CHALLENGES IN AIR QUALITY IMPACT ASSESSMENTS OF AIRPORT OPERATIONS DUE TO AMBIGUOUS LEGISLATIVE FRAMEWORKS

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Abstract

Identifying appropriate regulatory and technical requirements for an air quality impact assessment (AQIA) is critical. For an operational airport, this can be complex due to Commonwealth and state legislation being either outdated or contradictory.

Emissions from an airport, whether they are generated by stationary, ground based or airborne sources are regulated by different legislative instruments. Generally, when assessing a facilities environmental impact, pollution effects are targeted at sensitive receptors which are commonly limited to off-site locations such as private residences or public recreation areas. In the case of an airport, sensitive receptors could be on-site, which leads to the question, 'is it appropriate to assess air quality impacts on-site in locations where sensitive community members are expected to be?'.

There are Commonwealth legislative air quality standards ("objectives") applicable to Commonwealth owned airports. However, AQIA criteria can vary depending on an individual airport's Environment Strategy. Airport specific legislation allows an airport flexibility to adopt substitute (local) criteria, which could omit pollutants considered of high importance by current science (e.g.: PM_{2.5}) or result in the application of a criterion at levels above Commonwealth or State standards. Conversely, the airport could substitute standards from more contemporary criteria sources. To further complicate the situation, an airport's Environment Strategy may (or may not) evolve when an adopted local standard receives an update.

This paper investigates the relationship between legislation relevant to Commonwealth owned airports in NSW, the appropriateness of assessing impacts to sensitive receptors within the boundaries of an airport and the ability of airport specific legislation to respond to a change in local standards. This paper provides a summary of the potential challenges whilst undertaking an AQIA for a Commonwealth owned airport and briefly comments on the possible areas of change to the 2025 update to the Airports (Environment Protection) Regulations.

Keywords: airport, legislation, framework, impact assessment

1. Introduction

Airports in Australia can be classed as Commonwealth, council or privately owned. Generally, larger airports in cities or major regional centres are Commonwealth owned, whereas smaller regional airports are council owned. Private airports are generally located outside of cities and are often located in areas of mixed usage including for recreational purposes.

Australia currently has 21 airports which are located on Commonwealth land and are listed in legislation. These airports were previously owned and managed by the Federal Airports Corporation, however between 1997 and 2003 each airport entered longterm leases with private entities.

A Commonwealth owned airport is a unique operation upon which to perform an air quality impact

assessment (AQIA) due to the Commonwealth legislative instruments that are specific to airports, as opposed to other facilities which are regulated by State based legislative instruments.

This paper focuses on Commonwealth owned airports where air quality impacts due to airport development projects are often required to be assessed in detail, such as through dispersion modelling. The examples of challenges faced in the following sections are based on a New South Wales location.

2. Airport Specific Legislation

A federally leased airport on Commonwealth land is not required to adhere to the State laws upon which is it located as federally leased airports are regulated under an alternate comprehensive environmental regulatory framework. This framework is established by the Airports Act 1996, Airports Regulations 2024 and the Airports (Environment Protection) Regulations 1997, with the details of relevance to air quality summarised below.

2.1. Airports Act 1996

The Airports Act establishes the regulatory arrangements which apply to Commonwealth owned airports. The objectives of the Airports Act relevant to environmental protection are:

- to promote the sound development of civil aviation in Australia
- to establish a system for the regulation of airports that has due regard to the interests of airport users and the general community.

Part 5, Division 3 of the Act specifies that an airport requires a "master plan", with the relevance of the master plan to environmental management summarised below from Section 70, part 2:

- to ensure that all operations at the airport are undertaken in accordance with relevant environmental legislation and standards; and
- to establish a framework for assessing compliance at the airport with relevant environmental legislation and standards; and
- to promote the continual improvement of environmental management at the airport.

Additionally, the master plan must cover a 20-year "planning period" but only remains in force for five to eight years (depending on the airport), necessitating an update to the master plan every five to eight years.

The master plan must include an "environment strategy" which would include specific detail as prescribed in Section 71, part 2 and 3. The environment strategy from an air quality perspective requires that an airport sets clear objectives for environmental management, identify sources of air pollution, understand existing air pollution through studies and take measures to reduce and ensure air pollution from the airport is not adversely affecting the environment in a timely manner.

2.2. Airports Regulations 2024

The Airports Regulations were made under the Airports Act and specifies matters to be detailed and things to be addressed in the environment strategy. Of relevance to air quality, matters to be detailed and addressed in the environment strategy are:

- The strategy for environmental management of areas of the airport that are not connected with airport operations.
- Training necessary for people with responsibility for environmental management.
- Continuous improvement in the consequences of activities.

- Progressive reduction in pollution.
- Development and adoption of a comprehensive environmental management system for the airport that maintains consistency with relevant Australian and international standards.
- Involvement of the local community and airport users in development of any future strategy.
- The quality of air at the airport site, and in so much of the regional airshed as is reasonably likely to be affected by airport activities.
- Release, into the air, of substances that deplete stratospheric ozone.

2.3. Airports (Environment Protection) Regulations 1997

The Airport (Environment Protection) Regulations 1997 (AEPR) are regulations designed to manage and protect the environment at federally leased airports. The objectives of the AEPR are:

- to establish, in conjunction with national environment protection measures made under section 14 of the National Environment Protection Council Act 1994, a Commonwealth system of regulation of, and accountability for, activities at airports that generate, or have potential to generate:
 - o *pollution; or*
 - excessive noise; and
- to promote improving environmental management practices for activities carried out at airport sites.

Note that aircraft emissions, such as from the main engines, are regulated by Air Navigation (Aircraft Engine Emissions) Regulations 1995and as a result, the AEPR has limited application to mobile sources such as aircraft.

Part 2, Division 1, Section 2.01 defines when air pollution has occurred and what pollutants are considered relevant to airports. Pollutants are listed in the AEPR Schedule 1 and air pollution is considered to have occurred when:

- a. harm is likely to be caused to the environment; or
- b. unreasonable inconvenience is likely to be caused to a person:
- c. at a place other than the immediate vicinity of the source of the pollutant; or
- d. if the source is in a place to which members of the public have access—in that place.

Sources on an airport are limited within the AEPR as follows:

Stationary source means plant or equipment that:

- a. is not a vehicle; or
- b. is fixed to a particular place for the purpose of carrying out its function.

For the regulation, unreasonable inconvenience from an odour is likely to be caused to a person if the odour:

- a. is generated from something other than the ordinary operations of aircraft; and
- b. is detectable, by an airport environment officer's unassisted sense of smell, at a place other than the immediate vicinity of the source of the pollutant; or if the source is in a place to which members of the public have access—in that place.

Part 4, Division 1 outlines the duties of the airport operators in relation to their general duty to avoid air pollution, compliance with the general duty and operation of pollution control equipment.

Part 5, Division 1 allows for the substitution of air quality standards outlined in Schedule 1 of the AEPR "to enable flexibility in the administration of standards under these Regulations where, because of climatic, topographic and similar considerations peculiar to an airport, or to the region in which an airport is located, inflexibility would be unreasonable".

To propose a substitute standard, consultation with the public, relevant regulatory departments (e.g.: State Environmental Authorities) and any other persons who could be affected by the substitution is required. An application for an alternative standard is then assessed by the Minister before being approved or rejected.

Schedule 1 of the AEPR provides the accepted ambient pollution concentration limits. Part 1 provides accepted emission concentration limits for stationary sources and reference methods for measurement, analysis, or monitoring. Part 2 provides ambient air quality objectives for within the airport for lead, photochemical oxidants (O₃), sulphur dioxide (SO₂), total suspended solids (TSP), nitrogen dioxide (NO₂), sulphates (SO₄²⁻) and carbon monoxide (CO).

Note that the AEPR is sunsetting on 1 April 2025 and is currently under review. Further discussion of potential updates to the revised AEPR is included in section 5.

3. Summary of legislative requirements

The legislative requirements for all Commonwealth owned airports listed in the Airport Regulations are as follows:

- No requirement to adhere to State environmental laws due to being on Commonwealth land
- Must have a master plan and environment strategy covering a 20-year planning period, which is reviewed and updated every five years

- At a minimum must comply with the air quality standards (termed "ambient objectives") in Schedule 1 of the AEPR
- Are allowed to substitute air quality standards for local or more applicable standards after consultation with appropriate stakeholders and approval from the minister.

4. Ambiguity in assessment

4.1. Applicable Air Quality Standards

Schedule 1 of the AEPR specifies pollutants of relevance for airports along with ambient air quality standards which could be considered the "default" standards unless an airport's environment strategy specifies alternative (local) standards. The option to adopt local standards makes it possible that ambient air quality standards could vary significantly between different airports, not only in different states but within the same city.

As an example of the ambiguity in determining which standards would be applicable for an AQIA, Sydney Airport (SYD) has been compared to Bankstown Airport (BAL), which are two airports in Sydney located approximately 15km from each other. With regard to air quality standards the SYD Environment Strategy 2019-2024 states "Comply with State and Commonwealth legislation and relevant standards and guidelines". That is simple enough if the State and Commonwealth standards are the same, however it is unclear which standards take precedence if the state and Commonwealth standards are not aligned. Generally, Commonwealth laws take priority over State laws, however for the purpose of an AQIA it would be assumed to be the more conservative of Commonwealth or State standards. Of course, it could be possible to comply or non-comply with both State and Commonwealth standards even if they were different, however confusion could occur if an assessment showed compliance with one standard and non-compliance with the other.

The BAL Environment Strategy 2019 states "NSW Government legislation applies where Commonwealth Government legislation is silent. BAL will consider NSW legislation to achieve best practice environmental standards or where there is a risk to off airport environment". It is assumed the "Commonwealth Government legislation" refers to the AEPR standards, as the AAQ NEPM standards and goals were intended for jurisdictions to report against, noting the locations of ambient air quality monitoring stations must be located to obtain a representative measure of the air quality likely to be experienced by the general population in a region. Therefore, the AAQ NEPM standards and goals were intended to assess background air quality away from specific sources of air pollution (such as

an airport) and were not intended to be used as AQIA criteria.

In summary, air quality standards for an AQIA for SYD could be different to those of BAL due to the interpretation of the wording in the Environment Strategies for each airport, even though the airports are located in the same city and would be assessed by the same local authority if not for being on Commonwealth land. Essentially, Environment strategies for airports become legal documents that can be open to further ambiguity.

To complicate matters further, in the event that there are updates to adopted local standards, such as a reduction in state pollutant criteria, it is unclear whether the updates to the standards are adopted automatically or whether the standards are re-visited as a part of the regular master plan and environment strategy updates. Depending on the nature of the project (eg: minor or major development), the regulator who determines if the applicable standards have been used and the assessment has been performed appropriately could also vary and therefore introduce more ambiguity in the interpretation of assessment methodology and outcomes. Therefore, any assessments performed in periods between local standard updates and master plan updates could be considered a grev area as to which standards are applicable from an AQIA and approvals perspective. Additionally, if standards were to automatically update, an airport could go from a state of compliance to noncompliance at the next master plan update without any actual changes in operations.

4.2. Sensitive Receptors

The AEPR mentions sensitive receptors for noise impacts, however there is no mention or definition of sensitive receptors for air quality. Therefore, in the example case of SYD, it would be assumed the definition of sensitive receptors would be from the adopted local standards as specified in the Environment Strategy. For SYD, the adopted State air quality standards would be from The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW which defines a sensitive receptor as "A location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area. An air quality impact assessment should also consider the location of known or likely future sensitive receptors." (NSW EPA, 2022).

Typically, sensitive receptors for air quality studies are located at or beyond the boundary of a facility. An airport, however, is a unique operation from a sensitive receptor perspective as sensitive community members can be present on-site, for periods longer than some of the objective exposure periods, which leads to the question, 'is it appropriate to assess air quality impacts on-site in locations where sensitive community members are expected to be?'.

It could be argued that the nature of airport usage is transient and therefore it would not be expected that significant periods of time would be spent in outdoor areas where there could be potential for exposure to air pollution. Alternatively, as members of the public who could be highly sensitive to air pollution use airports (including for medical transport), it could be argued that on-site locations should be included in an AQIA to ensure public health safety for all users of an airport. This is particularly important for short term-effect pollutants where impacts can be apparent after only short exposure periods.

Though sensitive receptors for air quality are not mentioned explicitly in the AEPR, the AEPR does define air pollution as having occurred "*if the source is in a place to which members of the public have access—in that place.*" This definition hints at assessing air pollution in locations where the public have access, which could be both on-site and offsite. As an example, it is common practice to embark and disembark an aircraft via mobile stairs directly from the apron of an airport which is a location where many sources of pollution occur, such as from the main engines, auxiliary power unit and various ground support equipment directly used in aircraft operations.

4.3. Differences In Air Quality Standards

To highlight the potential for differences or conflicting air quality standards for Commonwealth owned airports, the below table summarises the air quality standards from the AEPR, national standards (National Environment Protection (Air Quality) Measure (AAQ NEPM)) and the NSW EPA. In general, the AEPR standards have higher concentrations due to the age of the AEPR (1997), whereas the AAQ NEPM and NSW EPA standards were updated in 2021 and 2022, respectively. Of most significance is the difference in NO2 with the AEPR being almost double the AAQ NEPM and NSW EPA standards. Also of note is the omission of PM_{2.5} and PM₁₀ from the AEPR standards, which are now considered of high importance in AQIA's in Australia and internationally. Additionally of note is the difference in averaging periods for some pollutants, for example, NO₂ does not have an annual average standard in the AEPR, whereas the NEPM and NSW EPA standards do.

Table 1 Summary of air quality standards (standards published in ppm have been converted to µg/m³)

Pollutant	AEPR	NEPM ¹ / NSW EPA ²
CO	10,000 (8-hr)	100,000 (15-min) ²
		30,000 (1-hr) ²
		10,000 (8-hr) ^{1,2}
NO ₂	320 (1-hr)	164 (1-hr) ^{1,2}
		31 (1-yr) ^{1,2}
Ozone ³	210 (1-hr)	139 (8-hr) ^{1,2}
	170 (4-hr)	
SO ₂	60 (1-yr)	286 (1-hr) ^{1,2,4}
	570 (1-hr)	215 (1-hr) ^{1,5}
	700 (10-min)	57 (1-day) ^{1,2}
SO42-	15 (1-yr)	na ^{1,2}
Lead	1.5	0.5 (1-yr) ^{1,2}
	(3-mth)	
TSP	90 (1-yr)	90 (1-yr) ²
PM ₁₀	na	50 (1-day) ^{1,2}
		25 (1-yr) ^{1,2}
PM _{2.5}	na	25 (1-day) ^{1,2}
		8 (1-yr) ^{1,2}
3: Photochemical oxidants		
4: pre 1 Jan 2025		
5: post 1 Jan 2025		
na: no applicable standard		

5. AEPR Sunsetting

As introduced earlier, the AEPR is sunsetting on 1 April 2025 and consultation is underway with key stakeholders for the next revision of the AEPR. It is considered vital that the update includes:

- A revised list of pollutants (substances) relevant to airports in Schedule 1.
- An update to ambient air quality standards (termed "ambient objectives") in line with more contemporary science, such as the latest AAQ NEPM.
- A definition of sensitive receptors and locations specific to air quality impacts.

If the above points of ambiguity were updated to provide clarity, the legislative and technical requirements for AQIA's at Commonwealth owned airports would become much clearer and would also aid with improving consistencies in AQIA's between airports, such as the SYD and BAL example discussed in earlier sections. The update would also make it easier for airports to understand their risks and make business decisions on managing risks.

6. Conclusion

The legislative framework for environmental regulation under the Airports Act allows for airports to adapt their environmental strategy to suit their locality in the interest of environmental protection. This flexibility can create ambiguity and has the potential to cause inconsistencies in AQIA Additionally, the definition methodologies. of sensitive receptors for an operational airport AQIA is not well defined and could be open to interpretation, again having the potential to cause inconsistencies AQIA methodologies. Inconsistencies in in assessment methodologies could result in inaccurate assessments of some airports, which could have poorly quantified or underestimated air quality impacts, resulting in unacceptable impacts to human health and the environment.

The AEPR is due to sunset on 1 April 2025, with consultation with stakeholders already underway to provide input for the next revision. It is considered vital that the updated AEPR includes updates to more contemporary pollutant inclusions (e.g. PM_{2.5}), air quality standards and definitions of sensitive receptors which would reduce ambiguity in determining the regulatory and technical requirements of Commonwealth owned operational airport AQIA, whilst better protecting human health and the environment in the areas surrounding Commonwealth owned airports.

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