Development around Aerodromes

Developers planning developments and more specifically housing developments around aerodromes should take cognisance of the following:

1. The most critical part of flight is the take off. Far less critical but never the less still potentially dangerous is the landing.

2. An incident relating to a take off and landing should be rated as probable, i.e. it will happen, sooner or later.

3. The noise of any aircraft taking off is in the vicinity of 100 decibel \(^{(1)}\) (dB). At 60 m above the ground, a sound level of more than 100 dBA \(^{(2)}\) can be realised. (See SANS standard below).

The extent of existing and future aircraft noise over a proposed development must be determined to ensure that the township layout and land uses are in line with Chapter 6 of the Draft White Paper on National Civil Aviation Policy and the applicable laws.

Failure to comply with the above will result in the creation of an environment that is not compatible with residential and associated land uses.

4. High levels of exhaust gasses emitted at low levels especially at take off where aircraft engines are at maximum power.

5. Risk of chemical pollutants like fuel, lubricants and pesticides (from crop spraying aircraft) etc.

6. Navigation equipment of different types, radiating electromagnetic energy in different frequency bands. From the Medium Frequency (MF) band (low hundreds of Kilohertz below the “Broadcast AM band”), to the Very High Frequency (VHF) band (above the “Broadcast FM” band starting at 108 Megahertz), to the Ultra High Frequency (UHF) band (above M-net and e-TV frequencies) and to frequencies in the Microwave bands are used on and around aerodromes. These

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\(^{(1)}\) The decibel (dB) is used to measure sound level. The dB is a logarithmic unit used to describe a ratio where the log base is 10. 10 dB would represent a 10-fold increase, 20 dB a 100-fold increase, 60 dB a million fold increase etc., in the level.

\(^{(2)}\) The decibel A-weighted (dBA) relates to the response of the human ear where 0dB is the threshold of hearing, i.e. the smallest sound a human can hear.
facilities are most often placed on the extended centre line of runways. The effects of long term radiation from navigation equipment especially on children that could be playing in the vicinity of such equipment, has not been proven. The only safeguard from electromagnetic radiation is distance.

7. Structures built in the near vicinity of an aerodrome, especially in the approach path to a runway, has the potential to interfere with the proper operation of navigational equipment, both on the ground and on airborne equipment. In addition, expected spin-offs from such developments such as lights, sunlight reflections from roofs, trees that will grow high in time and smoke also have the potential to endanger aviation.

Furthermore, factories in the vicinity of aerodromes emitting large volumes of hot air/gasses can seriously affect the flying conditions of aircraft by producing high velocity ascending airflow being replaced by high velocity descending airflow. This could head to loss of control of aircraft by the rapid succession of down then up and down again forces exerted on aircraft, which in severe cases could also lead to structural damage to aircraft.

It can hence reasonably be deduced that especially the approach areas to an aerodrome are neither safe nor healthy to live in. It is against this background, that the areas in line with a runway was traditionally zoned for “Agriculture” in the immediate proximity of an aerodrome and for “Light industry” in the adjacent area.

SANS Standard 10117

<table>
<thead>
<tr>
<th>Type of district</th>
<th>Equivalent continuous day/night rating levels (L_{Aeq,day/night}) dBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESIDENTIAL DISTRICTS 2</td>
<td></td>
</tr>
<tr>
<td>a) Low Density (&lt;25 units/hectare) (Schools, churches, educational)</td>
<td>45</td>
</tr>
<tr>
<td>b) Medium Density (&lt;25 to 100 units/hectare) (Schools, churches, educational)</td>
<td>50</td>
</tr>
<tr>
<td>c) High Density (&gt;100 units/hectare) (Schools, churches, educational, conference)</td>
<td>55</td>
</tr>
<tr>
<td>NON-RESIDENTIAL DISTRICTS</td>
<td></td>
</tr>
<tr>
<td>d) Commercial districts (Retail shopping, offices, consulting rooms)</td>
<td>60</td>
</tr>
<tr>
<td>e) Commercial/industrial districts (Central business, district motor trade, warehousing, etc.)</td>
<td>65</td>
</tr>
<tr>
<td>f) Agriculture (livestock and breeding) Cemeteries</td>
<td>65</td>
</tr>
<tr>
<td>g) Industrial (Manufacturing, assembly, repairing, packaging, bus depots, builders yards, etc)</td>
<td>70</td>
</tr>
<tr>
<td>h) Agriculture, land tenure, (not livestock), picnic facilities, open spaces (vacant land)</td>
<td>75</td>
</tr>
<tr>
<td>i) Forbidden areas – no development allowed</td>
<td>&gt;80</td>
</tr>
</tbody>
</table>

Source: SABS 0117 (Ed.2)
The following should be noted: -

It is clear that all legislation effecting such development is seldom properly investigated, especially as far as noise is concerned.

From a national level, noise is regulated by six acts, namely:

- **The Standards Act, 1982** (Act No 30 of 1982).

Other relevant legislation is:

*EIA Regulations*

*National/Provincial Noise Control Regulations.*


Issues

i) The legal proving of noise impact/noise disturbance/noise nuisance requires that an appropriate scientific and technical approach be applied in any investigation/evaluation of any noise-related problem.

ii) Requirements placed on new developments/rezoning/consent uses regarding noise impact evaluation require a uniform and scientific approach.

Scope and Details

i) Noise measurement and calculations shall be undertaken in accordance with the appropriate standards. Reference to a standard is deemed to be a reference to the latest edition of that standard.

ii) The procedure set out in SANS 10328 (SABS 0328), *Methods for Environmental Noise Impact Assessments* shall be used as a guide for all noise impact investigations.

iii) SANS 10103:2003, *The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communications* is to be used as the specific reference for the acceptable rating levels for noise in districts.

Also all noise measurement surveys are to be undertaken in accordance with this standard.

iv) SANS 10210 (SABS 0210), *Calculating and Predicting Road Traffic Noise* is to be used to calculate supplementary controlled areas related to road traffic as well as any road traffic problem noise levels.
v) **SANS 10117:2003, Calculation and Prediction of Aircraft Noise around Airports for Land Use Purposes** is to be used to calculate the noisiness index related to the establishment of supplementary controlled areas around airports and military air bases. **SANS 10117** specifies that the Integrated Noise Model (INM) which has been developed and issued by the Federal Aviation Administration (FAA) is to be used to calculate the noise contours around airports.

vi) **SANS 10357 (SABS 0357), The Calculation of Sound Propagation by the Concave Method** is to be used for the calculation of supplementary controlled areas related to any major noise source(s).

vii) The procedures set out in **SANS 10181 (SABS 0181), The Measurement of Noise Emitted by Road Vehicles when Stationary** and **SANS 10205 (SABS 0205), The Measurement of Noise Emitted by Motor Vehicles in Motion** will be used for the monitoring of individual motor vehicles.

viii) Procedures are set out in the various SABS ISO Acoustics Codes of Practice.

It is most likely that most, if not all of the development will fall in an area where the noise level would exceed the 55 dBA limit set for residential development.

- **Section 24 of the Constitution** provides that "everyone has the right … to an environment that is not harmful to their health or well-being; and … to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that

  (i) prevent pollution and ecological degradation;

  (ii) promote conservation; and

  (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

The Constitution thus, compels government to give effect to people's environmental rights and places government under a legal duty to act as a responsible custodian of the nation's environment. This would apply to developments around airports.

**CIVIL AVIATION REGULATIONS, 2011 to the CIVIL AVIATION ACT, 2009 (ACT NO 13 OF 2009)**

Regulations from The Civil Aviation Act relating to Obstacles (Extract)

Obstacle limitations and markings outside aerodrome or heliport 139.01.30
(1) All objects, whether temporary or permanent, which project above the horizontal surface within a specified radius of 8 kilometers as measured from the aerodrome reference point should be marked as specified in Document SA-CATS 139.

(2) Any other object which projects the horizontal surface beyond these radii or above the conical surface and which constitutes a potential hazard to aircraft must be marked as specified in Document SA-CATS 139.

(3) Buildings or other objects which will constitute an obstruction or potential hazard to aircraft moving in the navigable air space in the vicinity of an aerodrome, or navigation aid, or which will adversely affect the performance of the radio navigation or instrument lading systems, must not be erected or allowed to come into existence without the prior approval of the Director.

(4) No buildings or objects higher than 45 meters above the mean level of the landing area, or, in the case of a water aerodrome or heliport, the normal level of the water, must without the approval of the Director be erected within a distance of 8 kilometer measured from the nearest point on the boundary of an aerodrome or heliport.

(5) No building, structure or object which projects above a slope of 1 in 20 and which is within 3000 meters measured from the nearest point on the boundary of an aerodrome or heliport must, without the prior approval of the Director be erected or be allowed to come into existence.

(6) No building, structure or other object which will project above the approach, transitional or horizontal surfaces of an aerodrome or heliport must, without the prior approval of the Director, be erected or allowed to come into existence.

(7) The obstacle limitation surface as prescribed in Document SA-CATS 139 must be clear of any penetration of obstacles temporary or otherwise.

(8) In the event of a conflict of interest between land use authorities and air space users, air safety must be regarded as predominant and not to be compromised by land development projects or other obstacles.

Protection of radio sites
171.03.3

No structure or object, whether natural or artificial, which have the potential of interfering or degrading radio signals for the purpose of aviation safety, shall be allowed to come in existence or to move or be moved within the surfaces and slopes as prescribed in the Document SA-CATS 171.

Endangering safety
91.01.10

(1) No person shall, through any act or omission –
(a) endanger the safety of an aircraft or person therein; or
(b) cause or permit an aircraft to endanger the safety of any person or property.

(2) No person shall cause, by any means, a beam of light or other energy source, either visible or not, to be emitted towards any aircraft or air traffic control tower or any person therein such that there would be the potential for causing blindness or otherwise adversely affecting the ability of such person to safely carry out his or her duties.

Part 188.00.1 Makes non compliance of the above an offence

1. In accordance with the Civil Aviation Regulations (CAR) to the Civil Aviation Act (Act 13 of 2009), the standards of the International Civil Aviation Organisation (ICAO) are applicable.

2. ICAO annex 14 stipulates that all new developments in the approach area shall be below 1.6% (slope of 1: 62.5), if a slope of not exceeding 2% (slope of 1:50) does not already exist. In which case this slope (2% or lower) shall be maintained. The approach area starts at a point 60 m beyond the end of the runway and 150 m either side of the extended centre line, diverging by 15% (10 degrees) outwards from this point outwards.

Conclusion

The aerodrome license holder should register safeguarding maps with the Local Planning Authorities and should receive, from the Local Planning Authority, copies of applications for developments in and within the vicinity of the aerodrome.

If against the above background, developers still persist on continuing with development, the existence of mentioned dangers should be reflected in the establishment conditions.