



HITCHCOCK ROAD SAND EXTRACTION AND REHABILITATION PROJECT, MAROOTA

AIR QUALITY MONITORING PROGRAM



PF Formation

HITCHCOCK ROAD MAROOTA

Sand Extraction and Rehabilitation Project

AIR QUALITY MONITORING PROGRAM

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**Hitchcock Road sand extraction and rehabilitation project Maroota
Environmental management plan****Contents list**

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Terms and abbreviations

Term:	Definition
AEMR	Annual Environmental Management Report
AHD	Australian Height Datum. The standard reference level used to express the relative elevation of various features. A height given in metres AHD is essentially the height above sea level.
Airshed	Lower atmosphere within a defined geographic area.
Ambient	The background level at a specific location, being a composite of all sources.
Batter	The side slope of walls, embankments and cuttings or the degree of such slope, usually expressed as a ratio of horizontal distance to one vertical height.
Bore	A cylindrical drill hole sunk into the ground from which water is pumped for use or monitoring.
Conservation	The management of resources in a way that will benefit both present and future generations.
Contaminant	Any physical, chemical, biological or radiological substance or matter in water or soil that is not of natural origin.
Contamination	The degradation of the natural environment as a result of human activities.
Council	The Hills Shire Council.
Day	The period from 7.00am to 6.00pm on Monday to Saturday and 8.00am to 6.00pm on Sunday and public holidays.
DECC	NSW Department of Environment and Climate Change.
Department	NSW Department of Planning.
Director-General	Director-General of the Department of Planning or delegate.
DPI	NSW Department of Primary Industries
DWE	NSW Department of Water and Energy
EA	Environmental Assessment of the project entitled <i>Hitchcock Road Sand Extraction and Rehabilitation Project Environmental Assessment and Appendices</i> (3 volumes) dated November 2007, prepared by DFA Consultants, including the response to submissions and Preferred Project Report.
Ecology	The relationship between living things and their environment.
Ecologically Sustainable Development	Using, conserving and enhancing the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
Ecosystem	A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic community and between the biotic components of the system.

Term:	Definition
Emission	Discharge of a substance to the environment.
Environment	A term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms, including humans, exists.
Environmental Assessment (EA)	A formal description of a project and an assessment of its likely impact on the physical, social and economic environment. It includes an evaluation of alternatives and an overall justification of the project. The EA is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.
Environment Protection Licence	A licence that allows pollution of the environment under controlled conditions regulated by the Department of Environment and Climate Change.
EMP	Environmental Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979.</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000.</i>
EPL	Environmental Protection Licence issued under the <i>Protection of the Environment Operations Act 1997.</i>
Erosion	The wearing away of the land surface by the action of water, wind and ice.
Evening	The period from 6.00pm to 10.00pm.
Excavate	Dig into natural material and remove using specialist machinery.
Extraction	A term referring to the removal of material from the earth synonymous with quarrying.
Extraction area	The land described as the extraction area in Appendix 1 of the Project Approval.
Fauna	All animals including birds, reptiles, marsupials and fish.
Flora	All plants
Friable	Easily crumbled.
Front-end loader	Machine used to lift and place soil, earth, rocks and other materials within an extraction site or to load products into trucks.
Gradient	Rate of change of a given variable with distance, such as temperature or elevation.
g/m ² /month	grams per square metre per month
Greenhouse effect	Changes in climate that could occur due to increases in atmospheric concentrations of certain gases.
Impact	The effect of human-induced action on the environment.

Term:	Definition
Infrastructure	Supporting installations and services supplying the needs of a project.
Land	Land means the whole of a lot or contiguous lots owned by the same landowner in a current plan registered at the Land Titles Office at the date of the approval.
Landform	A specific feature of the landscape or the general shape of the land.
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
$\mu\text{s}/\text{cm}$	microsiemens per centimetre
micron	Unit of measure-one millionth of a metre.
mg/L	milligrams per litre
Mitigation measures	Measures put in place to reduce an impact.
Modelling	Use of mathematical equations to simulate and predict real events and processes.
Monitoring	Regular measurement of components of the environment to understand their condition and establish if necessary standards are being met.
Minister	NSW Minister for Planning or delegate.
Night	The period from 10.00pm to 7.00am on Monday to Saturday and 10.00pm to 8.00am on Sunday and public holidays/
Privately owned land	Land not owned by a public agency or the proponent or its related companies.
Preferred Project Report	The proponent's Preferred Project Report dated September 2008 prepared by DFA Consultants as modified in the Proponent's email to the Department of Planning on 18 November 2008.
Process plant	Equipment used to clean and separate sand into various sizes.
Project	The development as described in the EA.
Proponent	PF Formation or its successors in title.
Receptor	An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, work place, school or other place where people spend some time. An elevated receptor is a point above ground level.
Rehabilitation	Preparation of a final landform following extraction and its stabilisation with vegetation.
Resource	Potentially usable material in a defined area that can be economically extracted.
Response to Submissions	The proponent's response to issues raised in submissions dated March 2008 prepared by DFA Consultants and subsequent submissions to the Department of Planning dated 27 August 2008.

Term:	Definition
RL	Reduced level, usually in metres to an arbitrary datum.
RTA	NSW Roads and Traffic Authority
Sand	Sediment comprising particles ranging between 0.063mm and 2mm.
Sandstone	A fine grained rock of sedimentary origin composed primarily of sand-sized particles (0.06 to 2 mm).
Stakeholder	An individual or group with an interest in the proposal.
Statement of Commitments	The proponent's commitments in Appendix 3 of the Project Approval.
Stockpile	Mound used to store material.
Strategy A, Strategy B	The alternative rehabilitation proposals described in the Preferred Project Report.
Topography	The physical relief and contours of the area.
Topsoil	The surface layer of a soil profile containing most of the organic material and viable life forms and seeds.
TSC Act	NSW Threatened Species Conservation Act.
Wash plant	Equipment designed to wash unwanted sized materials from the product.

*Chapter One***INTRODUCTION**

Approval Condition 12 of Schedule 3 requires the preparation and implementation of an air quality monitoring program. This is to include details of the way in which the air quality performance of the project would be monitored, providing for additional dust deposition monitoring in the vicinity of residences to the north and west of the site and including a protocol for evaluating compliance with the relevant air quality criteria in the approval.

Approval Condition 13 of Schedule 3 requires PF Formation to establish a suitable meteorological station on the site or in the immediate vicinity that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales*.

The main activities likely to generate dust during the operation of the extraction areas on the site include topsoil stripping and overburden removal, truck movements along unsealed surfaces, loading and unloading of raw feed and products to trucks and stockpiles and wind erosion of stockpiles and exposed unpaved areas. Dust generated by activities relating to the Hitchcock Road site would also have cumulative impacts in combination with that generated by local sand mining activities undertaken by other operators.

Dust monitoring of site-related activities has been undertaken and regularly reported for the past ten years. A long term data set is therefore available. Current monitoring procedures and reporting protocol will be amended, where necessary, to reflect the requirements of the relevant approval conditions.

*Chapter Two***APPROVAL REQUIREMENTS**

The approval contains a number of conditions relating to the monitoring and management of potential air quality impacts. These are:

Schedule 3 Condition 10 Impact assessment criteria

The proponent will ensure that dust generated by the project does not cause exceedances of the criteria listed in **Tables 3, 4 and 5** of the condition at any residence or on more than 25 percent of any privately owned land. These are shown in **Tables 2.1 and 2.2**.

Table 2.1 Impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90µg/m ³
Particulate matter < 10µm (PM ₁₀)	Annual	30µg/m ³
	24 hour	50µg/m ³

Table 2.2 Impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2g/m ² /month	4g/m ² /month

Table 2.2 Notes

- *Deposited dust is assessed as insoluble solids as defined by Standards Australia 1991 AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method*

Schedule 3 Condition 12 Air quality monitoring

The proponent will prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program will be prepared in consultation with DECC and include details of how the air quality performance of the project would be monitored, provide for additional dust deposition monitoring in the vicinity of clusters of residences to the north and west of the site and include a protocol for evaluating compliance with the relevant air quality criteria in this approval.

Schedule 3 Condition 13 Meteorological monitoring

The proponent shall ensure that the project has a suitable meteorological station on the site or in the immediate vicinity that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales*.

*Chapter Three***AIR QUALITY MONITORING PROCEDURES****3.1 Introduction**

Air quality monitoring comprises two components. PM₁₀ is measured by a continuous ambient particulate monitor using a tapering element oscillating microbalance (TEOM). A monitoring station of this kind is located near Maroota Public School and provides data on PM₁₀ concentrations as part of the approval conditions for an adjacent sand extraction operation in the area.

Deposited dust is measured at a number of monitoring locations adjacent to the Hitchcock Road site where the dust is assessed as insoluble solids as defined by Standards Australia 1991, *AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method*.

If any rolling 24-hour average PM₁₀ result (each 15 minutes) measured at the monitoring station near the school is greater than 42.5 µg/m³, the site operator (not PF Formation) must:

- Immediately notify DECC;
- take immediate action to reduce PM₁₀ emissions generated by the project; and
- cease all dust generating activities at the site except those undertaken for the purpose of reducing dust impacts such as the watering of roads, exposed areas or dust monitoring.

PF Formation will be notified if this exceedance occurs and will cease any dust generating activities on its sites.

Dust generating activities on site may only recommence when the rolling 24-hour average PM₁₀ result (each 15 minutes) measured at the monitoring station near the school is less than 42.5 µg/m³ for four consecutive 15 minute periods.

If PM₁₀ dust monitoring over a twelve month period, starting 01 March 2008 until 01 March 2009 shows that levels measured at Maroota Public School do not exceed DECC's goals, DECC will review the requirement for ongoing monitoring.

Deposited dust has been measured at a number of locations around the site boundary for the past ten years. While annual average concentrations are consistently below the criteria level, occasional spikes result in monthly exceedances. The source of these exceedances is not clear from the available data but may result from activities on other adjacent sand extraction operations, agricultural/horticultural activities in the surrounding area or occasional bushfires.

3.2 Compliance criteria

Compliance criteria for particulate matter and deposited dust are shown in **Tables 2.1** and **2.2** respectively.

3.3 Air pollution sources and controls

The main activities likely to generate dust during the operation of the extraction areas on the Hitchcock Road site would include:

- topsoil stripping and overburden removal;
- ripping and excavation of friable sandstone;
- vehicles travelling on unsealed surfaces;
- loading and unloading the raw feed and products to trucks and stockpiles; and
- wind erosion of stockpiles and exposed unpaved areas.

The following safeguards and management procedures are implemented on the Hitchcock Road site to limit the generation of dust from site activities. These would be extended to include those areas included in the project Approval.

- A 10,000 litre water truck would continue to be used to regularly wet the active internal unsealed roads. Watering would take place at least five times per day depending on the prevailing conditions with an application of at least two litres per square metre.
- Topsoil stockpiles and areas where landform preparation is complete would be seeded with either native or pasture species to assist in stabilising exposed surfaces.
- Mobile equipment used for ripping and loading of friable sandstone would have enclosed cabs to avoid exposure of operatives to generated dust.

The raw feed material delivered to the wash plant would include a degree of inherent moisture that would contribute to the overall control of dust.

All safeguards and management procedures would be reviewed as part of the annual environmental management audit and any changes to the site operations would be reflected in the review of the dust management strategies adopted at the site.

3.4 Stakeholder consultation

Activities on the site and the transport of the extracted material from it have the potential to result in impacts on the air quality experienced by local community. These may give rise to complaints regarding the project. It is important that any complaints received are handled and addressed in an appropriate manner. The following complaints management procedure will be followed:

- Each complaint received will be recorded on the complaints register. This will include details of the complainant, the nature of the complaint and the date and time received;

- The nature of the complaint will be addressed by the Site Manager/Environmental Manager and any measures required to mitigate its effects identified and implemented;
- The appropriate record sheet will be signed-off by the relevant manager once the identified measures are completed;
- Monitoring will be undertaken, if necessary, to confirm the source of the complaint and its subsequent mitigation;
- A copy of the relevant complaints record will be made available to the CCC and the complainant, on request. A summary of all complaints received, if any, will be presented at each CCC meeting and reported in the relevant AEMR. and
- A copy of the complaints register will be provided to the Department of Environment and Climate Change as part of the annual licence reporting.

3.5 Complaints management

Condition 1 of Schedule 4 requires that if environmental monitoring indicates that impacts generated by the project are greater than the relevant assessment criteria, the Director-General and the affected landowners and/or existing or future tenants must be notified and the relevant monitoring results provided to these parties until the results show that the project is complying with the relevant criteria.

Condition 2 of Schedule 4 enables a landowner of privately owned land who believed that quarry operations are exceeding the impact assessment criteria to request PF Formation in writing for an independent review of the impacts of the project. If the Director-General is satisfied that an independent review is warranted, PF Formation will undertake the following within 3 months of the Director-General's advice:

- consult the landowner to determine the nature of their concerns;
- commission a suitably qualified, independent specialist, approved by the Director-General to conduct monitoring on the land to determine whether the project is complying with the relevant criteria in Schedule 3 and identify the source(s) and scale of any impact on the land and the contribution of the project to that impact; and
- provide a copy of the independent report to the Director-General and the landowner.

If the independent review determines that the quarry operations are complying with the relevant criteria in **Schedule 3**, PF Formation will discontinue the review following approval of the Director-General.

If the independent review determines that the quarry operations are not complying with the relevant criteria in **Schedule 3** and that these operations are primarily responsible for the non-compliance, PF Formation will undertake the following:

- implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and
- conduct further monitoring to determine whether these measures ensure compliance; or

- secure an agreement with the landowner to allow exceedances of the relevant criteria in Schedule 3.

If additional monitoring subsequently determines that the quarry operations are complying with the relevant criteria in **Schedule 3**, PF Formation will discontinue the review following approval of the Director-General. If an agreement with the landowner cannot be achieved, PF Formation or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process.

If the results of the independent review are disputed by the landowner, either PF Formation or the landowner may refer the matter to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process.

3.6 Monitoring programs

Air quality monitoring methods and procedures including monitoring locations, methods, frequency, parameters and reporting are provided in **Chapter 4**.

3.7 Response to non-compliance

If an exceedance of any of the air quality assessment criteria set out in **Tables 2.1** and **2.2** is identified, the following procedures will be instituted:

Confirmation of exceedance

A check will be made of the monitoring data to confirm that an error has not been made in recording or analysing the result. If this is the case, the process will continue to the next stage. If any uncertainty arises in relation to the available results, further checking will be undertaken to confirm the outcome of the assessment.

Exceedance of particulate concentration criterion

Data made available from the TEOM air quality monitoring station near Maroota Public School will indicate whether there is an exceedance of the particulate concentration criterion. This is defined as any rolling 24-hour average PM₁₀ result (each 15 minutes) greater than 42.5 µg/m³. Should this occur, the following actions will be undertaken by the relevant site operator (not PF Formation):

- immediate notification of DECC;
- immediate action to reduce PM₁₀ emissions generated by the project; and
- cessation of all dust generating activities at the site except those undertaken for the purpose of reducing dust impacts such as the watering of roads, exposed areas or dust monitoring.

PF Formation will be notified if this exceedance occurs and will cease any dust generating activities on its sites and will only recommence these activities when the rolling 24-hour average PM₁₀ result (each 15 minutes) measured at the monitoring station near the school is less than 42.5 µg/m³ for four consecutive 15 minute periods.

This procedure will be reviewed by DECC following 12 months of operation (between 01 March 2008 and 01 March 2009) and depending on the assessment of the data over that period may discontinue the protocol and delete the requirement from the licence.

Exceedance of dust deposition criterion

Experience of air quality management at the Hitchcock Road site has shown that while the annual criterion for dust deposition is not exceeded, it is occasionally exceeded on a monthly basis. However, recent monitoring results have shown an overall trend of diminishing rates of deposition at the monitoring sites.

If monthly rates of dust deposition approach the criterion level of $4\text{g}/\text{m}^2/\text{month}$ in any one month as a result of operations on the Hitchcock Road site, the site manager will be notified and the reasons for this level noted.

If annual rates of dust deposition approach or exceed the criterion level of $4\text{g}/\text{m}^2/\text{month}$ at any monitoring site, the site manager will be informed, who will, within 7 days, notify the affected landowner, the Director-General and DECC of the nature of the exceedance. PF Formation will prepare a corrective action plan to return local air quality to acceptable levels.

Details of the proposed corrective actions will be provided to the landowner, the Director-General and DECC. If requested by the Director-General, PF Formation will commission an independent consultant to undertake a review of site operations and related air quality impacts. Any recommendations will be incorporated in the corrective action plan.

Corrective action

Air quality at the site of the measured exceedance will be reassessed. If additional measurements indicate no exceedance of the relevant criterion, no further action will be undertaken but the site will be identified in the event of a future non-compliance. If the new measurements confirm the exceedance of the criterion, further action will be required.

PF Formation will prepare a plan of action to return the air quality impacts of site operations and/or truck movements to compliance. This will document the corrective measures to be undertaken, frequency and scale of these measures and the results expected from their implementation. Details of the action plan will be included in the relevant AEMR and reported to the Director-General and DECC, if required.

Continuing monitoring and assessment

Air quality at the site of the measured exceedance resulting from operations on the Hitchcock Road site will be reassessed during and following the implementation of the corrective measures in order to demonstrate a return to compliance with the relevant criterion. PF Formation will provide quarterly monitoring results to the affected landowner or resident and the DECC until the results show a consistent return to compliance. During this period, regular consultation will be maintained with the affected landowner or resident to assist in determining the effectiveness of the corrective measures.

If the dust deposition levels continue to exceed the nominated criterion at a particular location, PF Formation will attempt to develop an agreement with the landowner for signed acceptance of the exceedance of the relevant air quality criterion.

PF Formation will notify the affected landowner, the Director-General, the DECC and other government agencies together with local stakeholders of a return to compliance following the successful implementation of the action plan or, alternatively, the establishment of an agreement between PF Formation and the affected landowner.

Continued non-compliance

If exceedance of the relevant air quality criterion continues and PF Formation is unable to achieve an agreement with the affected landowner, the situation will be referred to the Director-General and an Independent Dispute Resolution Process, as set out in **Condition 1 of Schedule 4** of the Project Approval, will be instituted.

Reporting

The recorded exceedance, corrective actions and any air quality reassessment will be reported to the CCC and included in the relevant AEMR.

This procedure will be reviewed by DECC following 12 months of operation and depending on the assessment of the data over that period may discontinue the protocol and delete the requirement from the licence.

3.8 Responsibilities

PF Formation is responsible for the management of the project in a manner which achieves the environmental outcomes set out in the approval conditions. The project team members responsible for the implementation of the EMP have been nominated although these may be changed with approval over the life of the approval. Their responsibilities are:

Site manager - responsible for the day to day activities on the extraction and process sites.

Environmental manager - responsible for the environmental management of the activities on the extraction and process sites.

Each person with responsibilities (as identified above) will hold a controlled copy of the EMP.

Site inspections during operations, the assessment of environmental impacts and the performance of mitigation measures will be carried out regularly by a nominated *environmental officer*. Such inspections will be documented in a standard format and a copy submitted to the *site manager*. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

All persons undertaking any form of work on the site subject to the EMP will be required to attend an induction. This will provide instruction in the environmental rules, procedures and processes applying to their activities on the site including those necessary to limit air quality impacts to acceptable levels.

*Chapter Four***MONITORING AND REPORTING****4.1 Introduction**

PF Formation will undertake monitoring to establish that any pollutants generated by its activities on the Hitchcock Road site are within acceptable limits and that measured air quality pollutant levels are compliant with the criteria listed in **Chapter 2**.

4.2 Monitoring locations

PM₁₀ is measured by a continuous ambient particulate monitor using a tapering element oscillating microbalance (TEOM) at a monitoring station located near Maroota Public School. This is operated and the results reported by an adjacent sand mine operator (not PF Formation).

Dust monitoring relating to extraction activities on the Hitchcock Road site has been undertaken at three locations for the past ten years. These are:

- Maroota Public School approximately 1,500 metres to the north of the active areas on the site and closer to other sand extraction activities not operated by PF Formation;
- adjacent to a small house on Lot 1 DP223323 in the eastern corner of the site; and
- adjacent to a house in the south west corner of Lot 167 DP752039.

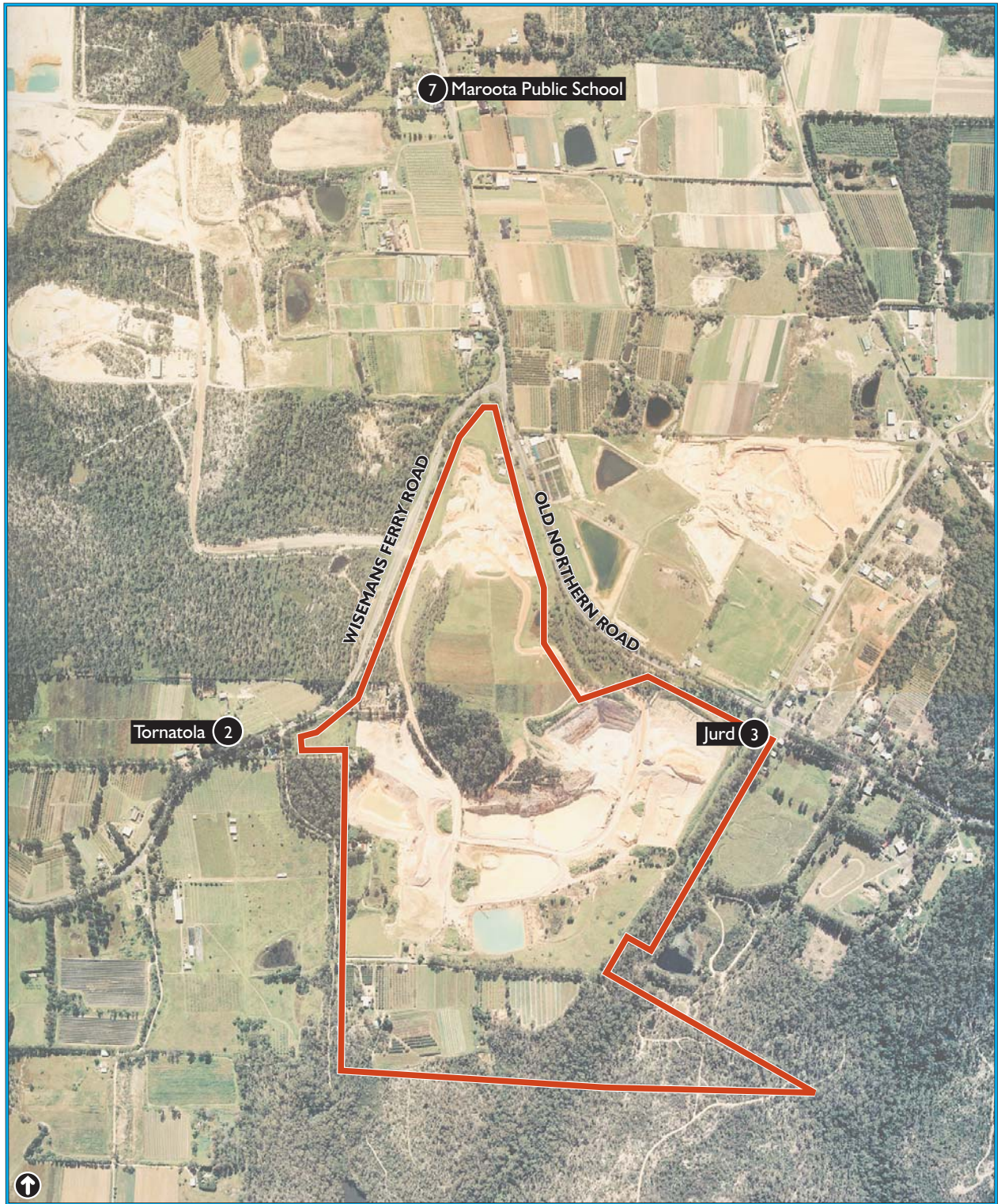
All these locations measure ambient dust deposition generated by other sand mine operators in Maroota in addition to agricultural and other non-mining related activities. Dust monitoring will be continued at the first two of these locations but the third location will be moved to a new site adjacent to a house on the western side of Wisemans Ferry Road close to its intersection with Hitchcock Road. The location of these monitoring points is shown on **Figure 4.1**.

4.3 Air quality measurements

Dust deposition will be measured at each of the monitoring locations listed in **Section 4.2** where deposited dust is assessed as insoluble solids as defined by Standards Australia 1991, *AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method*.

4.4 Monitoring frequency

Monitoring of dust deposition will be undertaken monthly at the nominated locations.



Scale
 0 500 Metres

— Hitchcock Road site boundary

⑨ Monitoring locations

Figure 4.1
 AIR QUALITY MONITORING LOCATIONS

4.5 Data recording and reporting

The deposited dust and its container will be removed each month and sent to a NATA accredited laboratory for analysis. The following information will be recorded at each monitoring location:

- date and time of removal and replacement;
- condition of the dust gauge;
- any changes in ground conditions in the vicinity since the previous removal; and
- notable activities or conditions adjacent to the monitoring location.

The results of air quality monitoring will be presented in the relevant AEMR. This will include an analysis of the monitoring results against the criteria listed in **Tables 2.1** and **2.2**, previous monitoring results and the air quality modelling described in the EA. Any trends in local air quality will be identified and any non-compliance noted.

Meteorological conditions over the monitoring period will be summarised and assessed if appropriate.

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