

PF FORMATION



HITCHCOCK ROAD SAND EXTRACTION AND REHABILITATION PROJECT, MAROOTA

AIR QUALITY MONITORING PROGRAM
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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

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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.
Department	NSW Department of Planning and Environment.
DPI Water	NSW Department of Primary Industries - Water
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.
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.

Term	Definition
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 NSW EPA.
EMP	Environmental Management Plan
EPA	NSW Environment and Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979.</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000.</i>
EPL	Environment 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.
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 NSW Land & Property Information at the date of the approval.

Term	Definition
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 and Infrastructure 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/
OEH	Office of Environment and Heritage
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 and Environment 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 and Environment dated 27 August 2008.
RL	Reduced level, usually in metres to an arbitrary datum.
RMS	Roads and Maritime Services
Sand	Sediment comprising particles ranging between 0.063mm and

Term	Definition
	2mm.
Sandstone	A fine grained rock of sedimentary origin composed primarily of sand-sized particles (0.06 to 2 mm).
Secretary	Secretary (formerly Director-General) of the Department of Planning and Environment or delegate.
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. Strategy A has been selected.
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 *Approved Methods for the Modelling and Assessment 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 over 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 the conditions of approval, as shown in **Table 2.1** and **Table 2.2**, at any residence or on more than 25 percent of any privately owned land.

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 AS/NZS 3580.10.1:2003 (R2014) Methods for sampling and analysis of ambient air – Determination of particulate matter – 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 Secretary. This program will be prepared in consultation with EPA 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.

A draft copy of this plan will be provided to the EPA for review and comment. Furthermore, ongoing consultation with OEHL via written correspondence (eg. Email), electronic correspondence (eg. Website) and verbal correspondence (eg. CCC meetings) will be continually undertaken. OEHL will be invited to attend an annual CCC meeting.

A copy of the Landscape Management Plan will be made publicly available on the PF Formation website.

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

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 AS/NZS 3580.10.1:2003 (R2014) *Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method*.

Deposited dust has been measured at a number of locations around the site boundary for over 15 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 probably relates to agricultural/horticultural activities in the surrounding area or occasional bushfires or abnormal weather factors, as the extractive industry operations are very consistent and stable.

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.

- One 32,000 litre water truck (new in December 2015) would continue to be used to regularly wet the active internal unsealed roads. Watering would take place up to four times per day depending on the prevailing conditions with an application of at least two litres per square metre.
- Water sprays fitted to the new water truck would be used to wet down stockpiles in dry windy weather.
- Material is wet screened prior to processing.
- 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 has enclosed cabs to avoid exposure of operatives to generated dust.

The raw feed material delivered to the wash plant includes an inherent level of moisture that would contribute to the overall control of dust.

In December 2015 the two access roads intersection with Wisemans Ferry Road were re-asphalted to improve dust control. A daily check is made on the two access roads intersection with Wisemans Ferry Road and any loose material is removed by road broom or hand sweeping.

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 Quarry 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.
- A copy of the complaints register will be provided to the EPA 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 Secretary 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 considers 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 Secretary is satisfied that an independent review is warranted, PF Formation will undertake the following within 3 months of the Secretary's advice:

- consult the landowner to determine the nature of their concerns;
- commission a suitably qualified, independent specialist, approved by the Secretary 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 Secretary 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 Secretary.

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 Secretary. If an agreement with the landowner cannot be achieved, PF Formation or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary 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 Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary 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 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 no trend of increasing rates of deposition at the monitoring sites.

If monthly rates of dust deposition approach the criterion level of 4g/m²/month in any one month as a result of operations on the Hitchcock Road site, the quarry manager will be notified and the reasons for this level noted.

If annual rates of dust deposition approach or exceed the criterion level of 4g/m²/month at any monitoring site caused by the operations on the Hitchcock Road site, the quarry manager will be informed, who will, within 7 days, notify the affected landowner, the Secretary and EPA 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 Secretary and EPA. If requested by the Secretary, 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 Secretary and EPA, 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 EPA 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 Secretary, the EPA 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 Secretary 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 EPA 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:

Quarry 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** or the **environmental manager**. Such inspections will be documented in a standard format and a copy submitted to the **quarry manager**. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

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

Dust monitoring relating to extraction activities on the Hitchcock Road site has been undertaken at three locations since prior 1998. 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
- the intersection of Hitchcock Road and Wisemans Ferry Road.

All these locations measure ambient dust deposition generated from all sources which would include other sand mine operations in Maroota and agricultural and other non-mining related activities. 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 *AS/NZS 3580.10.1:2003 (R2014) Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method*.

4.4 PM₁₀ dust action plan

Background

Dixon Sand (a neighbouring operator) operate a Tapered Element Oscillating Microbalance PM₁₀ at a monitoring location on the property adjoining the Maroota Public School. Dixon Sand have agreed to contact PF Formation in the event the rolling 24-hour average PM₁₀ result recorded by the Tapered Element Oscillating Microbalance nears or exceeds 42.5 µg/m³ in working hours. (This is after Dixon Sand themselves are notified by their consultants.) PF Formation have agreed to the following plan in the event they become aware of high PM₁₀ dust recordings in the Maroota area. The aim is to determine whether PF Formation operations could be a source or contributor to the high results and if this is the case and if there could be a potential impact on the school to take measures to reduce this potential impact.

At no time in the past decade have the results derived from the Tapered Element Oscillating Microbalance reached the designated trigger. A copy of the action plan if this occurs is shown below.

Hitchcock Road Sand Extraction and Rehabilitation Project
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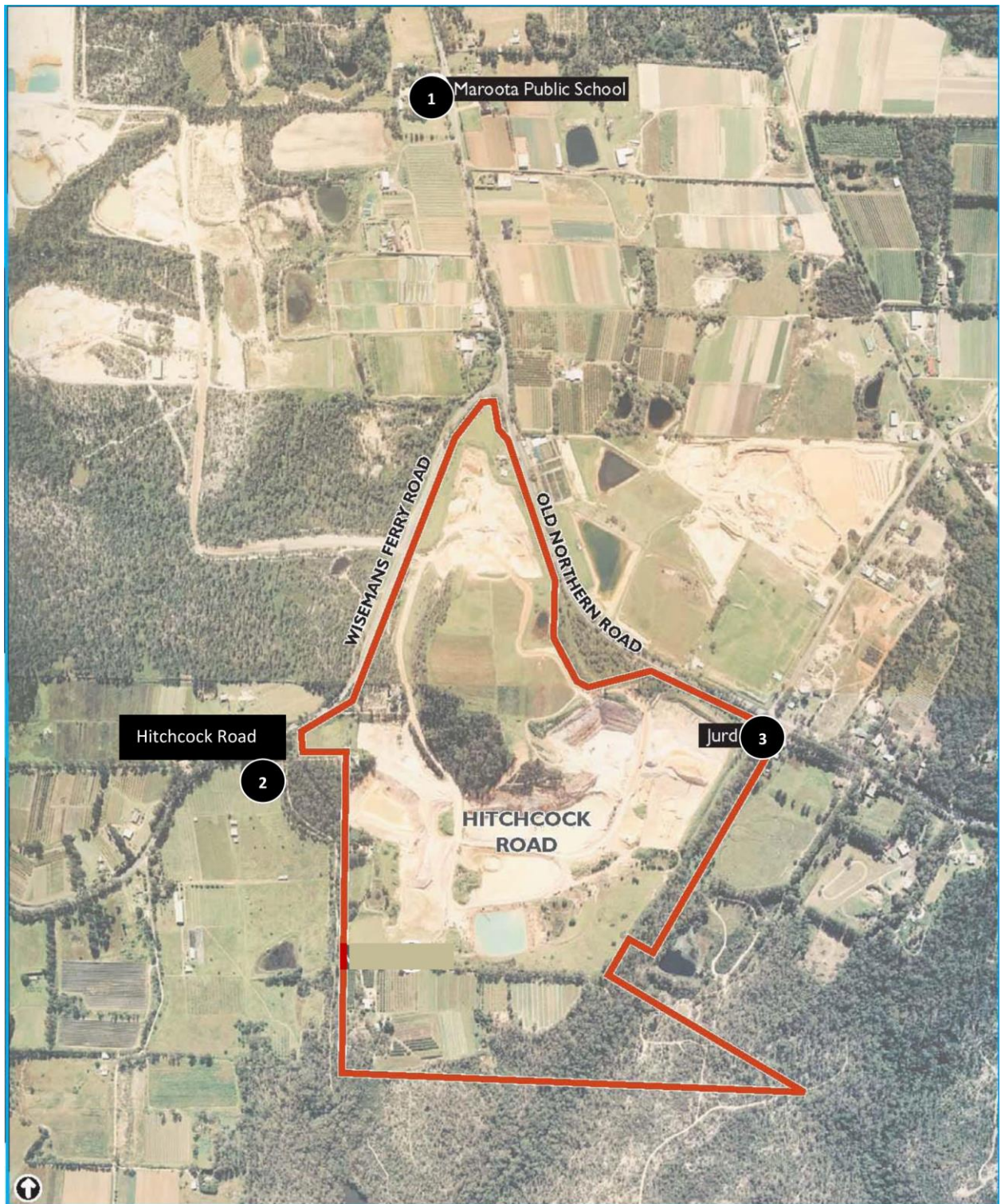


Figure 4.1
Dust Deposition Monitoring Locations

PM₁₀ dust action plan

In the event PF Formation are contacted by Dixon Sand advising that the PM₁₀ result is near or exceeds the trigger then:

1. John Graham, Peter Watt, Joshua Graham, Luke Graham and Peter Cummins (management team) are all to be advised by telephone/two-way radio immediately.
2. The current wind direction is to be assessed by them at the weather monitoring station.
3. If the wind direction is from PF Formation operations towards the Dixon Sand PM₁₀ monitoring location then action must be taken to reduce PF Formation's PM₁₀ emissions.
4. The management team are to advise all staff to assess all dust generating activities for all areas that could impact the Maroota Public School except for activities solely undertaken to reduce dust impacts.
5. The management team is to evaluate the conditions, liaise with Dixon Sand regarding the status of the rolling 24-hour PM₁₀ average and undertake necessary dust suppression activities such as watering roads, exposed areas and stockpiles.
6. If the dust levels have not reduced to allowable levels within 1 hour of ceasing dust generating activities and it is within school hours plus 30 minutes then all dust generating activities within the relevant area must stop.

4.5 Monitoring frequency

Monitoring of dust deposition will be undertaken monthly at the three nominated locations as shown in Figure 4.1.

4.6 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.

References

Collin C. Donges and Associates Pty Limited (1996) *Development Application. Proposed Extension of Sand Extraction, Haul Road Construction and Agricultural Land Rehabilitation on Land Containing and Surrounding the Maroota Trigonometrical Reserve, Maroota, Baulkham Hills*, Prepared for PF Formation.

Department of Environment and Conservation (2005), *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*.

DFA Consultants Pty Ltd (1998), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan*, Prepared for PF Formation.

DFA Consultants Pty Ltd (1999), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 1998/1999* Prepared for PF Formation.

DFA Consultants Pty Ltd (2000), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 1999/2000* Prepared for PF Formation.

DFA Consultants Pty Ltd (2001), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2000/2001* Prepared for PF Formation.

DFA Consultants Pty Ltd (2002), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2001/2002* Prepared for PF Formation.

DFA Consultants Pty Ltd (2003), *Maroota Trigonometrical Reserve Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2002/2003* Prepared for PF Formation.

DFA Consultants Pty Ltd (2004), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2003/2004* Prepared for PF Formation.

DFA Consultants Pty Ltd (2005), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2004/2005* Prepared for PF Formation.

DFA Consultants Pty Ltd (2006), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2005/2006* Prepared for PF Formation.

DFA Consultants Pty Ltd (2007), *Hitchcock Road Sand Extraction and Rehabilitation Project Maroota – Environmental Assessment (Three volumes)* Prepared for PF Formation.

DFA Consultants Pty Ltd (2007), *Hitchcock Road Sand Extraction and Rehabilitation Project – Environmental Management Plan, Audit Report 2006/2007* Prepared for PF Formation.

**Hitchcock Road Sand Extraction and Rehabilitation Project
Air Quality Monitoring Program**

DFA Consultants Pty Ltd (2008), *Hitchcock Road and Lot 1 Old Northern Road Sand Extraction and Rehabilitation Projects – Environmental Management Plan, Audit Report 2007/2008* Prepared for PF Formation.

Standards Australia AS/NZS 3580.10.1:2003 (R2014) *Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method.*