

2016-2017 ANNUAL ENVIRONMENTAL MANAGEMENT REVIEW

**EXTRACTIVE INDUSTRY at PITS 5 and 15,
LOT 3 DP 567166 and LOT 2 DP 510812,
4713 and 4751 OLD NORTHERN ROAD,
MARROOTA, NSW 2756**

PREPARED FOR PF FORMATION

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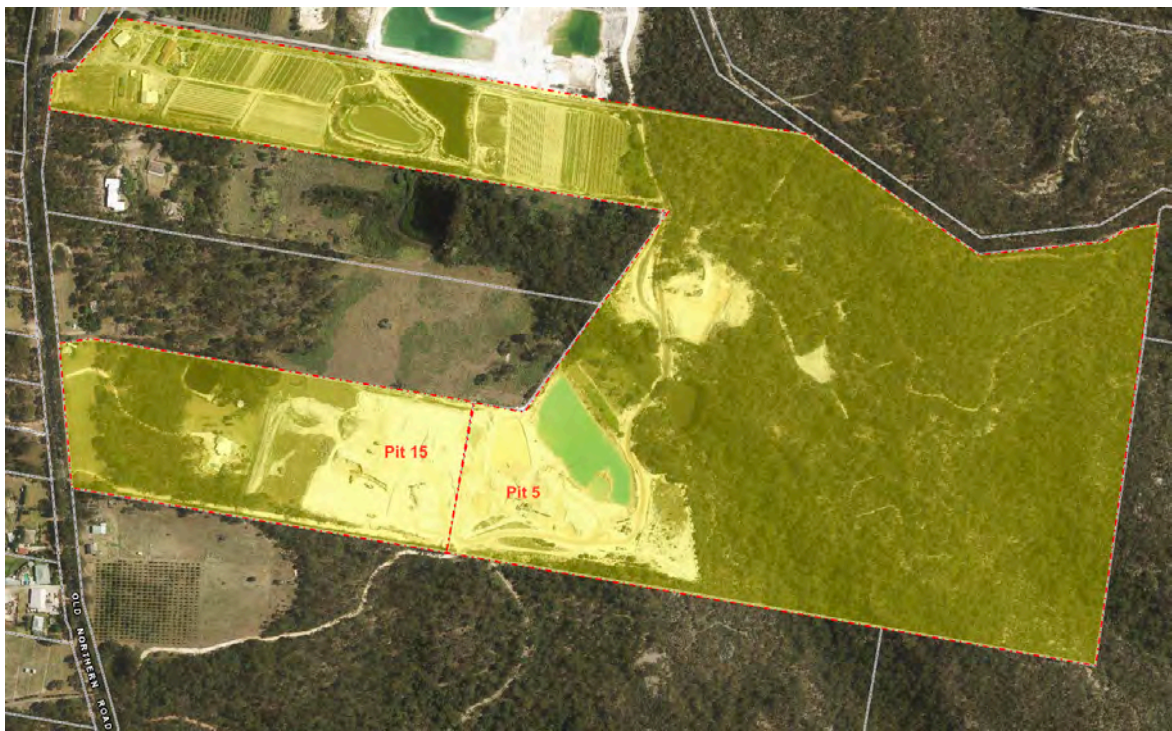
1. Background

The approved extraction areas are situated within Lot 3 DP 567166 (Pit 5) and the adjacent Lot 2 DP 510812 (Pit 15) at Maroota. The two lots have a combined area of approximately 60 hectares and are situated east of Old Northern Road approximately 2 km north of its intersection with Wisemans Ferry Road. The site geology is weathered Hawkesbury sandstone underlain by shale and both lots are included within the Maroota area of *Sydney Regional Environmental Plan No. 9 - Extractive Industry (No 2 - 1995)*.

Lot 3 DP 567166 has been partially extracted and rehabilitated under a previous development consent. Lot 3 DP 567166 is a privately owned battle-axe shaped lot with an area of 50.59 hectares and has a dwelling house located at the front of the property near Old Northern Road. Further east within the lot are two dams which support market gardening on rehabilitated land previously used for extractive industry.

Lot 2 DP 510812 is owned by a legal entity linked with PF Formation and is a rectangular shaped lot with an area of 10.12 hectares and frontage to Old Northern Road. A dwelling house occupied by an employee of PF Formation is located within the property near Old Northern Road as well as a dam and cleared grazing land. Figure 1 shows an aerial view of the land with the area within the two lot boundaries shaded in yellow.

Figure 1 Aerial View of Pits 5 and 15



Source: Six Maps 2017

The natural intermittent watercourse known as Coopers Creek and two tributaries cross the site and flow in a south-east direction into the adjoining Marramarra National Park. Coopers Creek drains into the Hawkesbury River approximately 4 km to the east. The flow of water in Coopers Creek is affected by agricultural use. The surrounding area has rural land uses characterised by areas of sand extraction, bushland and market gardens. Annual rainfall in the Maroota area averages 839mm although it is highly variable.

2. Environmental Management Plan

An Environmental Management Plan (EMP) for the site was provided to Hornsby Shire Council in December 2011. The EMP was revised in September 2012 taking into account the March 2012 modifications to the development consent and the Environment Protection Authority (EPA) need for a Pollution Incident Response Management Plan. The EMP was revised again in August 2013 taking into account the January 2013 order of the Land and Environment Court with regard to reduced setbacks from Aboriginal sites CC1 and CC6. The EMP was revised in November 2016 taking into account a modification to condition 10 in development consent No. 578/2009B and an updated Environment Protection Licence.

Copies of development consent No. 578/2009B and Environment Protection Licence No. 3829 for the site are included in the revised EMP. The EMP also includes Quarry Rehabilitation Plans, a Pollution Incident Response Management Plan, revised Dust Monitoring Plan, an Erosion and Sediment Control Strategy and Waste Management Plan. An environmental commitments summary checklist is completed each month by the site's Environmental Manager (assisted by specialist contractors and consultants) and is included in the Annual Environmental Management Review (AEMR)¹.

The revised EMP (November 2016) for the site includes 178 environmental commitments and/or actions as safeguards for the following key issues and activities.

- Hornsby Shire Council operational conditions.
- Department of Water and Energy (now NSW Office of Water) conditions.
- Department of Environment, Climate Change and Water (EPA) conditions.
- Department of Primary Industries - Mineral Resources condition.
- Department of Environment and Climate Change (NPWS) conditions.
- Roads and Traffic Authority (now Roads and Maritime Services) conditions.
- Environment Protection Licence 3829 requirements.
- EIS mitigation measures.
- Other requirements.

The objectives and/or requirements for the monitoring programme in the revised EMP include the following key issues and activities.

- Operational.
- Traffic.
- Water quality.
- Groundwater.
- Air quality.
- Noise.
- Waste management.
- Rehabilitation.
- Community and complaints.
- Contributions.

The requirements of condition 11 of development consent No. 578/2009B include an EMP in which Council is to be satisfied of the overall performance and management of the operation.

This document is the 2016-2017 AEMR for the site and reports on the key issues and activities, monitoring results plus the requirements of Condition 11 in Development Consent No. 578/2009B. The AEMR should be read in conjunction with the EMP.

¹ Formerly named an Annual Environmental Management Plan (AEMP).

3. Operational

The site has a maximum production rate of 195,000 tonnes/annum with a maximum extraction depth of 177 metres AHD and a 2 metre buffer above the wet weather high water table whichever is the higher level. Extraction will be staged over 11.8 hectares and 20 years. Administration of the site is carried out from PF Formation's main processing plant and offices at 1774 Wisemans Ferry Road, Maroota approximately 4 km from the site. The hours of operation are from 7am to 6pm Monday to Saturday. The site operates for around 275 days a year.

Extraction of material commenced in January 2013 in cell 1 of extraction area A of 3.5 hectares and was completed in 2015. Extraction of material commenced in 2013 in cell 1 of extraction area C of 4.8 hectares and continues into cell 2. Production from Pits 5 and 15 was approximately 188,740 tonnes in 2016-2017. The extraction depths established from surveyed benchmarks within the extraction areas in June 2017 were 181.3 metres AHD in Pit 5 and 187.2 metres AHD in Pit 15. Figures 2, 3, 4 and 5 show selected extraction and processing areas.

Figure 2 Pit 5 Sand Processing Area



Figure 3 Pit 5 View South in Area C Towards Cells 1 and 2



Figure 4 Pit 5 View North in Area C Towards Cells 1 and 2



Figure 5 Pit 15 Extraction Area and Silt Pond



The site operations are subject to the conditions in Development Consent No. 578/2009B and the requirements of EPA Licence No. 3829. The revised EMP details the development consent conditions and requirements of the EPA Licence. The Annual Return to the EPA for Pits 5 and 15 from March 2016 to March 2017 is included in Appendix 1. Completed monthly Environmental Commitments Summary Checklists for the site are provided in Appendix 2.

Section 2.5 of the *Hornsby Development Control Plan 2013* provides controls for extractive industries at Maroota. The DCP provides desired outcomes and prescriptive measures for various environmental issues. The site operations where relevant generally comply with the DCPs desired outcomes listed below.

Setbacks

- Setbacks to extractive operations that protect the natural environment and provide reasonable visual and acoustic amenity to the area.
- Where extraction is occurring on adjoining properties, the setbacks may be reduced to provide an integrated final land form.

Transport

- Extractive industries that maintain a safe and efficient road network.
- Extractive industries that have minimal impact on the local road network.

Water Resources

- The protection of existing drainage patterns including location, quantity and quality of water.
- The conservation and effective management of the sustainability of surface and groundwater resources.
- The protection of downstream dependent riparian ecosystems and natural habitats.

Soil and Water Management

- Extractive operations that minimise soil erosion and water pollution by minimising land disturbance, and requiring control measures on-site.

Acoustic Environment

- Reasonable acoustic amenity for residents and other users of the area.

Air Quality

- Extractive industries designed with measures to prevent air pollution.

Mitigation and Monitoring

- The implementation of good environmental management practices and mitigation measures throughout the life of an extractive operation.
- The establishment of a framework for ongoing monitoring of the environmental management practices and mitigation measures of an extractive operation including a flora and fauna monitoring program.

Extraction Sequence

- Extraction that occurs in an orderly and controlled manner.
- Extraction that is undertaken in an environmentally acceptable manner.
- Protection of land holdings not currently being extracted and to facilitate future extraction.

Rehabilitation

- Extractive industries that implement progressive rehabilitation strategies that minimise long-term impacts on surrounding land uses and optimise sustainable future land use.
- Extractive industries that adopt measures to ensure ongoing biodiversity conservation and sustainable management of vegetation.

4. Traffic

The modified development consent permits 35 truckloads to be removed from the site each day averaged over one month and in addition 10 laden vehicles are permitted to enter and leave the site between 6am and 7am Monday to Saturday inclusive.

Access to the site processing area is via Old Northern Road, along approximately 100 metres of a sealed Crown road and then approximately 1 km of unsealed internal access or haul road to Lot 3 DP 567166 and Lot 2 DP 510812. No site access is permitted off Old Northern Road to Lot 2 DP 510812 except for use by residents and visitors to the dwelling and for light vehicles in an emergency.

Regular audits were conducted by the Environmental Manager or delegate on truck movements from Pits 5 and 15 between 6am and 7am and total truck movements each month. The audit results show compliance with a maximum of 10 laden vehicles permitted to enter and leave the site between 6am and 7am Monday to Saturday. With approximately 188,740 tonnes of material extracted in 2016-2017 from Pits 5 and 15 and a truck load averaging around 30 tonnes there was on average 23 truckloads removed from the site per operating day.

Material is transported from Pits 5 and 15 by PF Formation via Old Northern Road and Wisemans Ferry Road to either Pit 4 for further processing or by customers to destinations in the Sydney metropolitan area.

5. Soil and Water Management

5.1 Sediment Control

The erosion and sediment control strategy in Attachment 8 of the EMP and the relevant measures in *Managing Urban Stormwater: Volume 2E Soils and Construction - Mines and Quarries and Soils and Construction 2004* (the Blue Book) are implemented and monitored by the Quarry Manager and Environmental Manager.

5.2 Surface Water

Rainfall discharges over the disturbed and undisturbed portions of the site within Coopers Creek catchment. All surface water run-off from site operations is contained within clean water ponds, sediment ponds and tailings ponds. No water has been drawn from Coopers Creek or groundwater for production. Monitoring of site operations by the Quarry Manager and Environmental Manager ensures that no sediment laden run-off water reaches Coopers Creek and that no groundwater is used in production.

5.3 Water Quality

Water quality is monitored downstream of the causeway on Coopers Creek (when flowing) in Lot 3 DP 567166 on a quarterly basis for pH, turbidity, oil and grease, total suspended solids and conductivity and then the samples are tested at a NATA registered laboratory. However, Coopers Creek did not flow within the site in 2016-2017 hence no results are available. Full documentation is kept by the Environmental Manager in the office at 1774 Wisemans Ferry Road, Maroota and is available for inspection.

5.4 Groundwater

At Lot 3 DP 567166 groundwater has been monitored in the Hawkesbury Sandstone aquifer near the extraction area since April 1998 at the specifically constructed and licensed bore PFL3MW1 which was abandoned and replaced by a new bore PFL3MW2 in April 2014. As agreed with DIPNR (now NSW Office of Water) in 1998 groundwater quality is monitored for:

- pH, electrical conductivity and total dissolved solids.

- calcium, magnesium, sodium and potassium.
- chloride, sulphate and bicarbonate.
- oil and grease.

The Annual Groundwater Management Plan for 2016-2017 is provided in Appendix 3 and includes the monitoring data collected from 1998 to date. An assessment of the data collected on the groundwater levels at Lot 3 DP 567166 since 1998 indicate that:

- The depth to the water table in the new bore (PFLMW-2, 17 July 2017) is 35.40m/152.73m AHD (based on measurements from below top of casing @188.13 RL). The new bore was equipped with a new Solinst Logger (3001 model, SN 0052032400) on 8 August 2014 (logger data 2013-2014 and during 2016-2017 was corrupted from PFL3MW1/MW2 and not analysed).
- The current pit extraction depths are approximately 181m AHD (Area A) and 187m AHD (Area C) which are both greater than 2 m above the groundwater level (~152m AHD).
- The water level data from PFLMW-2 (August 2014 to July 2017) indicates a relatively stable to slightly rising water table (i.e. 17 July 2017 was approximately 152.7m AHD). The recent water levels reflect a period of average rainfall periods following periods of high rainfall periods (2016-2017 = 957.4 mm, 2015-2016 = 1176 mm, and 2014-2015 = 1321.5mm).
- Water quality in the aquifer has shown to be consistent over a full seasonal cycle and since the start of monitoring.
- Since September 2008, the water level has fluctuated within the previous bore (PFLMW-1) over a small range of less than 0.4m (water table is relatively deep and shows a subdued response to rainfall recharge). The same stable pattern is observed with the 2014-2017 water levels.
- The current sand extraction operations in the Lot 3 area do not appear to have an adverse impact upon the groundwater sustainability and meet the development approval conditions.

The data collected during the year are available to the NSW Office of Water for their continued study in the area."

6. Air Quality

Dust deposition is monitored on a monthly basis via a dust gauge located near the western boundary of Lot 2 DP 510812 and Pit 15 and in accordance with the EPA endorsed Dust Monitoring Plan. A summary of the results of the monthly dust monitoring completed by a private contractor is shown in Table 1 over.

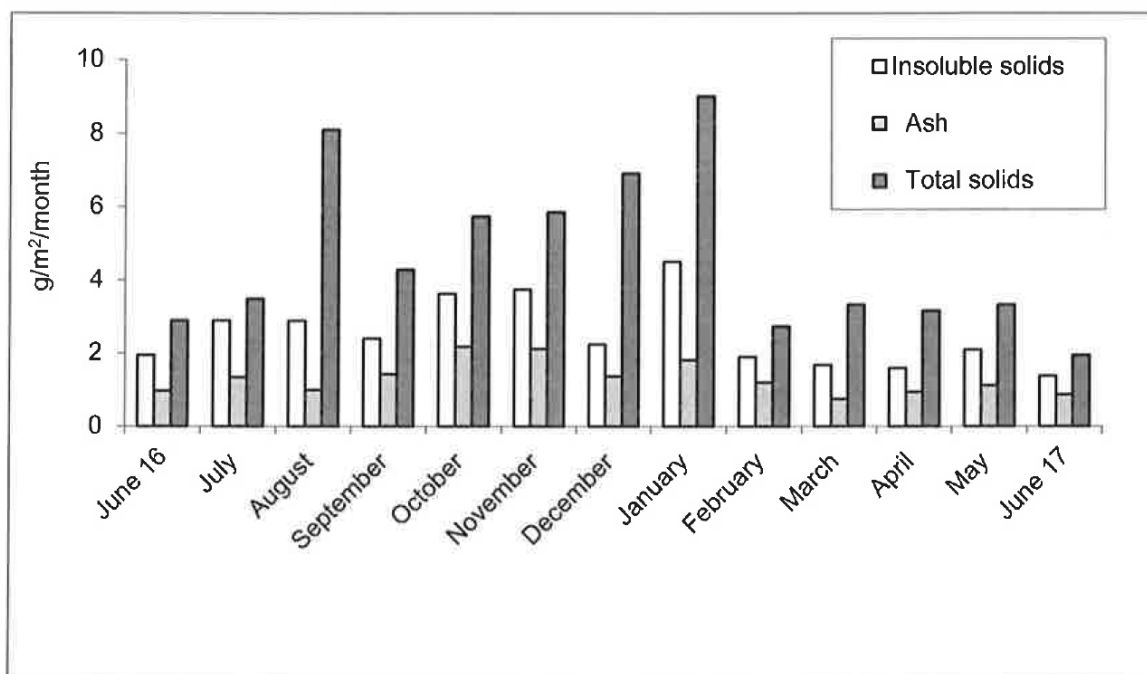
The results show that the annual average for insoluble solids dust deposition for the year ending June 2017 is 2.58 grams/square metre/month and below the EPA limit of 4 grams/square metre/month.

PF Formation has an agreement with Dixon Sands to be advised if the rolling 24-hour average PM₁₀ impacts at Maroota Public School reach 42.5 µg/m³. At no time during 2016-2017 were PF Formation advised that the Tapered Element Oscillating Microbalance recorded results of 42.5 µg/m³ or above during working hours.

The Environmental Manager is responsible for ensuring the air quality monitoring is completed by others with full documentation held at 1774 Wisemans Ferry Road, Maroota and available for inspection.

Table 1 Pit 15 Dust Monitoring Results

	Insoluble solids	Ash	Total solids
June 16	1.95	0.97	2.89
July	2.89	1.34	3.48
August	2.88	1.00	8.09
September	2.40	1.43	4.28
October	3.62	2.18	5.73
November	3.74	2.12	5.85
December	2.24	1.37	6.91
January	4.50	1.82	9.01
February	1.90	1.21	2.73
March	1.68	0.75	3.33
April	1.59	0.95	3.16
May	2.09	1.12	3.33
June 17	1.38	0.88	1.95



In addition, regular on-site checks are made by the Environmental Manager that there is no visible dust blowing across the site on windy days; there are no visible continuous exhaust emissions on public lands for greater than 10 seconds; and that dust suppression techniques have been applied during operations including on-site watering and keeping stockpiles damp. In October 2015, a manually operated dust suppression system designed by professional irrigation contractors was installed along approximately 1.5km of internal haul roads to help reduce traffic generation of on-site dusts. The bitumen at the entrance to the site is monitored regularly for material tracking and any visible dust. Several hundred tonnes of road base was placed on the haul road starting where the bitumen finishes to ensure that mud and fines are not tracked onto the road. A mechanical road sweeper and water cart are also available to reduce dust emissions.

At no time during 2016-2017 were operations stopped at Pits 5 and 15 because of windy conditions.

7. Noise

EPA Licence 3829 for the site has a number of requirements including $L_{Aeq(15\text{ minute})}$ noise limits for 13 locations in the Maroota area and requires implementation of a Noise Management Plan for the area so that the limits are not exceeded. The closest noise monitoring location to Pit 5 is the western boundary of Lot 2 DP 510812 or 4713 Old Northern Road and EPA Licence 3829 specifies a noise limit of 45 dB(A) $L_{Aeq(15\text{ minute})}$ during daytime. Noise has been monitored quarterly at this location since October 2010. Other receiver locations listed in the EPA Licence 3829 were further away from Pit 5 and therefore noise impact would be less.

Noise is measured using Australian Standard AS 1055.1 1997 *Acoustics - Description and Measurement of Environmental Noise – General Procedures*. Instrumentation is held at 1774 Wisemans Ferry Road, Maroota and includes a Class 1 Svan Sound Level Meter calibrated with a Class 1 Svantek Acoustic Calibrator. Instructions are available for the use of the equipment and the Environmental Manager and a delegate have been trained in their use. Full documentation and results are held at 1774 Wisemans Ferry Road, Maroota and are available for inspection.

An acoustic assessment report (Koikas Acoustics, 9 October 2017) for Pit 4 (Old Telegraph Road) and Pits 5 and 15 (Old Northern Road being the site) in the Maroota area is provided in Appendix 4. Noise monitoring was undertaken at the western boundary of 4713 Old Northern Road in July 2016, October 2016, February 2017 and June 2017. The results show that in most cases the measured $L_{Aeq(15\text{ minute})}$ was dominated by environmental noise (for example, birds chirping, insects, rustling of leaves) and intermittent traffic noise sources unrelated to the quarry noise. Generally quarry noise was not audible and not measurable. The noise criteria in EPA Licence No. 3829 for the site for the hours of operation were not exceeded. No noise mitigation measures need to be implemented.

8. Waste Management

The Environmental Manager is responsible for monitoring all on-site waste management, ensuring that all waste disposal, recycling and reuse procedures are followed as shown in the Waste Management Plan in Attachment 9 of the EMP. No waste is buried or burnt on site. Compliance with the Waste Management Plan as determined by the Environmental Manager is shown in Table 2.

Table 2 Pits 5 and 15 2016-2017 Compliance with Waste Management Plan

Material	Destination for Reuse and Recycling		Destination for Disposal		Compliance
	Estimated Volume	On-site	Estimated Volume	Off-site	
Surplus extraction material	Varies ~25% of total volume of extracted material	Completely reused as backfill in site rehabilitation	Not applicable	Not applicable	Yes
Topsoil	Varies	Stockpiled and completely reused in site rehabilitation	Not applicable	Not applicable	Yes
Vegetation	Varies depending on area of extraction	Completely reused on-site for sediment control and as mulch in landscaping	Not applicable	Not applicable	Yes
Wash water	~130,000 m ³ per month but varies	Completely recycled and reused on-site	Not applicable	Not applicable	Yes

Material	Destination for Reuse and Recycling		Destination for Disposal		Compliance
	Estimated Volume	On-site	Estimated Volume	Off-site	
Sullage	Varies	Held in 4,000L underground holding tank for disposal into an on-site absorption trench	Not applicable	Not applicable	Yes
Amenities shed garbage (food scraps, wrappers etc)	~1 m ³ per month	Held on-site in Council wheelie bins	~1 m ³ per month	Council provides weekly service for disposal at landfill	Yes
Glass, Plastics, Metals, Paper and Cardboard	~1 m ³ per month	Stockpiled on-site for transfer to waste bins at 1774 Wisemans Ferry Road	~1 m ³ per month	Recycled by approved waste contractors with two weekly collection	Yes
Oils, lubricants, used filters	~100 litres per month	Held on-site for transfer to waste oil tank at 1774 Wisemans Ferry Road	~100 litres per month	Recycled by an approved waste oil contractor	Yes

9. Rehabilitation

The site is being progressively rehabilitated and monitored in accordance with the Quarry Rehabilitation Plans shown in Attachment 2 of the EMP and in Figures 6, 7 and 8. The final land use for the extraction areas will be for agricultural purposes and bushland. The rehabilitation progress is monitored by the Environmental Manager or delegate. Full documentation for site rehabilitation is held at 1774 Wisemans Ferry Road, Maroota and is available for inspection.

PF Formation engaged a senior ecologist in 2016-2017 to locate the *Tetratheca glandulosa* clumps in Area A Cell 3 and to mark the northern extraction boundary of Area A. The clumps will be translocated later into rehabilitation Area E and shade shelters placed over them until sufficient shade can be provided by the developing vegetation in the site. An irrigation system will also be installed to keep the soil moist until the plants are established.

Figure 6 Pit 5 Recently Translocated *Tetratheca glandulosa* from Area A Cell 3



Figure 7 Pit 5 Translocated *Tetratheca glandulosa* from Area A Cell 3



Figure 8 Protection for *Tetratheca glandulosa* Plantings in Pit 5 from Area A Cell 3



10. Community and Complaints

PF Formation will contact the Pits 5 and 15 neighbouring residents by email or letter later in 2017 requesting them if there are any issues to resolve and to inform them of the 2016-2017 AEMR which will be available on PF Formation's website at www.pfformation.com.au. Neighbouring residents will also be advised in the letter that PF Formation are happy to have communication by calling PF Formation direct if there are any issues or complaints rather than formal meetings.

Community complaints are monitored and procedures implemented by the Quarry Manager and Environmental Manager to rectify any problems. A register of complaints is provided in Attachment 5 of the EMP and is maintained by the Environmental Manager. The objective is to have nil complaints and none were recorded in 2016-2017. The EPA annual return for March 2016 - March 2017 showed nil pollution complaints.

Environmental audits of the site, the EMP and its effectiveness and implementation may be completed as required. These audit reports would be confidential to PF Formation. No formal environmental audits of the site were conducted in 2016-2017.

No Corrective Action Requests were issued in 2016-2017.

There was no need to implement the Pollution Incident Response Management Plan in 2016-2017.

11. Contributions

Extraction and processing of material from Pit 5 commenced in January 2013 and Section 94 Contributions have since been regularly paid to Hornsby Shire Council.

12. Development Consent No. 578/2009B Condition 11

The requirements of Development Consent No. 578/2009B Condition 11 relate to monitoring and management. The specific conditions and an assessment of compliance are listed below in Table 3 below.

Table 3 Compliance with Development Consent No. 578/2009B Condition 11

Development Consent No. 578/2009A Condition 11	Compliance
<p>11. The proponent must submit to Council every 12 months after the endorsed date of this consent or prior to the commencement of the on-site extraction works (whichever is the latter date), an <i>Environmental Management Plan</i> in which Council is to be satisfied of the overall performance and management of the operation.</p> <p>The <i>Environmental Management Plan</i> should refer to the objectives and principles of Ecologically Sustainable Development and address the following matters:</p>	<p>First EMP submitted to Council in December 2011. EMP revised September 2012, August 2013 and November 2016.</p> <p>Ecologically Sustainable Development principles referred to in Section 3.2 of EMP.</p>
<p>11 a. Acquisition of all necessary licences and permits and an indication of how compliance with licensing and approval requirements will be achieved and due diligence attained.</p>	<p>The March 2016-March 2017 annual return for EPA Licence No. 3829 showed compliance with licence conditions (see Appendix 1).</p>
<p>11 b. On site materials management including management of operational impacts: if appropriate, include such as:</p> <ul style="list-style-type: none"> i. management of explosives, chemicals and fuel and their use ii. maintenance and site security plans 	<p>Implementation of 178 environmental commitments in EMP manages operational impacts. No explosives or chemicals used on-site. A 26,500 litre storage vessel complying with AS 1940-2004 supplies diesel fuel for vehicles, plant and equipment.</p>
<p>11 c. Water Management</p>	<p>See Attachment 8 of EMP, Section 5 and Appendix 3 in this AEMR.</p>
<p>11 d. Acoustic Management</p>	<p>See Section 7 and Appendix 4 in this AEMR.</p>
<p>11 e. Air Quality Management</p>	<p>See Attachment 7 of EMP and Section 6 of this AEMR.</p>
<p>11 f. Transport routes, access & movements.</p>	<p>See Section 4 of this AEMR.</p>
<p>11 g. Soil Conservation including geo-technical appraisal of tailing systems and erosion and sediment controls.</p>	<p>See Attachment 8 of EMP and Section 5.1 in this AEMR.</p>
<p>11 h. Social impact management including consultation with community groups, nearby residents and monitoring of complaints received.</p>	<p>See Section 10 of this AEMR. One dust complaint was received in 2016-2017.</p>

Development Consent No. 578/2009A Condition 11	Compliance
11 i. Identification, assessment and evaluation of risks, safeguards and the confidence level of contingency / emergency plans;	The Pollution Incident Response Management Plan did not need to be implemented in 2016-2017.
11 j. Statement of Compliance with the approved EIS documentation, conditions of this consent and the objectives of Councils DCP - Extractive industries.	General compliance with EIS, development consent conditions and <i>Hornsby DCP 2013</i> .
11 k. Advice and recommendations of all relevant state government agencies;	EPA Licence No. 3829 obtained. Implementation of 178 environmental commitments in EMP includes advice and recommendations of relevant state government agencies. Department of Water and Energy conditions 25 to 42 in development consent 578/2009B relate to works requiring controlled activity approval and do not apply as all extraction will take place at least 40 metres from Coopers Creek.
11 l. Reference to International Standards (ISO) 14001-14004 relating to Environmental Management Systems, which should address issues such as:- i. the capacity and support mechanisms necessary to implement and achieve the proponent company's environmental policy, objectives and targets; and ii. the means by which the proponent company measure, monitor and evaluate its environmental performance.	EMP in general compliance with AS/NZ ISO 14001:2004 and AS/NZ ISO 14004:2004. PF Formation's environmental policies in Section 3.1 of EMP.
11 m. Recommendations to adjust operation procedures to improve the overall performance of the operations.	No amended or additional procedures beyond 178 environmental commitments in EMP required at this stage. In October 2015 a dust suppression system was installed along approximately 1.5km of internal haul roads to help reduce traffic generation of on-site dusts.
11 n. Strategies to feed information from the monitoring program back into the management practices and action plans to improve the environmental performance and sustainability of all components of the proposal.	Section 3.5 of EMP provides for amendments and variations to EMP.

Development Consent No. 578/2009A Condition 11	Compliance
11 o. Training programs for operational staff and incentives for environmentally sound performance.	All PF Formation staff working on the site are inducted, trained and made aware of their environmental responsibilities, emergency response procedures and the requirements of the EMP.
11 p. Archaeological protection measures.	In January 2013 the Land and Environment Court made orders for reduced 20 metre buffer zones from Aboriginal sites CC1 and CC6.
11 q. Performance indicators in relation to critical operational issues including: <ul style="list-style-type: none"> i. Compliance with the conditions of consent; ii. Compliance with the objectives of Sydney Regional Environmental Plan No.9 Extractive Industries (No. 2 - 1995); and iii. Compliance with the objectives of Council's Extractive Industry Development Control Plan. 	Performance indicators have been set in Section 5 Environmental Monitoring of EMP. General compliance with conditions of consent which are included in EMP, the objectives of <i>Sydney Regional Environmental Plan No.9 Extractive Industries (No. 2 - 1995)</i> and <i>Hornsby DCP 2013</i> desired outcomes.

Appendix 1

EPA Annual Return 2 March 2016 to 1 March 2017

ANNUAL RETURN

LICENCE NO	3829
LICENCE HOLDER	ETRA PTY LTD
REPORTING PERIOD	02-Mar-2016 to 01-Mar-2017

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:

REVISED REPORTING PERIOD ____ / ____ / ____ to ____ / ____ / ____

(Note: the revised reporting period also needs to be entered in Section H)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 01-May-2017

Your Annual Return must be completed, including certification in Section H, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.

Failure to submit this Annual Return within 60 days after the reporting period ends may result in:

- the issue of a Penalty Notice for \$1500 (individuals) or \$3000 (corporations);
- OR
- prosecution.

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**



It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the *Protection of the Environment Operations Act 1997*.

Annual Return

ETRA PTY LTD



Use the checklist below to ensure that you have completed your Annual Return correctly.

(✓ the boxes)

CHECKLIST		
<input checked="" type="checkbox"/>	Section A:	All licence details are correct
<input checked="" type="checkbox"/>	Section B1:	You have entered the correct number in the complaints table
<input checked="" type="checkbox"/>	Section B2 – B3:	If there are tables, you have provided the required details
<input checked="" type="checkbox"/>	Section C:	You have answered question 1, and 2 if applicable
<input checked="" type="checkbox"/>	Section D:	If applicable, you have completed all load calculation worksheets
<input checked="" type="checkbox"/>	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
<input checked="" type="checkbox"/>	Section F:	You have answered question 1, 2 and 3 if applicable
<input checked="" type="checkbox"/>	Section G:	You have answered question 1 and question 2, 3 and 4 or question 5 through to 11 if applicable
<input checked="" type="checkbox"/>	Section H:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered
<input checked="" type="checkbox"/>	Make a copy of the completed Annual Return and keep it with your licence records	

Please send your completed Annual Return by **Registered Post** to:

**Regulatory and Compliance Support Unit
Environment Protection Authority
PO Box A290
SYDNEY SOUTH NSW 1232**

A Statement of Compliance - Licence Details

ALL licence holders must check that the licence details in Section A are correct

If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.

Licence variation and transfer application forms are available on the EPA website at: <http://www.epa.nsw.gov.au/licensing>, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number 3829
Licence Holder ETRA PTY LTD
Trading Name (if applicable) PF FORMATION

A2 Premises to which Licence Applies (if applicable)

Common Name (if any) HORNSBY SITES
Premises OLD NORTHERN ROAD MAROOTA NSW 2756

A3 Activities to which Licence Applies

Extractive activities

A4 Other Activities (if applicable)

A5 Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure
Land-based extractive activity	> 100,000.00 - 500,000.00	T annual capacity to extract, process or store

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

<p>Number of complaints recorded by the licensee during the reporting period.</p> <p>If no complaints were received enter nil in the attached box, otherwise complete the table below.</p>	<p>nil</p>
--	------------

Pollution Complaint Category	Number of Complaints
Air	
Water	
Noise	
Waste	
Other	

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is **not** required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Monitoring Point 1

Dust monitoring, "Dust Monitoring Location" on the map titled "Staging of Sand Extraction at Part Lot 3 DP 567166 & Part Lot 2 DP510812 at Old Northern Rd, Maroota" which was emailed to the EPA on 3 June 2010.

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulates - Deposited Matter	grams per square metre per month	12	12	0.93	2.62	4.50

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, **no tables** will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☒ the boxes)

- 1 Were all conditions of the licence complied with (including monitoring and reporting requirements)? ☒ Yes ☐ No

(✓ a box)

- 2 If you answered 'No' to question 1, please supply the following details for each non -compliance in the format, or similar format , provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

- a) What was the specific licence condition that was not complied with?
- b) What were the particulars of the non -compliance?
- c) What were the date(s) when the non -compliance occurred, if applicable?
- d) If relevant, what was the precise location where the non -compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

- e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non -compliance?
- f) What was the cause of the non -compliance?
- g) What action has been, or will be, taken to mitigate any adverse effects of the non -compliance?
- h) What action has been, or will be, taken to prevent a recurrence of the non -compliance?

3. How many pages have you attached?

Each attached page must be initialled by the person(s) who signs Section G of this Annual Return

C2 Details of Non-Compliance with Licence

Licence condition number not complied with
Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS)
If required, further details on particulars of non-compliance
Date(s) when the non-compliance occurred, if applicable
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
Cause of non-compliance
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Action taken or that will be taken to prevent a recurrence of the non-compliance

D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

- 1 Have you prepared a PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

- 2 Is the PIRMP available at the premises?

(✓ a box)

☒ Yes

☐ No

- 3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box)

☒ Yes

☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address

www.ptformation.com.au

- 4 Has the PIRMP been tested in the last 12 months?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on

19/10/2016

- 5 Has the PIRMP been updated?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on

19/10/2016

- 6 How many times has the PIRMP been activated in this reporting period?

Nil

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on

 / /

The EPA's guidelines for preparation of pollution incident response management plans are available at

<http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm>

F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1 Are there any conditions attached to your licence that require pollution monitoring to be undertaken?

(✓ a box)

☒ Yes

☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Do you operate a web site?

(✓ a box)

☒ Yes

☐ No

3 Is the pollution monitoring data published on your web site in accordance with the EPA's written requirements for publishing pollution monitoring data?

(✓ a box)

☒ Yes

☐ No

If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:

Web site address

www.pformation.com.au

The EPA's written requirements for publishing pollution monitoring data are available at

<http://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm>

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.

G Statement of Compliance - Environmental Management Systems and Practices

- 1 Do you have an environmental management system (EMS) certified to ISO 14001 or any other demonstrated equivalent system¹? (see note below on demonstrated equivalent)

(✓ a box)

☐ Yes

☒ No

If your answer to question 1 is 'No', please proceed to question 5. If your answer to question 1 is 'Yes', please proceed to question 2.

- 2 When was the last check of the EMS² completed (see note below on check of EMS)?

- 3 Were there any non-conformances related to environmental issues identified in the last check of the EMS?

(✓ a box)

☐ Yes

☐ No

- 4 If there were non-conformances identified, were these non-conformances rectified?

(✓ a box)

☐ Yes

☐ No

If you answered 'No' to question 1, please answer questions 5 - 11. If you answered 'Yes' to question 1 please proceed to section H. Questions 5-11 relate to any documented environmental practices, procedures and systems in place. Refer to <http://www.epa.nsw.gov.au/licensing/EMCP.htm> for guidance on how to complete questions 5 to 11. If unsure of the answer, tick No.

- 5 Have you conducted an assessment of your activities and operations to identify the aspects that have a potential to cause environmental impacts and implemented operational controls to address these aspects?

(✓ a box)

☒ Yes

☐ No

- 6 Have you established and implemented an operational maintenance program, including preventative maintenance?

(✓ a box)

☒ Yes

☐ No

- 7 Do you keep records of regular inspections and maintenance of plant and equipment?

(✓ a box)

☒ Yes

☐ No

- 8 Do you conduct regular site audits to assess compliance with environmental legal requirements and assess conformance to the requirements of any documented environmental practices, procedures and systems in place?

(✓ a box)

☒ Yes

☐ No

- 9 Are the audits of documented environmental practices, procedures and systems undertaken by a third party?

(✓ a box)

☐ Yes

☒ No

- 10 Have you established and implemented an environmental improvement or management plan?

(✓ a box)

☒ Yes

☐ No

- 11 Do you train staff in environmental issues that may arise from your activities and operations and keep records of this

(✓ a box)

☒ Yes

☐ No

¹ Demonstrated equivalent refers to an environmental management system that the EPA considers is equivalent to the accountability, procedures, documentation and record keeping requirements of an ISO 14001 system. For further information go to:

<http://www.epa.nsw.gov.au/resources/licensing/150402-environmental-management-systems-guidelines.pdf>

² Undertaking a 'check of an EMS' refers to the ISO 14001 requirements that an organisation demonstrates conformity to the requirements of its EMS and to the standard, these checks require third-party certification that requirements have been met.

Annual Return

ETRA PTY LTD



H Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. **Please tick (✓) the box** next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is:	the Annual Return must be signed and certified by one of the following:
an individual	<input type="checkbox"/> the individual licence holder, or <input type="checkbox"/> a person acting on behalf of the individual licence holder in accordance with a power of attorney for the individual. A copy of the power of attorney must be submitted with the Annual Return.
a company	<input checked="" type="checkbox"/> by two directors, or <input type="checkbox"/> by a director and a company secretary, or <input type="checkbox"/> if a proprietary company that has a sole director who is also the sole company secretary - by that director, or <input type="checkbox"/> by a person delegated to sign a copy of the Annual Return on the company's behalf in accordance with the Corporations Act 2001. Delegation of authority must be submitted with the Annual Return, or. <input type="checkbox"/> by affixing the common seal, in accordance with the Corporations Act 2001
a public authority other than a Council	<input type="checkbox"/> by the Chief Executive Officer of the public authority, or <input type="checkbox"/> by a person delegated to sign on the public authority's behalf in accordance with its legislation.
a local Council	<input type="checkbox"/> by the General Manager in accordance with s377 of the Local Government Act 1993 , or <input type="checkbox"/> by affixing the seal of the Council in a manner authorised under the Local Government Act 1993.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.

I/We

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C, D, E, F and G and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:

For the reporting period 02-Mar-2016 to 01-Mar-2017 or ___/___/___ to ___/___/___

SIGNATURE: [Signature]

NAME: (printed) Joshua Graham

POSITION: Director

DATE: 4, 04, 2017

SIGNATURE: [Signature]

NAME: (printed) Luke Graham

POSITION: Director

DATE: 4, 4, 2017

SEAL(if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED

Appendix 2

Completed Environmental Commitment Checklists

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING ...June.... 2017 .

Completed by Environmental Manager - Signature*Melissa Mass*..... Date30th June 2017.....

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	Truck movements were not exceeded. Weighbridge records were reviewed.
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		No	

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING ...May..... 2017 .

Completed by Environmental Manager - Signature *Melissa Mass* Date 30th May 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	Truck movements were not exceeded. Weighbridge records were reviewed.
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		No	

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: April 2017

Completed by Environmental Manager - Signature  Date: 28th April 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Deposited dust results for March 2017 showed low levels. No more than 10 truck movements occurred between the hours of 6:00 and 7:00am.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MARROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: March 2017

Completed by Environmental Manager - Signature  Date: 31st March 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Deposited dust results for February 2017 showed low levels. No more than 10 truck movements occurred between the hours of 6:00 and 7:00am.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: February 2017

Completed by Environmental Manager - Signature  Date: 28 February 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Noise monitoring was carried out at the nominated location, quarry noise was audible throughout the reading but was not measurable. Road traffic and natural sounds were the dominant noise sources. Deposited dust results for January were higher than previous months' results for the reporting period, the average remains below the EPA criterion. Water samples could not be collected from Coopers Creek as the creek was not in flow. No more than 10 truck movements occurred between the hours of 6:00 and 7:00am.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	Yes

**PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MARROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST**

COMMITMENT/ACTION - MONTH ENDING: January 2017

Completed by Environmental Manager - Signature  Date: 31st January 2017

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Noise readings will be undertaken next month. Deposited dust results for December 2016 showed low levels. No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00am.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: December 2016

Completed by Environmental Manager - Signature  Date: 23rd December 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed. The EMP has been reviewed and updated to include Sect 96 changes, the revised plan is on the PF Formation website.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	No more than 10 laden vehicle movements occurred between the hours of 6:00 & 7:00am Deposited dust results for November 2016 showed low levels. Water samples were un able to be collected from Coopers Creek as it was not in flow.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	No material tracking onto Old Northern Rd was observed throughout the month.
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA

ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: November 2016

Completed by Environmental Manager - Signature  Date: 30th November 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00am Deposited dust results for October 2016 showed low levels.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	The EPA Risk Based Licencing system has classified the site as a Low Risk site.
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	No

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: October 2016

Completed by Environmental Manager - Signature  Date: 31st October 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	An average of 25 truckloads per day was removed from the site over the month.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00 am. Deposited dust results for September 2016 showed low levels. Noise monitoring was carried out at the nominated location. Noisy birds and road traffic were the dominant noise sources. Quarry noise was just audible but not measurable.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	Yes

PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA

ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST

COMMITMENT/ACTION - MONTH ENDING: September 2016

Completed by Environmental Manager - Signature  Date: 30 September 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	An average of 20 truckloads per day was removed from the site over the month.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00am Deposited dust results for August 2016 show low levels. Water samples were un able to be collected from Coopers Creek as it was not in flow.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	No

**PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST**

COMMITMENT/ACTION - MONTH ENDING: August 2016

Completed by Environmental Manager - Signature  Date: 31st August 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded, weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Deposited dust results showed low levels for July 2016. No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00am
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	Groundwater samples were collected and the data logger was downloaded, the information will be analysed in the Groundwater Report.
Other Requirements	167 to 178		
Any As Required commitments implemented?		Yes or No	No

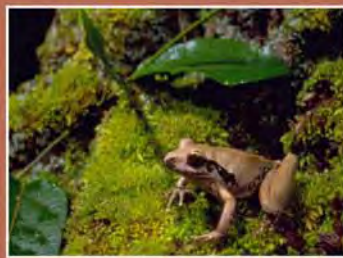
PF FORMATION EXTRACTIVE INDUSTRY AT PITS 5 AND 15, OLD NORTHERN ROAD, MAROOTA
ENVIRONMENTAL COMMITMENTS SUMMARY CHECKLIST
COMMITMENT/ACTION - MONTH ENDING: July 2016

Completed by Environmental Manager - Signature  Date: 29th July 2016

COMMITMENT GROUP	EMP Checklists Commitment Numbers	COMPLETED ✓ Satisfactory or X Needs Corrective Action	COMMENTS Include details of any Corrective Actions required, complaints received and implementation of any As Required commitments
Operational	10 to 24	✓	Truck movements were not exceeded; weighbridge records were reviewed.
Dept. Water and Energy	25 to 42	✓	
Dept. of Environment Climate Change and Water (EPA)	43 to 64	✓	Deposited dust results showed low levels for June 2016. No more than 10 laden vehicle movements occurred between the hours of 6:00 and 7:00am. Noise monitoring was carried out at the nominated location. Quarry noise was not audible and road traffic was the dominant noise source.
Dept. of Primary Industries Mineral Resources	65	✓	
Dept. of Environment and Climate Change (NPWS)	66 to 74	✓	
Roads and Traffic Authority	75 to 79	✓	
Environment Protection Licence	80 to 91	✓	
EIS Mitigation Measures	92 to 166	✓	
Other Requirements	167 to 178	✓	
Any As Required commitments implemented?		Yes or No	Yes

Appendix 3

***Groundwater Report Lot 3, DP 567166, Maroota (Pit 5),
Annual Groundwater Management Plan, 2016-2017, 26 July 2017,
Earth2Water Pty Ltd.***



PF Formation

Groundwater Report Lot 3, DP 567166, Maroota (Pit 5) Annual Groundwater Management Plan 2016-2017

Report E2W-0224 R003b

26 July 2017



Prepared by: Dino Parisotto (Director)
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earth₂water
Pty Ltd
Environmental & Groundwater Consulting

Client: PF Formation

**Project: Groundwater Report
Lot 3, DP 567166, Maroota (Pit 5)
2016-2017 Annual Groundwater Management Plan**

Prepared for:
Josh Graham
PF Formation
1774 Wisemans Ferry Road
Maroota, NSW, 2756

Report: 26 July 2017
Ref: E2W-224 R003b



Prepared By: Earth2Water Pty Ltd

A handwritten signature in blue ink, appearing to read 'D. Parisotto'.

D. Parisotto (Managing Director)
BAppSc; Geology (Hons). MAppSc; Groundwater Management. C3 Driller; DL1977
SCPA Certified Practitioner (17017); Site Assessment & Management

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Reports Distributed and Authorised for:

PF Formation: report - electronic copy (pdf)

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Appendix C	Previous Bore Hydrographs (URS, 2013)
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1 INTRODUCTION

Earth2Water Pty Ltd (E2W) was engaged by PF Formation (PFF) to provide the Groundwater Report (Maroota 2014-2015 Annual Water Management Plan) for Lot 3 (D.P 567166), Maroota (Pit 5, Figure 1) as part of the Approval by Hornsby Shire Council. Groundwater sampling of the new bore (abandoned PFL3MW-1 was replaced by PFL3MW-2 in April 2014) and a Solinst logger setup¹ was conducted in consultation with Dr Fabio Carosone (retired hydrogeologist from URS Pty Ltd) on 8 August 2014. URS Australia Pty Ltd (URS) was previously retained by PFF to prepare the groundwater component of the report. The following June 2015, August 2016 and this July 2017 sampling event were conducted by E2W (Dino Parisotto) in consultation with PFF (Joshua Graham).

The Water Management Plan (WMP) is part of the overall Environmental Management Plan and addresses the surface water and groundwater aspects of the sand extraction operations at the site. The current Groundwater Management Plan by E2W for the year 2016 - 2017 includes the monitoring data collected from 1998 to 18 July 2017.

2 GROUNDWATER MONITORING NETWORK

At the Lot 3 site, groundwater has been monitored in the Hawkesbury Sandstone aquifer since April 1998 at the specifically constructed bore PFL3MW1. Initially, water levels in the bore were measured manually at weekly intervals together with chemical field parameters, such as pH and Electrical Conductivity (EC). The manual measurements continued until December 1998. In January 1999, the bore was equipped with a Dataflow automatic datalogger (URS, 2013).

Between January 1999 and June 2000, the datalogger was downloaded quarterly. Since June 2000, data downloading has been carried out bi-annually.

In January 2006, the data logger was changed to a Solinst Levellogger, model 3001 unit, capable of recording up to 10 000 readings and which has a battery life of 10 years at the rate of one daily reading. The unit, in addition to measuring the head of water above the sensor, also records temperature variations. The change was necessitated by the Dataflow Company ceasing its operations in Australia.

During April 2014 the data logger was removed from PFL3MW1 (now abandoned) due to drilling of a replacement bore (PFL3MW-2, Refer to Appendix C & D). The data in the logger was damaged and could not be retrieved for assessment (Note: faulty logger was sent to Solinst Canada for assessment). The data from 2014 to 2016 is available and shows little variation over time (SWL=36.60m @ 8 August 2014, and SWL=36.98 m @ 30 June 2015, and approximately SWL=36.72 @ 10 August 2016). The logger data recorded from 2016 to 2017 was not usable. The logger was re-programmed and installed for a 2 week trial period to assess usability or replacement. Groundwater data is available from August 2016, June and July 2017 (Table 2).

¹ Download of the Solinst logger in PFL3MW-1 in July 2014 was not successful due to an instrument reading error (logger age and water ingress).

Groundwater samples from PFL3MW2 (Appendix C & D contains drilling and borelog construction details) was collected by E2W (Dino Parisotto and Joshua Graham) on 17 July 2017 and submitted for chemical analysis under Chain of Custody procedures to Australian Laboratory Services Pty Ltd. The laboratory reports are presented in Appendix B. The analytical list, which was discussed and agreed upon in 1998 with the DIPNR (now the NSW Office of Water), includes:

- pH, Electrical Conductivity and Total Dissolved Solids;
- Calcium, Magnesium, Sodium and Potassium;
- Chloride, Sulphate and Bicarbonate; and
- Oil and Grease.

The depth to groundwater (acoustic water level probe) and the field chemistry (EC, PH, T, DO, Redox) was measured using a calibrated field meter (TPS 90 FLMV) on 17 July 2017.

The chemical parameters from the bore (PFL3MW2) are tabulated and graphed together with the previous data from PFL3MW1 (Graph-1). The previous water monitoring data (PFL3MW1) is presented in Appendix C.

The site plan has been updated with topographic contours from an aerial survey conducted in May 2017 by Landair Pty Ltd (Figure 1). The current pit extraction depths are approximately 181 mAHD (Area A) and 187 mAHD (Area C) which are both greater than 2 m above the groundwater level (~152 mAHD).

3 GROUNDWATER DATA ASSESSMENT

3.1 Groundwater Levels

Since beginning of recording, the range of fluctuations in water levels in bore PFL3MW1 has been from a maximum of 175.09 m AHD in September 1998 (manual measurement) to a minimum of 172.01 m AHD at the beginning of February 2007, with a long term average of 173.80 m AHD. This range of fluctuations is comparable with similar conditions observed in other monitoring bores in the Hawkesbury Sandstone in the Maroota area and reflects the extended drought and rainfall recharge trends experienced in the area during that period.

Since June 2007, when the Maroota area recorded a monthly total rainfall of 384.5 mm, the water levels have maintained a steady level regardless of the mostly above average rainfall since that time. Groundwater levels in the Hawkesbury Sandstone measured in the monitoring bore indicate that the water levels respond in a subdued manner to the infiltration of rainwater and that the overall fluctuation in levels has been 3 m (maximum and minimum recorded values), but with the most common range being less than 0.5 m.

Water level data from PFL3MW1 from April 1998 to 2013 are presented in Appendix C, Figure 1. Although the loss of data is highly regrettable (2014 download), it is considered that no unexpected conditions would have evolved at the site, based on previous trends and the fact that no changes to the operation of the sand mining operation occurred during the period.

The water table in the new bore (PFL3MW-2, 8 August 2014) is 36.60 m and 151.56 mAHD (based on measurements from below top of PVC casing @188.13 RL). The new bore was

equipped with a new Solinst Logger (3001 model, SN 0052032400) installed at completion of groundwater sampling (8 August 2014).

The water level data from PFL3MW-2 (August 2014 to August 2016) indicates a relatively stable to rising water table (i.e. June 2016 ~ 151.8 mAHD and approximately ~ 1m rise over 2 years) which is associated with the above average rainfall (2014-2015 = 1321.5 mm, and 2015-2016 = 1176 mm). The groundwater table on 17 July 2017 was 152.73 mAHD indicating relatively stable to rising water levels given the 16 June 2017 (152.37 mAHD), and August 2016 results (152.47 mAHD, Table 2 and Figure G-1).

3.2 Groundwater Quality

The laboratory analytical results from June 1999 to 2013 for PFL3MW1 (are summarised in Table 3.1 and Graph-1). The laboratory results for PFL3MW2 (August 2014, June 2015, August 2016, July 2017) are tabulated in 3.2 and in Appendix B (ALS report).

The groundwater in bore PFL3MW2 is fresh, with a characteristic rainfall composition, low (acidic 4.11) pH and low TDS (102 mg/L); it is of a Sodium-Chloride type (similar to other bores in the Maroota area). The water in PFL3MW2 is similar composition to PFL3MW1 (Graph-1).

The samples were also analysed for Oil and Grease to monitor the possible effect of the sand extraction operations. The water sample from PFL3MW2 did not report any presence of Oil or Grease.

Overall, the quality of the groundwater (PFL3MW1 & PFL3MW2) at Lot 3 is relatively consistent with minor fluctuations as expected from a deep groundwater system with seasonal rainfall variations.

3.3 Quality Control

The laboratory quality control samples (laboratory duplicates, procedure blanks and control spikes) returned results within the required limits and acceptance criteria. The quality control data generated by the laboratory are presented with the laboratory certificates in Appendix B.

Based on the evaluation of the data, it is assessed that the accuracy and precision of the analytical data generated in the sampling round, as reported by the analytical laboratory, are acceptable as a basis for interpretation.

4 CONCLUSIONS

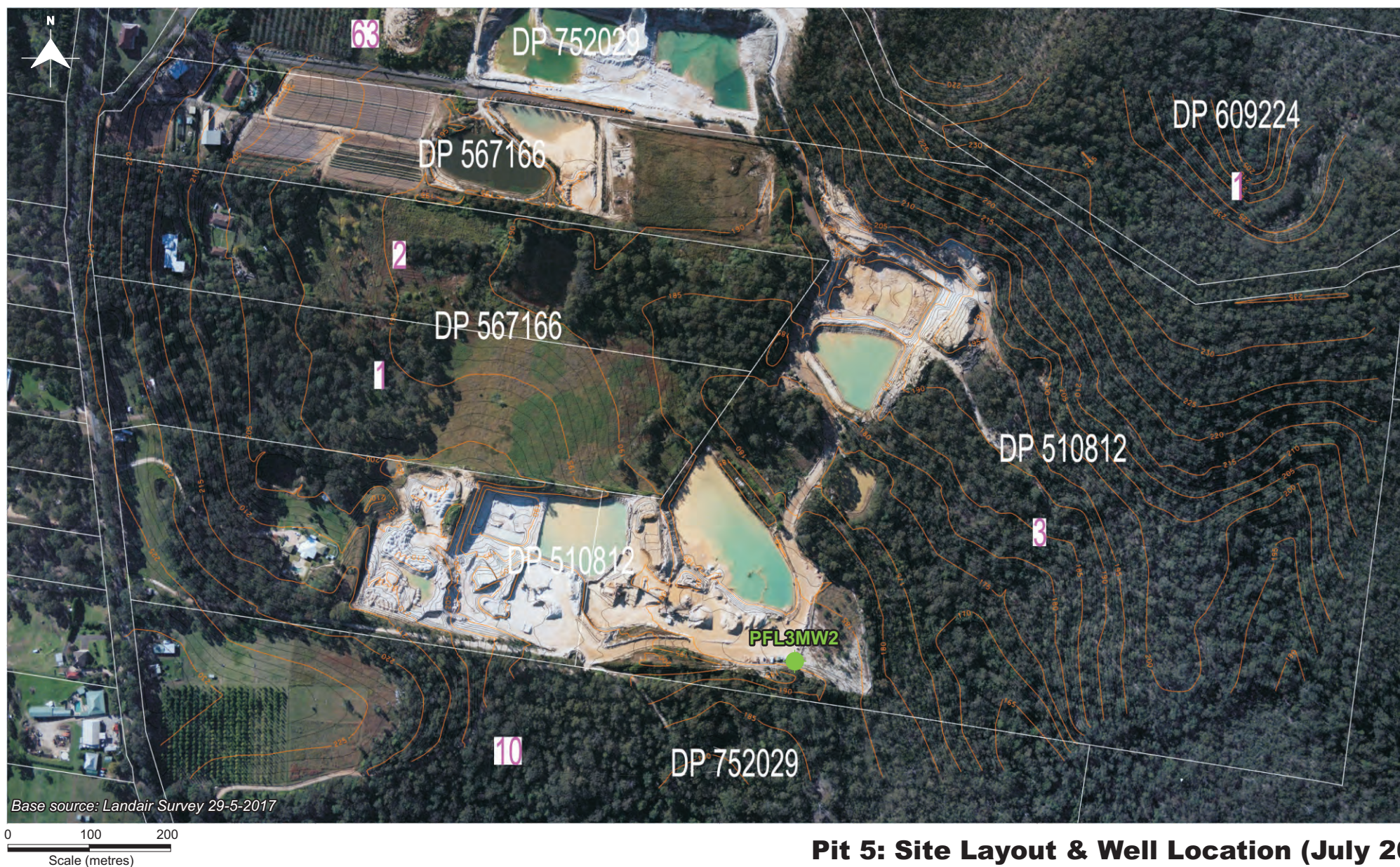
An assessment of the data collected on the groundwater levels at Lot 3 since 1998 indicate that:

- The depth to the water table in the new bore (PFLMW-2, 17 July 2017) is 35.40 m/152.73 mAHD (based on measurements from below top of casing @188.13 RL). The new bore was equipped with a new Solinst Logger (3001 model, SN 0052032400) on 8 August 2014 (logger data 2013-2014 and during 2016-2017 was corrupted from PFL3MW1/MW2 and not analysed).

- The current pit extraction depths are approximately 181 mAHD (Area A) and 187 mAHD (Area C) which are both greater than 2 m above the groundwater level (~152 mAHD).
- The water level data from PFL3MW-2 (August 2014 to July 2017) indicates a relatively stable to slightly rising water table (i.e. 17 July 2017 is approximately 152.7 mAHD). The recent water levels reflects a period of average rainfall periods following periods of high rainfall periods (2016-2017 =957.4 mm, 2015-2016=1176 mm, and 2014-2015 =1321.5 mm).
- Water quality in the aquifer has shown to be consistent over a full seasonal cycle and since the start of monitoring;
- Since September 2008, the water level has fluctuated within the previous bore (PFL3MW-1) over a small range of less than 0.4m (water table is relatively deep and shows a subdued response to rainfall recharge). The same stable pattern is observed with the 2014-2017 water levels.
- The current sand extraction operations in the Lot 3 area do not appear to have an adverse impact upon the groundwater sustainability and meet the Development Approval Conditions.

The data collected during the year are available to the NSW Office of Water for their continued study in the area.

FIGURES



Pit 5: Site Layout & Well Location (July 2017)

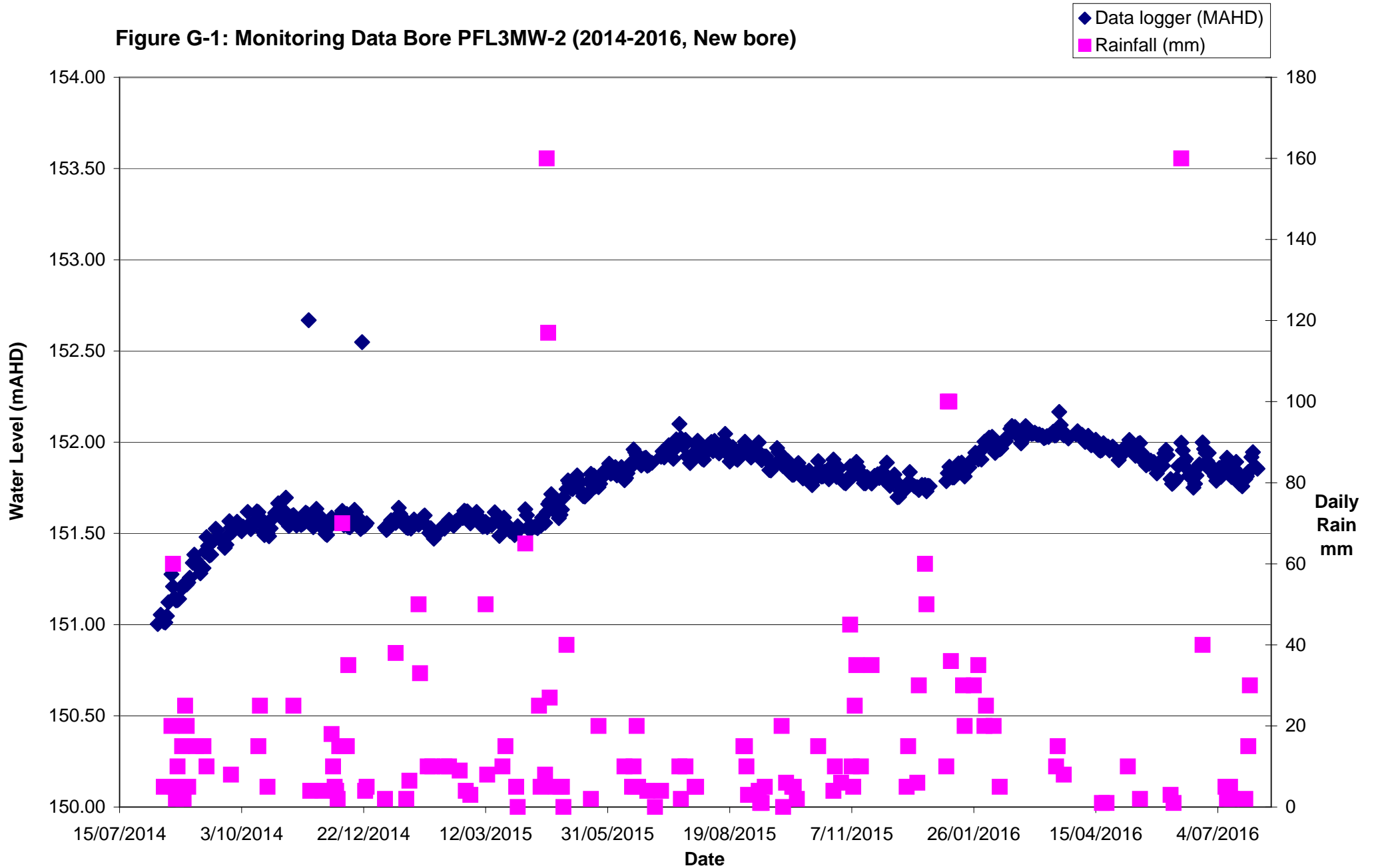
PF FORMATION - Lot 3 in DP 567166 (Pit 5)

Figure 1

Date: 25 July 2017

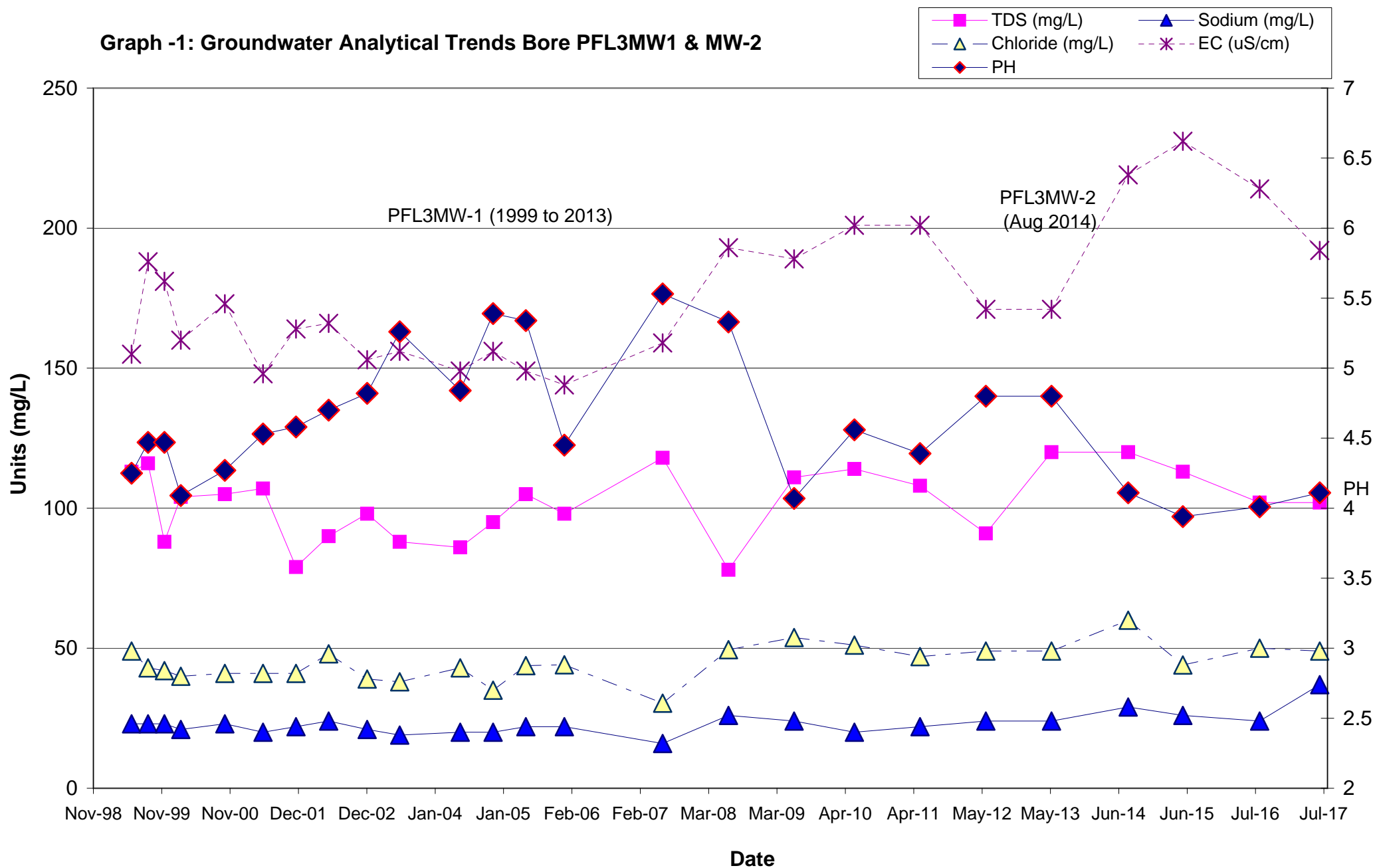
Reference: E2W_224_21.cdr

Figure G-1: Monitoring Data Bore PFL3MW-2 (2014-2016, New bore)



GRAPH

Graph -1: Groundwater Analytical Trends Bore PFL3MW1 & MW-2



TABLES

Table 1: Maroota Climate Summary (2016-2017)



Date	Monthly Rainfall (mm)
July (2016)	61
August	83
September	57
October	34.4
November	68.2
December	66.8
January	59.8
February (2017)	84.2
March	276.8
April	32.2
May	15.2
June	118.8
Total (mm/yr)	957.4

Table 2: Monitoring Well Details and Water Table Gauging (July 2017)
Maroota - Pit 5



Sample ID	SWL (m btoc) 17-7-2017	SWL (m btoc) 13-6-2017	SWL (m btoc) 10-8-2016	PVC Stickup *	BOH (mbgl)	Co-ordinates	RL (TOC) *	Reduced SWL (mAHD) 17-7-2017	Reduced SWL (mAHD) 13-6-2017	Reduced SWL (mAHD) 10-8-2016	Aquifer	pH	EC (mS/cm)	DO (%)	DO (mg/L)	Redox (mV)	Temp (°C)	Comments
PFL3 MW-2	35.40	35.76	35.66	0.5	53.4	314071.57 & 6297932.42	188.13	152.73	152.37	152.47	deep sandstone	3.89	0.229	30	3.5	223	15.1	Clear to cloudy brown

Notes:
 NA= not available
 SWL= standing water level
 BOH= bottom of well (borelogs not available, depths measured from site gauging)
 E2W Field parameters (pH, EC, DO, Eh and temperature using a calibrated TPS 90mfl multi-parameter meter)
 Redox (Eh mV, based on Ag/AgCl electrode). Need to add 199 to convert to Standard Hydrogen Electrode (SHE)

Table 3.1: Maroota Lot 3- Water Analyses (1999 to 2013)**Table 3-1 Bore PFL3MW1 Chemical Analyses Summary**

ANALYTE	Unit	2.6.99	8.9.99	21.12.99	9.3.00	28.11.00	20.6.01	20.12.01	26.6.02	23.01.03	9.7.03	29.6.04	15.12.04	22.6.05	19.1.06	4.7.07	3.07.08	3.07.09	16.6.10	22.6.11	20.6.12	19.6.13
Date																						
pH		4.25	4.47	4.47	4.09	4.27	4.53	4.58	4.7	4.82	5.26	4.84	5.39	5.34	4.45	5.53	5.33	4.07	4.56	4.39	4.8	4.8
El. Conductivity	mS/cm	155	188	181	160	173	148	164	166	153	156	149	156	149	144	159	193	189	201	201	171	171
Total Dissolved Solids	mg/L	116	88	104	105	107	79	90	98	88	86	95	105	98	118	78	111	114	108	91	120	120
Calcium, Ca	mg/L	<1	<1	<1	<1	<1	<1	<1	<	<1	<1	<1	1	<1	<1	1	1	<1	<1	<1	<1	<1
Magnesium, Mg	mg/L	4	4	3	3	3	3	3	3	3	2	3	2	3	3	4	4	3	3	4	4	4
Sodium, Na	mg/L	23	23	23	21	23	20	22	24	21	19	20	20	22	22	16	26	24	20	22	24	24
Potassium, K	mg/L	1	<1	1	1	1	1	1	1	<1	1	1	2	1	1	2	1	1	3	1	1	1
Bicarbonate, HCO ₃	mg/L	<1	<1	1	<1	<1	<1	<1	<1	<1	3	2	2	2.44	2.44	15.9	<1	<1	6	<1	<1	1
Sulphate, SO ₄	mg/L	4	4	5	5	6	5	5	5	2	4	2	4	4	3	4	5	5.57	2.47	4	4	4
Chloride, Cl	mg/L	49	43	42	40	41	41	41	48	39	38	43	35	43.8	44.1	30.4	49.5	53.8	51.1	47	49	49
Oil and Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Table 3-2 PFL3MW2 Chemical Analyses Summary (2014, 2015, 2016 & 17 July 2017)

ANALYTE	Unit	8.08.14	30.06.15	10.8.16	17.07.17
Date					
pH		4.11	3.94	4.01	4.11
El. Conductivity	mS/cm	219	231	214	192
Total Dissolved Solids	mg/L	153.3	102	113	102
Calcium, Ca	mg/L	<1	<1	<1	2
Magnesium, Mg	mg/L	3	2	2	8
Sodium, Na	mg/L	29	26	24	37
Potassium, K	mg/L	1	<1	<1	<1
Bicarbonate, HCO ₃	mg/L	2	<1	<1	<1
Sulphate, SO ₄	mg/L	3	3	3	2
Chloride, Cl	mg/L	60	44	50	49
Oil and Grease	mg/L	<5	<5	<5	<5

Note: green highlight is recent sampling results by ALS

APPENDIX A

Limitations

Earth2Water Pty Ltd has prepared this report for the use of PF Formation in accordance with the standard terms and conditions of the consulting profession. This report is prepared in accordance with the scope of work and for the purpose outlined in the proposal. The methodology adopted and sources of information used by E2W are outlined in this report.

This report was prepared during July 2017 and is based on the information reviewed at the time of preparation. This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

The precision with which conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of groundwater and some aspects of contaminants in soil and groundwater are complex. Our conclusions are based upon the analytical data presented in this report, and our experience.

Where conditions encountered at the site are subsequently found to differ significantly from those anticipated in this report, E2W should be notified of any such findings and be provided with an opportunity to review the recommendations of this report.

APPENDIX B

CERTIFICATE OF ANALYSIS

Work Order : **ES1717633**
Client : **EARTH2WATER PTY LTD**
Contact : **MR DINO PARISOTTO**
Address : **175 FERN ST**
GERRINGONG NSW 2534
Telephone : **+61 4236 1334**
Project : **----**
Order number : **E2W-224A**
C-O-C number : **----**
Sampler : **DINO PARISOTTO, ELLEN SWANSON**
Site : **Maroota-Pit 5**
Quote number : **BQ 2015**
No. of samples received : **7**
No. of samples analysed : **7**

Page : 1 of 4
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 18-Jul-2017 10:30
Date Analysis Commenced : 18-Jul-2017
Issue Date : 24-Jul-2017 13:00



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	PFL3MW-2	PF166MW.1	PF167MW.1	PFL2Hitch MW.1	PFMW.2S
Client sampling date / time					17-Jul-2017 00:00	17-Jul-2017 00:00	17-Jul-2017 00:00	17-Jul-2017 00:00	17-Jul-2017 00:00
Compound	CAS Number	LOR	Unit		ES1717633-001	ES1717633-002	ES1717633-003	ES1717633-004	ES1717633-005
					Result	Result	Result	Result	Result
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		4.11	4.11	4.67	4.02	4.58
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		192	176	151	298	166
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		102	122	99	147	114
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		2	2	24	5	6
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		49	38	28	70	38
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		2	<1	4	<1	3
Magnesium	7439-95-4	1	mg/L		8	5	4	4	4
Sodium	7440-23-5	1	mg/L		37	21	14	37	18
Potassium	7440-09-7	1	mg/L		<1	2	3	<1	2
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		1.42	1.11	1.29	2.08	1.20
Total Cations	----	0.01	meq/L		2.37	1.38	1.21	1.94	1.31
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	<5

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1717633	Page	: 1 of 5
Client	: EARTH2WATER PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR DINO PARISOTTO	Telephone	: +61-2-8784 8555
Project	: ----	Date Samples Received	: 18-Jul-2017
Site	: Maroota-Pit 5	Issue Date	: 24-Jul-2017
Sampler	: DINO PARISOTTO, ELLEN SWANSON	No. of samples received	: 7
Order number	: E2W-224A	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural PFL3MW-2, PF167MW.1, PFMW.2S, PF166MW.1, PFL2Hitch MW.1, PFMW.2D	----	----	----	18-Jul-2017	17-Jul-2017	1
Clear Plastic Bottle - Natural PF214MW.1	----	----	----	19-Jul-2017	17-Jul-2017	2

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) PFL3MW-2, PF167MW.1, PFMW.2S, PF166MW.1, PFL2Hitch MW.1, PFMW.2D	17-Jul-2017	----	----	----	18-Jul-2017	17-Jul-2017	✘	
Clear Plastic Bottle - Natural (EA005-P) PF214MW.1	17-Jul-2017	----	----	----	19-Jul-2017	17-Jul-2017	✘	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) PFL3MW-2, PF167MW.1, PFMW.2S, PF166MW.1, PFL2Hitch MW.1, PFMW.2D	17-Jul-2017	----	----	----	18-Jul-2017	14-Aug-2017	✔	
Clear Plastic Bottle - Natural (EA010-P) PF214MW.1	17-Jul-2017	----	----	----	19-Jul-2017	14-Aug-2017	✔	



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H)		17-Jul-2017	----	----	----	19-Jul-2017	24-Jul-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S,	PF166MW.1, PFL2Hitch MW.1, PFMW.2D							
Clear Plastic Bottle - Natural (EA015H)		17-Jul-2017	----	----	----	20-Jul-2017	24-Jul-2017	✓
PF214MW.1								
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		17-Jul-2017	----	----	----	18-Jul-2017	31-Jul-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S,	PF166MW.1, PFL2Hitch MW.1, PFMW.2D							
Clear Plastic Bottle - Natural (ED037-P)		17-Jul-2017	----	----	----	19-Jul-2017	31-Jul-2017	✓
PF214MW.1								
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		17-Jul-2017	----	----	----	18-Jul-2017	14-Aug-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S,	PF166MW.1, PFL2Hitch MW.1, PFMW.2D							
Clear Plastic Bottle - Natural (ED041G)		17-Jul-2017	----	----	----	19-Jul-2017	14-Aug-2017	✓
PF214MW.1								
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G)		17-Jul-2017	----	----	----	18-Jul-2017	14-Aug-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S,	PF166MW.1, PFL2Hitch MW.1, PFMW.2D							
Clear Plastic Bottle - Natural (ED045G)		17-Jul-2017	----	----	----	19-Jul-2017	14-Aug-2017	✓
PF214MW.1								
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F)		17-Jul-2017	----	----	----	18-Jul-2017	24-Jul-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S,	PF166MW.1, PFL2Hitch MW.1, PFMW.2D							
Clear Plastic Bottle - Natural (ED093F)		17-Jul-2017	----	----	----	20-Jul-2017	24-Jul-2017	✓
PF214MW.1								
EP020: Oil and Grease (O&G)								
Amber Jar - Sulfuric Acid or Sodium Bisulfate (EP020)		17-Jul-2017	----	----	----	20-Jul-2017	14-Aug-2017	✓
PFL3MW-2, PF167MW.1, PFMW.2S, PF214MW.1	PF166MW.1, PFL2Hitch MW.1, PFMW.2D,							



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	6	58	10.34	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	4	23	17.39	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	33	12.12	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	4	27	14.81	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	5	43	11.63	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	3	58	5.17	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Oil and Grease	EP020	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	6	43	13.95	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	23	8.70	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	33	6.06	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Oil and Grease	EP020	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	3	43	6.98	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Oil and Grease	EP020	WATER	In house: Referenced to APHA 5520 B. Oil & grease is a gravimetric procedure to determine the amount of oil & grease residue in an aqueous sample. The sample is serially extracted three times n-hexane. The resultant extracts are combined, dehydrated and concentrated prior to gravimetric determination. This method is compliant with NEPM (2013) Schedule B(3)

APPENDIX C



PF FORMATION Bore PFL3MW1 Groundwater Monitoring Data

Rainfall, mm
Water Level, m AHD

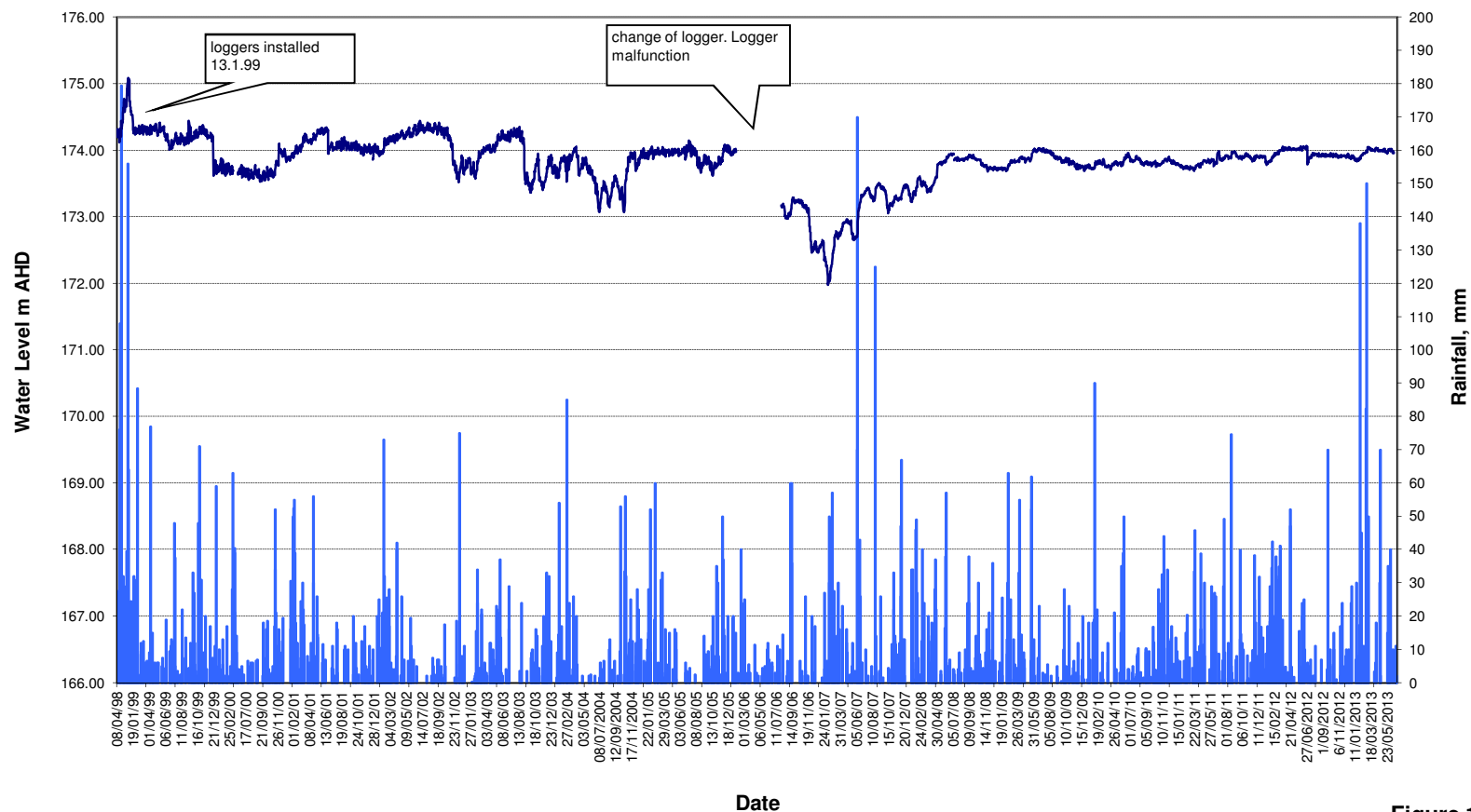
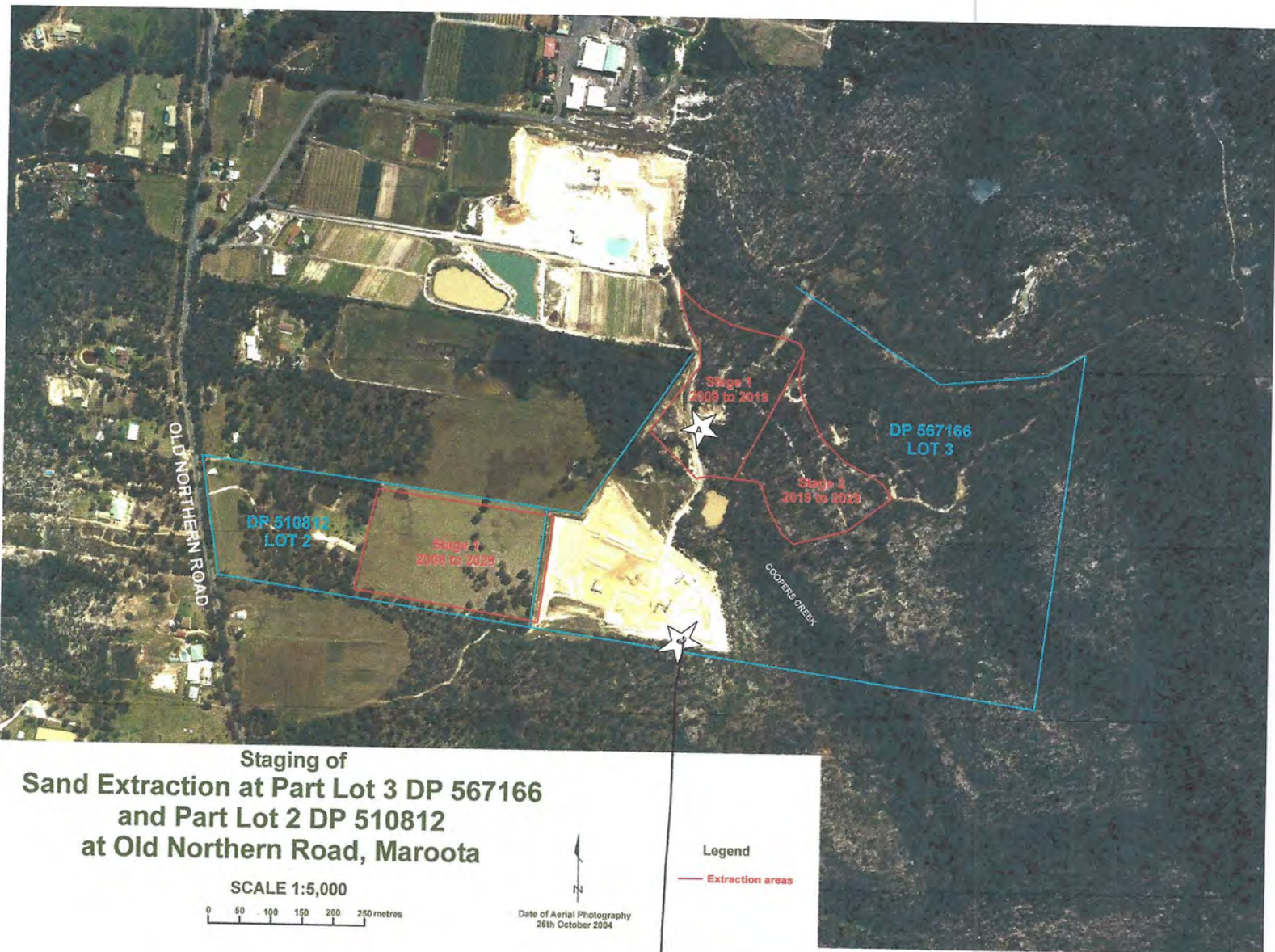


Figure 1



Staging of
Sand Extraction at Part Lot 3 DP 567166
and Part Lot 2 DP 510812
at Old Northern Road, Maroota

PFL3MW2

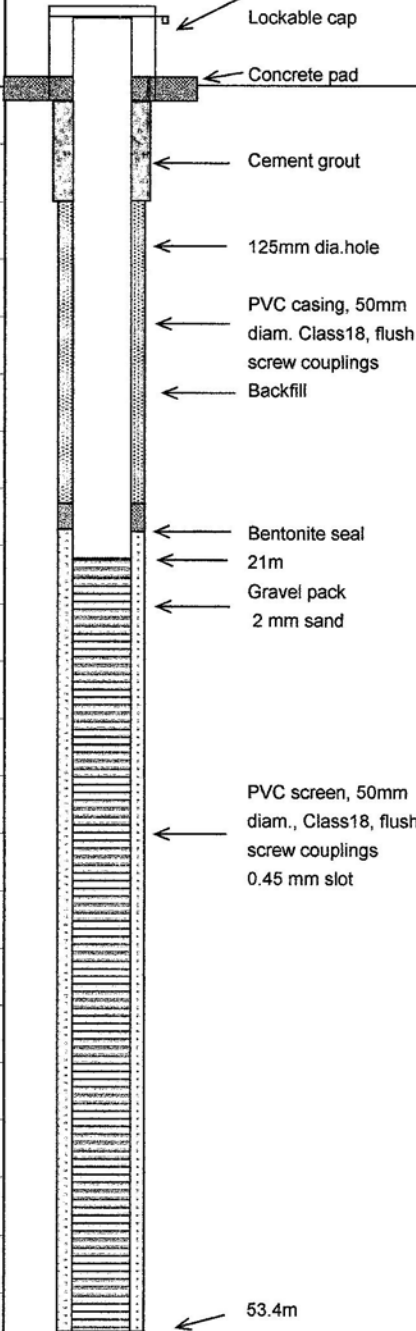
APPENDIX D

PROJECT : PF Formation Bore Replacement
 LOCATION: Lot 3 Maroota
 SUPERVISOR: F.Carosone

JOB NO.:
 DATE STARTED: 30.4.2014
 DATE COMPLETED: 30.4.2014

INSTALLED BY: Ultra Drilling P/L	METHOD: Air drilling	DIAMETER: 125 mm
RIG: Pioneer 550	TOTAL DEPTH : m	R.L. GROUND: 187.64m
DATUM: 0.52 m.above concrete/ground	SWL: 36.60 m b.d.	R.L.DATUM: 188.16m
EASTING: 314071.59	NORTHING: 6297932.52	R.L. SWL : 151.56m

WELL NUMBER: PFL3MW2

Lithological Log		Remarks	Depth (m)	Bore Construction
				
0 - 6	SITE BACKFILL: brown-orange soft, moist			
6 - 8	SANDSTONE: Orange=buff, fine, subrounded, subangular quartz grains, med.hard, dry. Minor clay			
8 - 10	darker		5	
10 - 12	brown-orange		10	
12 - 14	light grey		15	
14 - 18	brown-orange		20	
18 - 20	dark grey, very fine		25	
20 - 22	brown-orange		30	
22 - 24	grey, very fine		35	
24 - 26	light brown		40	
26 - 34	grey, fine, clayey		45	
34 - 42	orange		50	
42 - 44	red, wet		53.4	
44 - 48	grey and orange			
48 - 52	grey			
52 - 54	clayey			
53.4	Bottom of the hole		55	

LAST PAGE OF REPORT



*Thank you for the opportunity to work with
PF Formation.*

Feedback is Welcomed at Earth2Water
(dino@earth2water.com.au)



Appendix 4

***Noise Compliance Testing of PF Formation Extractive Industry Operations
at Pit 4 Old Telegraph Road and Pit 5 & 15 Old Northern Road, Maroota,
9 October 2017, Koikas Acoustics Pty Ltd.***



KOIKAS ACOUSTICS PTY LTD

CONSULTANTS IN NOISE & VIBRATION

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**NOISE COMPLIANCE TESTING
OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS**

**AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD
NORTHERN ROAD, MAROOTA**

(JULY 2016 - JUNE 2017)

DOCUMENT CONTROL	
Project Title	NOISE COMPLIANCE TESTING OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA (JULY 2016 – JUNE 2017)
Our Project No.	1933
Our File Reference	Z:\ACOUSTICS\ACOUSTICS 17\REPORT\Other\1933C20171009mfcMarootaS5-7v2.docx
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Prepared By	Michael Fan Chiang
Approved By	Nick Koikas
Client	PF Formation Trust 1774 Wisemans Ferry Road Maroota NSW 2756 Attention: Joshua Graham E-mail: josh@pfformation.com.au ; accounts@pfformation.com.au

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NOISE COMPLIANCE TESTING
OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS
AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA
(JULY 2016 – JUNE 2017)

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Appendix A - Aerial photograph of Monitoring Locations 5, 6 & 7

Appendix B - Aerial photograph of Locations Listed in EPL 3829

NOISE COMPLIANCE TESTING
OF PF FORMATION EXTRACTIVE INDUSTRY OPERATIONS
AT PIT 4 OLD TELEGRAPH ROAD AND PIT 5 & 15 OLD NORTHERN ROAD, MAROOTA
(JULY 2016 – JUNE 2017)

1.0 CONSULTANT'S BRIEF

Koikas Acoustics Pty Ltd was engaged by PF Formation Trust to undertake noise compliance testing during the sand extraction operations at various sites including:

- Pit 4, Lot 2 DP 748820 at 311 Old Telegraph Road, Maroota;
- Pit 5, Lot 3 DP 567166 at 4751 Old Northern Road, Maroota, and
- Pit 15, Lot 2 DP 510812 at 4713 Old Northern Road, Maroota.

The assessment provides the following:

- a discussion of the applicable noise criteria at each site, and
- attended noise monitoring survey results.

Sand extractions have been undertaken in this area for many years for Pit 4 Lot 2 DP 748820, Pit 5 Lot 3 DP 567166 and Pit 15 Lot 2 DP 510812. Until recently, there was a single unresolved noise complaint from a resident located to south-east of Pit 4 quarry, approximately 300 meters away.

This assessment has been conducted to demonstrate noise compliance with the Development Consent No.578/2009B (associated with EPA Licence No. 3829 for sand extraction operation at Pit 5 and 15) and Development Consent No. 342/98F (associated with EPA Licence No. 10357 for sand extraction operation at Pit 4).

Some measurements of sleep disturbance could not be taken 1 metre from a bedroom window. Sound level measurements were taken from the boundary. Measurements taken from the boundary were closer to the noise source and therefore louder compared to if measurements had been taken outside a bedroom window.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The sand mining extraction and processing sites are bounded by:

- Old Telegraph Road
- Old Northern Road
- Rural properties and Marramarra National Park to the north, south and east.

A detailed aerial photograph showing the surrounding premises is attached as **Appendix A**. It is noted that this acoustic assessment considered the noise sensitive locations at receivers 5, 6 and 7 marked on the aerial photograph.

2.2 HOURS OF OPERATION

Table 1. Hours of Operation		
Activity	Day	Time [Hours]
Construction	Monday to Friday	0700 – 1800
	Saturday	0800 – 1300
	Sunday and Public Holiday	None
Quarrying and processing including overburden removal	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None
Product Transportation	Monday to Saturday	0600 – 1800
	Sunday and Public Holiday	None
Maintenance	Monday to Saturday	0700 – 1800
	Sunday and Public Holiday	None

2.3 AMBIENT NOISE PROFILE OF THE NOISE MONITORING SITES (RECEIVERS)

During the daytime, the perceived intrusiveness of noise of cars and trucks traversing along these roads whilst residents are inside or outside their homes is expected to be significantly greater compared to the noise of sand mining extraction activities.

The rustling of leaves with slight wind speeds would normally raise background noise levels. For periods when the wind is calm, background noise levels would typically be that of distant noises emanating from motor vehicles, and the sound of insects and birds.

2.4 SAND EXTRACTION LOCATIONS

The sand extractions were undertaken at the following sites:

- Pit 4, Lot 2 DP 748820 at 311 Old Telegraph Road, Maroota;
- Pit 5, Lot 3 DP 567166 at 4751 Old Northern Road, Maroota, and
- Pit 15, Lot 2 DP 510812 at 4713 Old Northern Road, Maroota.

2.5 MONITORING LOCATIONS

Noise monitoring was conducted in the Maroota area at the following locations:

Location 5. Old Telegraph Road;

Location 6. Western boundary 4713 Old Northern Road, and

Location 7. Lot 1 Hart Place.

The above were the most noise-sensitive receiver locations near the subject quarry sites. Other receiver locations listed in the Environment Protection Licence (EPA 3829) were further away from the quarry sites as shown in **Appendix B** and therefore noise impact would be less.

The site locations are attached as aerial photographs in **Appendices A** and **B**.

3.0 NOISE CRITERIA

3.1 BACKGROUND NOISE

The noise criterion has been derived from previous noise surveys by undertaking 'long term' ambient noise level measurements at a representative site. The background noise level was determined over consecutive 15 minute periods for a duration of at least one week. From this data of LA90,15 minutes noise levels, the 10 percentile lowest background noise levels were determined for each of the days. The *rating background level* was then determined by calculating the median value of the daily 10 percentile background noise levels for each of the three specific time periods: daytime, evening and night time.

The rating background level result is used to determine the noise criteria applicable for the surrounding residential properties in accordance with the EPA's Industrial Noise Policy (INP) assessment procedures.

The background noise level LA90,15 minutes is normally determined in the absence of extraneous noise such as traffic, wind, rain, conversation, birds chirping, insect noise and unnatural increases in noise from distant sources due to local air movement. The EPA defines such sources as *incidental noise* which can cause the masking of offensive noise from a specific source. When traffic or other incidental noises cannot be excluded, then it is considered that these noise sources are part of the background noise.

3.2 EPA INDUSTRIAL NOISE POLICY

The INP defines two criteria, the Intrusive Noise Criterion and the Amenity Noise Criterion. The EPA requires that compliance with both the intrusive and amenity criteria be achieved for the purpose of controlling the intrusive nature of the industrial noise in the short term and also maintaining the noise level amenity of the area for residences and other land uses.

For the purpose of applying the INP the following time periods apply:

- Daytime 7am to 6pm Monday to Saturday
 8am to 6pm Sunday
- Evening 6pm to 10pm Monday to Sunday
- Night-time 10pm to 7am Monday to Saturday
 10pm to 8am Sunday

3.2.1 Intrusive Noise Criterion

The intrusiveness of an industrial noise source is generally considered acceptable by people if the equivalent continuous (A-weighted) noise level (L_{Aeq} , 15 minutes) does not exceed the background noise level by more than 5 dB. The intrusive noise criterion is defined as:

$$L_{Aeq, 15 \text{ minutes}} = (\text{rating background level}) L_{90, \text{Period}} + 5\text{dB}$$

When the noise source contains annoying characteristics such as prominent tonal, impulsive, intermittent, irregular and dominant low frequency components, adjustments are made.

3.2.2 Noise Amenity Criterion

In order to limit the continuing increase in noise, the EPA has nominated recommended acceptable and maximum ambient noise levels for various receiver sites from industrial noise.

Table 2.1 of the EPA's INP (below) specifies the following acceptable and maximum recommended $L_{Aeq, \text{Period}}$ noise levels for this project specific type area. In this case, the area is described as being Rural. The EPA refers to 'rural' as:

Rural—means an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic. Such areas may include:

- an agricultural area, except those used for intensive agricultural activities
- a rural recreational area such as resort areas
- a wilderness area or national park
- an area generally characterised by low background noise levels (except in the immediate vicinity of industrial noise sources).

This area may be located in either a **rural, rural-residential, environment protection zone or scenic protection zone**, as defined on a council zoning map (Local Environmental Plan (LEP) or other planning instrument).

Table 2.1 of the EPA INP

Type of Receiver	Indicative Noise Amenity	Time of Day	Recommended LAeq, Noise Level dB(A)	
			Acceptable	Recommended Maximum
Residential	Rural	Day	50	55
		Evening	45	50
		Night	40	45
Schools	All	Noisiest 1 hour period when in use	35	40
Commercial	All Areas	Day Evening Night	65	70
Industrial	All Areas	Day Evening Night	70	75
Area specifically reserved for passive recreation	All	When in use	50	55

Table 2.2 of the EPA INP (below) specifies the modification to the acceptable noise level to account for the existing level of industrial noise when additional industrial noise sources are proposed for the site:

Table 2.2 of the EPA INP

Total existing LAeq noise level from industrial sources, dB(A)	Maximum LAeq noise level from new sources alone, dB(A)
≥ Acceptable noise level plus 2	If existing noise level is <i>likely</i> to decrease in future: acceptable noise level minus 10 If existing noise level is <i>unlikely</i> to decrease in future: existing level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

The amendments to the EPA INP (2006) state that both the predicted amenity noise level criterion and the intrusive noise level criterion need to be satisfied, which supersedes the requirement of assessing only the most stringent of the two noise criterion. In clearly obvious cases, one or the other noise criterion is considered. In this case, the intrusive noise criterion has been considered as it is clearly the most stringent due to the low Rating Background Level (RBL).

3.3 NOMINATED NOISE CRITERIA

The noise criteria for the sand extraction operation are as follows for the EPA Licences (No.10357 and 3829) are shown in Table 2:

Table 2. Operational Criterion Levels (EPA Licences No.10357 and 3829)		
Site Location	Daytime [LAeq,15 mins]	EPA Licence
5. Lot 1 Old Telegraph Road	42	10357
6. Lot 2 DP567166 at 4713 Old Northern Road	45	3829
7. Lot 1 Hart Place	40	10357

The above receiver locations were the most noise-sensitive receiver locations near the subject quarry sites. Koikas Acoustics has been advised that other receiver locations listed in the Environment Protection Licence (EPA 3829) were further away from the quarry sites and therefore noise impact would be less.

Refer to aerial photo attached in **Appendix A** for all noise-sensitive receiver locations.

4.0 NOISE SURVEYS

4.1 NOISE MONITORING PROCEDURES

All measurement methodologies and equipment used comply with the relevant Australian Standards:

- AS1259.2-1990 "Acoustics - Sound Level Meters - Integrating - Averaging", and
- ISO 1996.2-2007 "Acoustics – Description, measurement and assessment of environmental noise" Part 2: Determination of environmental noise levels.

All sound and noise level measurements were A-frequency and Fast-time weighted.

4.2 ATTENDED NOISE MONITORING

Attended noise monitoring was conducted on the following days at each monitoring location below:

At Location 5 Old Telegraph Road

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

At Location 6 Western Boundary 4713 Old Northern Road

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

At Location 7 Lot 1 Hart Place

18 th July 2016	Daytime hours
20 th October 2016	Daytime hours
3 rd February 2017	Daytime hours
1 st June 2017	Daytime hours

The noise measurements taken from July 2016 to June 2017 were conducted with a Class 1 Svan 971 S/N 40412 Sound Level Meter and calibrated with a Svanteck SV 33 Class 1 Acoustic Calibrator.

5.0 NOISE SURVEY RESULTS

Table 3, 4 and 5 refers to the measured noise levels obtained at locations 5, 6 and 7 respectively for each monitoring period.

It is noted, that in all cases the measured L_{Aeq} was dominated by environmental and intermittent noise sources unrelated to the quarry noise. The exceeding levels are therefore not that of quarry activities.

Table 3. Location 5 Old Telegraph Road - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	42 $L_{Aeq,15min}$	47 $L_{Aeq,15min}$	44	5	See Note 1.
20 th October 2016 Daytime hours		43 $L_{Aeq,15min}$	34	1	See Note 2.
3 rd February 2017 Daytime hours		39 $L_{Aeq,15min}$	36	-	See Note 5.
1 st June 2017 Daytime hours		41 $L_{Aeq,15min}$	37	-	See Note 1.

Table 4. Location 6 Western Boundary 4713 Old Northern Road - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	45 $L_{Aeq,15min}$	51 $L_{Aeq,15min}$	42	6	See Note 4.
20 th October 2016 Daytime hours		46 $L_{Aeq,15min}$	41	1	See Note 3.
3 rd February 2017 Daytime hours		45 $L_{Aeq,15min}$	35	-	See Note 3.
1 st June 2017 Daytime hours		42 $L_{Aeq,15min}$	41	-	See Note 3.

Table 5. Location 7 Lot 1 Hart Place - Noise Survey Results					
Date	Applicable Criterion Level [dB(A)]	Measured Noise Level [dB(A)]	Measured L_{A90} [dB(A)]	Exceeding [dB]	Note
18 th July 2016 Daytime hours	40 $L_{Aeq,15min}$	46 $L_{Aeq,15min}$	39	6	See Note 1.
20 th October 2016 Daytime hours		43 $L_{Aeq,15min}$	34	3	See Note 2.
3 rd February 2017 Daytime hours		41 $L_{Aeq,15min}$	31	1	See Note 1.
1 st June 2017 Daytime hours		40 $L_{Aeq,15min}$	39	-	See Note 1.

Note 1. Dominant noise source is that of birds chirping/insects and/or other natural sounds. Quarry noise was audible but not significant.

Note 2. Dominant noise source is that of birds chirping/insects and other natural sounds. Quarry noise was not audible and not measurable.

Note 3. Dominant noise source is that of traffic and/or birds chirping and other natural sounds (during lulls in traffic). Quarry noise was barely audible but not measurable.

Note 4. Dominant noise source is that of traffic and/or birds chirping (during lulls in traffic). Quarry noise was not audible and not measurable.

Note 5. Dominant noise source is that of quarry noise and birds chirping. Quarry noise was not intrusive.

On account of the large distances which sound travels from the sand mining extraction activities to the surrounding residential premises, it is often not measureable because it is either less than the prevailing background noise or because it is inaudible.

The noise criterion nominated by the EPA Licences for the hours of operation was therefore not exceeded.

6.0 CONCLUSIONS

Koikas Acoustics was requested to undertake noise level surveys around two Maroota sand mining extraction and processing quarries (July 2016 – June 2017) and ascertain whether the noise from the extraction and processing works currently exceed the noise criteria as nominated by EPA licenses No.10357 and 3829.

The results of the noise surveys show that the site extraction and processing work complies with the EPA nominated noise criteria.

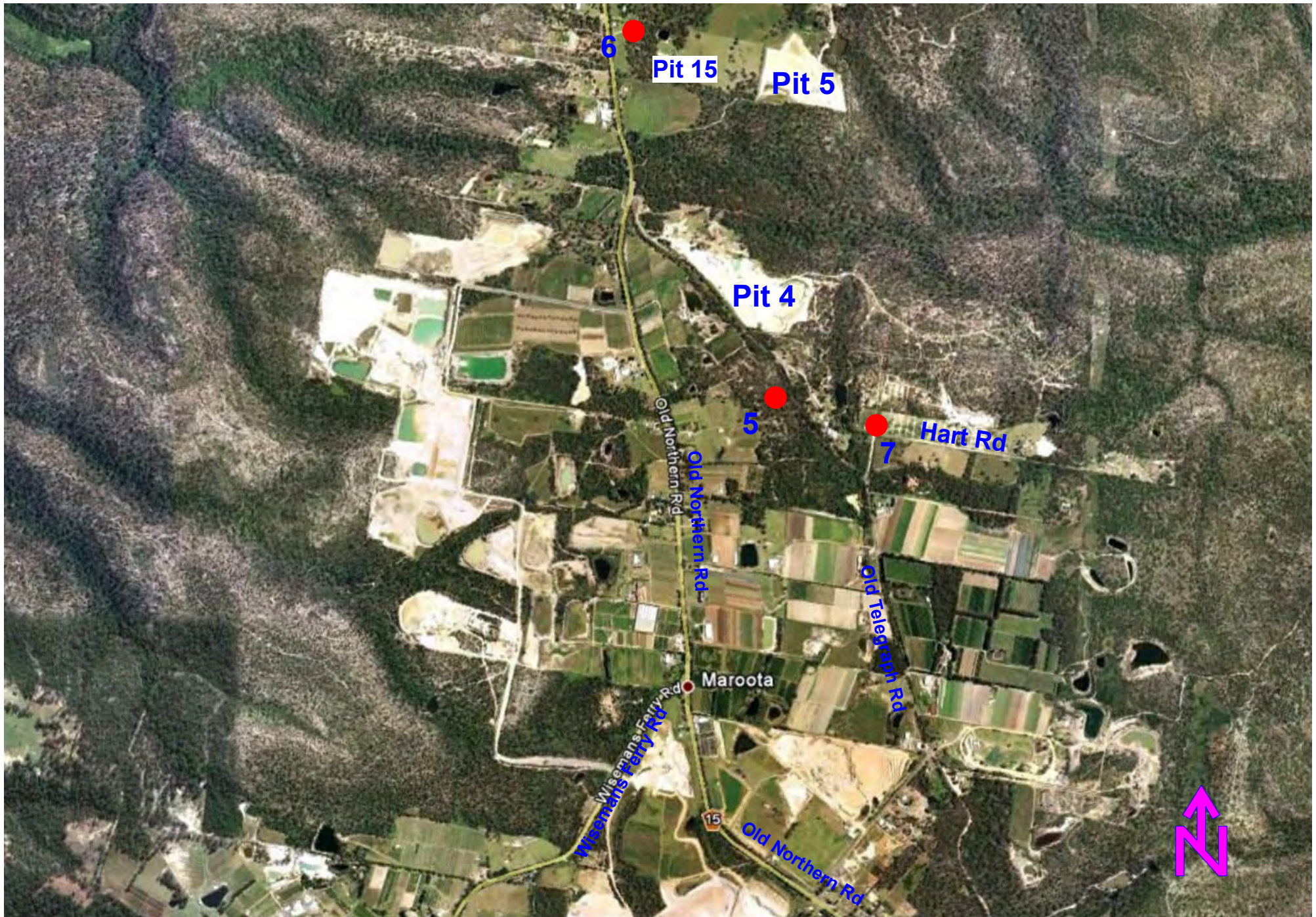
At most sites, quarry activities are either just audible or inaudible and in most cases, the noise emanating from the site was found not to be measureable on account of that the natural noise (which includes birds chirping, insects, rustling of leaves) and un-natural noise (being cars and trucks traversing along the main roads).

There are no noise mitigation measures necessary to be implemented for any of the subject quarry sites.

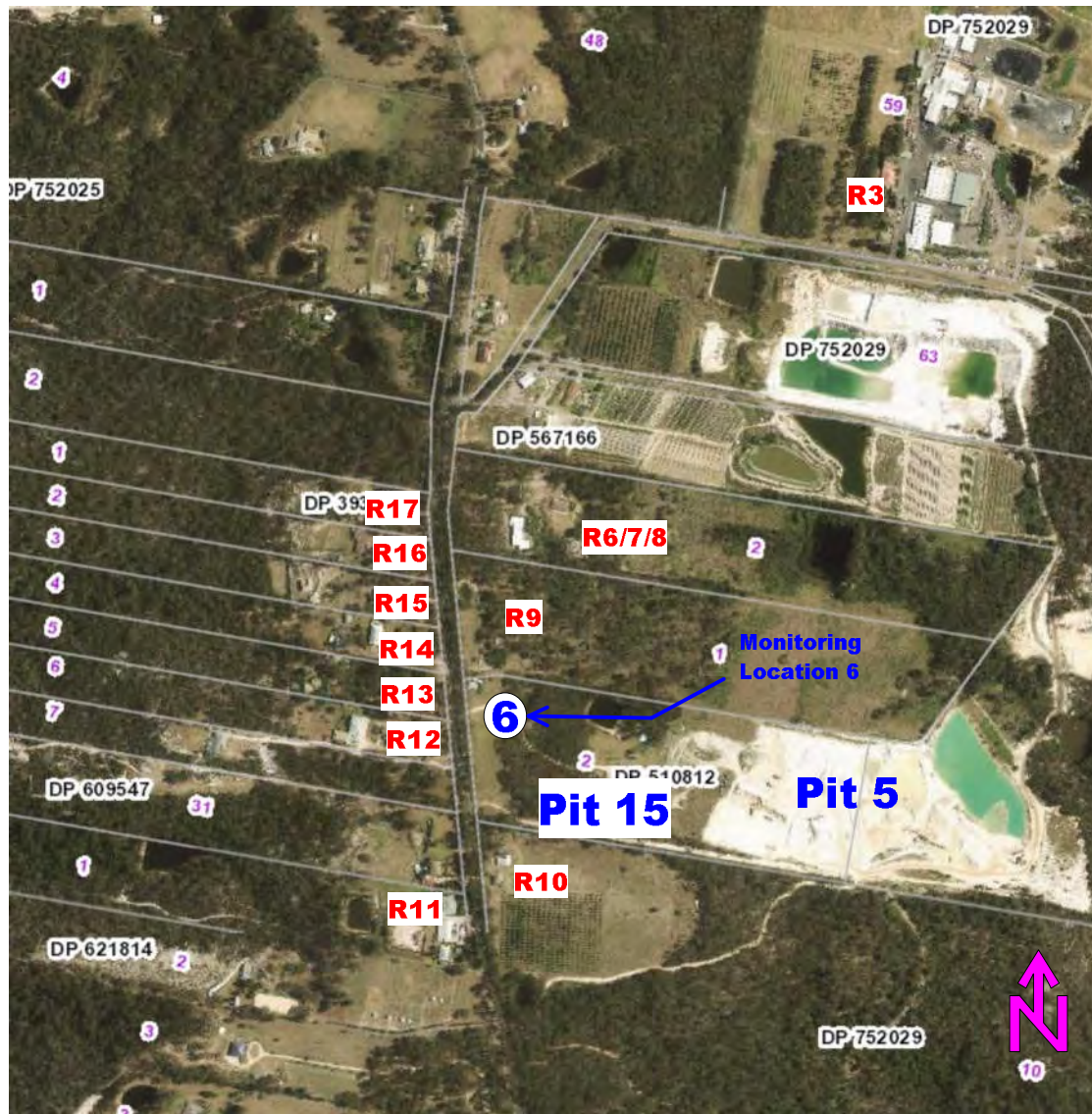
Koikas Acoustics therefore certifies that the subject quarries currently comply with the EPA nominated noise criteria despite that the measured noise levels (predominantly that of traffic and other natural sound sources) are currently producing sound levels in-excess of the nominated noise criteria during some days.

In regards to the unresolved noise complaint from the resident to the south-east direction of Pit 4 quarry, PF Formation has endeavoured to arrange additional noise testing with the resident to address the issue. However, the complainant claimed he is suffering from some medical issues and declined on several occasions for additional noise measurements. At this point in time, PF Formation is continuing to negotiate and endeavouring the arrangement for additional noise measurements in regard to this complainant.

APPENDIX A - AERIAL PHOTOGRAPH



APPENDIX B - AERIAL PHOTOGRAPH OF LOCATIONS LISTED IN EPL 3829



Location	Day; LAeq,15min
R3 - Lot 59, DP 752029	43
R6 - Lot 2, DP 567166	45
R7 - Lot 2, DP 567166	45
R8 - Lot 2, DP 567166	46
R9 - Lot 1, DP 567166	47
R10 - Lot 10, DP 752029	47
R11 - Lot 1, DP 621814	35
R12 - Lot 6, DP 39392	35
R13 - Lot 5, DP 39392	35
R14 - Lot 4, DP 39392	35
R15 - Lot 3, DP 39392	35
R16 - Lot 2, DP 39392	35
R17 - Lot 1, DP 39392	35