

GUIDE | MINERAL EXPLORATION

Guide to airborne geophysical surveying for mineral exploration

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1. Introduction

Airborne geophysical surveys are commonly used in mineral exploration projects to measure Earth property data that can be processed and enhanced to provide information on the geology. The surveys can measure natural Earth fields, such as magnetism, radioelements and gravity, or induced fields such as electromagnetism. These surveys are typically undertaken using low-flying helicopters or light aircraft that fly in a grid pattern. The instruments may be either mounted on the aircraft or towed underneath a helicopter. Depending on the type of survey, the aircraft may fly between 25 and 60 metres above the ground, with flight lines typically spaced between 25 and 200 metres apart.

While the airborne surveys offer an exploration method having low levels of environmental impact, the potential for disturbance of property residents and impact on stock (or pet) animals is a key risk. Airborne surveying requires appropriate and timely consultation and notification of all stakeholders within the flight areas and surrounds.

The key legislation relevant to airborne geophysical surveying is contained in:

1. Civil Aviation Act 1988 and Civil Aviation Safety Regulations 1998
2. Mining Act 1992 and Mining Regulation 2016

The purpose of this guide is to provide information to mineral explorers—both licence holders and contractors—who are responsible for planning, preparing and flying airborne geophysical surveys.

2. Sources of general information

Stay up to date: It is recommended that explorers check the Resources & Energy website (under the Miners & Explorers tab) to understand ongoing changes to coal, petroleum and coal exploration requirements in NSW.

www.resourcesandenergy.nsw.gov.au/miners-and-explorers

Annual work programs: The program should include plans for geophysical surveys, along with other exploration activities, for any current NSW exploration title.

Environmental approval: Under the Mining SEPP [NSW State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries 2007)], airborne surveying is defined as a low-intensity exploration activity having minimal environmental impact. Being identified as exempt development allows these surveys to be undertaken without activity approval (ESF4), provided that they are on land that is:

- not in an environmentally sensitive area of state significance, or
- within a state conservation area, but is not otherwise on land referred to in section 3 of the Mining SEPP as being an environmentally sensitive area of state significance.

Further information on environmental approval is available in the [Assessment Requirements for Exploration Activities guide](#), which is available from www.resourcesandenergy.nsw.gov.au

Conducting airborne surveys: The [NSW Minerals Industry Exploration Handbook](#) (prepared by the NSW Minerals Council with assistance from NSW Resources & Energy) provides details of procedures and considerations for conducting airborne surveys (pages 48, 49). It includes preparation of an Airborne

Geophysical Survey Management Plan, and consultation steps to be undertaken. The handbook is available from www.nswmining.com.au

General exploration requirements: are given in the [Industry Guideline for Mineral Explorers](#) in NSW, which is available from www.resourcesandenergy.nsw.gov.au

3. Notification and consultation

Tenement holders and contractors need to plan, coordinate and act to ensure that landowners, residents and other occupiers are adequately notified. Effective measures must be taken to communicate survey plans as they can be a source for potential complaints, particularly where stock or other animals are concerned. It is critical to engage with property owners and managers about:

- mustering plans or crop-dusting, to avoid overlapping activities
- identifying when other aircraft might be operating at low levels in the area.

Landholder access arrangements and community consultation are key elements required for undertaking all exploration activities in NSW. Please stay informed of those requirements via the DRE (Division of Resources and Energy) website, www.resourcesandenergy.nsw.gov.au. If land access is required to do the airborne survey (e.g. use of a private airstrip) normal access arrangements are needed.

Where survey operations will extend outside of the Exploration Licence boundary (for example to turn the plane around), as a courtesy, any adjoining tenement holders should be notified in addition to the normal landholder permissions.

A new community consultation code of practice applies to any titles granted, renewed or transferred after 1 March 2016 (see "When this code applies" in the [Assessment Requirements for Exploration Activities guide](#)). For pre-survey preparation, it is now a requirement that a community consultation strategy is developed and a community consultation plan is implemented prior to survey activity, to a degree relevant to the proposed activities. Registers of contacts and complaints must be kept.

Annual community consultation reports must be prepared in accordance with the *Exploration code of practice: community consultation*, or with the *Guideline for community consultation requirements for exploration* as amended or replaced from time to time (coal and petroleum prospecting titles only), as relevant to the conditions of title.

The [Exploration code of practice](#) and the [Guideline for community consultation](#) are available from www.resourcesandenergy.nsw.gov.au

4. Flight regulation

Australian airspace is regulated by the Civil Aviation Safety Authority (CASA) for the safety of civil aviation and related purposes (*Civil Aviation Act 1988*). CASA regulates surveys by helicopter, fixed-wing, or any other airborne platform, including commercial drones (remotely piloted aircraft).

For low-level flying of surveys the contractor operates under CASA regulations (e.g. defined separation distances from buildings, populous areas: Subregulation 137.140 (3) of the *Civil Aviation Safety Regulations 1998*).

For more information on CASA, visit <https://www.casa.gov.au/>

5. Work health and safety

Since 2013, exploring for minerals has been included as a 'mining operation' under the *Work Health and Safety Act (Mines and Petroleum Sites) 2013* No 54. This Act does not apply to aircraft activity where Commonwealth aviation legislation applies. CASA supplies information regarding Safety Management Systems (SMS) for aviation for use in airborne survey preparation and operation. This information can be found at:

<https://www.casa.gov.au/education/standard-page/sms-resource-kit>

6. Data submission

For guidance on geophysical data, including appropriate formats, please refer to Part D in the [Guide for reporting on exploration and prospecting in New South Wales](#), which is available from www.resourcesandenergy.nsw.gov.au

Geophysical data no longer needs to be submitted in a separate report six months after the survey was acquired. It must now be submitted in the annual reports through EROL (Exploration Reporting Online) or through La Fix (Large File Exchange Service) where files are:

- large geophysical data files exceed the 32 MB limit for EROL and cannot be split into smaller files, or
- datasets are less than 32 MB but cannot be converted to EROL-acceptable formats (ascii, csv, pdf, jpg, tif)

[EROL submission information and help documents](#), including La Fix details, are available from www.resourcesandenergy.nsw.gov.au

7. Further information

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