Video Diary cc

CK97 38738/23

PO Box 386

Fontainebleau

2032

Telephone 082 855 7263

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REVIEWERS REPORT ON THE REVISED NOISE IMPACT ASSESSMENT FOR THE PROPOSED RUNWAY RE-ALIGNMENT AT CAPE TOWN INTERNATIONAL AIRPORT

1. Introduction

This revised report reviews the aircraft noise impact assessment for the proposed runway re-alignment at Cape Town International Airport. The noise review was an ongoing pro-active process whereby the peer reviewer was consulted in designing the terms of reference, the plan for undertaking the specialist study, later addition of supplemental noise information, and the final noise report. Information about the methods, data collection, assumptions used, and modelling of the noise was regularly provided and commented upon as part of the review process.

This review report refers to the Terms of Reference, with individual comments provided for each of these. General comments on report structure, methods used and a discussion of results are included. A discussion of mitigation measures is also incorporated.

2. Terms of Reference

This reviewers report refers to the Terms of Reference for the noise study which were listed in Section 1.1 of the noise report. This section lists the terms of reference (**in bold typeface**), and simultaneously comments on each aspect:

2.1 Define and describe baseline noise conditions around the airport;

- **Comment**: baseline ambient noise measurements were made at six sites: two each to the north and south of the airport, and two on the airport site. The measurements were made in 2011, prior to the commencement of this project, and so were presumably not designed

specifically to service the project's goals. The on-site measurements at points MP5 and MP6 are of limited use in assessing background noise in communities due to their location at the airport, however were necessary at the time, in terms of *ICAO Annex 16: Recommended Noise Monitoring Locations*. Measuring points MP1-4 produced useful data which can reasonably be expected to represent community noise.

2.2 Provide an overview of relevant legislation, standards, guidelines and policies, including international standards and policies (such as the ICAO) regarding reduction of aircraft noise at source, noise surrounding airports, compatible land use planning and limitations on land use and requirements for noise mitigation (including aircraft noise abatement procedures) and compensation;

Comment: Both local and international standards, legislation and guidelines have been included in Section 2.4. South African standards (SANS codes of Practice), and the National Department of Transport White Paper policy on aircraft operations and the environment have been incorporated, and are used to inform the study methodology and recommendations in later chapters. This was an important aspect to include since it locates the study in the South African context. The relevant ICAO (International Civil Aviation Organisation) have been included in this section.

2.3 Identify the noise sensitive receptors, such as schools, hospitals, places of worship, etc in the area that may be affected;

Comment: Population densities and likely noise sensitive receptors have been addressed by the illustrations in Chapter 4. These are later used as base maps, over which noise contours are laid to determine noise sensitive receptors which will be directly impacted by aircraft noise.

2.4 Use the Integrated Noise Model that is developed by the Federal Aviation Administration, as defined in SANS 10117, to determine and map the future noise contours (representing average and maximum noise levels) associated with the proposed runway;

Comment: Early in the project, the reviewer participated in discussions about which noise contour sets would be most useful to inform the decision making process. The four scenarios presented in the study arose out of these discussions, and were developed to illustrate cross-sectional (Scenarios 1&3, and 2&4) and longitudinal (Scenarios 1&2 and 3&4) noise impacts.

Members of the general public who are not expert in acoustics frequently struggle to understand what the average-energy noise contours mean in terms of impact. On recommendation from the reviewer, the specialist has included supplemental noise information in the form of number-of-events above defined noise levels to facilitate public engagement. These have been incorporated into the report to facilitate information sharing and public understanding.

2.5 Assess the impacts of noise on surrounding communities and the environment using the prescribed impact assessment methodology;

Comment: In order to quantify the noise impact in terms of estimates of people affected, baseline population maps were overlaid with noise contours depicting average-energy and number-of-events for selected daytime and night time operational scenarios. Using standard GIS data interrogation techniques, population estimates for the appropriate district noise level guidelines were derived. These estimates were desegregated by noise level zones, and time of day (day / night). These distinctions in terms of noise zones and time of day were used to inform the mitigation measures later in the report.

2.6 Consider, and where required, assess the impacts of vibrations associated with the construction and operations phases of the development;

Comment: Vibration was not part the noise reviewers brief.

2.7 Identify and describe potential cumulative impacts resulting from the proposed project in relation to proposed and existing developments in the surrounding area;

Comment: Average-energy noise contours are cumulative in that the total amount of noise energy is assessed over a 24 hour time period. The noise consultant has expanded on this cumulative noise effect by indicating where the Day-Night Noise Rating Level (L_{Rdn}) is calculated to rise above the SANS 10103 District Guidelines in the newly affected areas (for example Figures 4.23 & 4.30).

The noise impacts have been assessed using noise impact ratings which include reference to extent, duration, intensity, consequences, probability, significance, status and confidence of the impact. These impact ratings can be used to assess the effectiveness of mitigation measures which are discussed below.

2.8 Recommend practicable mitigation measures to minimise/reduce impacts and enhance benefits. Assess the effectiveness of proposed mitigation measures using the prescribed impact assessment methodology;

Comment: Mitigation measures have been identified and addressed in Chapter 6 of the noise report, for the airport's operations. As a result of the realignment of the runway and subsequent flight route changes, new land users will be affected by the airport's operations. The mitigation measures have been recommended are frequently applied to airports around the world, to reduce noise impact.

It was recommended that these measures should be customised according to the likely specific operational procedures of Cape Town International Airports, taking into account ICAO guidelines for noise abatement as well as surrounding land use sensitivities. This was done in the form of updating the noise contours to include mitigation measures, as described in Appendix E of the report.

ICAO's Balanced Approach to Aircraft Noise Management has been incorporated into the report. The guiding principles must underlie noise mitigation, but the specific measures to be adopted can be much deeper and more effective.

The historical problem of urban encroachment onto the airport's boundaries should not be ignored, even though the area is already densely populated. Development of unused land in future noise-susceptible areas should be carefully considered by the City of Cape Town planning authorities.

Insulation of buildings from noise can be a very effective noise mitigation measure. This option requires in-depth understanding of the noise levels, frequencies to be attenuated, building design and construction materials, weather and climate, etc. to be successful. Given the constraints of budgets, absence of clarity on funding responsibility, quality of the construction techniques of the current housing stock (and other noise sensitive buildings like schools, health care facilities and places of worship around the airport), this option will need further investigation in the future.

There are numerous system constraints that prevent or hinder the implementation of noise mitigation measures in general:

Harmonising guidance
Capacity requirements
Aircraft equipage
Pilot and air traffic controller acceptance
Lack of skills, training, and awareness
Economic constraints
Airport configuration and local community characteristics
Terrain and obstacles
Trade off between noise and emissions

These constraints have been incorporated into the report.

2.9 Recommend and draft a monitoring campaign to ensure the correct implementation and adequacy of recommended mitigation and management measures, if applicable;

Comment: In section 6.3, the report discusses the noise monitoring currently in place, and makes recommendations for future noise monitoring once the new runway is operational.

2.10 Assist the EAP in addressing any relevant comments raised by stakeholders.

Comment: This noise expert has provided input into drafting responses as required.

3. Comment on Report Structure

The noise specialist report structure is effective in addressing the construction and operational aircraft noise issues and concerns that need to be considered in an airport runway development. Whilst construction noise is limited to a medium-term duration, noise from aircraft operations has been shown to be a major concern worldwide since this noise will occur for as long as aircraft are flying, and will be audible both day and night. The links between these issues and the noise assessment method used, namely the Integrated Noise Model (INM) and relevant South African Bureau of Standards SANS codes of practice are logical and understandable, and align with ICAO guidelines and airport noise studies worldwide.

The report is logically laid out and understandable, and is written in an accessible format. The writing is clear, and discipline-specific; specialised terms are explained in the text and in the terminology summary at the beginning of the report.

4. Comment on Methods Used for the Scientific Study

The assessment methods used are placed within the context of current knowledge bases. This was achieved in two aspects: firstly, noise calculations were performed using the Integrated Noise Model to derive average-energy noise contours, which are used in conjunction with SANS documents to assess the spatial and population impact. Since average-energy noise contours can be difficult for non-experts to understand in terms of how noise will affect them, supplemental noise information in the form of Number-of-events above defined thresholds were also used. This information will be useful during public consultations. Where appropriate, ICAO guidelines for investigating and reporting on noise have been included.

Secondly, the results of field noise measurements were incorporated into the report to provide information about the current noise environment. Mention is also made of the newly installed noise monitoring system, which is beginning to provide a picture of the soundscape both in currently affected areas, and areas which will be affected once the realigned runway is taken into service.

Aircraft flight paths, air traffic movements and growth, and meteorological conditions are important variables in noise modelling. The research and assessment design is solid and the methods used are appropriate, with multiple combinations of maps being used to illustrate the noise impact of the scenarios.

5. Comment on Discussion of Results

The discussion of the results aligns well with the terms of reference in the introductory section and the report delivers what was required by the terms of reference. In the conclusion, the original four scenarios, and noise contours and impacts of the four scenarios are summarised. Two additional supplemental scenarios into which mitigation measures were incorporated are included. These are useful in quantifying and understanding the anticipated changes in population numbers which will result from the runway realignment. This section contains maps which are advantageous in assessing the newly impacted areas, followed by a section which outlines noise mitigation procedures and how these have been considered.

6. General Remarks

The report uses an accepted documentation style and language, which, whilst technical in nature is generally inclusive. The tables, figures and illustrations used are appropriate and necessary to the information presented in the report. There are no glaring omissions in the report, which informs and contributes to an advancement in the knowledge base of the airport's current and likely future noise climate.

Membership in Professional Societies:

Fellow, South African Acoustics Institute;
Member of the Society of South African Geographers

Key Qualifications

D. Phil (Stellenbosch University, Stellenbosch) 2008.

Paul Goldschagg has a PhD from Stellenbosch University titled *"Airport noise in South Africa – Prediction models and their effect on land-use planning"*, in which he investigated the effects of aircraft noise on land use planning in the vicinity of airports and proposed a transparent aircraft noise information model.

Over the past 12 years he has researched and written about aircraft noise, mining noise, industrial and transportation noise studies in southern Africa. He has been instrumental in formulating an aircraft noise and engine emissions policy for the Department of Transport, South Africa, and a revised noise modelling methodology for Standards South Africa, a division of the South African Bureau of Standards (SABS).

He has extensive experience working in an impartial manner within the environmental assessment community, and with municipal authorities and interested and affected parties, all of whom have pressing interests and concerns when it comes to developments and the environmental impact thereof.