

Technical Aerodrome Safeguarding Assessment

Laystall Street / Great Ancoats Street

Deloitte LLP

November 2022

PLANNING SOLUTIONS FOR:

- Solar
- Defence
- Airports
- Telecoms
- Buildings
- Radar
- Railways
- Wind
- Mitigation

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ADMINISTRATION PAGE

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1	27 October 2022	Initial issue
2	07 November 2022	Minor amendments
3	23 November 2022	Inclusion of finalised red line boundary

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EXECUTIVE SUMMARY

Report Purpose

Pager Power has been commissioned to investigate the potential impact of a proposed building development upon aviation infrastructure in the surrounding area. The Site is located in in Manchester City Centre. It is bounded by Laystall Street to the north, Great Ancoats Street to the east, vacant land at Lomax Street to the south and an apart-hotel to the west.

The Site will comprise a tall building with 20 storeys, which has a maximum altitude of 112.05m metres above ordnance datum and a maximum height of 65.05 metres above ground level.

Building developments have the potential to affect aviation operations in numerous ways. The most common impacts relate to building developments as physical obstructions both to aircraft and wireless signals used for radar and radio systems.

Overall Conclusions

No significant impacts upon Manchester Airport infrastructure are predicted and no mitigation requirement has been identified.

The findings of this report should be shared with the Manchester Airport safeguarding team and NATS at the earliest opportunity to confirm their position.

Assessment Results

Obstacle Limitation Surfaces (OLS)

The proposed development lies horizontally beneath the Outer Horizontal Surface (OHS) for Manchester Airport. The proposed development is vertically clear of the OHS by 94.6m.

No physical safeguarding concerns are therefore predicted with respect to the OLS from the building structure itself.

Secondary Surveillance Radar (SSR)

The modelling has revealed that the proposed development will be entirely visible to the SSR at Manchester Airport, based on bare-earth terrain.

A review of the line-of-sight profiles have shown that the proposed development will be significantly obstructed from view by the 4M Office Building at Manchester Airport.

No impacts upon the SSR at Manchester Airport are therefore predicted.

Crane Usage and Aviation Lighting

Based on the maximum height of the proposed building development (65.05m agl), lighting is not a mandatory requirement. Cranes used in construction are unlikely to breach the OHS and will not be subject to a mandatory lighting requirement.

Proposed heights and positions of the cranes should be identified as soon as possible and communicated to Manchester Airport to confirm this conclusion.

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ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 54 countries internationally.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems.

Over the years, the company has expanded into numerous fields including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

1 INTRODUCTION

1.1 Overview

Pager Power has been commissioned to investigate the potential impact of a proposed building development upon aviation infrastructure in the surrounding area. The Site is located in Manchester City Centre. It is bounded by Laystall Street to the north, Great Ancoats Street to the east, vacant land at Lomax Street to the south and an apart-hotel to the west.

Building developments have the potential to affect aviation operations in numerous ways. The most common impacts relate to building developments as physical obstructions both to aircraft and wireless signals used for radar and radio systems.

In detail this report includes:

- Proposed development details.
- Manchester Airport Details.
- Obstacle limitation surfaces (OLS) assessment for Manchester Airport.
- Radar impact assessment for the Secondary Surveillance Radar (SSR) at Manchester Airport.
- High-level comments regarding crane usage and lighting requirements.
- Overall conclusions and recommendations.

2 PROPOSED DEVELOPMENT DETAILS

2.1 Proposed Development Site Plan

The proposed development site plan is shown in Figure 1¹ below.



Figure 1 Proposed development site plan

¹ 10403-SHP-A-Z460-PL-00-0002 (cropped).

2.2 Proposed Development Roof Plan

The proposed development roof plan is shown in Figure 2² below.

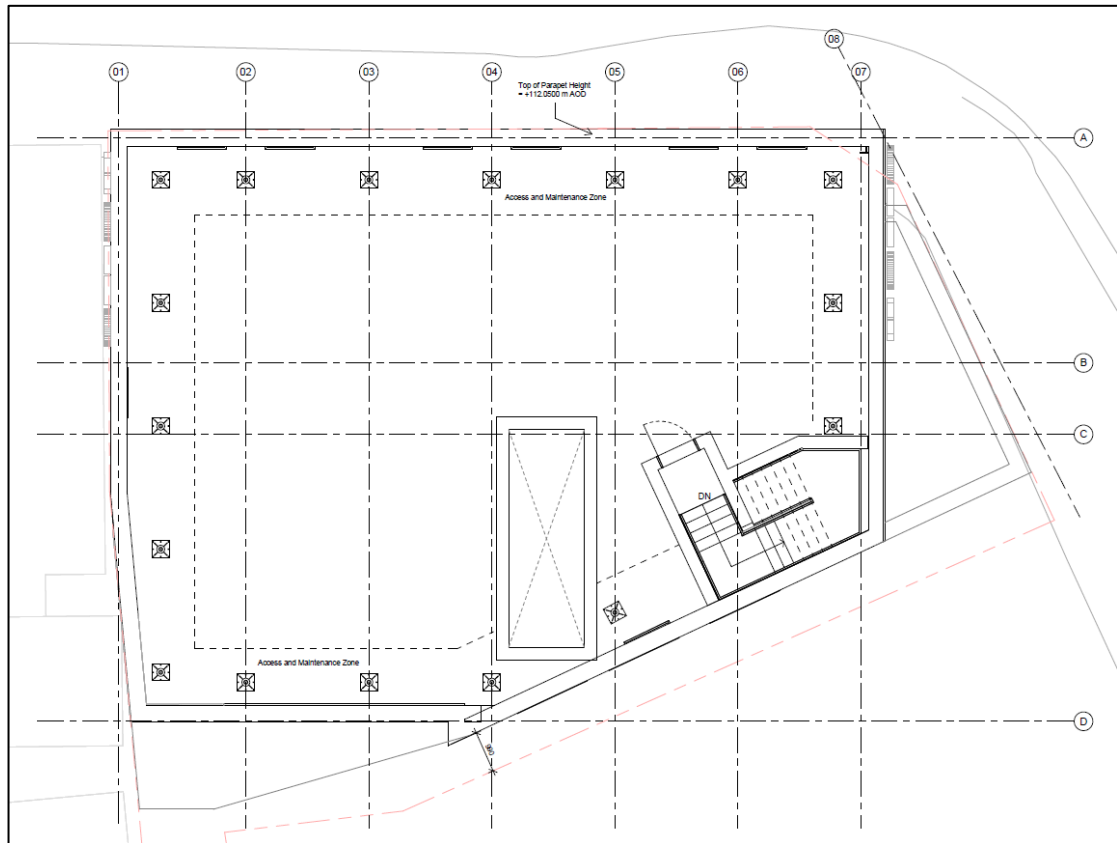


Figure 2 Proposed development roof plan

² 10403-SHP-A-G200-PL-RF-001 (cropped).

2.3 3D Building Representation

A 3D aerial image of the proposed development is shown in Figure 3 below.



Figure 3 3D building representation

2.4 Assessment Data

The building footprint coordinate data has been extrapolated from the project plans. The assessed coordinate and height data are presented in Table 1 below.

ID	Easting	Northing	Assessed Altitude / Height
1	383462	398434	Ground altitude = 47.0m AOD Maximum building height = 65.05m agl Total altitude = 112.05m AOD
2	383482	398392	
3	383496	398385	
4	383505	398417	
5	383506	398419	
6	383508	398422	

ID	Easting	Northing	Assessed Altitude / Height
7	383509	398423	Ground altitude = 47.0m AOD Maximum building height = 39.65m agl Total altitude = 86.65m AOD
8	383510	398425	
9	383512	398426	
10	383507	398437	

Table 1 Assessment data

3 OBSTACLE LIMITATION SURFACES ASSESSMENT

3.1 Overview

Obstacle Limitation Surfaces (OLS) are imaginary planes defined in three dimensions for physical safeguarding purposes (i.e., ensuring that physical structures do not present a safety hazard at an airfield) and are defined around licensed airfields. The dimensions and geometry of the surfaces are constructed based on detailed rules defined in the UK Civil Aviation Authority's Civil Aviation Publication 168. The size of the surfaces is dependent on the number of runways, their dimensions and the procedures carried out at the airfield.

3.2 Manchester Airport Obstacle Limitation Surfaces

The OLS for Manchester Airport have been modelled with respect to the tallest section of the proposed development (112.05 metres).

The Obstacle Limitation Surfaces for Manchester Airport are presented in Figure 4 on the following page. The proposed development location and the most relevant surfaces are indicated by the key within the figure.

Table 2 below presents a summary of the OLS assessment results.

Relevant Surface	Vertical Clearance ^{3,4} (m)
Outer Horizontal Surface (OHS)	94.6

Table 2 OLS detailed results

The proposed development lies beneath the OHS for Manchester Airport. The proposed development is clear of the OHS by 94.6m.

³ Vertical clearance between the top of the assessed building and the OHS.

⁴ These calculations have been based on an Outer Horizontal Surface of 206.6928m Above Ordnance Datum (AOD).

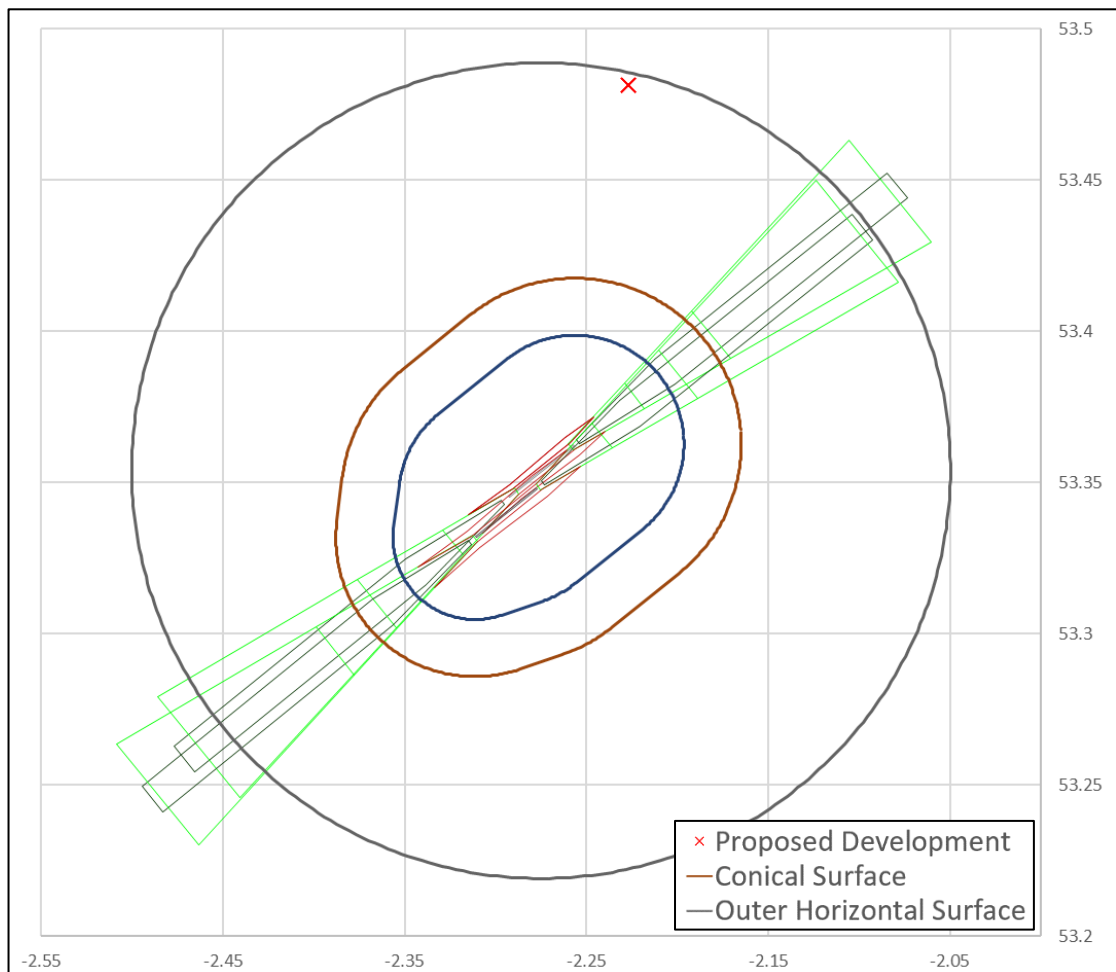


Figure 4 Manchester Airport Obstacle Limitation Surfaces chart

3.3 Assessment Conclusion

No physical safeguarding concerns are therefore predicted with respect to the OLS from the building structure itself.

4 RADAR LINE OF SIGHT AND IMPACT ASSESSMENT

4.1 Methodology

The approach taken within this report is presented in the following section below:

- Radar line of sight assessment based on the building footprint coordinates;
- Screening assessment to determine whether existing buildings and/or landscape features would hide/shield the proposed development from the SSR;
- Consideration of the distance from the SSR and operational effects.

4.2 Line of Sight Analysis

A radar line of sight assessment was completed for the proposed development – considering the building footprint coordinates and heights presented in Section 2.4.

Figure 5 on the following pages show the line-of-sight chart from Manchester Airport SSR to the closest and most visible corner of the proposed development⁵. Information regarding the methodology or the additional line of sight charts can be provided upon request.

The line-of-sight analysis has shown that the proposed development will be entirely visible to the radar, based on bare-earth terrain.

⁵ The box labelled 'certainty' in the figures provides the distance (in metres) by which the corner point is within line-of-sight to the radar (rounded to one decimal place).

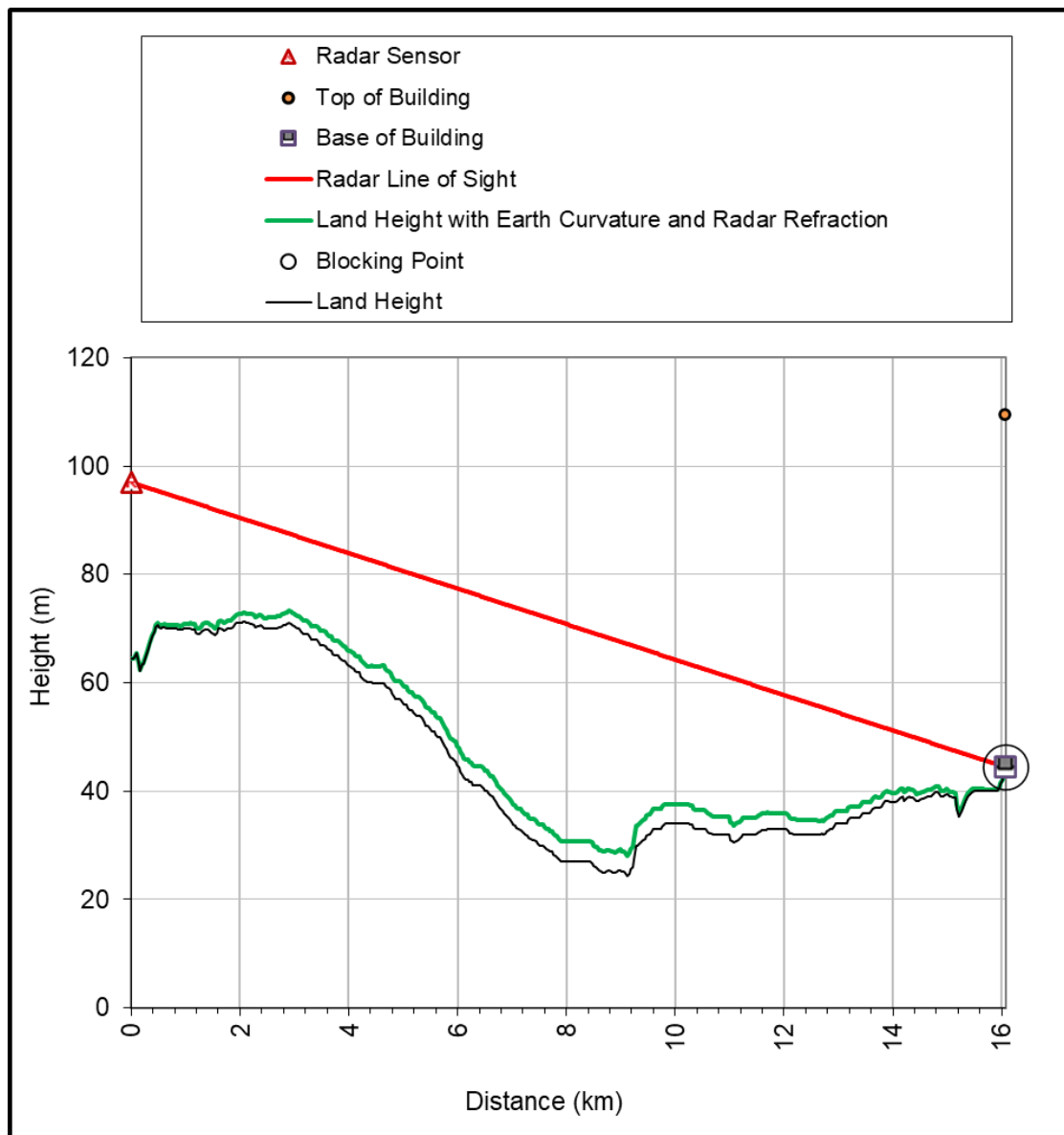


Figure 5 Manchester Airport SSR visibility for corner 3

4.2.1 Additional Screening

A review of the line-of-sight profiles was undertaken to identify any potential additional screening that may significantly reduce the visibility of the towers to the SSR. The review has shown that the 4M Office Building at Manchester Airport⁶ will provide screening such that the line-of-sight from the SSR towards the proposed development will be entirely obstructed.

The line-of-sight profiles are shown by the lines (yellow) extended to ground level (black) in Figure 6 below.



Figure 6 Significant screening along the line-of-sight profile

4.3 Assessment Conclusion

The modelling has revealed that the proposed development will be entirely visible to the SSR at Manchester Airport, based on bare-earth terrain.

A review of the line-of-sight profiles have shown that the proposed development will be significantly obstructed from view by the 4M Office Building at Manchester Airport.

No impacts upon the SSR at Manchester Airport are therefore predicted.

⁶ Approx. coordinates: Lon: -2.272433, Lat: 53.365586

5 HIGH-LEVEL OVERVIEW OF CRANE USAGE AND AVIATION LIGHTING

5.1 Crane Usage

During the construction phase, cranes will be present at the site that will reach elevations greater than the final building height. In principle, safeguarding concerns for cranes are the same as for building developments.

Based on the maximum height of the proposed building development, cranes are unlikely to breach the OHS. No physical safeguarding concerns are therefore predicted with respect to the OLS from the cranes.

Proposed heights and positions of the cranes should be identified as soon as possible and communicated to Manchester Airport to confirm this conclusion.

5.2 Aviation Lighting

The CAA has clear aviation lighting requirements for any obstacles that are 150m or more above ground level. The exact wording is:

“En-route obstacles (including cranes) of a height of 150m or more AGL must be fitted with lighting in accordance with the Air Navigation Order. Medium intensity (generically 2000 candela) steady red lights must be displayed at night and be visible from all directions (omnidirectional).

We recommend that lights are also displayed during daylight periods.

Lighting aids should be supplied with secondary power unless agreed otherwise with the CAA”

The highest point of the proposed development is 65.05m agl. This does not meet the height at which lighting is a requirement. Any cranes used on site are also unlikely to meet the height at which lighting is a requirement. This should be confirmed once the heights and positions of the cranes are determined.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Assessment Results

6.1.1 Obstacle Limitation Surfaces

The proposed development lies horizontally beneath the OHS for Manchester Airport. The proposed development is vertically clear of the OHS by 94.6m.

No physical safeguarding concerns are therefore predicted with respect to the OLS from the building structure itself.

6.1.2 Secondary Surveillance Radar

The modelling has revealed that the proposed development will be entirely visible to the SSR at Manchester Airport, based on bare-earth terrain.

A review of the line-of-sight profiles have shown that the proposed development will be significantly obstructed from view by the 4M Office Building at Manchester Airport.

No impacts upon the SSR at Manchester Airport are therefore predicted.

6.1.3 Crane Usage and Aviation Lighting

Based on the maximum height of the proposed building development (65.05m agl), lighting is not a mandatory requirement. Cranes used in construction are unlikely to breach the OHS and will not be subject to a mandatory lighting requirement.

Proposed heights and positions of the cranes should be identified as soon as possible and communicated to Manchester Airport to confirm this conclusion.

6.2 Overall Conclusions

No significant impacts upon Manchester Airport infrastructure are predicted and no mitigation requirement has been identified.

The findings of this report should be shared with the Manchester Airport safeguarding team and NATS at the earliest opportunity to confirm their position.



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