

22.1 INTRODUCTION

22.1.1 The principal potential impact on aviation activities of the AMEP is the presence of tall structures (likely to be >150 m). An assessment of the impact of the AMEP on aviation in the area and whether mitigation measures are needed to minimise the impact of the development is provided in this chapter.

22.2 LEGISLATION, POLICY AND GUIDANCE

Overview

22.2.1 Since the proposed development will not have wind turbines with blades rotating, the AMEP does not constitute a “wind farm”. Hence, the principal focus for aviation is the likely presence of “tall structures” or vertical obstructions (ie, the wind turbines themselves and any construction cranes, buildings etc which may be present).

22.2.2 Key guidance on the presence of vertical obstructions is provided in the following Civil Aviation Publications (CAPs) issued by the Civil Aviation Authority (CAA) Safety Regulation Group:

- CAP 738, Safeguarding of Aerodromes; and
- CAP 168, Licensing of Aerodromes.

22.2.3 The Licensing of Aerodromes (CAP 168) provides a section on aerodrome safeguarding and refers to CAP 738 for detailed guidance. In summary, CAP 168 states that:

‘all objects which extend to a height of 150 m or more above ground level are regarded as obstacles and shall be lit in accordance with ANO Article 219. Other objects of a lesser height may be assessed as hazards to aviation and also treated as obstacles’.

22.2.4 Legislation in relation to lighting requirements of tall structures is provided in:

- The Air Navigation Order 2009, Article 219: Lighting of en-route obstacles, Statutory Instrument 2009, No. 3015; and

- The Civil Aviation Act 1982, Section 47: Warning of presence of obstructions near licensed aerodromes.

22.2.5 The CAA Directorate of Airspace Policy provides a Policy Statement which outlines an overview of the more generic need for aviation warning lighting on tall structures, in addition to the statutory requirements set out in Air Navigation Order Article 219:

- The Civil Aviation Authority Directorate of Airspace. Policy Statement 1-April-2010. 'Lighting of En-Route Obstacles and Onshore Wind Turbines'.

22.2.6 Each safeguarded aerodrome is issued with two safeguarding maps centred on the aerodrome. One map extends out to a radius of 15 km and is colour-coded to indicate the height above ground level for which any proposed developments must be consulted. These coloured areas are based loosely on a series of protected "surfaces" around the aerodrome. The second map extends out to a radius of 30 km; the Local Planning Authority is required to consult the relevant aerodrome regarding any wind turbine proposal within this radius.

22.3 *ASSESSMENT METHODOLOGY AND CRITERIA*

Overview

22.3.1 The assessment is principally focussed on the potential impact of tall structures (likely to be present during the construction and operation of the AMEP) on aviation activities. The assessment methodology is informed by the consultation process and is focussed on the consideration of the position and height of tall structures according to the requirements set out in the relevant legislation and associated guidance.

22.3.2 The principal relevant details and criteria used in the assessment are summarised as follows:

- obstacle limitation surfaces are set out for Humberside Airport as per CAP 168 and in summary include inner and outer horizontal surfaces;
- the AMEP lies entirely within and only within the area covered by the outer horizontal surface of Humberside Airport;

- new objects or additions to existing objects should not extend above an outer horizontal surface (except in some exceptional circumstances);
- the height of the outer horizontal surface is 172.57 m above ordnance datum (AOD);
- the maximum elevation of the AMEP is approximately 6.3 m AOD;
- all en-route objects which extend to a height of 150 m or more above ground elevation are regarded as obstacles and shall be lit according to ANO Article 219;
- any en-route objects between 45 and 150 m above ground level, deemed to present a hazard to aviation should be lit with medium intensity red lights;
- any en-route objects 45 m or less above ground level deemed to present a hazard to aviation should be lit with low intensity red lights;
- Humberside Airport has advised that en-route obstacles 45 m or less would not be deemed to present a hazard to aviation; and
- Humberside Airport has advised that the hazards associated with en-route obstacles 45-150 m would be assessed on a case by case basis.

Construction Phase

22.3.3

During the construction phase, the only objects expected to be present are possibly some construction cranes together with buildings and lighting columns (up to approximately 50 m in height) which will tend to increase in height throughout the phase. None of these objects will extend to greater than 172.57 m AOD and therefore, will not penetrate the outer horizontal surface. Similarly, the lighting requirement for objects 150 m or more above ground level would not apply. In the context of en-route objects, these structures (up to 55 m in height) would require aviation warning lighting if they were deemed to present a hazard to aviation. The judgement on whether these objects were deemed hazards to aviation would be, in the first instance, the responsibility of Humberside Airport (any en-route consideration would involve the CAA) and specifically, Air Traffic Control. The consultation discussions indicated that since there are existing objects higher than 55 m closer to Humberside Airport and the runway

extended centreline (see *Section 22.5.4*), it is judged unlikely that these objects (approximately 55 m and less in height) would be deemed hazards to aviation.

Operational Phase

22.3.4 The tallest objects expected to be present on the AMEP site are any complete wind turbines. These are expected to be approximately 165 m in height and will not extend to greater than 172.57 m AOD. Therefore, it is expected that the outer horizontal surface will not be penetrated by wind turbines.

22.3.5 Cranes are likely to be present during the operational phase, principally for erecting the wind turbines. It is expected they will be no taller than the fully erected wind turbine and therefore, it is expected that the outer horizontal surface will not be penetrated by cranes.

22.3.6 The AMEP site plans provide for the following structures less than 150 m in height.

- buildings between 25-50 m above ground level (AGL);
- buildings between 15 m-25 m AGL;
- buildings up to 15 m AGL;
- existing lighting columns 21-30 m AGL; and
- proposed lighting columns 50 m AGL.

22.3.7 In the context of en-route objects, these would require aviation warning lighting if they were deemed to present a hazard to aviation. Similar to the construction phase and taken in context with the planned presence of complete turbines approximately 165 m in height, it is judged unlikely that these objects (approximately 50 m and less in height) would be deemed hazards to aviation.

Sensitive Receptors

22.3.8 The principal sensitive receptor is Humberside Airport, together with the aviation activities and aircraft themselves.

Significance Criteria

22.3.9 The significance criteria are the height thresholds for which specific requirements (eg in terms of lighting) are set out, as per CAP168 and ANO Article 219.

22.4 CONSULTATION

22.4.1 Following the completion and publication of the PEIR, *Annex 2.2* provides a summary of the responses relevant to aviation

22.4.2 On 20 September 2010 a meeting was held between Able, Humberside Airport and North Lincolnshire Council, involving the following attendees:

- Neil Etherington (Able);
- Tony Lavan (Managing Director of Humberside Airport);
- Stuart Hartley (representing Humberside Airport Air Traffic Control); and
- Marcus Walker (Head of Regeneration at North Lincolnshire Council).

22.4.3 The main discussion points of the meeting were:

- The opportunity that Humberside Airport presented in respect of helicopters – it is regarded as the UK’s second most important Heliport (after Aberdeen). Humberside Airport can offer hangar, maintenance and fuelling facilities as well as the ability (and permission) to carry loads slung beneath the aircraft.
- The potential planning application (subsequently approved) for a foundation and tower test facility within the AMEP site boundary.
- Potential issues of vertical obstruction heights and flight paths.

22.4.4 A second meeting was held between Able, ERM and Humberside Airport on 3 February 2011, and was attended by:

- Neil Etherington (Able);
- Tony Lavan (Managing Director of Humberside Airport);
- Stuart Hartley (representing Humberside Airport Air Traffic Control);
- Janusz Nowakowski (Environment and Safeguarding, East Midlands Airport, with responsibilities at Humberside Airport);

- Deborah Zost (Deputy Air Traffic Control Manager, Humberside Airport);
- Jonathan Hockley (Principal Airport Planning, Humberside Airport), and
- Dan Quinn (ERM)

22.4.5 The main discussion points of this second meeting were:

- Confirmation and clarification that the IPC application does not include operational turbines and any proposals for test facilities would be subject to a separate application. Therefore, the consultation is undertaken on the basis of no operational turbines present on the AMEP site.
- The question of wildlife habitat mitigation was raised, principally in relation to potential increased bird strike hazard and further details on this matter were requested by Humberside Airport.
- The question of crane heights was presented. It was demonstrated that the height of crane tip manoeuvring a blade assembly would likely be below the blade tip.
- It was confirmed that the relevant safeguarding zone around the airport is the outer horizontal surface (OHS) – this applies between a radius of 6.5 km - 15 km measured from the aerodrome reference point (533428.09N, 0002102.66W).
- It was confirmed that the OHS is at a height 150 m above the airport level – airport level is 22.57 m AOD and therefore the OHS is at 172.57 m AOD.
- Any obstructions breaching the OHS would be considered on a case by case basis and would likely be subject to some special consideration.
- As a separate consideration to the OHS issue, structures which do not breach the OHS are likely to be considered en-route obstacles.
- As per CAP168, for en-route obstacles (deemed to present a hazard to aviation): Medium intensity red steady obstacle lights should be used on obstacles between 45-150 m AGL; medium intensity steady red obstacle lights should be used to indicate the presence of an obstacle if its height is 150 m or more AGL.

22.4.6 A telephone conference was also held between Able and the Civil Aviation Authority on 21 March 2011, and was attended by:

- Neil Etherington (Able);
- Jonathan Monk (Able);
- Mark Smailes (CAA);
- Paul Askew (CAA); and,
- Dan Quinn (ERM).

22.4.7 The main discussion points of this meeting were:

- Clarification that that the responsibility for safeguarding lies with the aerodrome (Humberside Airport in this case) and the CAA's role is a regulatory one to help ensure that the aerodrome is suitably safeguarded.
- It was confirmed that objects would not penetrate the outer horizontal surface.
- Any structure 150 m or more above ground level requires lighting.
- CAA has no specific requirements for lighting objects less than 150 m above ground level.
- In the context of the AMEP site, if Humberside Airport did not require lighting on structures <150 m AGL, the CAA would be unlikely to intervene in its regulatory capacity.
- There is an International Civil Aviation Organization (ICAO) requirement to identify structures exceeding 300 ft in height on aviation charts.
- The Ministry of Defence can require charting of structures less than 300 ft in height, if they are deemed to be a potential hazard.
- There is an expectation that an organisation in control of land which has structures on it that exceed 300 ft in height will notify the "aviation community" of this. In practice, the "aviation community" is likely to include the CAA, MoD and Humberside Airport.
- The general point about cranes was addressed by considering them as tall structures which would require lighting as per the guidance and legislation. CAA advised that low intensity lighting on cranes

is considered good practice, when present in the vicinity of aerodromes.

- The potential marine transport of upright wind turbines was discussed. There are no CAA guidelines which deal specifically with structures in transit as this does not generally occur in the UK. It was advised that Able consult with CAA further in the event that this arrangement is planned such that it can be given further consideration.

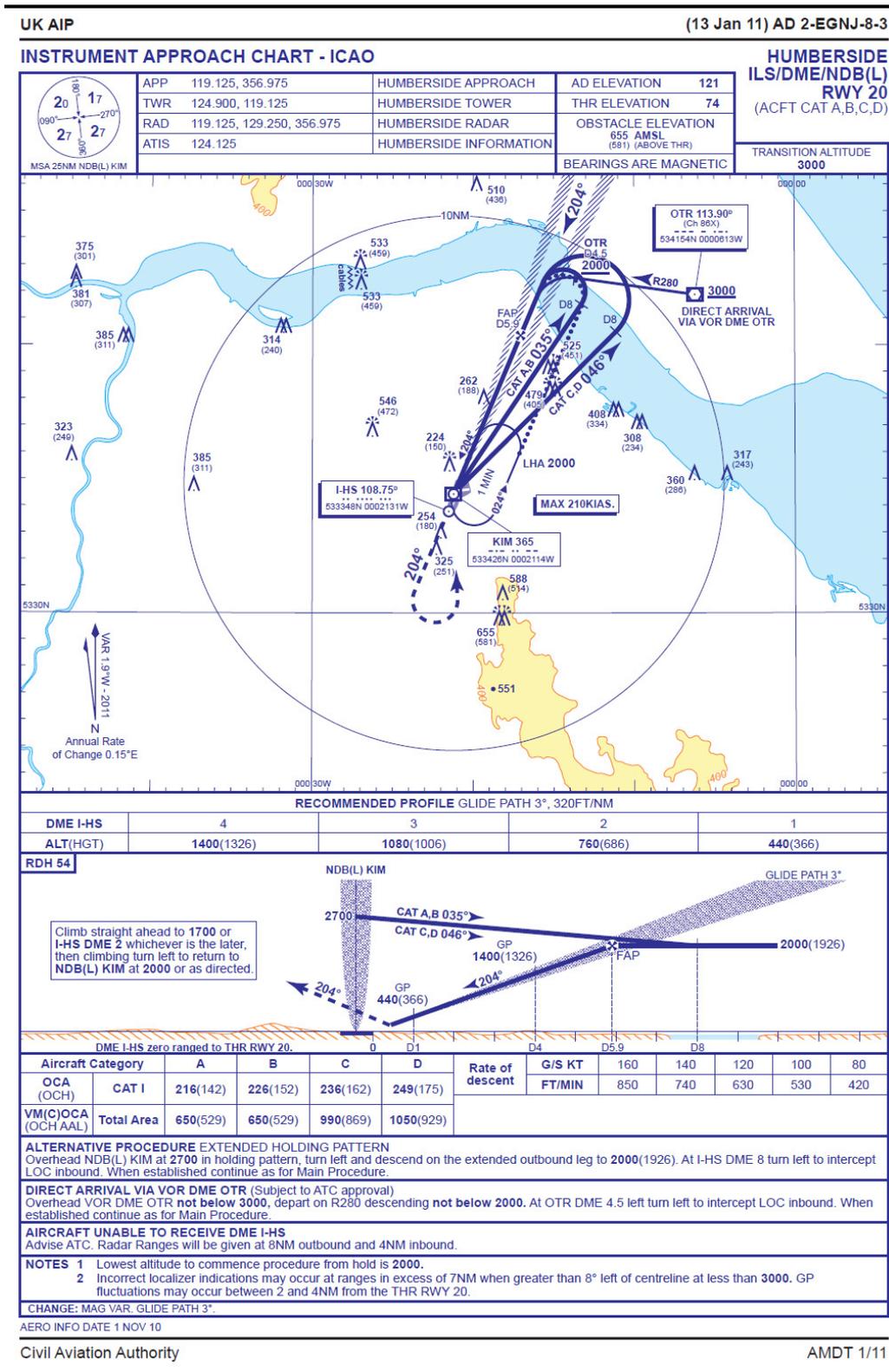
22.5

BASELINE

22.5.1

Tall structures in the vicinity of the AMEP are indicated on the Humberside Airport Instrument Approach charts, one of which is reproduced in *Figure 22.1*. The chart indicates structures which are relevant to aviation by virtue of their height. Therefore, in the aviation context, the structures indicated are judged to represent a suitable set for baseline purposes.

Figure 22.1 Tall Structures in Vicinity of the Project



- Obstacle
- Lighted obstacle
- Group obstacles
- Lighted obstacles

22.5.2 These tall structures are summarised in the Humberside Airport Aerodrome Aeronautical Information Publication (AIP-AD 10-Mar-11), reproduced in part in *Table 22.1*.

22.5.3 There are several tall structures present in the vicinity of the AMEP site. These include two groups close to the runway extended centreline at 525 ft (160 m) and 479 ft (146 m) Above Mean Sea Level (AMSL). Tall structures on the AMEP site would be located farther from the runway extended centreline than these two groups. Furthermore, there is a group at 408 ft (124 m) AMSL approximately 2 km south east of the AMEP site.

22.5.4 There is a pylon at (533749.44N 0001920.31W) which is very close to the runway extended centreline indicated as a height of 262 ft AMSL on the chart and 261 ft AMSL in *Table 22.1*. This pylon is approximately 80 m AMSL and indicated as not lit. It can reasonably be inferred that since it is not lit, this has been deemed not to present a hazard to aviation. Therefore, it is judged unlikely that objects less than 80 m AMSL, farther away from Humberside Airport and the runway extended centreline (ie on the AMEP site) would be deemed to present a hazard to aviation.

Table 22.1 *Humberside Airport Aerodrome Obstacles*

In Approach/Take-off Areas				In circling area and at aerodrome			
1				2			
Runway/Area affected	Obstacle type Elevation Markings/Lighting	Co-ordinates		Obstacle type Elevation Markings/Lighting	Co-ordinates		
a	b	c		a	b		
	ft amsl				ft amsl		
02/Approach 20/Take-off	Electric Pole	254	533247.92N 0002201.24W	Pylon	588	533029.94N 0001809.20W	
	Fence	149	533343.76N 0002126.73W	Mast (Lgtd)	633	532932.39N 0001813.93W	
	Fence on High Ground	151	533346.57N 0002126.02W	Mast (Lgtd)	655	532941.76N 0001812.48W	
	ILS Localizer	138	533347.59N 0002130.18W	Mast (Lgtd)	546	533636.36N 0002615.96W	
	High Ground	147	533346.57N 0002126.02W	Building (Lgtd)	224	533518.99N 0002128.88W	
20/Approach 02/Take-off	Pylon	261	533749.44N 0001920.31W				
	Trees	180	533540.37N 0002010.74W				
	Vehicles on road	86	533503.08N 0002046.41W				
	Fence	77	533502.50N 0002043.85W				
	Vehicles on road	84	533502.26N 0002039.05W				
	Vehicles on road	100	533437.43N 0002015.66W				
3	Remarks:	<p>Rising ground infringes the approach surface of Runway 02 (1:50) for the final 1000 m. Maximum penetration above the 1:50 is 4 m at a distance of 250 m from the threshold, 90 m right of centre-line.</p> <p>Rising ground penetrates the Take-off and Climb Surface of Runway 20 (1:50) out to a distance of 1000 m. Maximum penetration above 1:50 is 4 m at a distance of 250 m from the threshold, 90 m to the left of centre-line.</p> <p>A wooden post and rail fencing adds a further 1.3 m to the rising ground.</p>					

Source: Humberside Airport Aerodrome Aeronautical Information Publication (AIP-AD 10-Mar-11)

22.5.5 The AMEP site and immediately surrounding areas can support large numbers of birds at Killingholme Marshes foreshore (3766 birds recorded) and Killingholme Pits (4112 birds recorded). A mitigation site and compensation site will be provided to provide alternative habitat for the current population of birds.

22.6 *IMPACTS*

22.6.1 Structures, and particularly tall structures, present a hazard to aircraft and aviation activities since there is judged to be a potential for aircraft crashing into such structures and this judgement is reflected in the relevant legislation. There is a greater risk presented to aircraft in the hours of darkness (at night) and in conditions of poor visibility (eg fog) and, therefore, the legislation sets out measures for warning aircraft of the presence of structures – typically, these measures include lighting.

22.6.2 As discussed in *Section 22.5.4*, it is judged unlikely that structures on the AMEP site that are <80 m AMSL would be deemed hazards to aviation and on this basis structures up to this height would not require aviation warning lights. In practice, the tallest permanent structure proposed for the site will be no more than 55 m above ground.

Construction Phase

22.6.3 The construction phase may lead to changes in bird activity in the area, causing an increased bird strike hazard to aviation. Changes in bird activity during construction is likely to be possible displacement of birds to a different location due to noise and visual impacts

22.6.4 The Humberside Airport OHS will not be breached during the construction phase. In the later stages of the construction phase, there will be structures up to 50 m above ground level. Cranes will be present but the maximum crane height is likely to be less than 55 m.

Operational Phase

22.6.5 The Humberside Airport OHS will not be breached during the operational phase. There may be wind turbine structures approximately 165 m above ground level, during the operational phase. If 150 m or more above ground level, these would be deemed hazards to aviation and would require medium intensity steady red obstacle lights. Cranes will be present during the operational phase and these may also present a hazard to aviation. Maximum crane height is likely to be up to approximately 150 m and therefore, the aviation warning

light principles of structures of this height should be applied. It is judged that structures up to 55 m above ground level would not present a hazard to aviation and hence aviation warning lighting would not be required.

22.6.6 Birds displaced from the AMEP site and immediate surrounding area may move to the compensation site and mitigation site, both of which are further away from the Humberside Airport extended runway centreline. Furthermore the compensation site is 4.5 km further away from Humberside Airport. Since these sites are designed to provide alternative habitat for displaced birds, it is judged likely that there will not be an increased bird strike hazard to aviation activities at Humberside Airport, since birds will likely be displaced to a location further away from the runway extended centreline.

22.7 *MITIGATION*

22.7.1 The main impacts are potential for increased bird strike hazard and increased hazard to aviation due to tall structures.

22.7.2 It is judged unlikely there will be an increased bird strike hazard since birds are likely to be displaced further away from the runway extended centreline. Therefore, mitigation measures for bird strike hazard are not required.

22.7.3 The hazard to aviation presented by tall structures will be mitigated by provision of aviation obstacle warning lighting.

22.7.4 For structures on the AMEP site less than 45 m above ground level, aviation obstacle warning lighting is not specifically required. For structures on the AMEP site between 45-150 m above ground level, deemed to present a hazard to aviation, medium intensity red steady obstacle warning lighting should be provided. As discussed in *Section 22.5.4*, it is judged unlikely that structures <80 m AMSL would be deemed hazards to aviation and on this basis the tallest proposed structures (up to 55 m above ground level) on the AMEP site would not require aviation warning lights.

22.7.5 For structures 150 m or more above ground level, medium intensity (2000 candelas) steady red obstacle lights should be provided, positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 m.

22.8 *RESIDUAL IMPACTS*

22.8.1 Since birds will likely be displaced to locations further away from Humberside Airport, it is judged that the bird strike hazard will not be increased.

22.8.2 With the provision of the aviation warning light mitigation measures summarised in *Section 22.7*, the hazard to aviation presented by tall structures will be mitigated to a level in line with those presented at other airports and aerodromes in the UK. Therefore, the residual impact is judged to be low.

22.9 *CUMULATIVE IMPACTS*

22.9.1 There are several tall structures present in the vicinity of the AMEP site as summarised in *Section 22.5*. Therefore, on this basis that there are several existing tall structures, the cumulative impact of the tall structures on the AMEP site is judged relatively low.