transit Corridor (NWTC) allows general aviation aircraft to pass through the airspace between Liverpool and Manchester airports under specific conditions. |

| Acronym         | Definition                            | Explanation                                                                                                                                                         |
|-----------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OKTEM</b>    |                                       | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                   |
| <b>OTBED</b>    |                                       | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                   |
| <b>PENIL 1M</b> |                                       | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                 |
| <b>POL</b>      | Waypoint                              | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.                                |
| <b>PSR</b>      | Primary Surveillance Radar            |                                                                                                                                                                     |
| <b>QNH</b>      | Altitude above mean sea level         | Atmospheric pressure at a specific location, corrected to sea level under standard atmospheric conditions                                                           |
| <b>RAF</b>      | Royal Air Force                       | UK's aerial warfare service branch                                                                                                                                  |
| <b>RBC</b>      | Rossendale Borough Council            |                                                                                                                                                                     |
| <b>RCS</b>      | Radar Cross Section                   | Measure of how detectable an object is by radar.                                                                                                                    |
| <b>RF</b>       | Radio Frequency modelling             | Simulating the behaviour of electromagnetic waves within the radio spectrum.                                                                                        |
| <b>RMBC</b>     | Rochdale Metropolitan Borough Council |                                                                                                                                                                     |
| <b>RNAV</b>     | Area Navigation                       | Method of aircraft navigation that allows pilots to fly on any desired flight path within the coverage of ground-based or space-based navigation aids.              |
| <b>RNP</b>      | Required Navigation Performance       | Performance-based navigation specification that defines the level of navigation accuracy necessary for aircraft operations within a specific airspace or procedure, |
| <b>ROSUN</b>    | Waypoint                              | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.                                |
| <b>RWY</b>      | Runway                                |                                                                                                                                                                     |
| <b>SANBA</b>    |                                       | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                   |
| <b>SETEL 1M</b> |                                       | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                 |
| <b>SID</b>      | Standard Instrument Departure         | Pre-planned, standardised route that aircraft follow immediately after take-off under IFR.                                                                          |
| <b>SMII</b>     | Scout Moor II wind farm               |                                                                                                                                                                     |

| Acronym         | Definition                           | Explanation                                                                                                                                                                                                                                                                    |
|-----------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SONEX</b>    |                                      | One of the Standard Instrument Departure (SID) procedures for Manchester Airport.                                                                                                                                                                                              |
| <b>SPS</b>      | Standard Pressure Setting            | The Standard Pressure Setting is a specific altimeter setting (1013.25 hPa) used to indicate Flight Levels (FL) once an aircraft is above the Transition Altitude. When an altimeter is set to SPS, it displays the aircraft's height relative to the standard pressure value. |
| <b>SSR</b>      | Secondary Surveillance Radar         |                                                                                                                                                                                                                                                                                |
| <b>STAR</b>     | Standard Terminal Arrival Route      | Published flight procedure used by aircraft under Instrument Flight Rules (IFR) to transition from the enroute phase to the approach phase when arriving at an airport.                                                                                                        |
| <b>TILNI 1M</b> |                                      | One of the STARs (Standard Terminal Arrival Routes)                                                                                                                                                                                                                            |
| <b>TMA</b>      | Terminal Manoeuvring Area            | Control Area normally established at the confluence of ATS Routes in the vicinity of one or more major aerodromes.                                                                                                                                                             |
| <b>TOPA</b>     | Technical and Operational Assessment |                                                                                                                                                                                                                                                                                |
| <b>VFR</b>      | Visual Flight Rules                  | Rules that govern the operation of aircraft in Visual Meteorological Conditions.                                                                                                                                                                                               |
| <b>VOR</b>      |                                      | Approach procedure guide                                                                                                                                                                                                                                                       |
| <b>WAL</b>      | Waypoint                             | Specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.                                                                                                                                           |

## CONTACTS

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