



**South Coast Concrete Crushing and Recycling Pty Ltd**

**Annual Environmental Management Report**

**December 2016 - June 2017**

**Name of mine: - NOWRA BRICKWORKS & FLAT ROCK Quarries**

**Titles/Mining Leases: - ML 5087 / ML 6322 / ML 531**

**MOP Commencement Date: - 01/09/2015 MOP Completion Date 31/08/2021**

**AEMR Commencement Date: - 1/12/2016 AEMR End Date 30/06/2017**

**Name of leaseholder: - Abib Pty Ltd**

**Name of mine operator: - South Coast Concrete Crushing and Recycling P/L**

**Reporting Officer: - Budd Green  
Title: - Manager**

**Signature**

A handwritten signature in black ink, appearing to be 'Budd Green', is written over a white rectangular box.

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## 1. INTRODUCTION.

This AEMR has been prepared to cover a period from 1st December 2016 to 30<sup>th</sup> June 2017.

The operation of this mine is controlled by the Mining Operations Plan (MOP) which covers mining operations from September 2015 – 2021. The current MOP provides the relevant information on the mining, processing and rehabilitation operations necessary for compliance with the collective conditions imposed upon the mining development at the Nowra Brickworks Quarry by the applicable mineral authorities and other licences required to be held by SCCCR.

This report should be read in conjunction with the current mining operations plan.

### 1.1 Consents, Leases and Licences

#### 1.1.1 Mineral Authorities.

*Table 1 - Mineral Leases*

Title	Act	Expiry Date	Area (ha)	Group
ML 5087	1906	08 January 2019	7.36	Group 5
ML 6322	1906	08 March 2020	14.67	Group 5
ML 531	1906	05 Nov 2019	16.68	Group 5

The area covered by these mineral authorities is referred to hereafter as “the quarry site”.

**NO ACTIVITIES WERE CARRIED OUT IN FLAT ROCK QUARRY DURING THE REPORTING PERIOD**

#### 1.1.2 Licences

The Nowra Brickworks Quarry is operated in accordance with Environment Protection Licence No. 11765. This licence covers “Hard-Rock Gravel Quarrying” of between 100 000t and 500000t per annum and “Crushing, Grinding or Separating Works” between 100 000t and 500 000t per annum.

#### 1.1.3 Development Consents

Development Consent under Section 75J of The Environmental Planning and Assessment Act 1979. Application No. 07\_0123. Approved by the Minister for Planning 1<sup>st</sup> December 2009.

## 1.2 Mine Contacts

SCCCR personnel responsible for operational and environmental performance at the Nowra Brickworks Quarry and their relevant contact details are as follows.

- John Green – Mine Manager and sole director of SCCCR, retains overall responsibility for all activities and performance on site. Contact: 02 4421 7766. Fax 02 4421 7988. Postal Address PO Box 192, OAK FLATS NSW 2529
- Budd Green – Production Manager of SCCCR. Contact: 02 4421 7766. Fax 02 4421 7988. Postal Address PO Box 192, OAK FLATS NSW 2529
- Steve Mitchell – Allocations and Environment Manager of SCCCR. Contact: 02 4421 7766. Fax 02 4421 7988.

## 1.3 Actions Required at Previous AEMR Review

- Nowra Brickworks Quarry
  - Weed control is required in the rehabilitation areas at the northern end of the site
  - Clean out of a blocked pipe at the storage area west of the weighbridge
- Flat Rock Quarry
  - Submit a Mining Operations Plan in accordance with the DRE guidelines which will include an inspection and monitoring/maintenance program for this site.
  - Removal of rubbish and car bodies
  - Assessment of site access and potentially use of additional measures to minimise illegal site access
  - Ongoing review of erosion and repair/management as required.



## 2. Operations/Activities During Reporting Period

### 2.1 Exploration

No exploration was carried out within the mine area during the period.

### 2.2 Land Preparation

No Land preparation was required during the reporting period.

### 2.3 Construction

During the Dec2016 - June2017 AEMR reporting period no new structures were built; however, the existing wheel wash was upgraded to manage the sediment leaving site.

### 2.4 Mining - Extraction

All mining activities were carried out in accordance with the current MOP 2015-2021.

During the reporting period, ongoing extraction of minerals was carried out. This was carried out using standard excavating procedures (ripping and excavating) of the subsoil/overburden. The harder material was blasted as per approved methods.

#### **Mining Methods (ref section 2.3.3 MOP 2015-2021)**

*“Weathered shale material would be extracted from below the base of the subsoil to a depth where the material becomes too hard to be extracted using an excavator. The weathered shale material would be loaded into trucks for transportation to customers, stockpiled for subsequent sale and despatch, or used for rehabilitation-related purposes within the quarry. Once the hardness of the shale becomes too great to be ripped, drill and blast techniques would be used to extract the material which would be direct loaded into the processing plant using an excavator. All drilling and blasting-related activities will be conducted in accordance with the Drilling and Blasting procedures set out in the EMS (GHD 2010)”.*

## 2.5 Mineral Processing

All materials mined were processed in accordance with the current MOP 2015-2021.

### **From MOP 2.3.5 Mineral Processing**

*The quarry maintains the following infrastructure to carry out its operations:*

- Three mobile crushers (jaw, cone and impact);
- Four excavators (three 35t excavators and one 21t Excavator);
- Three mobile screens
- Two Front end loaders.

*The shale extracted from the quarry undergoes crushing, shaping, screening and blending with imported construction waste material.)*

### 2.5.1 Importation of material for Blending

The following materials were imported and stockpiled for re-use in processing or backfilling to existing quarry void: for processing and blending into recycled and reusable products.

- Virgin Excavated Natural Material (VENM) for blending and processing into quarry products
- VENM, top-soil, subsoil and weathered shale for quarry backfilling operations
- Blending materials, such as crusher dust and road base, for processing into quarry products
- Recyclable materials, such as masonry construction waste (brick, cement roof tiles), concrete and asphalt.

*In accordance with the mining leases, mining is planned to a depth of 30 metres with the maximum amount of shale material to be extracted while ensuring no resource sterilisation. The extraction area would then be backfilled with VENM to create a final, rehabilitated landform that would mimic the adjacent environment.*

All material imported onto the quarry will be as per the Importation and use of Virgin Excavated Natural Material procedures as set out in our **EMS GHD (2010)**.

*“VENM is to be imported to the site for processing and blending to produce quarry products. VENM not used to make quarry products will also be placed within the ‘exhausted’ extraction area for rehabilitation purposes and to ultimately establish a final landform which mimics the pre-extraction landform.”*

*The use of VENM as part of the rehabilitation process will be restricted to the use of VENM as defined in the NSW Protection of the Environment Operations Act 1997,*

*“Natural material (e.g. clay, gravel, sand, soil and rock) that is not mixed with any waste that:*

- a) *has been excavated from areas that are not contaminated, as the result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphidic ores or soils, or*

b) consists of excavated natural materials that meet such criteria as may be approved by the EPA”

## 2.5.2 VENM Certificate and Receipt Procedures

- All imported VENM will be certified at its source and certification verified by the Mine Manager (or delegated authority) on receipt in accordance with relevant guidelines current at the time of VENM importation. This is likely to include a visual inspection for signs of contamination and the presence of any other waste material.
- A VENM certification sheet will be prepared, dated and signed by the person certifying the material.
- The history of the site from which the material is to be excavated will be determined and recorded on the VENM certificate sheet. The following procedures will be implemented depending on the previous land uses.
  - Where the site has been used for commercial, industrial, mining or agricultural purposes at any time, or if the site contains fill material, or there is potential for chemical contamination from past or current uses, a testing regime will be implemented to establish that the material sourced from the site can be classified as VENM.
  - Where the site is, and has always been, used for residential or agricultural purposes then excavated material from the site, except for surface layers that may be contaminated with physical debris, vegetation, chemicals, fertilisers or asbestos, will be presumed to be classified as VENM.
- Upon arrival, the Mine Manager (or delegated authority) will require the drivers delivering the VENM material to complete and sign a VENM record sheet. The Mine Manager (or delegated authority) will direct the driver to the receival area where the load will be inspected to ensure it corresponds with the description of the material included on the certificate sheet before it is accepted.
- Any unsuitable loads (i.e. loads that do not meet the description of VENM) will not be accepted and the supplier/driver will be advised to deliver the load to a licensed waste facility.

## 2.5.3 VENM Stockpiling

When VENM is being processed, it will be placed in the stockpiling and processing area.

The environmental management measures for stockpiles detailed in Section 9 of the EMS will be applied.

- All surface waters will be diverted into the water storage or sump within the extraction area.

## 2.5.4 VENM Placement and Compaction

- When VENM is to be used to backfill the quarry, the following procedures will be undertaken:
- Compaction of VENM will not occur within approximately 3.5m of the proposed final landform.
- Between approximately 3.5 m and 1.0 m of the final landform VENM comprising weathered material is to be placed without compaction.
- Between 1.0 and 0.5 below the final landform, weathered shale material will be placed

*without compaction.*

- *Sub-soil and top-soil will be placed over the VENM/weathered shale in accordance with the Landscape and Biodiversity Management Plan.*
- *Soils will be handled only when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.*

### 2.5.5 VENM On-site Operations

- *Water sprays and water trucks will be used in all areas of potential dust lift-off to minimise potential dust emissions.*
- *A maximum speed limit of 10 km/hour will be maintained within the quarry site.*
- *The width of haul roads will be limited to that which is safe for heavy vehicle passage to minimise soil erosion hazards.*

### 2.5.6 Monitoring and Reporting

- *During all VENM importation operations, records will be kept for each site where imported VENM is to be sourced and for each load of material received.*
- *Record sheets must be filled out at the source of VENM for transport to the quarry, and at the quarry for the receiving of VENM. Completed record sheets are to be stored and filed in a suitable location to facilitate the reporting, auditing, and “access to information” requirements specified in the Project Approval and EPL.*

During the reporting period a total of 3688.06t of material was imported and placed within the void. All records have been kept and are referenced within Appendix K. the plan of the location of the placement of the VENM has been provided in Appendix L.

## 2.6 Waste Management

As the facility is designed to minimise waste production long term there is minimal waste produced at the facility however the following waste is dealt with onsite and managed in accordance with current environmental guidelines

### 2.6.1 Scrap steel (ferrous metal) from concrete recycling.

The bulk scrap steel from the concrete is separated during pre-processing of the concrete, this material is then stored in bulk storage bins. During final processing of the concrete the steel is separated using a magnet to remove the final small amounts and stored in the same bulk storage bins. Once full the bin is replaced with an empty bin and the full bin is taken to the metal recyclers.

### 2.6.2 Waste timber, plastic, non-ferrous metals

During processing of imported concrete and brick/masonry products there can be other unwanted products in the final processed material, such as plastic, timber, ferrous and non-ferrous metals. However, there is an allowable amount of this type of material in the final processed product (RTA T276 – Foreign Material content of Recycled Crushed concrete). With our products, we endeavour to have 100% of foreign material removed from our finished product, we do this by a process of

machine sorting and hand picking prior to crushing and sorting and picking after crushing. These materials are then sorted into various non-ferrous metal bins (copper, aluminium, steel) and or a rubbish bin. The recycled metal products are transported to the metal recyclers for recycling while the rubbish (plastic, timber etc.) is removed by Cleanaway and disposed of at an approved waste disposal facility.

### 2.6.3 Lunch Waste and Food Scraps

All lunch waste and food scraps are placed in bins around the facility, those bins are then consolidated into a waste bin provided by Cleanaway. This bin is then removed and disposed of by Cleanaway.

### 2.6.4 Asbestos Materials

All materials imported to site for disposal are handled per our asbestos management guidelines.

1. The load is visually checked at the weighbridge for signs of asbestos contamination. **If any asbestos is detected the load is refused and sent away. The date, time, truck and rego are all recorded.** If no asbestos is identified the truck is permitted to tip onsite subject to another inspection after tipping.
2. The load is then taken down to the unloading station in preparation for tipping.
3. The load is then directed for tipping away from the main stockpile of material to be processed, to prevent any cross contamination.
4. The load is then tipped in the presence of quarry personnel who again inspect the tipped load for any signs of potential asbestos. **If any asbestos is detected the load is reloaded and sent away. The date, time, truck and rego are all recorded.**
5. The tipped load is then pulled up into the main stockpile while again checking for any signs of asbestos.

### 2.6.5 Ablutions

Currently utilise medium sized ablution facility that is for all staff currently onsite. This has male and female amenities. This pump out is regularly maintained and serviced by offsite contractor.

### 2.6.6 Waste Oils, Batteries

Waste oil from servicing is stored in two, 205L drums located in the sea container bund within the maintenance area. These drums are pumped out regularly with local oil recycling contractors. Batteries that are no longer functioning are removed and stored on pallets. A local recycling contractor for batteries attends site and disposes of the batteries.

## 2.7 Ore and Product Stockpiles

All stockpiled material is managed in 4000t stockpiles. These stockpiles are situated on the floor of the current blasting area. All sales are managed and loaded from the stockpile floor. This area is not exposed to winds and dust generation. There are numerous stockpiles onsite that are stored in preparation for sales in meeting client demand.

## 2.8 Water Management

Any water that accumulates from the main extraction zone is pumped up to the main water storage buffer dam.

## 2.9 Hazardous Material Management

No hazardous materials are stored on the mine site.

- Fuel for machinery is brought to site as required, all refuelling is serviced via a dedicated plant refuelling truck.
- The blasting contractor only brings explosives to site on the day required.

Thus, eliminating the need to store any hazardous materials onsite.

## 2.10 Production Quantities and VENM importation for Emplacement in Void

### Cumulative Production (all cubic metres)

Table 2 - Production and Waste Summary

Process	Start of Reporting Period (Dec 2016)	At end of Reporting Period (June 2016)	End of next reporting (estimated)
Topsoil Stripped	16,480	16,480	25,000
Topsoil Used/Spread	16,480	16,480	25,000
Waste Rock	Nil	Nil	Nil
Ore	1,179,318	1,265,715	1,415,000
Processing Waste	12	15	18
Product	1,179,318	1,265,715	1,415,000
VENM importation (tonnes)	39107.22	42794.96	60000t

Table 3 - Stored Water

	Volumes held (cubic metres)		
	Start of Reporting Period	At end, of Reporting Period	Storage Capacity
Clean water	10000 est.	10000 est.	103000
Dirty water	Nil	Nil	Nil
Controlled discharge water	N/A	N/A	N/A
Contaminated water	N/A	N/A	N/A



### 3. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

#### 3.1 Blasting Monitoring

Five blasts were carried out in the AEMR reporting period 1<sup>st</sup> December 2016 through to 30<sup>th</sup> June 2017. All blasts were monitored in accordance with the blast management plan, blast controls and project approval. No results were recorded outside the approved limits for vibration and overpressure. All results were analysed at the completion of each blast and forwarded to the DECCW information and verification. See tables and charts below and results attached in appendix C


Blasting controls include the following.

- The police, Shoalhaven City Council, NSW Roads and Traffic Authority, Environmental Protection Agency and the resident occupying the house immediately to the south of the quarry site are notified verbally at least 24 hours prior to the initiation of each blast.
- The drill hole spacing, burden distance, stemming length, maximum instantaneous charge is carefully designed and implemented by the blasting contractor to ensure that ground vibration and air blast do not exceed the Project Approval Controls criteria and that there is no danger to motorists using the Princes Highway.
- Each blast is monitored at the nearest residence, adjacent to jail, adjacent to commercial premises and north of brickworks and subsequent blast designs are modified if required considering the blast monitoring.
- Records of each blast monitored have been stored for future reference, and are attached to this report.
- All blast monitors are downloaded and the results analysed at the completion of each blast. Checking for any exceedances of the reporting criteria. Precision Drill and Blast rely on this information for future blasting design and this information enables them to determine if any modifications to the MIC (Maximum Instantaneous Charge), drill pattern and overall blast design are required. (See attached letter and blast reports in Appendix C)
- All drilling and blasting-related activities will be supervised by a suitably qualified and experienced blasting engineer or shot-firer

As per **Section 14.3.1 of our EMS (GHD 2010)**

*Blasting is to be designed to:*

- *Achieve the required degree of fragmentation;*
- *Satisfy all environmental criteria (especially noise and vibration,)*

- 
- *Contain all blast fly rock within the nominated blast envelope.*
  - *Blast emissions will be quantified using a portable blast emissions monitor (measurement of air blast and vibration, which will be positioned at the nearest potentially affected residences and other blast emission sensitive receivers to the plant operations as identified in the Project Approval. Blast monitoring instrumentation will be employed to meet the primary specifications presented in the Noise Monitoring Program/Blast management Plan.*
  - *The Blast Design Record Sheet is to be filled in for individual blast events.*

### 3.1.1 Blasting Analysis (Ground Vibration)

Table 4 - Blasting Ground Vibration Results

Dec2016 – June2017 AEMR Ground Vibration – Results – Residential			
Date	Corrective Services	Goodsell Residence	Peak Vector Sum Reporting Limit
13/01/2017	4.72	0.647	5
16/02/2017	0.441	4.61	5
6/04/2017	2.7	3.85	5
15/05/2017	3.67	4.23	5
14/06/2017	2.5	2.71	5

Dec2016 – June2017 AEMR Ground Vibration – Results – Commercial			
Date	North of Brickworks	Commercial Premises	Peak Vector Sum Reporting Limit
13/01/2017	2.64	7.77	25
16/02/2017	1.81	3.86	25
6/04/2017	0.417	1.74	25
15/05/2017	0.59	1.93	25
14/06/2017	0.561	2.35	25

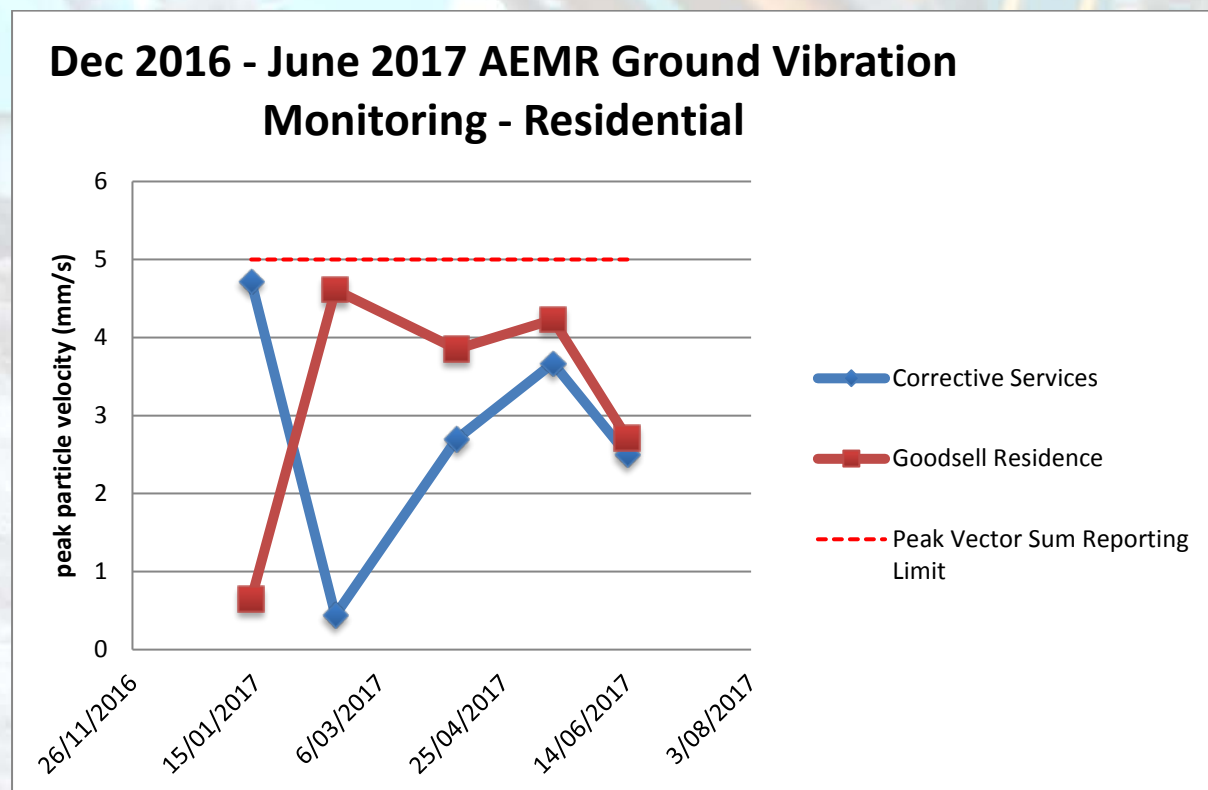


Chart 1 - Residential Ground Vibration

## Dec 2016 - June 2017 AEMR Ground Vibration Monitoring - Commercial

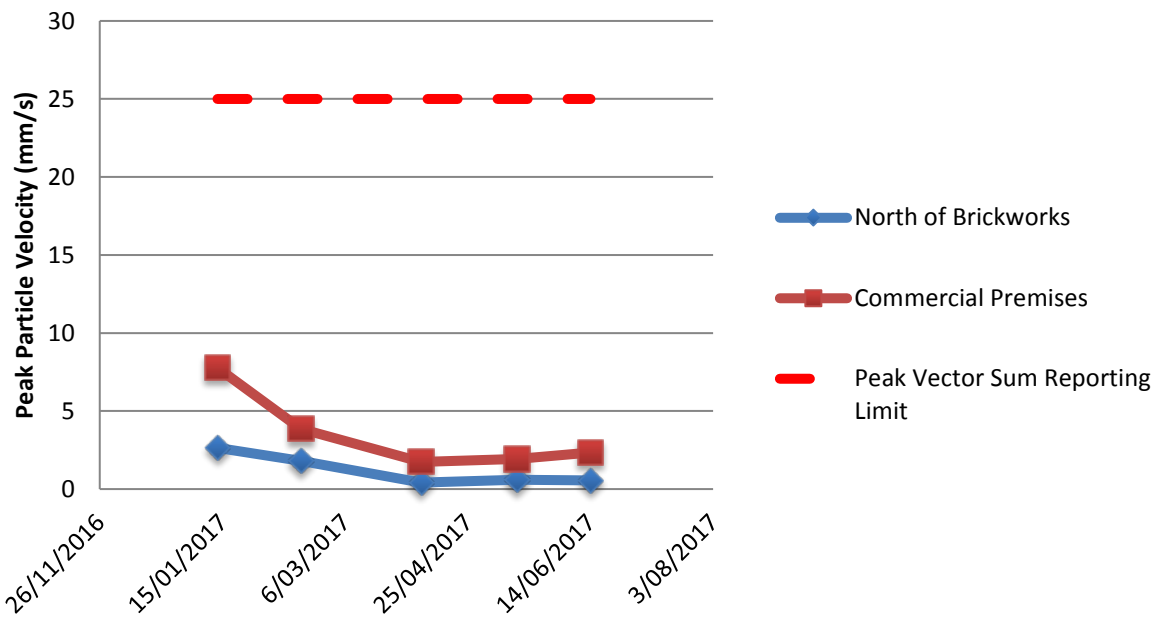


Chart 2 - Commercial Ground Vibration

### 3.1.2 Blasting Analysis (Air Blast Overpressure)

Table 5 - Residential Overpressure

Dec2016 – June2017 AEMR Air Blast Overpressures – Residential			
Date	Corrective Services	Goodsell Residence	Peak Vector Sum Reporting Limit
13/01/2017	111.5	106.5	115
16/02/2017	107	110.2	115
6/04/2017	114.4	109.9	115
15/05/2017	110.9	109.2	115
14/06/2017	114.9	114.9	115

Table 6 - Commercial Overpressures

Dec2016 – June2017 AEMR Air Blast Overpressures – Commercial			
Date	North of Brickworks	Commercial Premises	Peak Vector Sum Reporting Limit
13/01/2017	121.3	116.3	125
16/02/2017	116.1	119.6	125
6/04/2017	108	120.2	125
15/05/2017	104.9	121.9	125
14/06/2017	107	117.4	125

### Dec 2016 - June 2017 AEMR Air Blast Overpressures - Residential

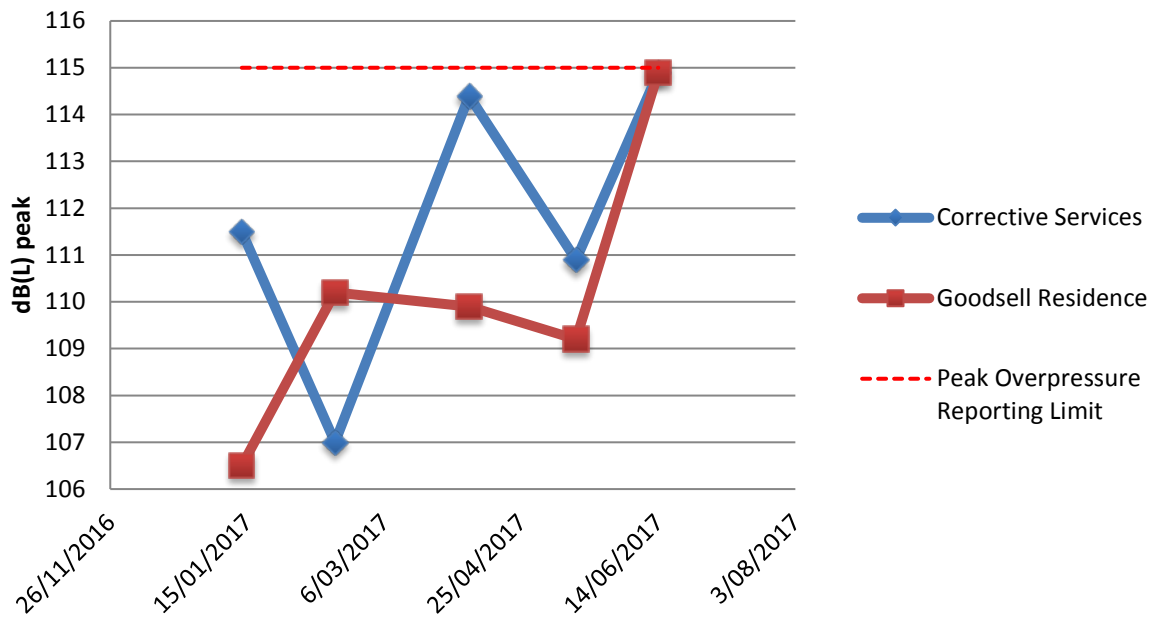


Chart 3 - Residential Overpressure

### Dec 2016 - June 2017 AEMR Air Blast Overpressures - Commercial

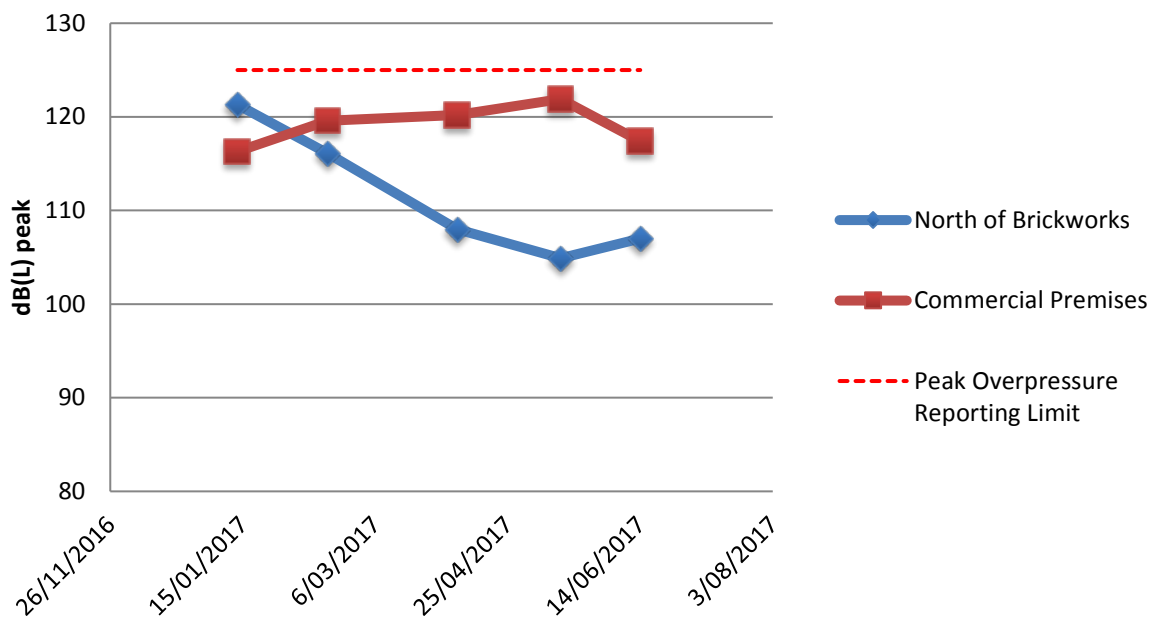


Chart 4 - Commercial Overpressure

### 3.1.3 Blasting Summary

The blasting program has been successful over this reporting period. This is based on maintaining small blasts onsite and ensuring the project criteria (ground vibration and overpressure) had not been exceeded during this reporting period. The results will continue to be closely monitored after each blast to assess blasting requirements for future blasts. We have now shown 3 consecutive AEMR reporting periods of blasting that we have been able to maintain project compliance with the use of small blasts. The number of blasts this reporting period reduced from 12 blasts to 5, however the reporting period was also reduced. With current demand, it is anticipated that we will maintain this blasting program with approx. 1 blast per month. This would still fall well within our project approval with permission to blast weekly. All blasts will continue to be kept small to keep air blast overpressures and ground vibration to a minimum and below the approved limits as opposed to increasing the yield but reducing the number of blasts as this has the potential to increase ground vibration and overpressures and result in non-compliance with our approval.

## 3.2 Noise Monitoring

As per the summary of our previous three AEMR's no noise monitoring was carried out during the AEMR reporting period 1<sup>st</sup> December 2016 through to 30<sup>th</sup> June 2017.

As per previous AEMR completed in Dec 2014 – Nov 2015 *"It was shown in the previous AEMR, 3 consecutive sets of attended noise monitoring were undertaken. It was shown that compliance with the approval criteria occurred on all 3 occasions. The surveys were carried out in accordance with the EMS and Project Approval documentation. With monitors being located monitoring stations 1,2,4 and 5. (as per EMS requirements). All surveys indicated that the quarry had not exceeded any of the "noise impact assessment criteria" at any locations."*

In accordance with section 4.4.2 Location and Frequency of the Environmental Management Strategy (EMS) by GHD and Section 3.3 Nowra Brickworks Quarry, South Nowra Noise Monitoring Program/Blast Management Plan by Heggies.

*"Noise monitoring may be discontinued if compliance with the nominated criteria is demonstrated at all four monitoring locations on three consecutive noise surveys"*

### 3.2.1. Noise Summary

Noise monitoring was not carried out in this reporting period as a result of proven compliance in the last reporting period. As per previous AEMR's There were no recorded noise complaints during the period or previous reporting periods. If any noise complaints are to be fielded in the future, noise monitoring can undertaken to verify compliance.

### 3.3 Air Monitoring

Airborne dust within the quarry site is generated predominantly through crushing and screening activities, vehicle movement on haul roads, stockpiles and exposed surfaces on the site.

A range of air quality controls are currently undertaken at the Nowra Brickworks Quarry and will continue to be implemented for the term of the MOP. (2015-2021)

- The processing plant is currently fitted with dust suppression equipment and this equipment would continue to be used whenever the plant is operational.
- On-site roads, hardstand areas, stockpiles and exposed surfaces are and will continue to be regularly watered using a water cart or sprinklers. Water for this purpose is sourced from water within the extraction area or the Water Storage Dam.
- The loads of trucks carrying material to or from the quarry site on public roads are and will continue to be covered.
- An automated wheel wash has been in conjunction with shaker grid has been improved and utilises several sprays on all vehicles exiting site.

See appendix D with attached results. These have been analysed and collated in the following charts and tables DDG, TsP and Pm10.

#### 3.3.1 Dust Deposition Gauges (DDG)

The DDG reporting criteria of 4 g/m<sup>2</sup>.month was not exceeded during the Dec 2016 – June 2017 AEMR reporting period. Nor were there any increases above 2g/m<sup>2</sup> from one month to the next.

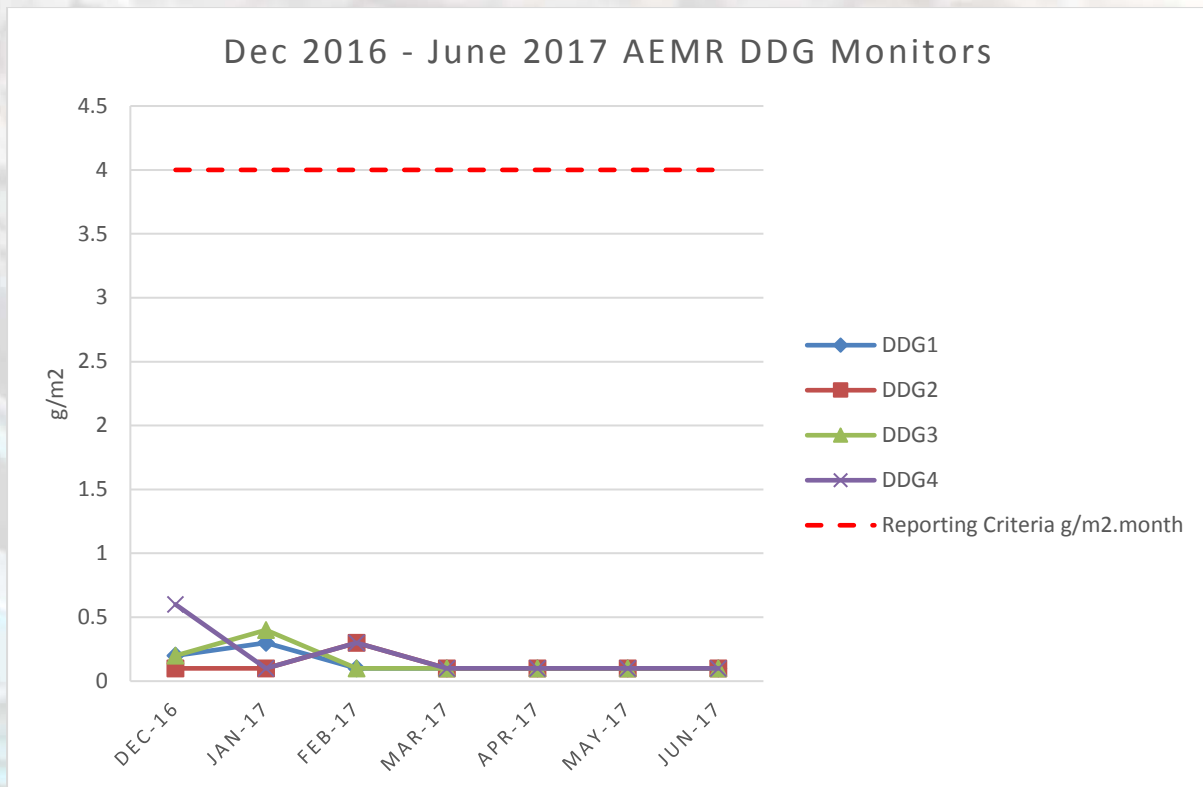


Chart 5- DDG

Table 7 - DDG Collected Data

		Ash Content		Combustible Matter		Total Insoluble Matter	
		g/m <sup>2</sup> .month	mg	g/m <sup>2</sup> .month	mg	g/m <sup>2</sup> .month	mg
<a href="#">December</a>	DDG1	0.6	13	0.3	6	0.9	19
	DDG2	0.3	7	0.1	2	0.4	9
	DDG3	0.1	3	0.1	1	0.2	4
	DDG4	0.2	4	0.1	3	0.3	7
<a href="#">January</a>	DDG1	0.1	1	0.1	1	0.1	2
	DDG2	0.1	1	0.1	1	0.1	1
	DDG3	0.1	2	0.1	1	0.1	2
	DDG4	1.2	20	2.8	49	4	69
<a href="#">February</a>	DDG1	2.1	34	1.7	26	3.8	60
	DDG2	1.7	27	0.6	9	2.3	36
	DDG3	2.1	34	0.7	11	2.8	45
	DDG4	0.8	12	0.3	5	1.1	17
<a href="#">March</a>	DDG1	0.1	1	0.1	2	0.1	3
	DDG2	0.1	1	0.1	1	0.1	1
	DDG3	0.1	1	0.1	1	0.1	1
	DDG4	0.1	1	0.1	1	0.1	1
<a href="#">April</a>	DDG1	0.1	2	0.1	1	0.2	3
	DDG2	0.4	6	0.1	2	0.5	8
	DDG3	0.1	1	0.1	1	0.1	1
	DDG4	0.1	1	0.1	1	0.1	1
<a href="#">May</a>	DDG1	0.1	2	0.1	2	0.2	4

	DDG2	0.2	4	0.2	4	0.4	8
	DDG3	0.1	1	0.1	1	0.1	1
	DDG4	0.1	1	0.1	1	0.1	1
<a href="#">June</a>	DDG1	0.1	1	0.1	1	0.1	1
	DDG2	0.1	1	0.1	2	0.2	3
	DDG3	0.1	1	0.1	1	0.1	1
	DDG4	0.1	1	0.1	2	0.2	3

### 3.3.2 TsP High Volume Samplers

The TsP Annual Average limit (90ug/m<sup>3</sup>) was not exceeded during the reporting period (Dec 2016 – June 2017)

#### **Dec 2016 - June 2017**

**TsP Annual Average – South (10.5 ug/m<sup>3</sup>)** slight increase of 0.5 ug/m<sup>3</sup> from the previous reporting period.

**TsP Annual Average – North (9.0 ug/m<sup>3</sup>)** a decrease of 10.5 ug/m<sup>3</sup> from the previous reporting period

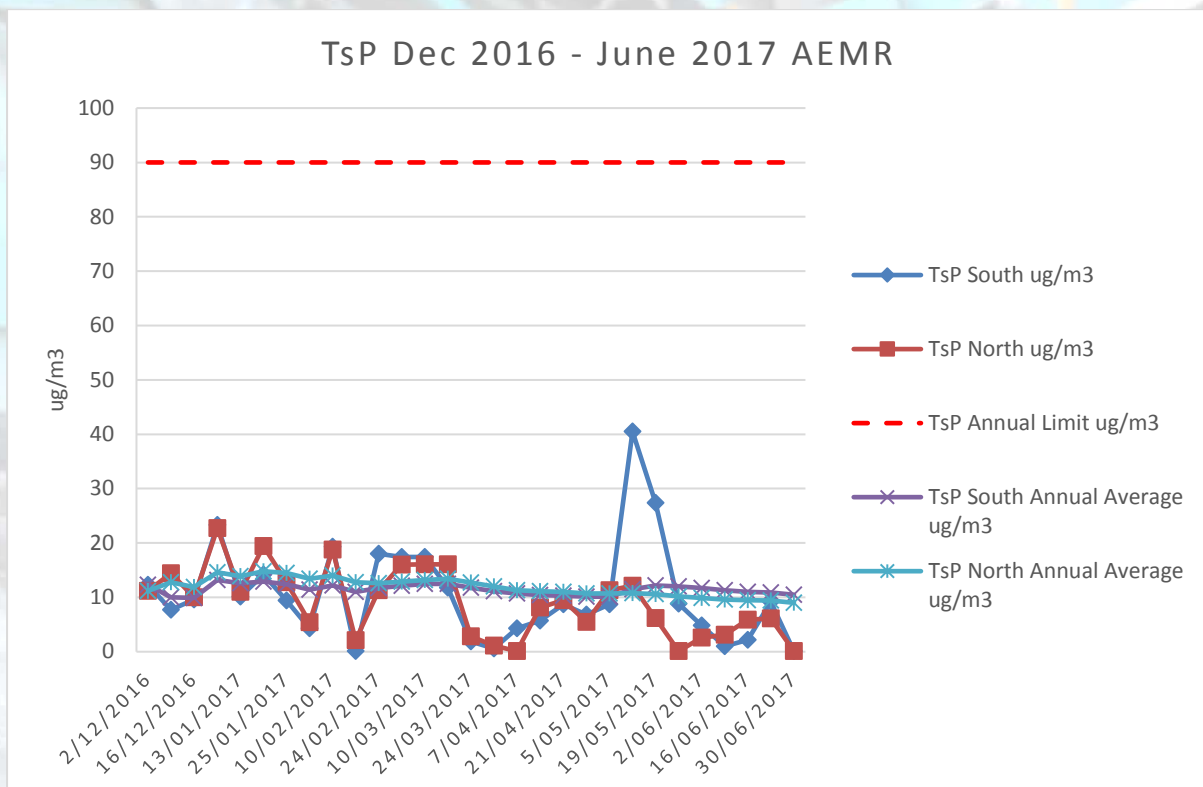


Chart 6 - TsP

Table 8 - TsP Data collected

Date	TsP South (ug/m3) - daily value	TsP North ug/m3 - daily value	TsP South Annual Average ug/m3	TsP North Annual Average ug/m3
<a href="#">2/12/2016</a>	12.3	11.2	12.3	11.2
<a href="#">9/12/2016</a>	7.7	14.4	10	12.8
<a href="#">16/12/2016</a>	9.6	10	9.9	11.9
<a href="#">21/12/2016</a>	23.3	22.7	13.2	14.6
<a href="#">13/01/2017</a>	10.1	11	12.6	13.9
<a href="#">20/01/2017</a>	14.2	19.4	12.9	14.8
<a href="#">25/01/2017</a>	9.4	12.8	12.4	14.5
<a href="#">3/02/2017</a>	4.3	5.4	11.4	13.4
<a href="#">10/02/2017</a>	19.3	18.8	12.2	14
<a href="#">17/02/2017</a>	0.1	2.1	11	12.8
<a href="#">24/02/2017</a>	18	11.3	11.7	12.6
<a href="#">3/03/2017</a>	17.4	16	12.1	12.9
<a href="#">10/03/2017</a>	17.4	16.1	12.5	13.2
<a href="#">17/03/2017</a>	11.8	16.1	12.5	13.4
<a href="#">24/03/2017</a>	1.9	2.8	11.8	12.7
<a href="#">31/03/2017</a>	0.6	1.1	11.1	12
<a href="#">7/04/2017</a>	4.3	0.1	10.7	11.3
<a href="#">14/04/2017</a>	5.7	8.1	10.4	11.1
<a href="#">21/04/2017</a>	8.7	9.5	10.3	11
<a href="#">28/04/2017</a>	6.8	5.5	10.1	10.7
<a href="#">5/05/2017</a>	8.7	11.3	10.1	10.7
<a href="#">12/05/2017</a>	40.5	12.1	11.5	10.8
<a href="#">19/05/2017</a>	27.4	6.2	12.2	10.6
<a href="#">26/05/2017</a>	8.8	0.1	12	10.2
<a href="#">2/06/2017</a>	4.8	2.6	11.7	9.9
<a href="#">9/06/2017</a>	1	3.1	11.3	9.6
<a href="#">16/06/2017</a>	2.2	5.9	11	9.5
<a href="#">23/06/2017</a>	9.2	6.1	10.9	9.4
<a href="#">30/06/2017</a>	0.1	0.1	10.5	9

### 3.3.3. Pm10 High Volume Samplers

The Pm10 Annual Average limit (30ug/m3) and the 24hr limit (50ug/m3) were not exceeded during monitoring during this reporting period.

The maximum values recorded for North and south were 21.3ug/m3 and 30.5ug/m3 which is well below the 50ug/m3 allowable limit.

### Dec2016 - June2017

**Pm10 Annual – South (8.2 ug/m3)** a slight decrease of 0.2ug/m3 for the reporting period.

**Pm10 Annual – North (10.8 ug/m3)** a decrease of 2.6ug/m3 for the reporting period.

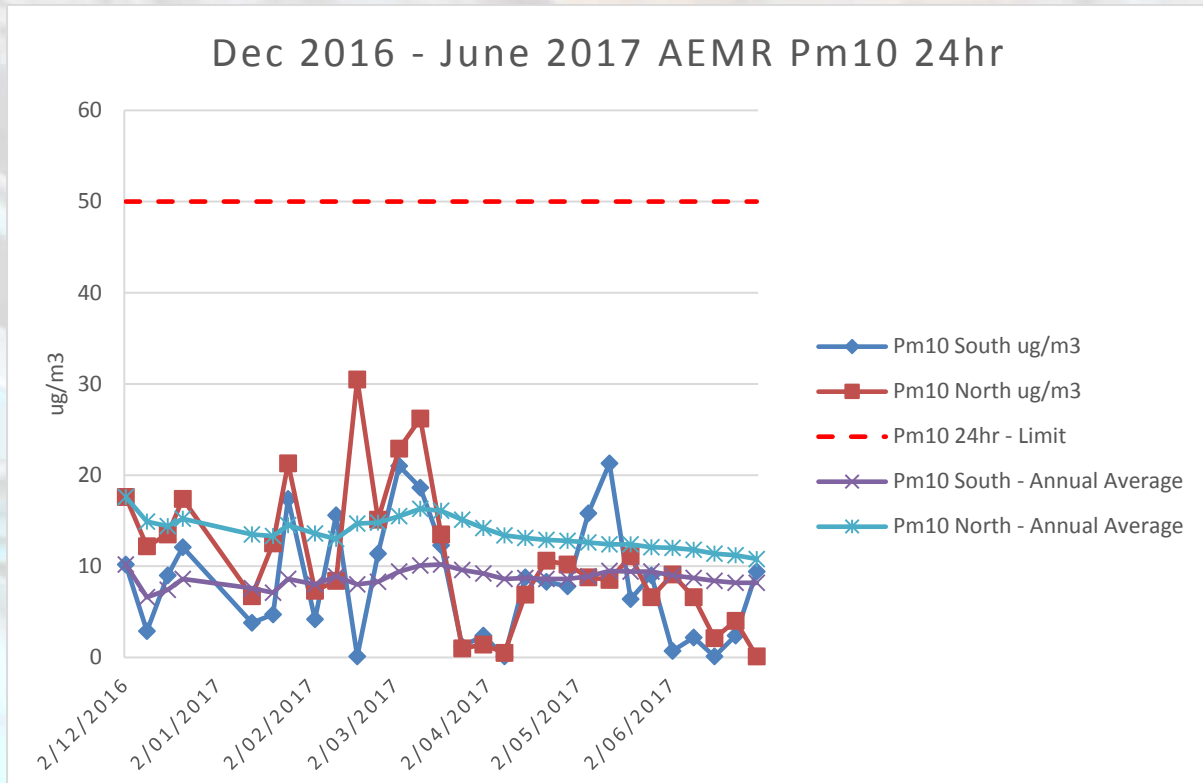


Chart 7 - Pm10 24hr and annual average

### 3.3.4. Dust Summary

For the majority of the operations during the reporting period there were no adverse effects in regards to generating additional dust during quarrying operations. As with last reporting period there were 3 complaints relating to the tracking of fine dust during the reporting period. These occurred in February and June 2017. Generally, this occurred during periods of wet weather and increased truck movements when fine particles adhered to the trucks tyres and were not removed when entering the truck shaker or wheel wash. SCCCR have invested in their own street sweeper and increased the use to 3 times daily for cleaning the roads and gutters and during times of high vehicle movements. During the previous reporting period it was noted that work was completed on upgrading and improving the wheel wash which is now fully automated. We have further invested in improvements to the wheel wash area during this reporting period with further work commencing on again improving the wheelwash this work was not completed at the end of the reporting period but the aim is to have operational by August/September 2017.

The Pm10 annual average south and north limits had tended to trend down or remain very close to the previous reporting period. The annual average limits are about 30% of our approved limits and do not appear likely to exceed our approved limits in the future.

## 3.4 Erosion and Sediment Control Monitoring

### 3.4.1 Nowra Brickworks Quarry

Erosion and sedimentation control at the Nowra Brickworks Quarry revolves around:

- diversion of 'clean' surface water runoff away from disturbed areas; and
- capture and retention of 'dirty' water flowing from disturbed areas of the quarry site.
- Sedimentation fencing around soil stockpiles
- Sedimentation fencing to Nowra Creek Riparian protection zone

Attached in appendix E is the sedimentation monitoring logs for the AEMR monitoring period.

### 3.4.2 Flat Rock Quarry

Following joint inspection of a flat rock quarry in February 2017

- It was determined that an ongoing monitoring program needs to be established to ensure that sediment control is well managed
- Currently existing sedimentation pond is working well however regular review needs to occur to ensure that there are no unchecked changes occurring.
- A review of this plan is underway along with an updated MOP and rehabilitation and completion of the final landform. Due to the shortened AEMR reporting period additional time will be required to finalise the proposed works with all interested parties.
- While this is occurring we will implement an interim erosion and sedimentation control program.

## 3.5 Landscape and Biodiversity Monitoring

### 3.5.1 Weed Management

Following the significant wet period that was experienced in the months of Feb, March April our weed control was delayed until June 2017. This primary weed control was carried out by Proust Land Services. It identified that species are present at the site but they are under control. A follow up program has been prepared for August to remove the dead weed species in preparation for a seeding program. The primary area of concern is located west of the weighbridge. This area is planned to have the dead weeds removed and planted out in the spring. The planting will be carried out by South coast Native seeds.

### 3.5.2 Site Reference Photos

Site Reference photos were taken in May 2017. Future site reference photos will be taken in November 2017 and May 2018. As the reporting period was reduced the 2<sup>nd</sup> set of reference photos were not taken however this will revert during the next AEMR

All photos attached in appendix F

Nov 2016



Figure 1



Figure 2



Figure 3

May 2017



### 3.5.3 Landscape and Biodiversity Summary

The site is generally in healthy condition. Control activities will continue during the Dec2016-June 2017 AEMR reporting period and the site will be monitored every 6 months for any new or increase in weed populations. New planting is proposed for the mound to the West of the weighbridge in the spring.

Site reference photos will continue to be taken and catalogued for future reference.

### 3.6 Aboriginal heritage monitoring.

No requirement for any specific aboriginal monitoring work was required the AEMR reporting period. 80% of the potential Aboriginal Heritage area is located in the riparian zone and no work will be carried out in this area of the mine. As such no earth works were carried out in this area.

### 3.7 Surface water monitoring

Surface water monitoring was carried out in accordance with the EMS throughout the AEMR monitoring period from the 1<sup>st</sup> December 2016 to 30<sup>th</sup> June 2017. Previous analysis of the baseline data by SEEC concluded that the quarry had no impact on the existing Nowra creek with high readings occurring at the control location (C1) and most data had no correlation to the surface water tested within the quarry at locations S4 and S5. Further extrapolation of the results in this AEMR reporting period continue to show no correlation between water results between the quarry and Nowra Creek. The results continue to show a large difference between the water found within the extraction area of the quarry (S5) and those within the creek (C1, C2 and C10). The results of the surface water runoff of the quarry (S4) are similar to those within the creek as it is a result of overland water flow. Generally, the results are higher at the control point C1 for the creek compared to those of S4.

#### 3.7.1 pH

The pH of the water within the quarry extraction area (S5) was found to be in the 7.7 - 8.6 range which is consistent with previous collected baseline data, while water within the creek had results ranging from 6.05 – 6.80. Further investigation showed that these results would have been the result of rainwater which is acknowledged as having a pH between 6 and 6.5 resulting in some readings that were below 6.5 within the waterways. (see chart below). Charting shows that after the low readings in after rain the pH levels tend to return to the norms.

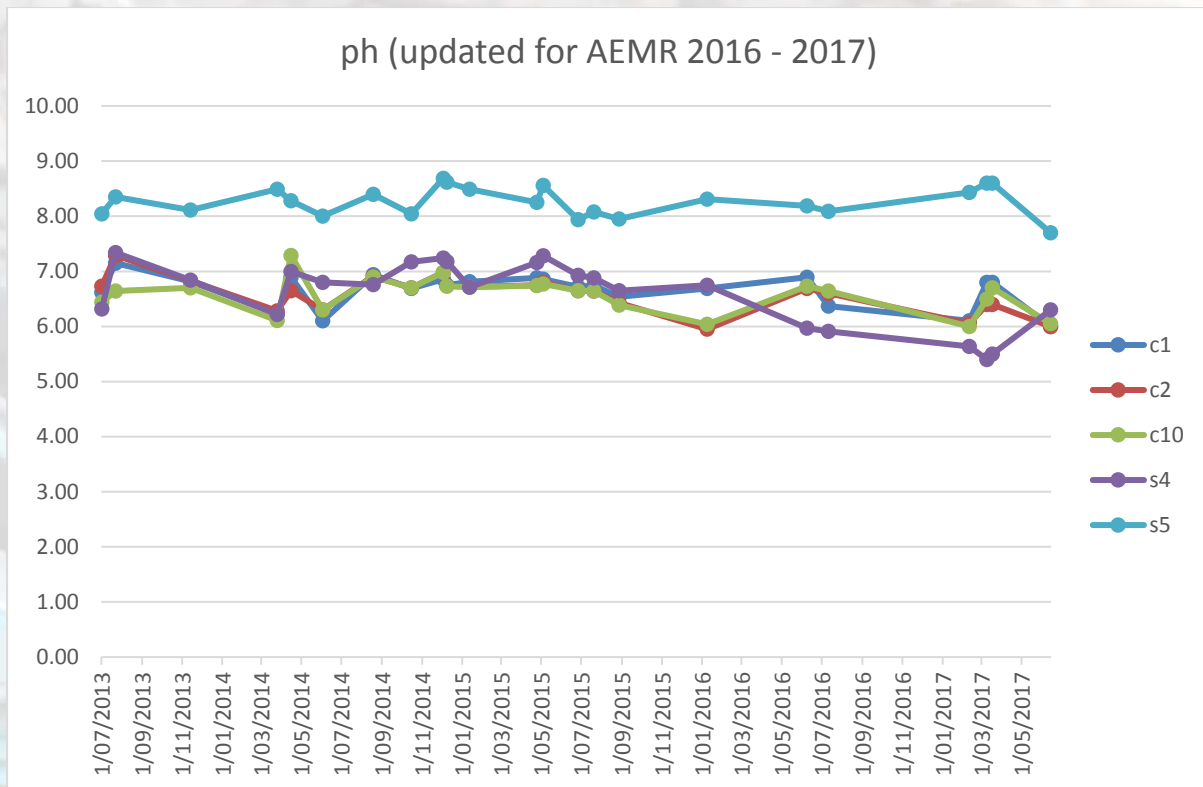


Chart 8 - Surface Water pH

### 3.7.2 Electrical Conductivity

Electrical conductivity of the water within the quarry (test location S5) recorded EC values between 5140 and 6770 us/cm while measurements at (test location S4) had values between 187 and 405. The results in the creek for the period were found to be within 135 and 201 and sow no correlation with the water within the quarry. (see chart below)

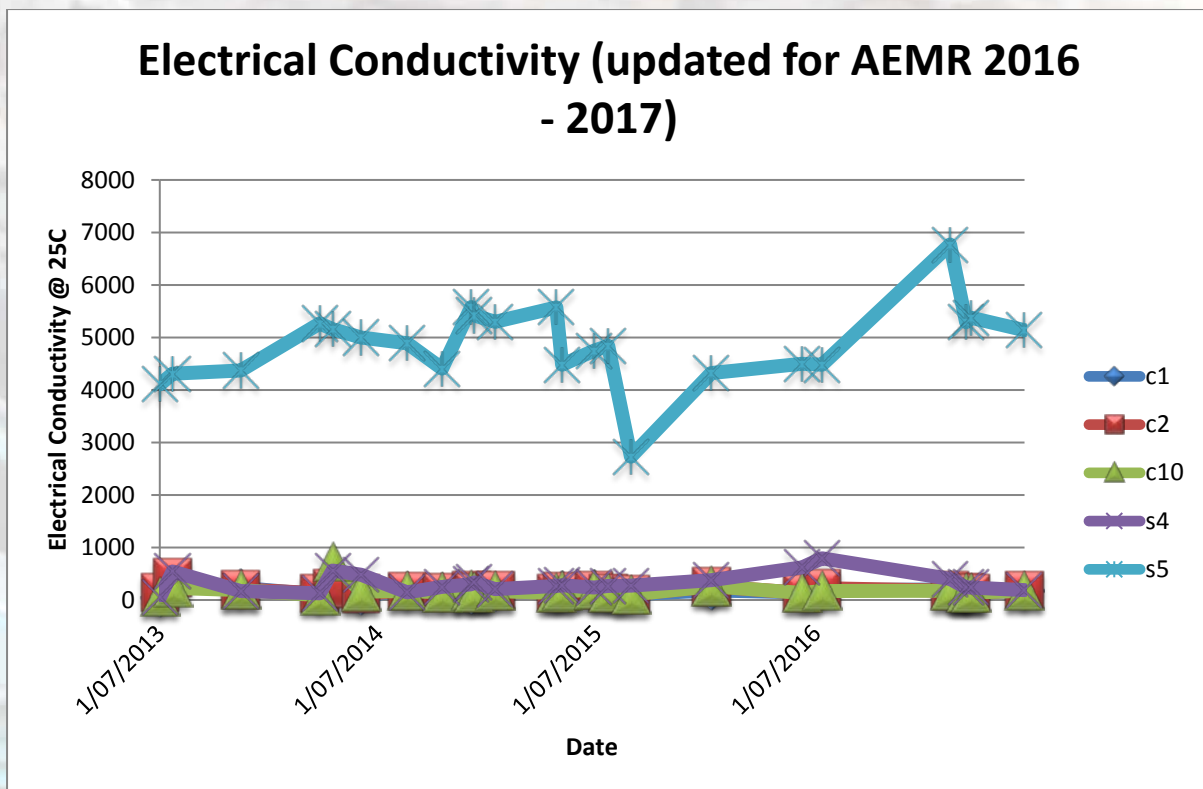


Chart 9 - Surface Water EC

### 3.7.3 Iron

Iron readings have remained consistent throughout the AEMR (2016-2017) reporting period with results maintaining previous baseline levels. The main water body within the quarry has zero detectable limits of iron.

### 3.7.4 Aluminium

Aluminium readings recorded were similar to that of iron with low readings recorded in the main quarry water body (S5) either at zero or well below all other results during the reporting period (2016-2017). The creek results are again correlated closely with those of the control location (C1) for the creek.

### 3.7.5 Arsenic

Arsenic recorded zero or negligible results for all locations.

### 3.7.6 Zinc

Zinc reported similar results to Iron and Aluminium with negligible or zero results recorded in the main quarry water body (S5). The results within the creek are closely following the creek control point (C1). Latest results are below the reporting limit of 0.015. During the reporting period the results were above the reporting limit of 0.015

however the results have returned to below the reporting limit for all locations during the last recorded results.

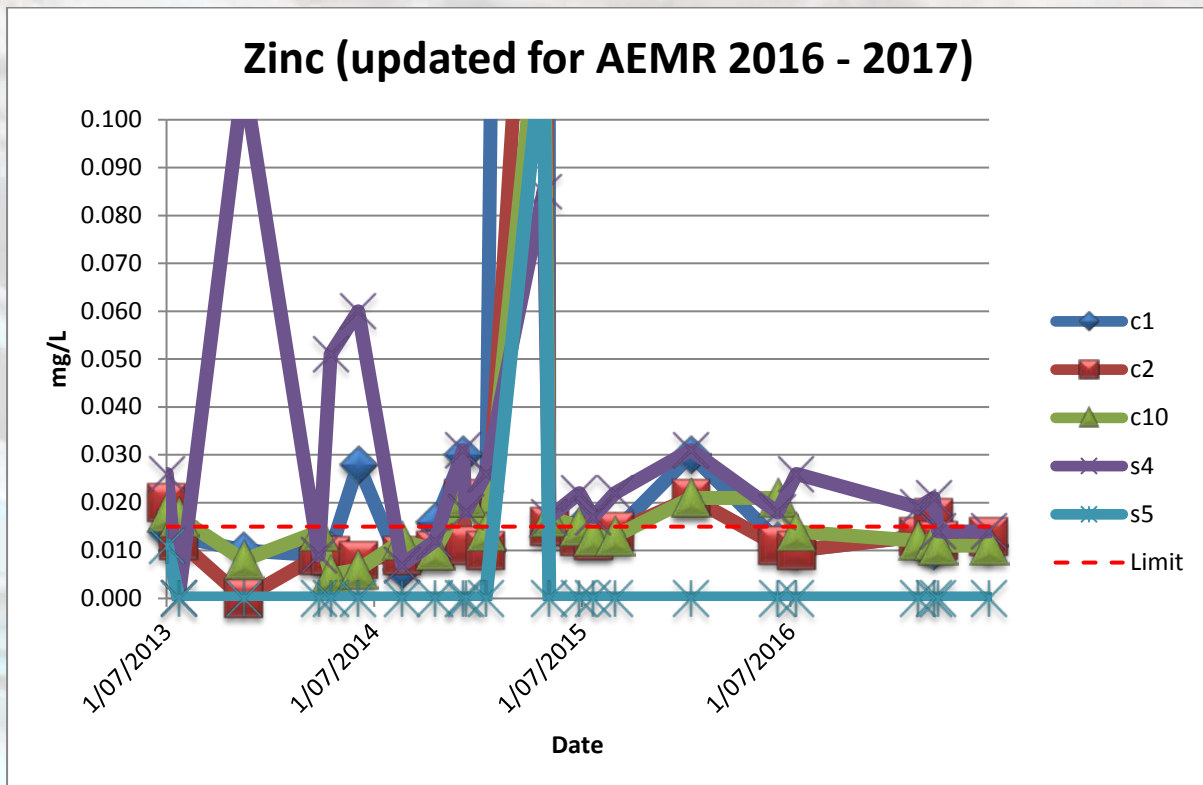


Chart 10 - Surface Water Zinc

### 3.7.7 Nitrate

As with previous AEMR results Nitrate values recorded in the creek were within the accepted guidelines there where high levels recorded in the main quarry body but these had no effect on the surface water runoff into the creek.

### 3.7.8 Ammonia

Ammonia recorded minimal levels at all monitoring locations.

### 3.7.9 Phosphorus

Higher results were recorded within the 2 middle records of the reporting period however these results had returned to around the nominated reporting value. High results are noted at all locations within the creek with correlation from the nominated control point C1.

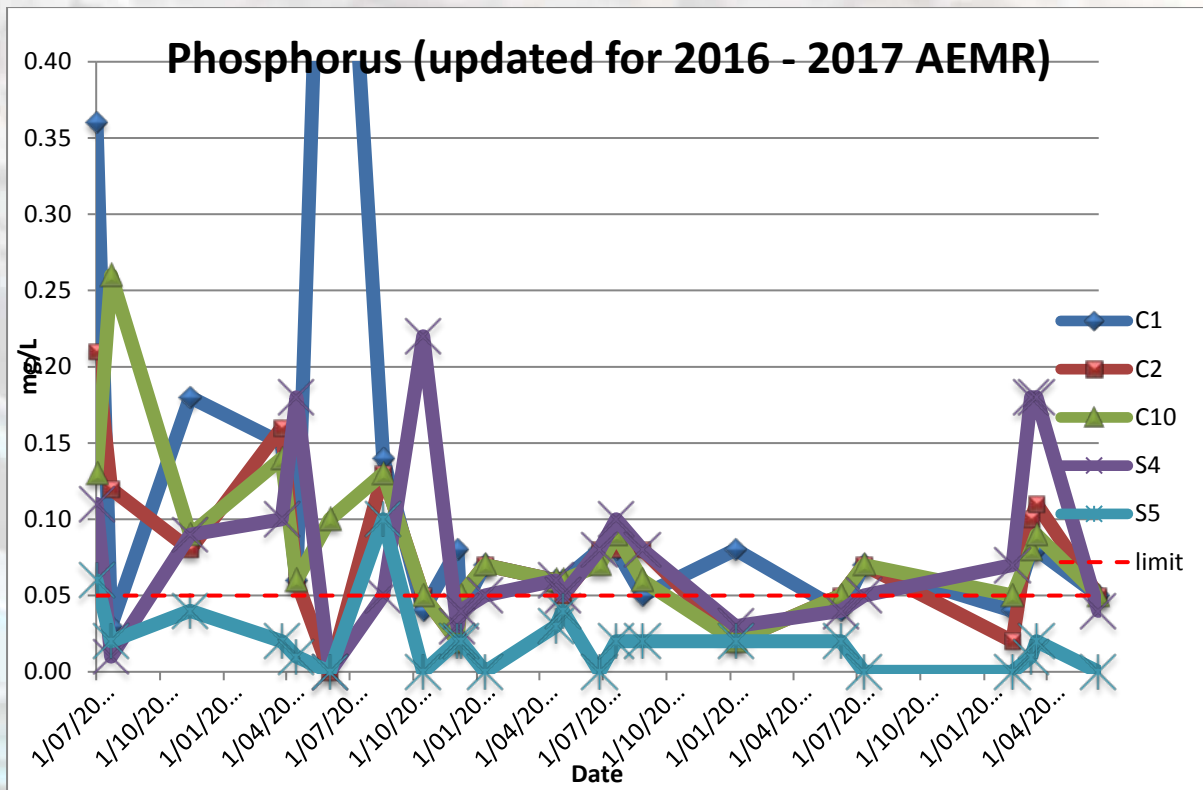


Chart 11 - Surface Water Phosphorus

### 3.7.10 Surface Water Summary

As with SEEC's report "Review of Water Quality Monitoring" from AEMR (2014-2015) the results are consistent in this reporting period and the quarry is having little to no impact on the water health of Nowra creek with no correlation between water tested within the quarry and that of Nowra creek. Monitoring will continue as per EMS (GHD 2010).

### 3.8 Ground water monitoring

Samples of Chart results for groundwater monitoring carried out during the AEMR reporting period (2016-2017). The results have been included with the baseline charts to allow ease of analysis showing change over time

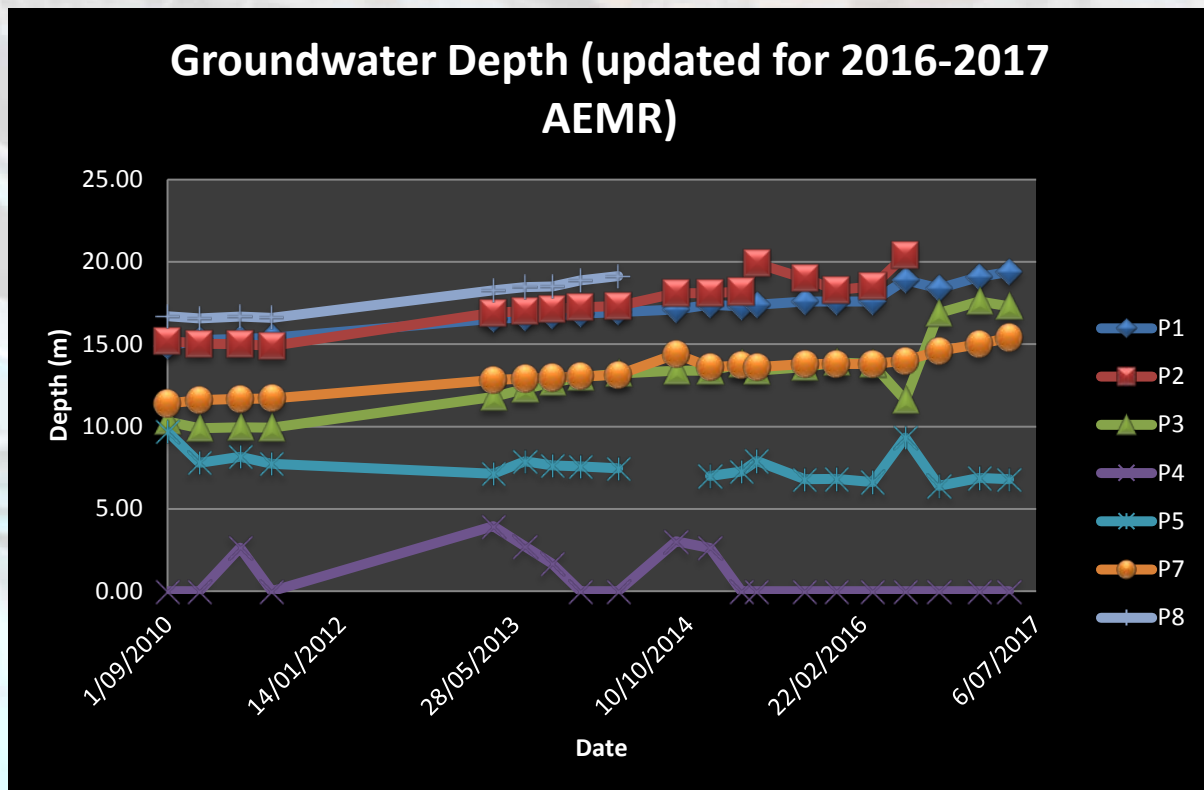


Chart 12 - Groundwater Depth

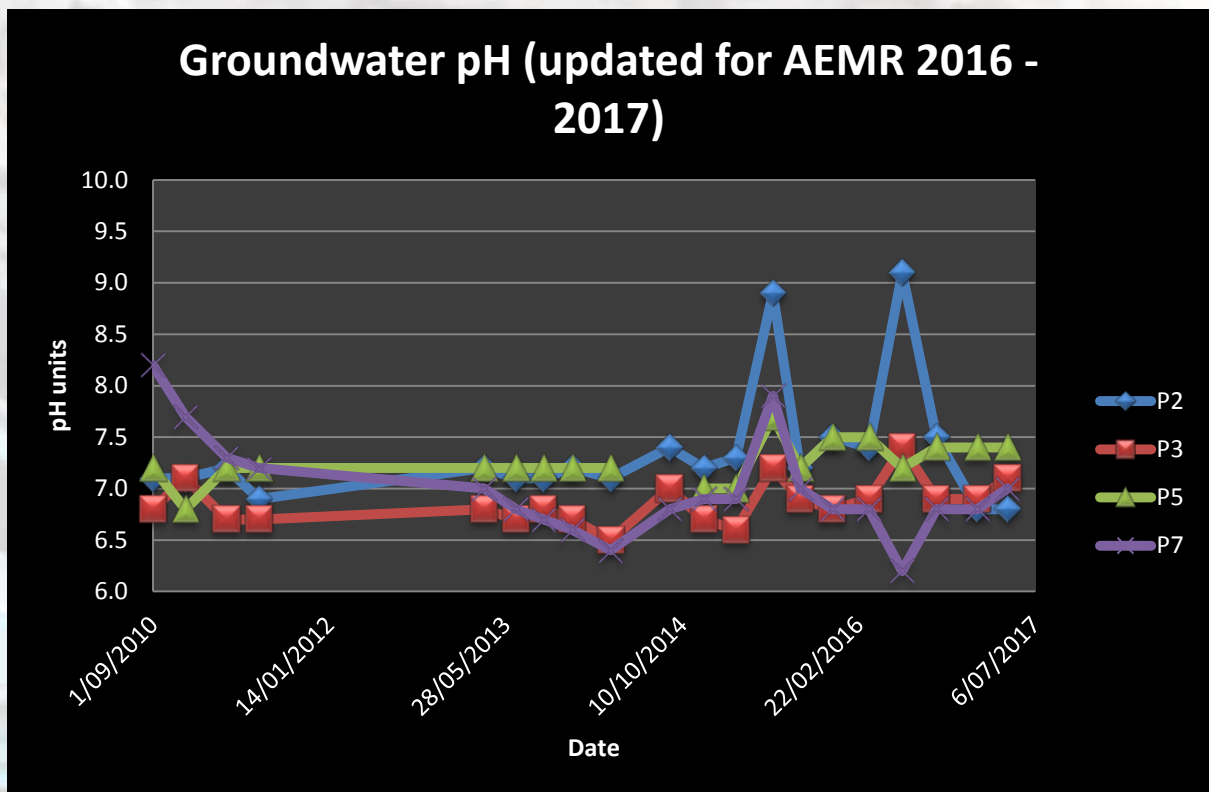


Chart 13 - Groundwater pH

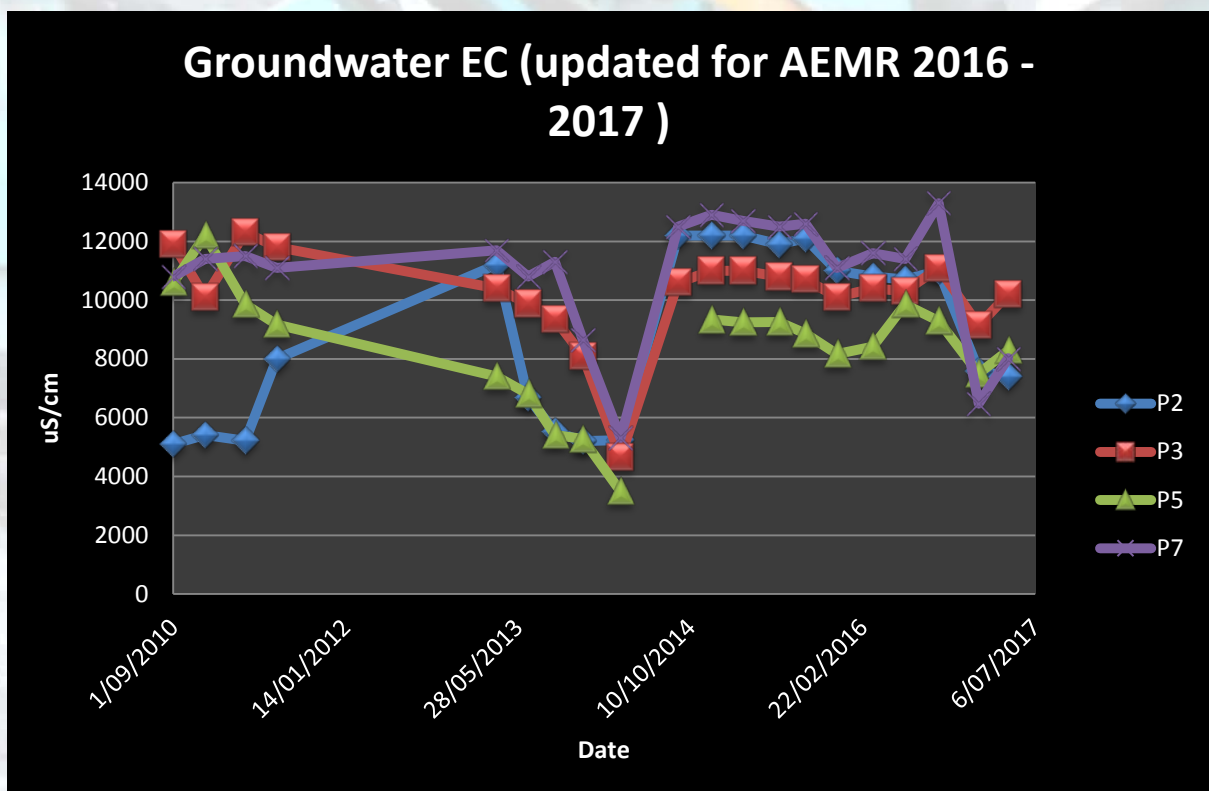


Chart 14 - Groundwater EC

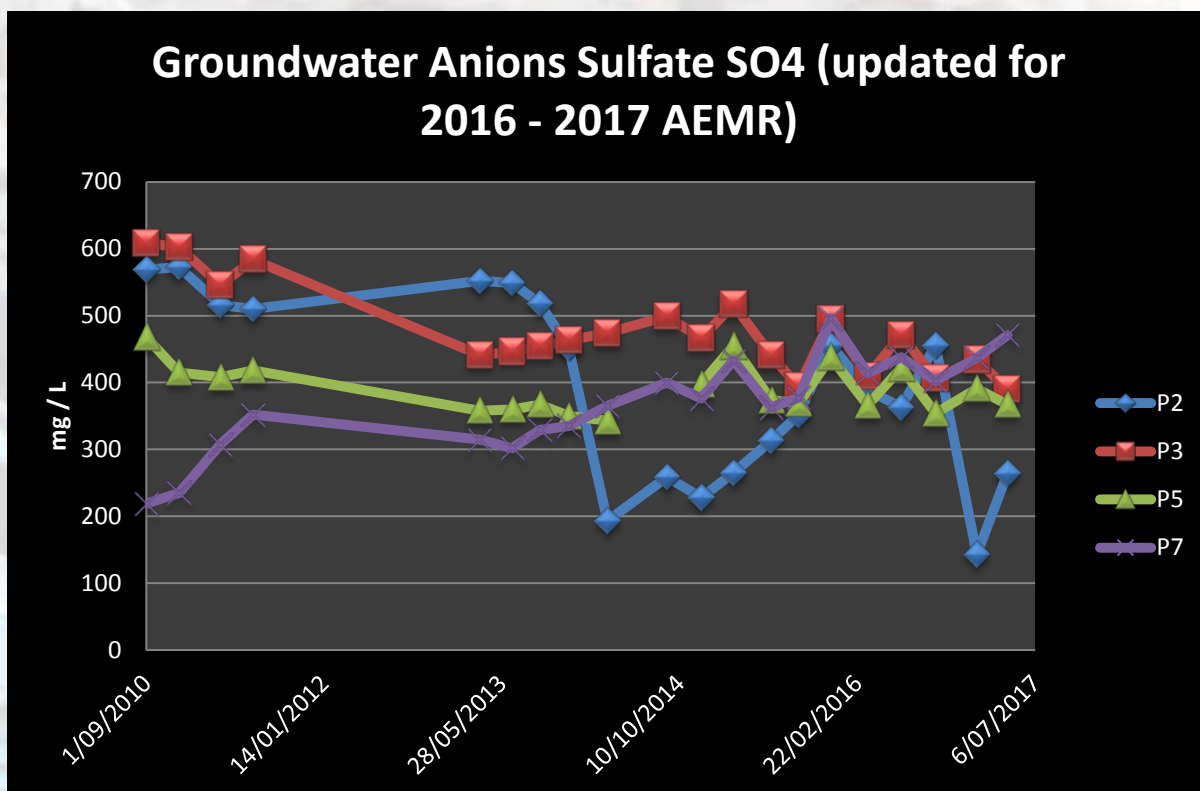


Chart 15 - Groundwater Sulfate Anions

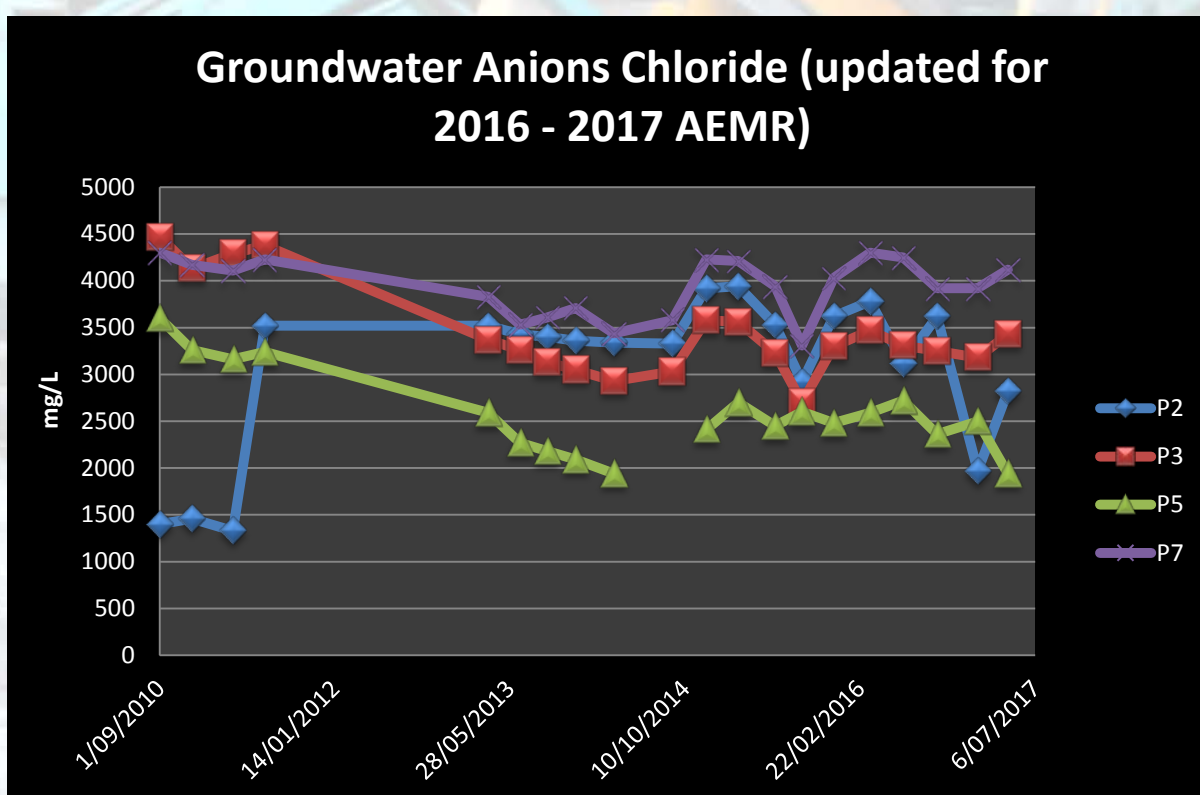


Chart 16 - Groundwater Chloride Anions

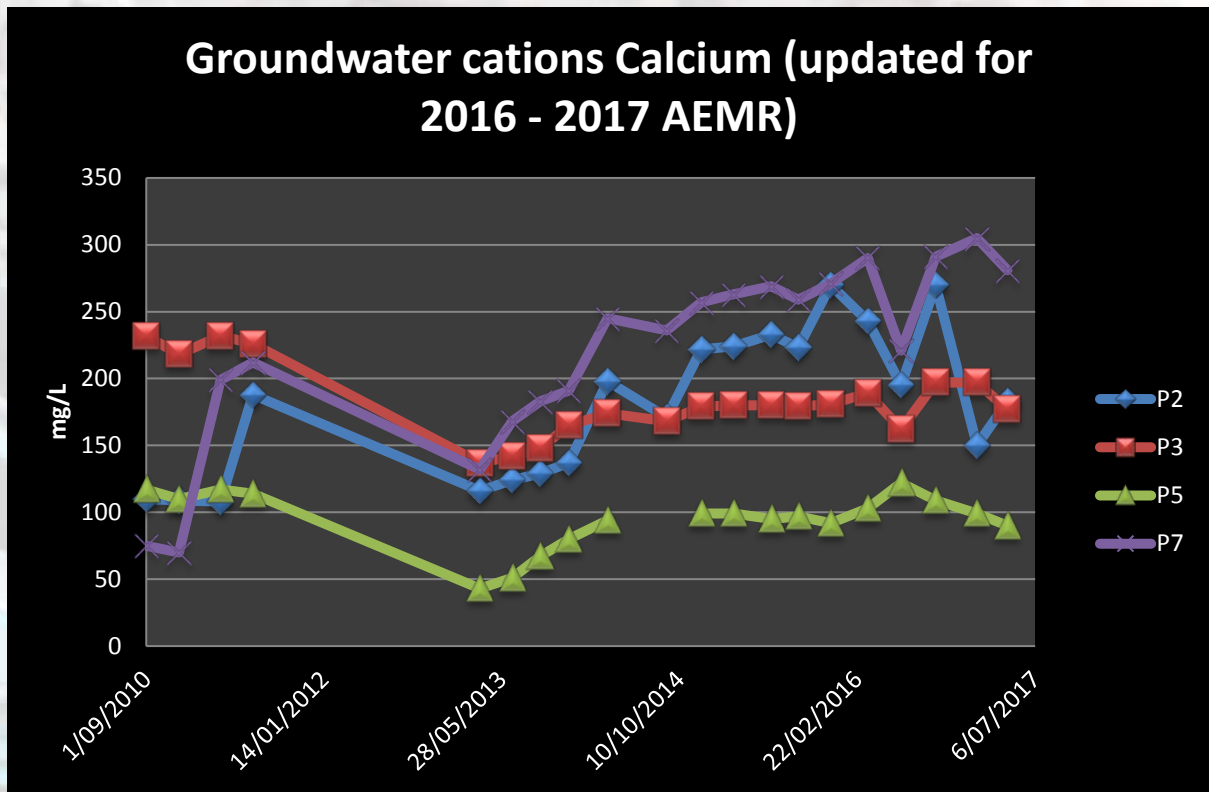


Chart 17 - Groundwater Calcium Cations

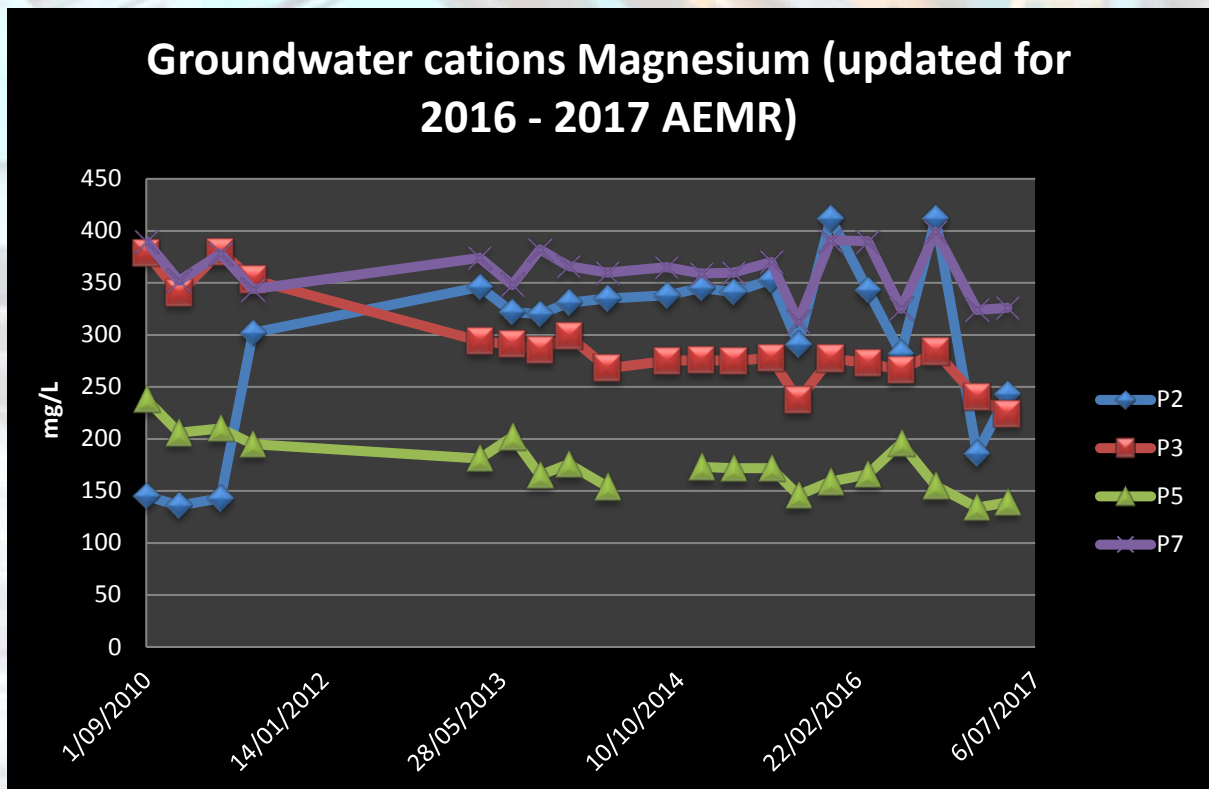


Chart 18 - Groundwater Magnesium Cations

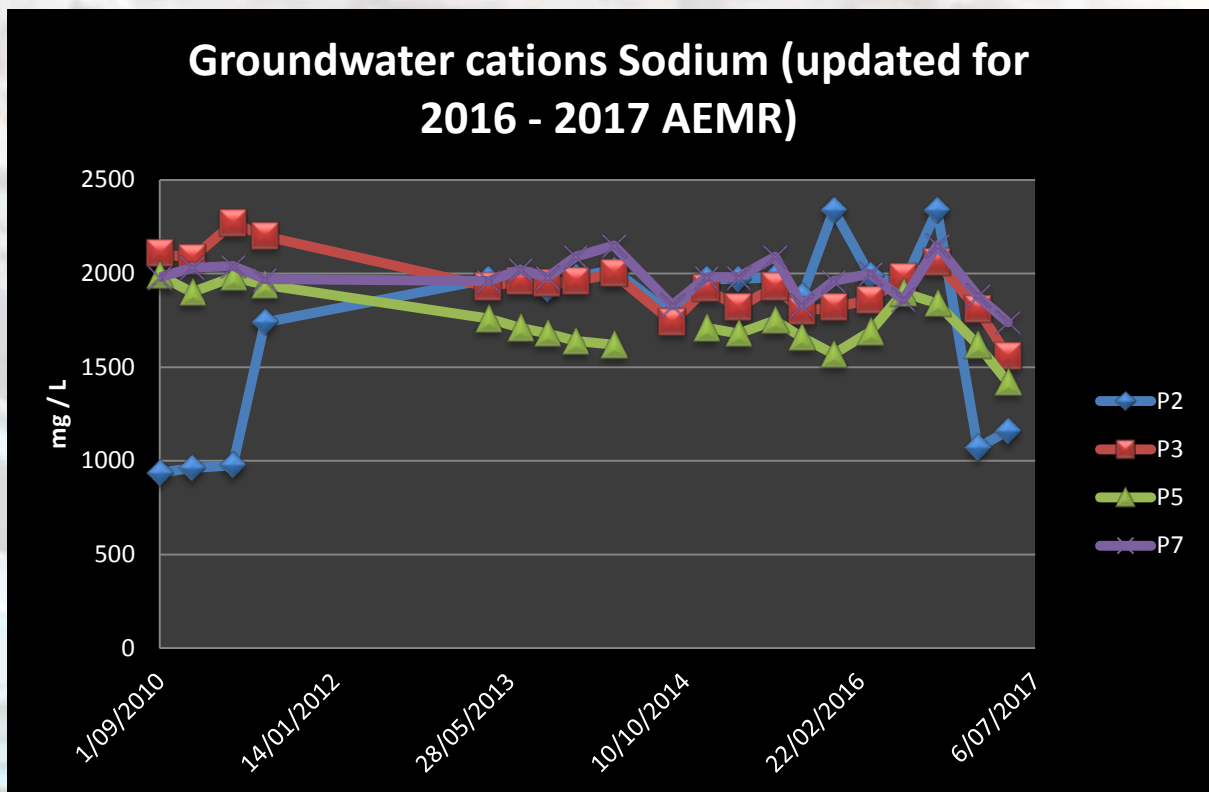


Chart 19 - Groundwater Sodium Cations

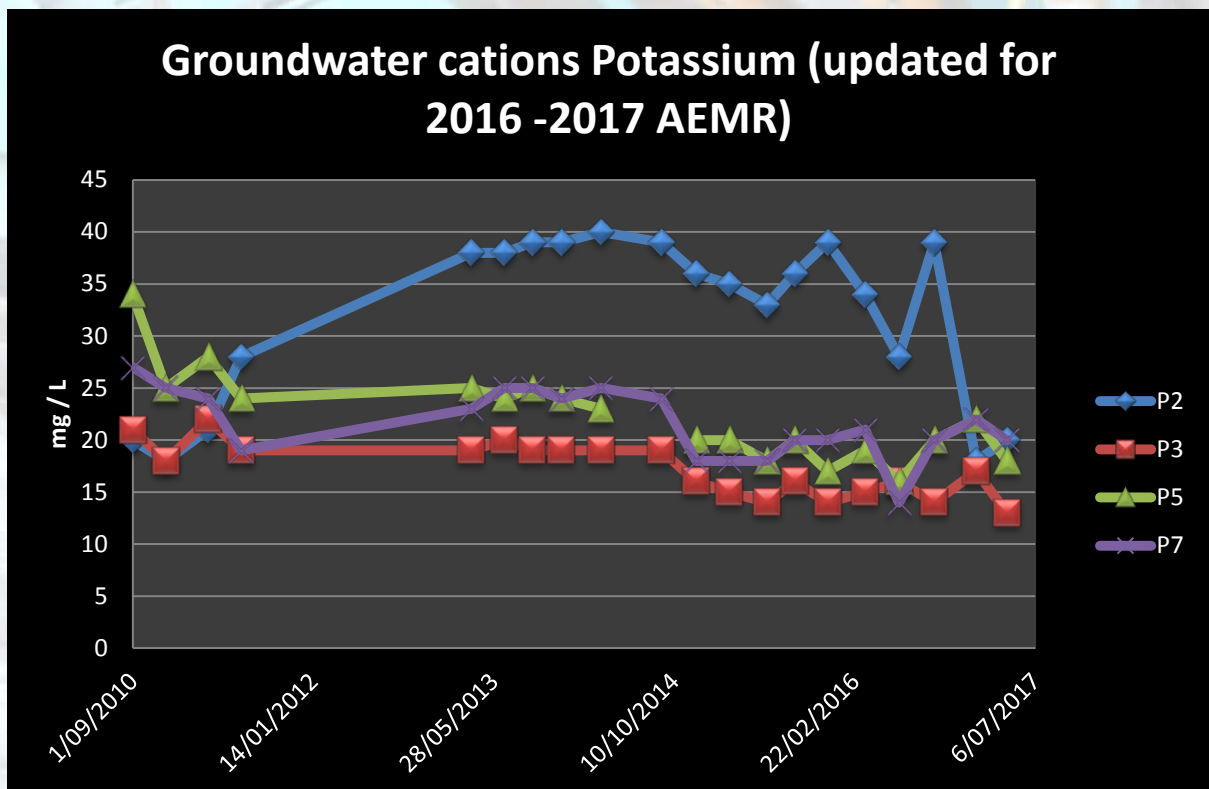


Chart 20 - Groundwater Potassium Cations

### 3.8.1 Groundwater Monitoring summary

Groundwater monitoring results remain consistent with previous baseline analysis. Ongoing monitoring will continue as per the EMS (GHD). Results will continued to be graphed for ongoing analysis and ease of reference for any correlation in change.

### 3.9 Nowra Creek Health monitoring

During sampling for surface water monitoring, photos are taken at monitoring locations C1, C2 and C10. These are for ongoing assessment of Nowra Creek Health Monitoring.

#### 3.9.1 Health Monitoring Photos 10<sup>th</sup> February 2017



*Figure 4 - Monitoring Location C1 - 10th February 2017*



*Figure 5 - Monitoring Location C2 - 10th February 2017*



*Figure 6 - Monitoring Location C10 - 10th February 2017*

### 3.9.2 Health monitoring photos 17<sup>th</sup> March 2017



*Figure 7 - Monitoring Location C1 17th March 2017*



*Figure 8 - Monitoring Location C2 17th March 2017*



*Figure 9 - Monitoring Location C10 17th March 2017*

#### 3.9.4 Creek Health Monitoring Summary

The creek has had no visible changes at any of the three monitoring locations C1, C2 and C10 during the reporting period. There are no signs of increased scour, contamination or any other adverse effect occurring at these locations.

### 3.10 Bushfire

The following bushfire-specific management controls have been implemented and enforced.

- On-site bushfire fighting facilities have been provided and maintained.
- Bushfire fighting equipment is operational for fire fighting purposes at all times.
- Firebreaks and fire tracks have been maintained.
- Sufficient water resources have been maintained within the quarry site for fire fighting purposes.
- Fuel loads are monitored and fuel reduction programs will be implemented where necessary.

### 3.12 Aboriginal Heritage

Also, included in section 3.6

### 3.13 Natural Heritage

No Natural artefacts were found or identified during the reporting period.

### 3.14 Spontaneous Combustion

Not applicable to mine

### 3.15 Bushfire

The following bushfire-specific management controls have been implemented and enforced.

- On-site bushfire fighting facilities have been provided and maintained.
- Bushfire fighting equipment is operational for fire fighting purposes at all times.
- Firebreaks and fire tracks have been maintained.
- Sufficient water resources have been maintained within the quarry site for fire fighting purposes.

Fuel loads are monitored and fuel reduction programs will be implemented where necessary.

### 3.16 Mine subsidence

No signs of mine subsidence were evident during the reporting period.

### 3.17 Hydrocarbon contamination

Management controls for preventing or minimising hydrocarbon contamination of water and/or land were carried out in accordance with the MOP and our updated PIRMP as per EPA guidelines and requirements. This document is available on our website as per EPA requirements also.

*(From MOP...*

#### **Existing and Additional Control Strategies**

- *Control strategies to manage hydrocarbon contamination at the quarry are defined in the following sections of GHD (2010):*
- *4 – Emergency Response; and*
- *10.2 – Loading, Despatch and Transportation.*
- *The main controls to reduce the impacts of hydrocarbon contamination from site activities are:*
- *Implementation of a Nowra Brickworks Quarries Mine Safety Plan;*
- *Training of employees in the Safety Plan;*
- *Notification of environmental harm to the DECCW hotline; and*
- *Maintenance of all mobile equipment to manufacturer's specifications.)*

*(EMS GHD 2010...*

#### **4. Emergency Response**

*Response to an emergency is to be in accordance with the Nowra Brickworks Quarries Mine Safety Plan, prepared in accordance with the NSW Mine Health and Safety Act 2004. Emergency procedures are located in the SCCCR main office.*

*The following procedures relate to environmental emergencies which are not covered by the quarry's emergency plan and procedures, i.e. spills and environmental harm.*

##### **4.1 Spills**

*The principal potential sources of soil or land contamination at the quarry is from spills or leaks of hydrocarbons (fuel, oil, grease, etc.). The following pollution control measures will be implemented during the life of the Project:*

- *Employees will read the quarry's Environmental Response Plan for fuel and oil spills, and will refer to the Material Safety Data Sheets (MSDS) located next to the first aid kit located in SCCCR main office.*
- *During fuelling, the following will be observed: – Fuelling will be undertaken carefully to minimise drips on the ground;*
  - *Fuelling will be undertaken in a suitable area away from access areas and drainage lines or water courses;*
  - *Persons undertaking the fuelling will remain present during the entire fuelling operation; – If necessary, the emergency shut off switch for plant and machinery is to be used; – A spill kit will be kept at or near each fuelling area and on the fuel truck; – Spills and dirty absorbent materials will be cleaned up; – Fuelling equipment will be inspected for cracks, leaks, corrosion or failure; and – Small equipment will be fuelled over a paved or concrete area, away from any*
- *Stormwater drains or ditches, and a funnel will be used when pouring fuel from a portable can.*
- *Any affected stormwater drains on site will be located and blocked. Spilled fuel will be prevented from reaching drains or waterways.*
- *Any spills will be cleaned up thoroughly and promptly. The Dry Method (refer to the Emergency Response Plan will be used for cleaning up fuel spills (diesel or kerosene).*
- *If fuels are leaking or have spilled on an impermeable surface, the nearest down gradient drain will be diked or bermed to prevent fluids from flowing. Absorbent material from the*

- spill kit will be applied on the spill area, and after cleaning up the contaminated absorbent material will be swept up, and the berm or dike will be removed from the stormwater drain.*
- *If fluids are leaking or have spilled on a permeable surface, the area will be marked and assistance will be sought to clean up.*
  - *Spills or leaks will never be hosed down.*
  - *Any spill kit materials will be disposed of in accordance with EPA guidelines.*
  - *Any spill or discharge of any pollutant will be reported to the Mine Manager. If a spill or leaks of a hazardous substance that exceeds 500 mL, is an unknown substance of any amount, or a spill is too great to control, the NSW Fire Brigade will be called on 000.*
  - *All applicable employees will be trained in general water pollution prevention and spill response, and a record of the employees trained will be kept.*
  - *A current copy of the Spill Response Plan will be maintained in the SCCCR main office.*

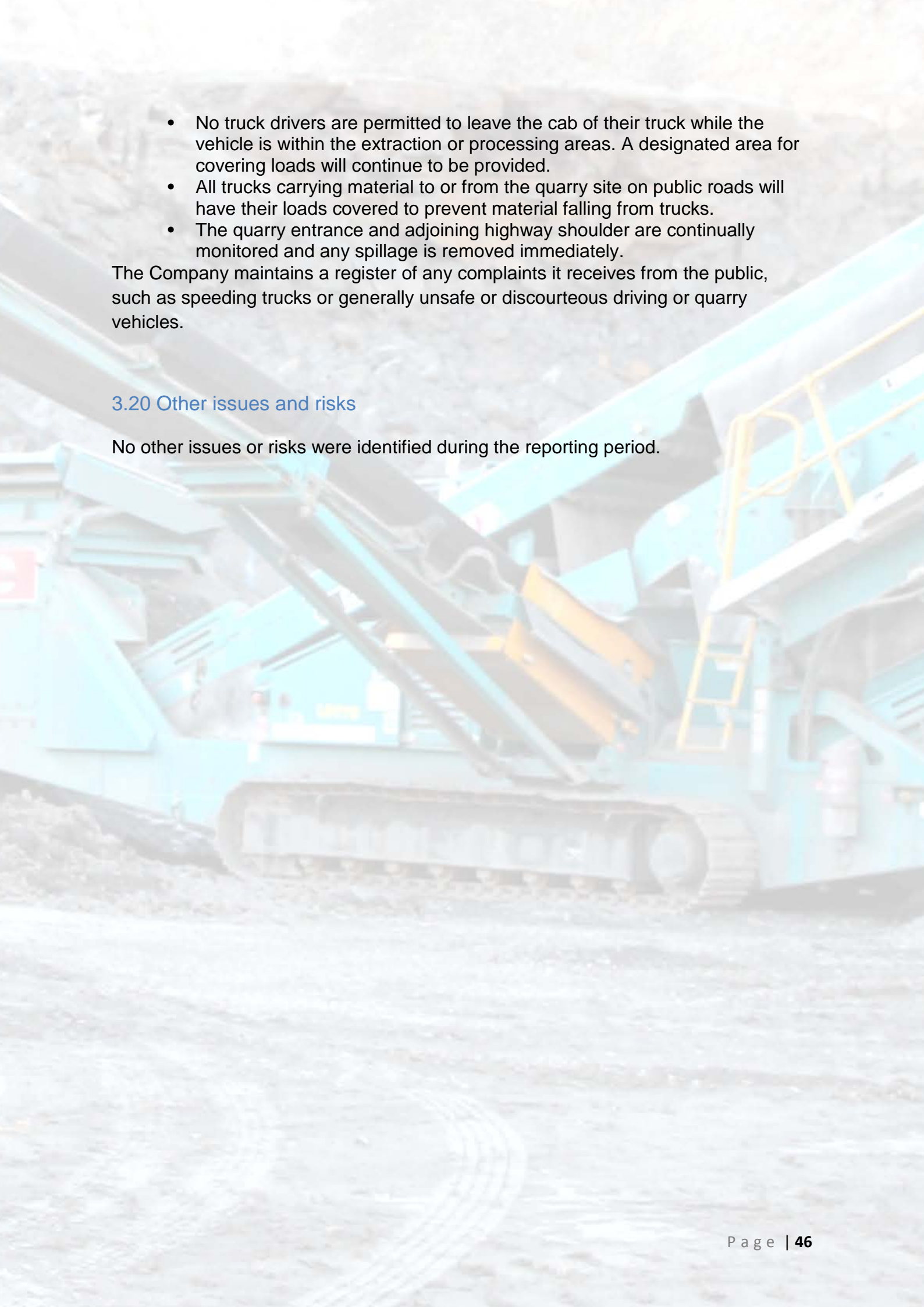
### 3.18 Methane drainage/ventilation

Not applicable

### 3.19 Public safety

The Nowra Brickworks Quarry is located in an area with extensive industrial development and adjacent to a major public road. As a result, public safety, including the safety of employees and contract truck drivers, is an important issue for the proper management of the quarry. The following management controls have been implemented and enforced to manage this safety issue.

- The front gate is locked outside the hours of operation and whenever the quarry site is not occupied.
- The perimeter bunding is maintained to ensure that the only vehicular access to the quarry site is via the front gate.
- Infrared and Motion sensing cameras have been installed at the weighbridge and front entrance gates, as well as within the vehicle maintenance compound. These are then programmed to send warning messages to appropriate quarry officer outside the approved hours of operation.
- Warning signs will continue to be prominently displayed around the perimeter and within the quarry site.
- Concrete blocks will continue to be placed adjacent to the perimeter of the extraction area in areas where vehicles or people may be working.
- 10km/h speed signs have been erected and site management enforces speed limits.
- All employees and contractors working within the quarry site will be required to complete a site induction.
- Visitors are required to complete a visitor's induction and sign a visitor's book indicating their time of arrival and departure.
- All employees, contractors and visitors are required to wear personal protective equipment, namely hard hats, safety glasses, steel cap boots and reflective vests. This equipment will be supplied to individuals who do not have their own.
- All communication between mobile equipment within the quarry site is by UHF radio. All mobile equipment owned or operated by SCCCR is fitted with a UHF radio. A handheld UHF radio is supplied to any transport contractor who does not have a UHF radio fitted to their vehicle.

- 
- No truck drivers are permitted to leave the cab of their truck while the vehicle is within the extraction or processing areas. A designated area for covering loads will continue to be provided.
  - All trucks carrying material to or from the quarry site on public roads will have their loads covered to prevent material falling from trucks.
  - The quarry entrance and adjoining highway shoulder are continually monitored and any spillage is removed immediately.

The Company maintains a register of any complaints it receives from the public, such as speeding trucks or generally unsafe or discourteous driving or quarry vehicles.

### 3.20 Other issues and risks

No other issues or risks were identified during the reporting period.



## 4. COMMUNITY RELATIONS

### 4.1. Community Consultative Committee (CCC)

As per the previous AEMR no Community Consultative Committee has been formed as there had been no interest from external parties. No requests have been made since to form a committee. As such there were no meetings during the reporting period. Following our last AEMR submission we had an audit from the Department of Planning who requested further efforts were made to create a CCC. We advertised for 2 weeks on the 10<sup>th</sup> and 17<sup>th</sup> February 2017 in the South Coast Register. Following this it was decided that we would run another advert for a further 12 weeks from the 8<sup>th</sup> March to the 24<sup>th</sup> May without any interest shown. During this time no responses were received in relation to our advert. We will review and advertise for interest again in the upcoming reporting period.

### 4.2. Complaints

We received 4 complaints during the reporting period. These occurred from February to May and were associated with dust tracking onto the highway. The predominant form of contact has been with either the EPA or the Department of planning. At all times we had follow up inspections and provided all information relating to controls in place to minimise tracking of material and dust. As covered in air emissions section we have also invested in a sweeper truck and full time driver to sweep the road and apron and we have invested heavily in further improved our wheel wash system to reduce tracking of material onto the highway. It is envisaged that this will be operational by August/September.



## 5. REHABILITATION

During this reporting period works commenced within the stage 3 of the project Staging plan with backfilling of the void well underway in stage 2. Only a minimal amount of VENM has been imported throughout the reporting period and the void has been progressively filled. Unusable overburden material containing tree roots was also used to fill the existing void. Appendix K contains the VENM certificates and importation records for the material imported to the void. Appendix L contains the plan of the VENM emplacement during the reporting period.

As per section 7 Rehabilitation of the 2015-2021 MOP it is anticipated that only the section of Domain 6 (voids) will undergo progressive rehabilitation as the area is filled.

Table 9 - Mine Rehabilitation Summary

Cumulative Area Affected (hectares)			
	To date	Last report	Next Report (estimated)
<b>A: MINE LEASE AREA</b>			
<b>A1 Mine Lease(s) Area</b>	22.028ha		
<b>B: DISTURBED AREAS</b>			
<b>B1 Infrastructure area</b> other disturbed areas to be rehabilitated at closure including facilities, roads	2.4 ha	2.4 ha	2.4 ha
<b>B2: Active Mining Area</b> excluding items B3 - B5 below	8.0 ha	7.3 ha	9.0 ha
<b>B3 Waste emplacements,</b> active/unshaped/in or out-of-pit	0.6 ha	0.6 ha	0.6 ha
<b>B4 Tailings emplacements,</b> active/unshaped/uncapped. These areas currently sit within active mining area B1	1.00 ha	0.60 ha	1.00 ha
<b>B5 Shaped waste emplacement</b> (awaits final vegetation)	0.60 ha	0.60 ha	0.60 ha
<b>ALL DISTURBED AREAS</b>	12.6 ha	9.1 ha	13.6 ha
<b>C REHABILITATION PROGRESS</b>			
<b>C1 Total Rehabilitated area</b> (completed)	3.9 ha	1.15 ha	3.9 ha
<b>D: REHABILITATION ON SLOPES</b>			
<b>D1 10 to 18 degrees</b>	Nil	Nil	Nil
<b>D2 Greater than 18 degrees</b>	Nil	Nil	Nil
<b>E: SURFACE OF REHABILITATED LAND</b>			
<b>E1 Pasture and grasses</b>			
<b>E2 Native forest/ecosystems</b>	4.85 ha	4.85 ha	4.85 ha
<b>E3 Plantations and crops</b>			
<b>E4 Other</b> (include non-vegetative outcomes)	1.1 ha	1.1 ha	1.1 ha

Table 10 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report period	Next period	
<b>Additional erosion control works</b> (drains re-contouring, rock protection)			None required at this stage
<b>Re-covering</b> (detail - further topsoil, subsoil sealing etc.)			No new rehabilitation areas will be undertaken during this AEMR period
<b>Soil treatment</b> (detail - fertiliser, lime, gypsum etc.)			Nil
<b>Treatment/Management</b> (detail - grazing, cropping, slashing etc.)			No treatment will be required
<b>Re-seeding/Replanting</b> (detail - species density, season etc.)	4.85 ha	4.85 ha	Backfilling covers will contain sufficient endemic native seed to self-establish as can be seen from some of the revegetated areas. Works will be ongoing on existing rehabilitated areas to ensure that native species have the opportunity to thrive no new areas will be rehabilitated. Additional works are planned for the bund to the west of the weighbridge office. This area will be stripped and ready for planting with native seeds on the spring.
<b>Adversely Affected by Weeds</b> (detail - type and treatment)			Various weeds present, ongoing treatment through spraying and removal. Kikuyu.
<b>Feral animal control</b> (detail - additional fencing, trapping, baiting etc.)			No feral animals have been observed on the site

(This period's activities and activities proposed in the next reporting period)



## 6. ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

During the next proposed AEMR period the works proposed to be carried out will be consistent with the current approved MOP (2015-2021). No works are proposed that will require any amendments to the MOP.

Figure 3 (attached in appendix L) from the Approved MOP shows the Project Development sequence for the overall project. With the current MOP, it is intended to transition from Stage 1 through to Stage 2 of the project. We have already commenced the filling component of stage 2 highlighted in blue and moving towards increasing the extraction area to that shown in Stage 2. Currently our extraction area is at the extent as shown in Stage 2 and Stage 3.

## Appendix A – Project Approval



# Project Approval

## Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project referred to in schedule 1, subject to the conditions in schedules 2 to 5.

These conditions are required to:

- prevent and/or minimise adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

*S Haddad*

Sam Haddad  
**Director-General**  
as delegate for the Minister for Planning

Sydney

*1<sup>st</sup> December*

2009

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### SCHEDULE 1

**Application No:**

07\_0123

**Proponent:**

South Coast Concrete Crushing and Recycling

**Approval Authority:**

Minister for Planning

**Land:**

Lot 464, DP1058778

**Project:**

Nowra Brickworks Quarry

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## DEFINITIONS

AEMR	Annual Environmental Management Report
BCA	Building Code of Australia
CCC	Community Consultative Committee
Council	Shoalhaven City Council
Day	The period between 7am and 6pm on Monday to Saturday and between 8am and 6pm on Sunday and Public Holidays
DECCW	Department of Environment, Climate Change and Water
Department	Department of Planning
Director-General	Director-General of Department of Planning, or delegate
DI&I	Department of Industry and Investment
EA	Environmental Assessment prepared for SCCCR entitled <i>Environmental Assessment for the Continuation and Expansion of Extractive Operations at the Nowra Brickworks Quarry, South Nowra</i> (February 2009), including the response to submissions
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence issued under the <i>Protection of the Environment Operations Act 1997</i>
Evening	The period between 6pm and 10pm
Land	The whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Material harm to the environment as defined in <i>Protection of the Environment Operations Act 1997</i>
Minister	Minister for Planning, or delegate
Night	The period between 10pm and 7am, Monday to Saturday and between 10pm and 8am on Sunday and Public Holidays
NOW	NSW Office of Water of DECCW
Privately-owned land	Land that is not owned by a public agency, or a quarry company (or its subsidiary)
Proponent	South Coast Concrete Crushing and Recycling or any other person or persons who rely on this approval to carry out the project
Quarrying operations	Extraction of clay/shale, structural clay and associated materials, processing of quarry products and transport of quarry products from the site
Quarry products	Clay/shale, structural clay and associated materials extracted from the site, whether or not blended with recycled and/or blending materials
Reasonable and feasible	<i>Reasonable</i> relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements. <i>Feasible</i> relates to engineering considerations and what is practical to build
Response to submissions	The Proponent's response to issues raised in submissions, dated August 2009
RTA	Roads and Traffic Authority, now part of the Department of Transport and Infrastructure
SCCCR	South Coast Concrete Crushing and Recycling
Site	Land to which the project application applies (see Schedule 1 and Appendix 1)
Statement of Commitments	The Proponent's Final Statement of Commitments for Site Operations and Management, as set out in Appendix 2

## **SCHEDULE 2 ADMINISTRATIVE CONDITIONS**

### **Obligation to Minimise Harm to the Environment**

1. The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.

### **Terms of Approval**

2. The Proponent shall carry out the project generally in accordance with the:
  - (a) EA;
  - (b) Statement of Commitments; and
  - (c) conditions of this approval.

#### *Notes:*

- *The general layout of the project is shown in Appendix 1; and*
- *The Statement of Commitments is reproduced in Appendix 2.*

3. If there is any inconsistency between the above documents, the latter document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The Proponent shall comply with any reasonable requirements of the Director-General arising from the Department's assessment of:
  - (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and
  - (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.
5. The Proponent shall prepare revisions of any strategies, plans or programs required under this approval if directed to do so by the Director-General. Such revisions shall be prepared to the satisfaction of, and within a timeframe approved by, the Director-General.
6. By 30 June 2010, the Proponent shall surrender all existing development consents for the site to the relevant consent authority, to the satisfaction of the Director-General.

### **Limits on Approval**

7. The Proponent may undertake quarrying operations on the site until 31 December 2039.

*Note: Under this approval, the Proponent is required to rehabilitate the site to the satisfaction of the Director-General. Consequently, this approval will continue to apply in all other respects other than the right to conduct quarrying operations until the site has been rehabilitated to a satisfactory standard.*

8. The Proponent shall not:
  - (a) extract more than 364,000 tonnes per year of clay/shale, structural clay and associated materials (in total) from the site;
  - (b) import more than 50,000 tonnes per year of recycling materials to the site;
  - (c) import more than 125,000 tonnes per year of blending materials to the site;
  - (d) import more than 200,000 tonnes per year of VENM to the site; or
  - (e) despatch more than 500,000 tonnes per year of quarry products from the site.

### **Management Plans / Monitoring Programs**

9. With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.

### **Structural Adequacy**

10. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.
- Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.

### **Demolition**

11. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

### **Operation of Plant and Equipment**

12. The Proponent shall ensure that all plant and equipment used on site is:
  - (a) maintained in a proper and efficient condition; and
  - (b) operated in a proper and efficient manner.

## SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

### NOISE

#### Noise Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1:

Table 1: Operational noise impact assessment criteria dB(A)

Location and Locality	Day <i>L<sub>Aeq</sub>(15 min)</i>	Evening <i>L<sub>Aeq</sub>(15 min)</i>	Night <i>L<sub>Aeq</sub>(15 min)</i>
1 80 Links Road	39	35	35
2 371 Old Southern Road	45	35	35
4 243 Princes Highway	49	38	38
5 South Coast Correctional Facility	51	37	37

Notes:

- To interpret the locations in Table 1, see Appendix 3.
- Location 3 in Appendix 3 is project related.
- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- The noise limits do not apply if the Proponent has an agreement with the landowner to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

#### Operating Hours

2. The Proponent shall comply with the operating hours in Table 2.

Table 2: Operating hours

Activity	Day	Time
Quarrying Operations	Monday – Friday	7.00am to 6.00pm
	Saturday	7.00am to 4.00pm
	Sunday and Public Holidays	None

Notes:

- Maintenance activities may be conducted outside weekday hours in Table 3 provided that the activities are not audible at any privately-owned residence, or until 6pm on Saturdays.
- Up to three unladen trucks are permitted to arrive at the site between 6.00am to 7.00am on Monday to Saturday; and up to three unladen trucks are permitted to return to the site between 6.00pm to 8.00pm on Monday to Friday and between 4.00pm to 6.00pm on Saturday.
- This condition does not apply to delivery of material if that delivery is required by police or other authorities for safety reasons, and/or the operation or personnel or equipment are endangered. In such circumstances, notification is to be provided to DECCW and the affected residents as soon as possible, or within a reasonable period in the case of emergency.

#### Continuous Improvement

3. The Proponent shall:
  - (a) implement all reasonable and feasible noise mitigation measures;
  - (b) investigate ways to reduce the noise generated by the project; and
  - (c) report on these investigations and the implementation and effectiveness of these measures in the AEMR,
 to the satisfaction of the Director-General.

#### Monitoring

4. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. The Program must:
  - (a) be prepared in consultation with DECCW and be submitted to the Director-General for approval within 6 months of the date of this approval;
  - (b) include annual attended noise monitoring;
  - (c) include details of how the noise performance of the project would be monitored; and
  - (d) include a noise monitoring protocol for evaluating compliance with the noise criteria in this approval.

## BLASTING AND VIBRATION

### Airblast Overpressure Limits

5. The Proponent shall ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 3.

Table 3: Airblast overpressure impact assessment criteria

Receiver	Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
Residential & South Coast Correctional Facility	115	5% of the total number of blasts in any 12 month period
	120	0%
Commercial	125	0%

### Ground Vibration Impact Assessment Criteria

6. The Proponent shall ensure that the ground vibration level from blasting at the project does not exceed the levels in Table 4.

Table 4: Ground vibration impact assessment criteria

Receiver	Peak particle velocity (mm/s)	Allowable exceedance
Residential & South Coast Correctional Facility	5	5% of the total number of blasts in any 12 month period
	10	0%
Commercial	25	0%

### Blasting Hours and Frequency

7. The Proponent shall carry out blasting on site only between 9 am and 3 pm Monday to Friday. No blasting is allowed on weekends and Public Holidays.
8. The Proponent shall not carry out more than one blast per week on site.

*Note: In the case of a documented misfire, the Proponent may carry out a second blast in the relevant week.*

### Operating Conditions

9. The Proponent shall not undertake blasting within 200 metres of any privately-owned land, unless suitable arrangements have been made with the landowner and any tenants to minimise the risk of flyrock-related impact to the property and to human safety to the satisfaction of the Director-General.

### Property Inspections

10. Prior to 30 June 2010, the Proponent shall advise all landowners within 500 m of proposed blasting activities, and any other landowner nominated by the Director-General, that they are entitled to a property inspection to establish the baseline condition of the property.
11. If the Proponent receives a written request for a property inspection from any such landowner, the Proponent shall:
- commission a suitably qualified person, whose appointment has been approved by the Director-General, to inspect and report on the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
  - give the landowner a copy of this property inspection report.

*Note: It is preferable for the property inspection to be carried out prior to the commencement of blasting activities on the site, and the Proponent should facilitate this occurring wherever possible.*

## Property Investigations

12. If any landowner within 500 m of proposed blasting activities, or any other landowner nominated by the Director-General, claims that his/her property, including vibration-sensitive infrastructure such as water supply or underground irrigation mains, has been damaged as a result of blasting at the project, the Proponent shall within 3 months of receiving this request:
- commission a suitably qualified person whose appointment has been approved by the Director-General to investigate the claim and prepare a property investigation report; and
  - give the landowner a copy of the report.

If this independent investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Director-General.

If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

## Management

13. Prior to 30 June 2010, the Proponent shall prepare and implement a detailed Blast Management Plan for the project to the satisfaction of the Director-General. The Plan must
- be prepared in consultation with DECCW;
  - substantiate blast design to ensure compliance with blast criteria;
  - include protocols for communicating with all neighbouring landholders regarding scheduled blasts;
  - include details of how and at what locations blasting performance would be monitored; and
  - include a blast monitoring protocol for evaluating compliance with the blast criteria in this approval.

## AIR QUALITY

### Continuous Improvement

14. The Proponent shall:
- implement all reasonable and feasible dust mitigation measures;
  - investigate ways to reduce the dust generated by the project; and
  - report on these investigations and the implementation and effectiveness of these measures in the AEMR,
- to the satisfaction of the Director-General.

### Impact Assessment Criteria

15. The Proponent shall ensure that dust emissions generated by the project do not cause additional exceedances of the criteria listed in Tables 5 to 7 at any residence on privately owned land, or on more than 25 percent of any privately-owned land.

*Table 5: Long term impact assessment criteria for particulate matter*

<b>Pollutant</b>	<b>Averaging period</b>	<b>Criterion</b>
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

*Table 6: Short term impact assessment criterion for particulate matter*

<b>Pollutant</b>	<b>Averaging period</b>	<b>Criterion</b>
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

*Table 7: Long term impact assessment criterion for deposited dust*

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

*Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.*

### **Air Quality Monitoring**

16. The Proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program must:
- (a) be prepared in consultation with DECCW, and be submitted to the Director-General for approval prior to 30 June 2010; and
  - (b) include details of how the air quality performance of the project will be monitored, and include a protocol for evaluating compliance with the relevant air quality criteria in this approval.

### **WATER MANAGEMENT**

#### **Discharge**

17. Except as may be expressly provided for by an EPL, the Proponent shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the project.
18. The Proponent shall manage on-site sewage to the satisfaction of the Council and DECCW. The facility must comply with the requirements of the *Environment and Health Protection Guidelines – On-site Sewage Management for Single Households (1998)*.

#### **Water Management Plan**

19. The Proponent shall prepare and implement a Soil and Water Management Plan for the project to the satisfaction of the Director-General. This plan must:
- (a) be prepared in consultation with DECCW and NOW, and be submitted to the Director-General for approval prior to 30 June 2010; and
  - (b) include a:
    - Site Water Balance;
    - Erosion and Sediment Control Plan;
    - Surface Water Monitoring Program;
    - Ground Water Monitoring Program; and
    - Surface and Groundwater Response Plan.

#### **Site Water Balance**

20. The Site Water Balance must:
- (a) include details of:
    - sources and security of water supply;
    - water make and use on site;
    - water management on site;
    - any off-site water transfers; and
    - reporting procedures; and
  - (b) investigate and describe measures to minimise water use by the project.

#### **Erosion and Sediment Control**

21. The Erosion and Sediment Control Plan must:
- (a) be consistent with the requirements of *Managing Urban Stormwater: Soils and Construction, Volume 1, 4<sup>th</sup> Edition, 2004* (Landcom);
  - (b) identify activities that could cause soil erosion and generate sediment;
  - (c) describe measures to minimise soil erosion and the potential for the transport of sediment downstream in Nowra Creek;
  - (d) describe the location, function, and capacity of erosion and sediment control structures; and
  - (e) describe what measures would be implemented to maintain the structures over time.

#### **Surface Water Monitoring**

22. The Surface Water Monitoring Program must include:
- (a) detailed baseline data on surface water flows and quality in Nowra Creek and any other waterbodies that could potentially be affected by the project;

- (b) surface water and stream health impact assessment criteria;
- (c) a program to monitor the impact of the project on surface water flows in Nowra Creek, water quality and stream health, including monitoring for major cations and anions; and
- (d) reporting procedures for the results of the monitoring program.

### Groundwater Monitoring

23. The Ground Water Monitoring Program must include:
- (a) detailed baseline data on ground water levels and quality, based on statistical analysis;
  - (b) ground water impact assessment criteria, including trigger levels for investigating any potentially adverse ground water impacts;
  - (c) a program to monitor ground water levels and quality;
  - (d) a protocol for further ground water modelling to confirm the limits to excavation depth across the site would not adversely affect ground water availability for the environment or local users; and
  - (e) a protocol for the investigation, notification and mitigation of identified exceedances of the ground water impact assessment criteria.

### Surface and Groundwater Response Plan

24. The Surface and Groundwater Response Plan must describe the measures and/or procedures that would be implemented to:
- (a) investigate, notify and mitigate any exceedances of the surface water, stream health and ground water impact assessment criteria, including an increase in salinity levels for Nowra Creek; and
  - (b) mitigate and/or offset any adverse impacts on groundwater dependent ecosystems or riparian vegetation.

## REHABILITATION AND LANDSCAPE MANAGEMENT

### Biodiversity Offset Strategy

25. The Proponent shall:
- (a) review its proposed Biodiversity Offset Strategy (see Table 8), in consultation with DECCW and the Director-General, to seek to identify a replacement for the proposed Southern Biodiversity Offset Area that:
    - is located in the vicinity;
    - is not affected by identified future public infrastructure proposals; and
    - has equivalent (or better) biodiversity values;
  - (b) implement the Biodiversity Offset Strategy (as amended under (a) above, if applicable);
  - (c) ensure that adequate resources are dedicated towards the implementation of the strategy;
  - (d) provide appropriate long term security for the offset areas; and
  - (e) provide a timetable for the implementation of the offset strategy prior to the clearing of any forested area of the site, or as otherwise agreed by the Director-General,
- to the satisfaction of the Director-General.

Table 8: Biodiversity Offset Strategy

Offset Areas	Minimum Size
Northern Biodiversity Offset Area	21.5 hectares
Southern Biodiversity Offset Area	16.19 hectares
Total	37.69 hectares

### Landscape and Biodiversity Management Plan

26. The Proponent shall prepare and implement a Landscape and Biodiversity Management Plan for the project to the satisfaction of the Director-General. This plan must:
- (a) be prepared by suitably qualified person(s), approved by the Director-General;
  - (b) be submitted to the Director-General for approval prior to the 30 June 2010; and
  - (c) include a:
    - Rehabilitation and Biodiversity Offset Strategy Management Plan; and
    - Long Term Management Strategy.

*Note: The Department accepts that the initial Landscape and Biodiversity Management Plan may not include the detailed Long Term Management Strategy. However, a conceptual strategy must be included in the initial plan, along with a timetable for augmentation of the strategy with each subsequent review of the plan.*

27. The Rehabilitation and Biodiversity Offset Strategy Management Plan must include:
- (a) the rehabilitation objectives for the site and offset areas;
  - (b) a description of the measures that would be implemented to:
    - rehabilitate and stabilise the site;
    - minimise the removal of mature trees;
    - implement the Biodiversity Offset Strategy; and
    - manage the remnant vegetation and habitat on the site and in the offset areas;
  - (c) detailed performance and completion criteria for the rehabilitation and stabilisation of the site;
  - (d) a detailed description of how the performance of the rehabilitation of the quarry areas would be monitored over time to achieve the stated objectives;
  - (e) a detailed description of what measures would be implemented to rehabilitate and manage the landscape of the site including the procedures to be implemented for:
    - progressively rehabilitating and stabilising areas disturbed by quarrying;
    - implementing revegetation and regeneration within the disturbance areas;
    - protecting areas outside the disturbance areas, including the Biodiversity Offset Strategy areas;
    - vegetation clearing protocols, including a protocol for clearing any trees containing hollows and the relocation of hollows from felled trees;
    - managing impacts on fauna, in particular threatened species;
    - controlling weeds and pests;
    - controlling access;
    - bushfire management; and
    - reducing the visual impacts of the project;
  - (f) a description of the potential risks to successful rehabilitation and a description of the contingency measures that would be implemented to mitigate these risks; and
  - (g) details of who is responsible for monitoring, reviewing, and implementing the plan.
28. The Long Term Management Strategy must:
- (a) define the objectives and criteria for quarry closure and post-extraction management;
  - (b) be prepared in consultation with NOW, DII and Council;
  - (c) investigate and/or describe options for the future use of the site;
  - (d) describe the measures that would be implemented to minimise or manage the ongoing environmental effects of the project; and
  - (e) describe how the performance of these measures would be monitored over time.

## Rehabilitation

29. Backfilling of the quarry void and water storage facility is restricted to the use of materials which are "Virgin Excavated Natural Materials" as defined in the *Protection of the Environment Operations Act 1997*, to the satisfaction of the Director-General. The Proponent must consult with the Council to identify the proposed alignment of the link road from Warra Warra Road to the Flinders Industrial Estate. Backfilling within the proposed alignment must use materials and a compaction standard suitable for the future construction of the link road, to the satisfaction of the Director-General.

*Note: the conceptual final landform is shown in Appendix 4.*

## HERITAGE

### Aboriginal Cultural Heritage Management Plan

30. The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director-General. This plan must:
- (a) be prepared in consultation with DECCW and local Aboriginal communities;
  - (b) be submitted to the Director-General for approval prior to 30 June 2010; and
  - (c) include a description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the project.

## VISUAL

### Visual Amenity

31. The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director-General.

## **WASTE MANGEMENT**

### **Waste Minimisation**

32. The Proponent shall minimise the amount of waste generated by the project to the satisfaction of the Director-General.

## **TRAFFIC AND TRANSPORT**

33. The Proponent shall make a monetary contribution of \$174,000 to the RTA for the construction of the following elements of the proposed Princes Highway upgrade between Central Avenue and Warra Warra Road:
- the central median for a length of 60m; and
  - a left turn deceleration lane on the southbound approach to the quarry access road.
34. The Proponent shall pay the monetary contribution required by condition 33 according to the following schedule:
- (a) \$54,000 paid prior to 30 June 2010; and
  - (b) \$40,000 paid prior to 30 June in each of the years 2011, 2012 and 2013,
- unless the RTA commences the proposed upgrade prior to the completion of these payments, in which case any remainder of the contribution not yet paid is payable immediately.
35. The Proponent shall upgrade the access to the development and land shall be dedicated generally in accordance with the RTA's preliminary concept design (see Appendix 5) to ensure the access accommodates swept paths for B-doubles and the future Princes Highway alignment, prior to the completion of the proposed Princes Highway upgrade and to the satisfaction of the RTA.

### **Road Haulage**

36. The Proponent shall ensure that:
- (a) all loaded vehicles entering or leaving the site are covered;
  - (b) all loaded vehicles leaving the site are cleaned of materials that may fall on the road, before they leave the site; and
  - (c) a truck wheel wash facility is constructed on the site prior to to 30 June 2010, to the satisfaction of the Director-General.

## **EMERGENCY AND HAZARDS MANAGEMENT**

### **Dangerous Goods**

37. The Proponent shall ensure that the storage, handling, and transport of fuels and dangerous goods are conducted in accordance with the relevant *Australian Standards*, particularly AS1940 and AS1596, and the *Dangerous Goods Code*.

### **Safety**

38. The Proponent shall secure the project to ensure public safety to the satisfaction of the Director-General.

### **Bushfire Management**

39. The Proponent shall:
- (a) ensure that the project is suitably equipped to respond to any fires on-site; and
  - (b) assist the rural fire service and emergency services, if safe to do so, if there is a fire on-site.

## **PRODUCTION DATA**

40. The Proponent shall:
- (a) provide annual production data to the DII using the standard form for that purpose; and
  - (b) include a copy of this data in the AEMR.

## **SCHEDULE 4 ADDITIONAL PROCEDURES**

### **NOTIFICATION OF LANDOWNERS**

1. If the results of monitoring required in schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria, then the Proponent shall notify the Director-General and affected landowners and tenants, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the relevant criteria.

### **INDEPENDENT REVIEW**

2. If a landowner of privately-owned land considers that the project is exceeding any of the impact assessment criteria in schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land.

If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 3 months of the Director-General advising that an independent review is warranted:

- (a) consult with the landowner to determine his/her concerns;
  - (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to determine whether the project is complying with the relevant criteria in schedule 3, and identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and
  - (c) give the Director-General and landowner a copy of the independent review.
3. If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.
  4. If the independent review determines that the project is not complying with the relevant criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:
    - (a) implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and
    - (b) conduct further monitoring to determine whether these measures ensure compliance; or
    - (c) secure a written agreement with the landowner to allow exceedances of the relevant criteria in schedule 3,to the satisfaction of the Director-General.

If the additional monitoring referred to above subsequently determines that the project is complying with the relevant criteria in schedule 3, or the Proponent and landowner enter into a negotiated agreement to allow these exceedances, then the Proponent may discontinue the independent review with the approval of the Director-General.

5. If the landowner disputes the results of the independent review, either the Proponent or the landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 6).

## **SCHEDULE 5**

### **ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING**

#### **ENVIRONMENTAL MANAGEMENT STRATEGY**

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:
  - (a) be submitted to the Director-General for approval by 30 June 2010;
  - (b) provide the strategic framework for environmental management of the project;
  - (c) identify the statutory approvals that apply to the project;
  - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
  - (e) describe the procedures that would be implemented to:
    - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
    - receive, handle, respond to, and record complaints;
    - resolve any disputes that may arise during the course of the project;
    - respond to any non-compliance; and
    - respond to emergencies; and
  - (f) include:
    - copies of the various strategies, plans and programs that are required under the conditions of this approval once they have been approved; and
    - a clear plan depicting all the monitoring currently being carried out within the project area.

#### **INCIDENT REPORTING**

2. Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent shall notify the Department and other relevant agencies of the exceedance/incident.
3. Within 6 days of notifying the Department and other relevant agencies of an exceedance/incident, the Proponent shall provide the Department and these agencies with a written report that must:
  - (a) describe the date, time, and nature of the exceedance/incident;
  - (b) identify the cause (or likely cause) of the exceedance/incident;
  - (c) describe what action has been taken to date; and
  - (d) describe the proposed measures to address the exceedance/incident.

#### **ANNUAL REPORTING**

4. Within 12 months of the date of this approval, and annually thereafter, the Proponent shall submit an AEMR to the Director-General and relevant agencies. This report must:
  - (a) identify the standards and performance measures that apply to the project;
  - (b) describe the works carried out in the last 12 months, and the works that will be carried out in the next 12 months;
  - (c) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
  - (d) include a summary of the monitoring results for the project during the past year;
  - (e) include an analysis of these monitoring results against the relevant:
    - impact assessment criteria/limits;
    - monitoring results from previous years; and
    - predictions in the EA;
  - (f) identify any trends in the monitoring results over the life of the project;
  - (g) identify any non-compliance during the previous year; and
  - (h) describe what actions were, or are being, taken to ensure compliance.

## INDEPENDENT ENVIRONMENTAL AUDIT

5. Within 3 years of the date of this approval, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
  - (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been approved by the Director-General;
  - (b) assess the environmental performance of the project, and its effects on the surrounding environment;
  - (c) assess whether the project is complying with the relevant standards, performance measures and statutory requirements;
  - (d) review the adequacy of any strategy/plan/program required under this approval; and, if necessary,
  - (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy/plan/program required under this approval.
6. Within 1 month of completion of each Independent Environmental Audit, the Proponent shall submit a copy of the audit report to the Director-General and relevant agencies, with a response to any of the recommendations in the audit report.
7. Within 3 months of submitting a copy of the audit report to the Director-General, the Proponent shall review and if necessary revise the:
  - (a) strategies/plans/programs required under this approval; and
  - (b) rehabilitation bond, to consider the:
    - effects of inflation;
    - changes to the total area of disturbance; and
    - performance of the rehabilitation against the completion criteria of the Landscape and Biodiversity Management Plan,to the satisfaction of the Director-General.

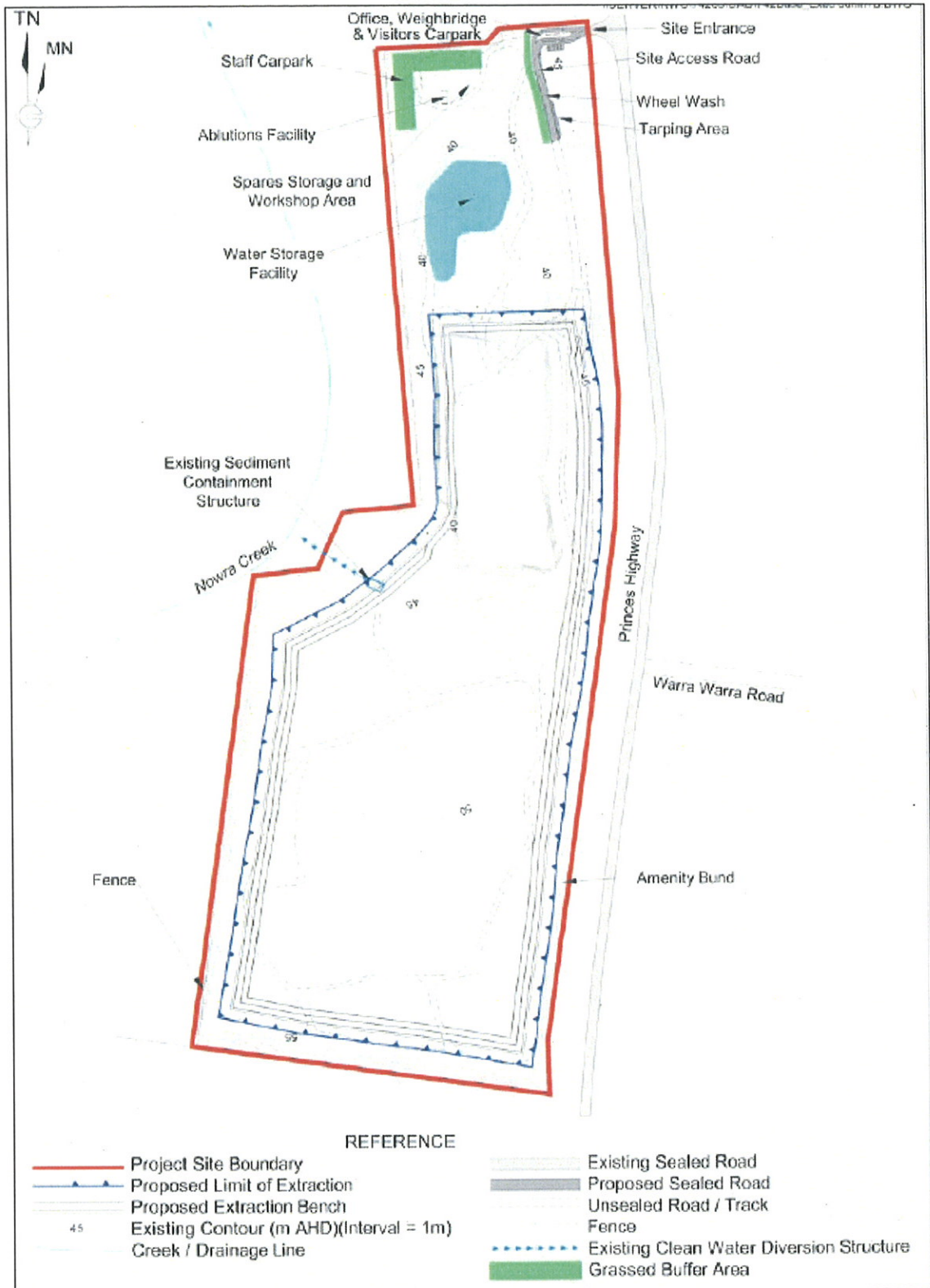
## COMMUNITY CONSULTATIVE COMMITTEE

8. Within 3 months of the commencement of quarrying operations, the Proponent shall establish a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General, in accordance with the Department's *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects*.

## ACCESS TO INFORMATION

9. Within 1 month of the approval of any strategies/plans/programs required under this approval (or any subsequent revision of these strategies/plans/programs), or the completion of the audits or AEMR required under this approval, the Proponent shall:
  - (a) provide a copy of the relevant document/s to the relevant agencies and to members of the general public upon request; and
  - (b) ensure that a copy of the relevant document/s is made publicly available on its website and at the site.
10. During the project, the Proponent shall:
  - (a) make a summary of monitoring results required under this approval publicly available on its website; and
  - (b) update these results on a regular basis (at least every 6 months).

## APPENDIX 1 PROJECT MAP



**APPENDIX 2**  
**STATEMENT OF COMMITMENTS**  
**Final Statement of Commitments for the Nowra Brickworks Quarry**

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Desired Outcome	Action	Timing
<b>1. Environmental Management</b>		
Compliance with all conditional requirements in all approvals, licences and leases.	1.1 Comply with all commitments recorded in <b>Table 5.1</b> 1.2 Comply with all conditional requirements included in the: Project Approval; Environment Protection Licence; Mining Leases; and any other approvals.	Continuous and as required.
All operations conducted in accordance with all relevant documentation.	1.3 Undertake all activities in accordance with the accepted Mining Operations Plan, environmental procedures, safety management plan and/or site-specific documentation. 1.4 provide annual production data to DPI	Continuous and as required.
<b>2. Area of Activities</b>		
All approved activities are undertaken generally in the location(s) nominated on the figures shown in Sections 2 and 4.	2.1 Mark, and where appropriate, survey the boundaries of the areas of proposed disturbance.	Prior to the commencement of the relevant activity.
<b>3. Hours of Operation</b>		
All operations are undertaken within the approved operating hours.	3.1 Extraction, processing and VENM backfilling-related activities. <ul style="list-style-type: none"> <li>• 7:00am to 6:00pm, Monday to Friday.</li> <li>• 7:00am to 4:00pm, Saturday</li> </ul> 3.2 Product despatch. <ul style="list-style-type: none"> <li>• 7:00am to 6:00pm, Monday to Saturday.</li> <li>• Up to three unladen trucks would arrive at the Project Site between 6:00am and 7:00am, Monday to Saturday and may return to the Project Site between 6:00pm and 8:00pm, Monday to Friday and between 4:00pm and 6:00pm Saturday.</li> <li>•</li> </ul> 3.3 Maintenance-related activities <ul style="list-style-type: none"> <li>• 7:00am to 6:00pm, Monday to Saturday.</li> </ul>	Continuous

(Cont'd)  
Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>4. Hydrology (Surface Water and Groundwater)</b>		
All surface water and ground water managed such that water to be discharged from the Project Site complies with all assessment criteria	4.1 Maintain and progressively relocate the existing surface water diversion and sediment containment structures.	As required
	4.2 Construct, maintain and relocate, as required, surface water diversion structures to ensure that all surface water flows within disturbed sections of the Project Site are directed to the extraction area. The maximum catchment area would be required to be less than 5.9ha. To achieve this, the Proponent would ensure that progressive rehabilitation is undertaken as soon as practicable on sections of the Project Site no longer required for extraction-related operations.	
	4.3 Construct temporary surface water diversion structures on the upslope side of all soil stockpiles or other disturbed areas to limit erosion.	
	4.4 Install sediment fencing adjacent to the down-slope toe of all soil stockpiles or other disturbed areas.	
	4.5 Regularly inspect all surface water and sediment control structures for adequacy and repair or upgrade, where required.	Six monthly and following significant rainfall events
	4.6 Install and maintain a suitably sized sump within the active extraction area to collect all surface water runoff and groundwater inflows to the extraction area.	Following receipt of project approval
	4.7 Preferentially use water within the extraction area sump for dust suppression-related activities. Surplus water within the extraction area sump would be pumped to the water storage facility.	As required
	4.8 Preferentially use water within the water storage facility for rehabilitation-related activities or for irrigation within the irrigation area.	
	4.9 Construct 'grassed buffer areas' adjacent to the site access road and other sealed sections of the Project Site.	Within 6 months of receipt of project approval

(Cont'd)  
Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>5. Ecology</b>		
Minimise Project-related impacts on flora and fauna within and surrounding the Project Site.	5.1 Stage extraction activities such that they preferentially progress from disturbed sections of the Project Site to undisturbed sections.	Continuous
	5.2 Remove native vegetation only from those areas required for operational purposes during the subsequent 12 months.	
	5.3 Mark hollow-bearing trees to ensure they are readily identifiable.	
	5.4 Mark the boundaries of areas of native vegetation to be cleared.	Prior to clearing operations
	5.5 Erect cage traps in the vicinity of hollow-bearing trees for three consecutive nights.	
	5.6 Keep any trapped animal in captivity by animal for the period of clearing of native vegetation.	During clearing operations
	5.7 Clear non-hollow-bearing trees before clearing other vegetation.	During clearing operations
	5.8 Ensure a qualified fauna consultant is present during clearing of hollow-bearing trees.	
	5.9 Release any trapped animal adjacent to the Project Site.	Following clearing operations
	5.10 Break or cut cleared vegetation into manageable sections to be placed on areas undergoing rehabilitation or within other areas of native vegetation surrounding the Project Site.	Following clearing operations
	5.11 Undertake weed control programs within the Project Site.	Annually
	5.12 Strip, stockpile and spread topsoil and subsoil in accordance with Section 2.3.5.	During soil stripping programs
	5.13 Progressively rehabilitate all areas of disturbance no longer required for extraction or placement activities.	Following completion of extraction operations
	5.14 Implement the proposed biodiversity offset strategy	

(Cont'd)

**Statement of Commitments for the Nowra Brickworks Quarry**

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Desired Outcome	Action	Timing
<b>6. Traffic and Transportation</b>		
Limit the impact of Project-related traffic	6.1. Adhere to the approved hours of operation.	Continuous
	6.2. Adhere to all speed limits.	
Allow concerned residents or motorists to report any traffic-related incidents, unsafe operation or general concerns.	6.3. Establish a complaints register, advertised in the local telephone directory.	On receipt of project approval
	6.4. Investigate all complaints and act decisively on substantiated incidents.	
Ensure all weight restrictions are adhered to	6.5. Weigh all entering and exiting laden trucks.	Continuous
Limit the tracking of material onto the Princes Highway to minimise dust, particulate matter and debris emissions.	6.6. Seal a 150m section of the site access road from the entrance gate and construct a wheel wash facility.	Prior to the amount of quarry products despatched from the Project Site exceeding 250 000t per year
	6.7. Ensure all loads are covered.	Continuous
	6.8. Provide a safe area for covering loads.	
Ensure all drivers adhere to the Projects Code of Conduct	6.9. Require all truck drivers to sign a Driver's Code of Conduct.	Prior to each driver leaving site for the first time
<b>7. Air Quality</b>		
Site activities are undertaken without exceeding DECC air quality criteria or goals.	7.1. Utilise water sprays and water trucks in all areas of potential dust lift-off to minimise potential dust emissions.	Continuous
	7.2. Utilise a chemical dust lift-off suppression system along unsealed roads, tracks and working areas, as well as with the mobile processing plant(s).	
	7.3. Utilise efficient mist sprays and wind sheltering equipment on processing equipment.	
	7.4. Maintain a maximum speed limit within the Project Site of 10km/h.	
	7.5. Stabilise the unsealed shoulders of the site access road.	Prior to the amount of quarry products despatched from the Project Site exceeding 250 000t per year
	7.6. Install a wheel wash on the site access road to limit tracking of material onto the Princes Highway	Prior to the amount of quarry products despatched from the Project Site exceeding 250 000t per year
	7.7. Disturb only the minimum area required for operation of the quarry during the subsequent 12 months.	Continuous
	7.8. Stabilise soil stockpiles to be in place for more than 10 days through the application of cleared vegetation, hydroseeding, hydromulching or equivalent.	Following soil stripping activities

(Cont'd)

Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>7. Air Quality (Cont'd)</b>		
Site activities are undertaken without exceeding DECC air quality criteria or goals. (Cont'd)	7.9. Minimise the creation of minor roads and access tracks.	Continuous
	7.10. Utilise dust aprons, dust extraction systems and/or water injection or sprays during drilling operations.	During drilling operations
	7.11. Adequately stem all blast holes with aggregates.	During blasting operations
	7.12. Commence rehabilitation as soon as practicable.	Once an area is no longer required for extraction or placement-related operations
<b>8. Noise</b>		
Project-related noise impacts on surrounding residences minimised.	8.1. Adhere to the approved hours of operation.	Continuous
	8.2. Use noise-mitigated mobile and processing equipment.	
	8.3. Undertake all processing operations within the deepest section of the quarry.	
	8.4. Maintain all mobile and processing equipment in accordance with the manufacturer's specifications.	
	8.5. Preferential selection of equipment with lower sound power levels over equipment with higher sound power levels.	As equipment renewal is required
	8.6. Progressively install frequency modulated reversing alarms on mobile equipment.	
<b>9. Blasting</b>		
Project-related blasting impacts within assessment guidelines.	9.1. Design and implement blasts by a suitably qualified blasting engineer and experienced shot-firer.	Each blast
	9.2. Design blasts to ensure the assessment criteria described in Section 4.7.4.5 are complied with at all residential and commercial receivers.	
	9.3. Modify blast designs, mitigation measures and operating procedures on the basis of monitoring results.	As required
	9.4. Limit blasting operations to between the hours of 9:00am and 4:00pm, Monday to Saturday.	Each blast
	9.5. Negotiate an appropriate arrangement with the owner of Residence A.	Prior to completion of Stage 1 of the Project

(Cont'd)  
Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>9. Blasting (Cont'd)</b>		
Project-related blasting impacts within assessment guidelines. (Cont'd)	9.6. Notify the following organisations verbally of each blast. <ul style="list-style-type: none"> <li>• Shoalhaven City Council.</li> <li>• NSW Police.</li> <li>• NSW Roads and Traffic Authority.</li> <li>• The owner of Residence A.</li> <li>• Environment Protection Authority.</li> <li>• The South Coast Correctional Facility (when constructed).</li> </ul>	On the working day prior to the blast being initiated
	9.7. Maintain the existing main telephone number (02 4421 7766) for the quarry as an environmental complaints line.	Continuous
	9.8. Maintain a register of complaints.	
	9.9. Respond promptly to any issue of concern.	
<b>10. Aboriginal Cultural Heritage</b>		
Unidentified Aboriginal sites are not disturbed by the Proponent's activities.	10.1. Ensure representatives of the Aboriginal community are present during activities that would disturb the upper 10cm of soil in the area marked on <b>Figure 5.1</b> .	During soil stripping operations in the area indicated
	10.2. Cease all work in the event that an item of suspected Aboriginal cultural heritage is discovered, establish a 20m x 20m buffer around the item and consult with the Department of Environment, Climate Change and Water.	As required
	10.3. Cease all work in the event that suspected human remains are discovered, establish a 50m x 50m buffer around the item(s) and consult with NSW Police and the Department of Environment, Climate Change and Water.	As required
<b>11. Soils</b>		
The Proponent's activities do not result in soil degradation or loss.	11.1. Strip soils only when they are moist.	During soil stripping operations
	11.2. Strip topsoils using a scraper, excavator or bulldozer to a depth of between 180mm and 250mm below the surface.	
	11.3. Strip subsoils to a depth of between 175mm and 500mm below the base of the topsoil.	
	11.4. Place soils directly on areas undergoing progressive rehabilitation, where practicable.	During rehabilitation operations

(Cont'd)

Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>11. Soils (Cont'd)</b>		
The Proponent's activities do not result in soil degradation or loss. (Cont'd)	11.5. Place Virgin Excavated Natural Material (VENM) in the manner described in Section 2.9.5.	During VENM placement operations
	11.6. Place subsoil over the VENM to a thickness of approximately 250mm.	During soil placement operations
	11.7. Place topsoil to a thickness of approximately 200mm.	
	11.8. Apply biosolids to the topsoil at a rate of less than 20 dry tonnes per hectare.	
	11.9. Spread between 20mm to 40mm of mulched native vegetation, broken tree debris or bitumen sprayed straw mulch over the topsoil.	
	11.10. Locate soil stockpiles, where required, at least 2m from existing vegetation, areas of concentrated surface water flows, roads or other hazardous areas.	During soil stockpiling operations
	11.11. Construct soil stockpiles as low (less than 2m high), flat, elongated mounds with side slopes no greater than 1:3(V:H). Where practicable, topsoil stockpiles would be less than 1m high.	
	11.12. Stabilise stockpiles to be in place for more than 10 days through the application of mulched or broken vegetation, hydroseeding, hydromulching or equivalent.	During soil stockpiling operations
	11.13. Erect a sediment fence approximately 1m from the toe on the downslope side of soil stockpiles.	
	11.14. Use stockpiled soil material for rehabilitation-related operations within 6 months of being stockpiled.	
Ensure sediment-laden surface water is not permitted to flow off site.	11.15. Maintain and relocate an earth bank to divert all 'clean' surface water to a sediment retention structure and level spreader.	Continuous
	11.16. Divert all surface water flows from disturbed areas to the water storage facility where practicable.	
	11.17. Divert all other potentially sediment-laden surface water flows to a sump within the extraction area.	

(Cont'd)

Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>11. Soils (Cont'd)</b>		
Ensure sediment-laden surface water is not permitted to flow off site. (Cont'd)	11.18. Preferentially use water from the extraction area sump for dust suppression and watering of roads and other areas.	
	11.19. Construct a bio-infiltration facility in accordance with the specifications in Section 4.9.3.	Prior to discharge of surface water to Nowra Creek
	11.20. Preferentially use water within the water storage facility for rehabilitation-related activities.	Continuous
	11.21. Pump excess water from the extraction are sump to the water storage facility.	As required
	11.22. Pump water from the water storage facility to a bio-infiltration facility when the concentration of total suspended solids within the water storage facility is less than 50mg/L.	
	11.23. Pump water from the bio-infiltration facility to Nowra Creek.	
<b>12. Visibility</b>		
Limit impacts to the visual amenity of the area surrounding the Project Site.	12.1. Maintain the existing perimeter bunds.	Continuous
	12.2. Maintain the existing mature trees on the eastern boundary of the Project Site.	
	12.3. Adopt a high standard of house keeping.	
<b>13. Socio-Economic</b>		
Ensure Project-related adverse impacts are minimised and benefits are maximised.	13.1. Give preference to suppliers of equipment, services or consumables located within the Shoalhaven Local Government Area or Illawarra Region, where ever practicable.	Continuous
	13.2. Give preference, where reasonable to do so, when engaging new employees to candidates who live within the Shoalhaven Local Government Area.	
	13.3. Continue to support local junior sporting clubs through sponsorship or in kind support.	
	13.4. Review any request by a community organisation for support or assistance during the life of the Project.	As required

(Cont'd)  
Statement of Commitments for the Nowra Brickworks Quarry

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Desired Outcome	Action	Timing
<b>13. Socio-Economic (Cont'd)</b>		
Ensure Project-related adverse impacts are minimised and benefits are maximised. (Cont'd)	13.5. Consult with the residents and community surrounding the Project Site.	Continuous
	13.6. Advertise and maintain a community complaints telephone line.	
	13.7. Develop and maintain a Complaints Management Plan to ensure prompt response to issues identified by the public.	
<b>14. Environmental Monitoring</b>		
Ongoing monitoring of surface and groundwater-related impacts.	14.1. Monitor groundwater levels within Piezometers P1 to P8 ( <b>Figure 5.1</b> ).	Monthly.
	14.2. Monitor and record groundwater quality within piezometers P2, P3, P5, P6 and P7 ( <b>Figure 5.1</b> ).	Quarterly
	14.3. Monitor and record groundwater seepage on rock faces. To be undertaken by a geotechnical engineer.	Six monthly
	14.4. Monitor and record surface water quality within the extraction area sump, the water storage facility, the sediment containment structure and within Nowra Creek upstream and downstream of the Project-site discharge point.	Monthly
	14.5. Determine and record the quality of water pumped from the water storage facility to the bio-infiltration facility.	During each pumping campaign
	14.6. Determine and record the quality of water discharged from the bio-infiltration facility to Nowra Creek.	
	14.7. Determine and record the quality of water flowing from the sediment containment structure to Nowra Creek.	During or immediately following significant rainfall events
	14.8. Determine, using in-line meters, and record the volumes of water pumped: <ul style="list-style-type: none"> <li>from the extraction area sump to the water storage facility;</li> <li>from the water storage facility to the bio-infiltration facility; and</li> <li>from the bio-infiltration facility to Nowra Creek.</li> </ul>	During pumping programs

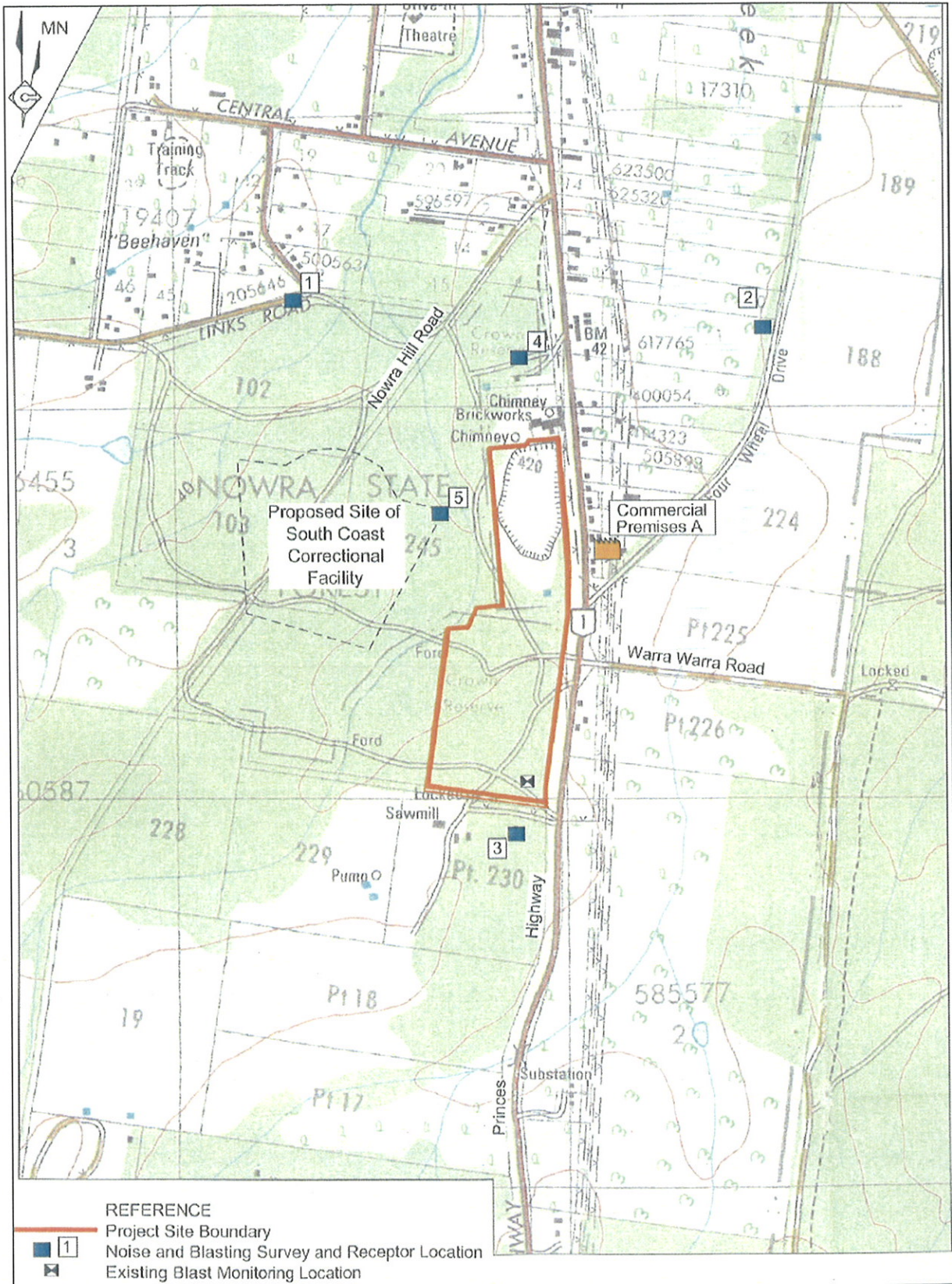
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Desired Outcome	Action	Timing
<b>14. Environmental Monitoring (Cont'd)</b>		
Ongoing monitoring of surface and groundwater-related impacts. (Cont'd)	14.9. Determine and record the volume of water used for extraction, processing, placement and rehabilitation-related operations.	Daily
Ongoing monitoring of ecology-related impacts.	14.10. Undertake regular monitoring of areas undergoing rehabilitation to determine the success or otherwise of the management, mitigation and ameliorative measures and the rehabilitation programs.	Six monthly
	14.11. Take photographs from fixed points to document activities within the Project Site, including rehabilitation progress.	Six monthly
	14.12. Undertake weed inspection programs.	Annually
Ongoing monitoring of air quality-related impacts.	14.13. Maintain the existing network of deposited dust monitoring gauges and determine and record dust deposition rates.	Monthly
	14.14. Establish a meteorological station capable of measuring temperature at the surface and at a height of 10m, wind direction and speed and rainfall.	Within 3 months of receipt of project approval
Ongoing monitoring of blasting-related impacts.	14.15. Monitor all blasts at the blast monitoring locations indicated on <b>Figure 5.1</b> .	Each blast
<b>15. Environmental Documentation</b>		
A systematic set of documents are in place to guide the planning and implementation of all environmental management strategies.	15.1 Incorporate the environmental procedures in an on-site management system.	Prior to relevant activity.
	15.2 Update the Mining Operations Plan.	As required.
	15.3 Incorporate relevant environmental data / information in Annual Environmental Management Reports.	Annually.
	15.4 Prepare the following environmental plans for the Project. <ul style="list-style-type: none"><li>- Air Quality Monitoring Program.</li><li>- Noise Monitoring Program.</li><li>- Blast Monitoring Program.</li><li>- Flora and Fauna Management Plan.</li><li>- Site Water Management Plan.</li><li>- Groundwater Management Plan.</li><li>- Rehabilitation and Landscape Management Plan</li></ul>	Variously.
	15.5 Incorporate the environmental procedures in an on-site management system.	Prior to relevant activity.

### APPENDIX 3 NOISE AND DUST MONITORING LOCATIONS



# APPENDIX 4 CONCEPTUAL FINAL LANDFORM

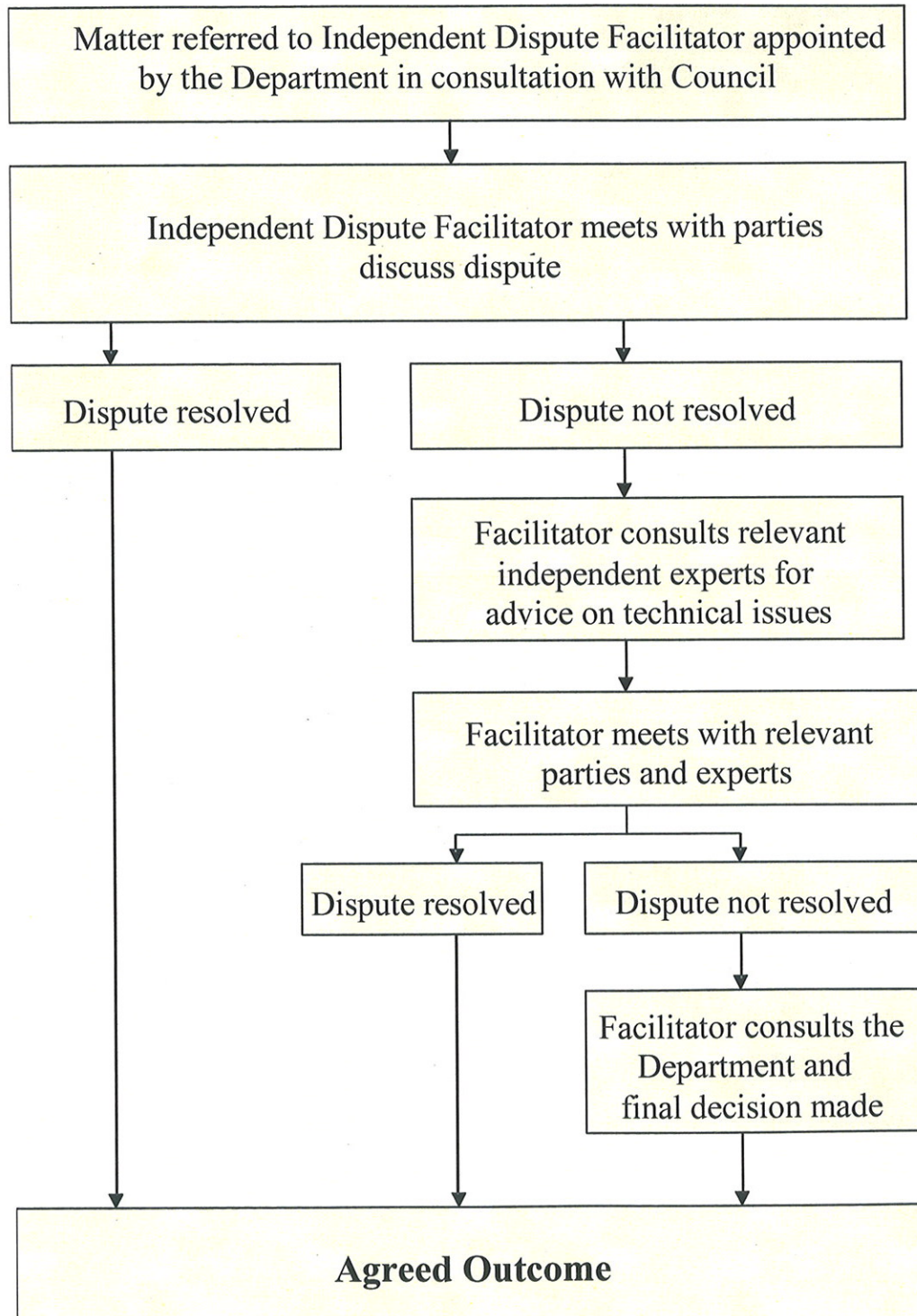


**APPENDIX 5  
QUARRY ACCESS – RTA PRELIMINARY CONCEPT DESIGN**



**APPENDIX 6  
INDEPENDENT DISPUTE RESOLUTION PROCESS**

**Independent Dispute Resolution Process  
(Indicative only)**



## APPENDIX C – CONSIDERATION OF ENVIRONMENTAL PLANNING INSTRUMENTS

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### ***Shoalhaven Local Environmental Plan 1985***

Under the current LEP the land to which the project applies is zoned 1(b) – Rural Arterial and Main Road Protection, with a small section zoned 1(f) – Forest. Extractive industries are permissible in both zones, subject to consent.

### ***Draft Shoalhaven Local Environmental Plan 2009***

The Draft LEP proposes to re-zone land contained in ML5087 as IN2 – Light Industrial and land contained in ML 6322 as E2 – Environmental Conservation. This may impact on the permissibility of the project, as the E2 zoning would prohibit extractive industry.

### ***State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP)***

Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of extractive industries, including:

- compatibility with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

The Department has considered these matters in its assessment report. Based on this assessment, the Department is satisfied that the project is able to be managed in a manner that is generally consistent with the aims, objectives and provisions of the Mining SEPP.

### ***State Environmental Planning Policy (Infrastructure) 2007***

In accordance with clause 104 of the Infrastructure SEPP (and equivalent provisions of the now repealed SEPP 11 *Traffic Generating Developments*), the application was referred to the RTA. Issues raised by the RTA and related traffic impacts are discussed in section 4.3.

### ***State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33)***

SEPP 33 aims to identify proposals with the potential for significant offsite impacts, in terms of risk and/ or offence (odour, noise etc) to people, property or the environment. The Department is satisfied that the project is not potentially hazardous or offensive, and that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 33.

### ***State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)***

SEPP 55 aims to ensure that potential contamination issues are considered in the determination of a development application. Clause 7 of SEPP 55 states that:

- 7(1) A consent authority must not consent to the carrying out of any development on land unless:
- (a) it has considered whether the land is contaminated, and
  - (b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and
  - (c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

The Department is satisfied that existing land contamination is not a significant issue for the site.

## **APPENDIX D – PROPONENT'S RESPONSES TO SUBMISSIONS**

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See attached CD-ROM containing a folder titled "*Nowra Brickworks Quarry: Response to Submissions*".

## **APPENDIX E – SUBMISSIONS**

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See attached CD-ROM containing a folder titled "Nowra Brickworks Quarry: Submissions".

## **APPENDIX F – ENVIRONMENTAL ASSESSMENT**

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See attached CD-ROM containing a folder titled "Nowra Brickworks Quarry: Environmental Assessment".

## Appendix B – EMS





## **South Coast Concrete Crushing and Recycling**

### **Nowra Brickworks Quarry Environmental Management Strategy**

June 2010





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- F Surface Water and Groundwater Monitoring and Response Plan
- G Site Water Balance Report
- H Landscape and Biodiversity Management Plan
- I Air Quality Management Plan
- J Aboriginal Heritage Management Plan
- K Record Sheets
- L Maps



## Abbreviations

AEMR	Annual Environmental Monitoring Report
CCC	Community Consultative Committee
DA	Development Application
DDG	Dust Deposition Gauges
EMS	Environmental Management Strategy
EOI	Expression of interest
DECCW	Department of Environment, Climate Change and Water
dB(A)	Decibels (A—weighted filter)
EPA	Protection Authority
EPL	Environmental Protection Licence
HVAS	High Volume Air Sampler
MSDS	Material Safety Data Sheets
NOW	NSW Office of Water
NSW	New South Wales
PM	Particulate Matter
SCCCR	South Coast Concrete Crushing and Recycling
TSP	Total Suspended Particulate
VENM	Virgin Excavated Natural Material

# 1. Introduction

## 1.1 Background

The Nowra Brickworks Quarry (the quarry) is located in South Nowra, approximately five kilometres south of the central business district, next to the Princes Highway (Figure 1-1). South Coast Concrete Crushing and Recycling (SCCCR) have operated the quarry since 2002, carrying out the following operations:

- ▶ Extraction of weathered and unweathered shale material;
- ▶ Importation of construction, concrete and waste bitumen material for crushing and recycling;
- ▶ Importation of quarry products from other quarries for blending operations;
- ▶ Crushing, screening and blending of extracted, recycling and blending materials to produce general and specialised quarry products;
- ▶ Stockpiling, loading and despatching quarry products; and
- ▶ Progressive rehabilitation of areas no longer required for extraction-related purposes.

The Minister for Planning approved the continuation and expansion of extractive operations at the quarry pursuant to section 75J of the *Environmental Planning and Assessment Act 1979* on 1 December 2009 (the Project Approval).

This Environmental Management Strategy (EMS) has been prepared to satisfy Schedule 5 Condition 1 of the Project Approval (refer to Section 1.3), attached as Appendix A.

## 1.2 Summary of the Project

The Project is the continuation and expansion of the extractive operations at the quarry and includes the following operations and works (Corkery and City Plan Services 2009):

- i. Continued operation of the quarry and its expansion to the south;
- ii. Realignment and sealing of the section of the site access road from the site entrance from the Princes Highway for a distance of 150 metres;
- iii. Construction of a wheel-wash facility, dual weighbridge and office and a sealed visitor carpark;
- iv. Extract more than 364,000 tonnes per year of clay/shale (using drill and blast methods), structural clay and associated materials (in total) from the site using an excavator for direct sale to customers or stockpiling for later sale without processing;
- v. Importation and stockpiling of up to approximately 50,000 tonnes per year of recycling materials;
- vi. Importation and stockpiling of up to approximately 125,000 tonnes per year of blending materials;
- vii. Processing and blending of extracted, recycling and blending material to produce general and specialised products using a mobile processing plant;
- viii. Stockpiling of quarry products;
- ix. Loading, sale and despatch of an average of approximately 300,000 tonnes per year, to a maximum of approximately 500,000 tonnes per year, of quarry products using road registered heavy vehicles;

- x. Importation and placement of up to 200,000 tonnes per year of Virgin Excavated Natural Material (VENM). A proportion of this material may be processed and blended with other materials to produce saleable products. The remainder will be placed within completed sections of the extraction area to establish a final landform that mimics the pre-extraction landform within the Project site; and
- xi. Progressive rehabilitation of areas no longer required for extraction or VENM placement-related activities.

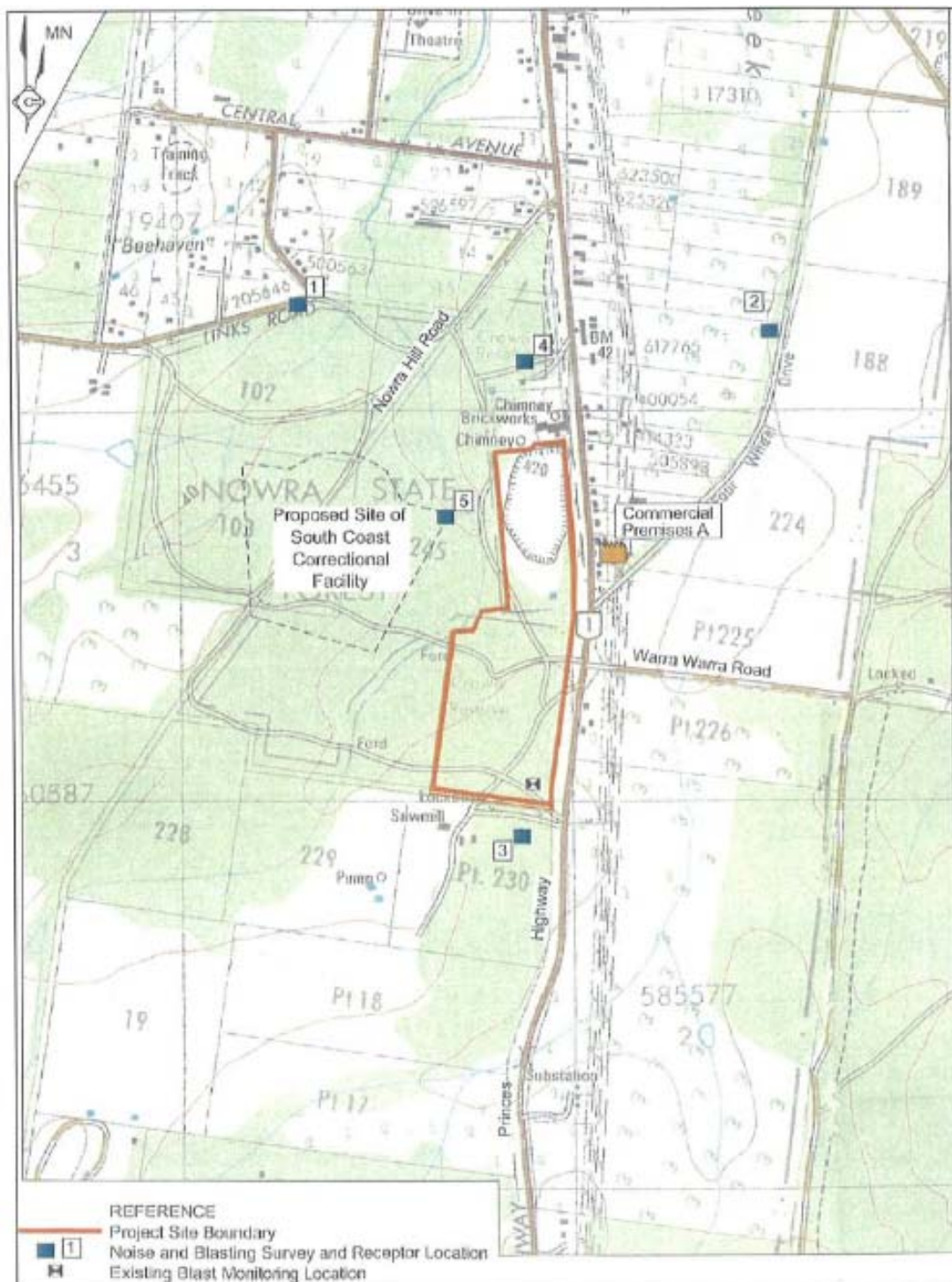
### 1.3 Project Approval Conditions

The Minister for Planning approved the continuation and expansion of extractive operations at the Nowra Brickworks Quarry in South Nowra pursuant to section 75J of the *Environmental Planning and Assessment Act 1979* on 1 December 2009 (the Part 3A Approval). In accordance with Schedule 5, Conditions 1 and 4 of the Part 3A Approval, SCCCR is required to prepare and implement an Environmental Management Strategy (EMS) for the project. Condition 1 of Schedule 5 states:

*"The Proponent will prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must:*

- a) be submitted to the Director-General for approval by 30 June 2010;*
- b) provide the strategic framework for environmental management of the project;*
- c) identify the statutory approvals that apply to the project;*
- d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;*
- e) describe the procedures that will be implemented to:*
  - keep the local community and relevant agencies informed of the operation and environmental performance of the project;*
  - receive, handle, respond to, and record complaints;*
  - resolve any disputes that may arise during the course of the project;*
  - respond to any non-compliance; and*
  - respond to emergencies; and*
- f) include:*
  - copies of the various strategies, plans and programs that are required under the conditions of this approval once they have been approved; and*
  - a clear plan depicting all the monitoring currently being carried out within the project area."*

**Figure 1-1 Location of Nowra Brickworks**



Source: Appendix 3, Project Approval for Nowra Brickworks Proposal

## **1.4 The Quarry's Environmental Management Strategy (EMS)**

### **1.4.1 Objectives and Scope**

The EMS has been developed to specifically address the requirements of Schedule 5, Condition 1 of the Project Approval (refer to Section 1.3 above). It describes the management procedures associated with the quarry relevant to managing the project's impact on the environment and incorporates matters required to be implemented or documented as well as the various strategies, plans and programs, and reporting mechanisms required by the Project Approval. Specifically the objectives of the EMS are to:

- ▶ Provide the strategic framework for environmental management of the project;
- ▶ Identify the statutory approvals that apply to the project; and
- ▶ Describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
- ▶ Describe the procedures that would be implemented to:
  - Keep the local community and relevant agencies informed about the operation and environmental performance of the project;
  - Receive, handle, respond to, and record complaints;
  - Resolve any disputes that may arise during the course of the project;
  - Respond to any non-compliance; and
  - Respond to emergencies.

In addition, the Project Approval required the preparation of a number of strategies, plans and programs relevant to environmental management of the quarry. Consequently, the EMS incorporates these in their entirety and by summary of actionable items, as follows:

- ▶ Environmental Response Plan (attached as Appendix C);
- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix D);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F);
- ▶ Site Water Balance Report (attached as Appendix G);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H);
- ▶ Air Quality Management Plan (attached as Appendix I); and
- ▶ Aboriginal Heritage Management Plan (attached as Appendix J).

This EMS, in concert with the above plans, provides for the environmental management of the operation of the quarry for use by the Mine Manager. Table 1-1 outlines how the specific environmental aspects relate to each activity and hence where they are addressed by the EMS.

**Table 1-1 EMS Organisation Matrix**

Key activities associated with the operations at the quarry	EMS section	Environmental Plans and Reports							Community consultation	Environmental monitoring	Reporting
		Noise and Blast	Erosion and Sediment Control	Surface Water and Groundwater	Landscape and Biodiversity	Air Quality	Aboriginal Heritage	Emergency and hazards			
Community Consultation	3	✓				✓			✓		✓
Emergency Response	4							✓			✓
Vegetation removal and soil stripping	5	✓	✓		✓	✓	✓			✓	✓
Soil placement and stockpiling (post-stripping)	6	✓	✓		✓	✓					
Drilling and blasting	7	✓				✓			✓	✓	✓
Extracting, importing and processing	8	✓	✓			✓					
Stockpiling	9	✓	✓		✓	✓					
Loading, dispatch and transportation	10	✓	✓			✓					
Importation and use VENM	11	✓	✓		✓	✓				✓	✓
Soil and Water management and use	12		✓	✓						✓	✓
Rehabilitation	13	✓	✓		✓	✓				✓	✓
Environmental Monitoring	14	✓	✓	✓	✓	✓	✓			✓	✓
Reporting	15	✓	✓	✓	✓	✓	✓		✓	✓	

#### **1.4.2 Framework of EMS**

The quarry is a small operation with a limited number of operation personnel. This EMS will be implemented by the Mine Manager, and as such the EMS has been structured to focus on the environmental management as it relates to operational activities at the quarry.

#### **1.4.3 Commencement and implementation of the EMS**

The EMS is to commence when all existing development consents for the site have been surrendered to Shoalhaven City Council (anticipated to be prior to 30 June 2010).

The EMS is to be implemented through the following means:

- ▶ The preparation of detailed work instructions which address the environmental requirements of the EMS;
- ▶ Assigning individual responsibilities for implementing, maintaining, monitoring, and reporting each environmental requirements and safeguards;
- ▶ Ensuring that all works are conducted in compliance with the EMS, legislative requirements, and the site's Environment Protection Licence and Project Approval;
- ▶ Ensuring appropriate monitoring, corrective actions and reporting of environmental incidents; and
- ▶ Ensuring that all employees conduct their work in accordance with the requirements of the EMS.

### **1.5 Management Responsibilities**

#### **1.5.1 Roles and Responsibilities**

The Mine Manager is responsible for the implementation of this EMS. The Mine Manager's authority has been provided for by the leaseholder (Abib Pty Ltd) and the Mine Operator (South Coast Concrete Crushing and Recycling Pty Ltd).

The Mine Manager, in the implementation of the EMS, will be accountable to the Mine Operator, Department of Mineral Resources (NSW Dept of Industry and Investment) and the Department of Planning.

### **1.6 Distribution**

The EMS is to be distributed in accordance with Table 1-2.

**Table 1-2 EMS Distribution**

Organisation	No of copies	Timing
SCCCR Mine Manager	1	Within one month of receipt of approval of the EMS
Shoalhaven City Council	1	
Land and Property Management Authority (formerly Department of Land)	1	
Members of the Community Consultative Committee	1 per member	
DECCW	1 copy	

The document will also be available at the quarry.

## 1.7 Review of the EMS

The EMS is a perpetual document that can be reviewed and amended or updated as needed to take account of changes occurring from time to time. In addition, a review of the EMS will be conducted at least every two years to promote opportunities for continual improvement. Further reviews and alterations to the EMS may also be required in the circumstances listed in Table 1-3 below.

**Table 1-3 Circumstances that may require alterations to the EMS**

Circumstance	Potential changes required
New Environmental Protection Licence issued	Any licence conditions will be incorporated into the EMS.
Water Access Licence obtained (Part 2, <i>Water Act 1912</i> )	
Aquifer Interference Licence obtained (Part 5, <i>Water Act 1912</i> )	
After each Independent Environmental Audit	The EMS may be changed, where appropriate, to reflect the audit's review of the adequacy of any strategy/plan/program required under the Part 3A Approval and reflected in the EMS.
Exceedance of limits/performance criteria in the Project Approval / EMS	Additional measures to address an exceedance/incident may be incorporated into the EMS.

## 2. Statutory Approvals

### 2.1 Project Approval Conditions

The *Continuation and Expansion of the Extractive Operations at the Nowra Brickworks Quarry, South Nowra* (the project) was given conditional approval by the Director-General as Delegate for the Minister for Planning on 1 December 2009 (Project Application No: 07\_0123) (attached as Appendix A).

Approval for the project was subject to conditions in Schedules 2 to 5 of the Project Approval. These conditions require that the operation be conducted to:

- ▶ Prevent and/or minimise adverse environmental impacts;
- ▶ Set standards and performance measures for acceptable environmental performance;
- ▶ Require regular monitoring and reporting; and
- ▶ Provide for the ongoing environmental management of the Project.

Schedule 2, Condition 2 requires that the project be carried out generally in accordance with the:

- ▶ Environmental Assessment submitted as part of the Major Projects Application (Corkery and City Plan Services 2009);
- ▶ Statement of Commitments (attached as Appendix 2 to the Project Approval); and
- ▶ The Project Approval.

This EMS provides guidance only on the implementation and reporting required by the environmental strategies, plans and programs. The strategies, plans and programs are attached as appendices to this EMS and should be referred to regularly and when updating the EMS.

### 2.2 Relevant Environmental Legislation

Other relevant Acts that operate independently of the Project Approval and which are of relevance to the quarry operations are listed in Table 2-1 below. The quarry's Mine Manager must be cognisant of the requirements of each of these Acts.

**Table 2-1 Environmental legislation relevant to the quarry operations**

Act	Requirement
<i>Environmental Planning and Assessment Act 1979</i>	All activities are to be carried out in accordance with the Project Approval.
<i>Protection of the Environment Operations Act 1997 (Chapter 5)</i>	<p>Except as provided by EPL, the operations of the quarry will not:</p> <ul style="list-style-type: none"> <li>▶ Dispose of waste or cause any leak or spill or similar in a matter that causes harms or likely to harm the environment.</li> <li>▶ Result in land, air, or water pollution.</li> <li>▶ Result in noise pollution.</li> </ul> <p>Pollution incidents causing or threatening material harm must be reported to the EPA.</p>
<i>Noxious Weeds Act 1993 (Part 3)</i>	The quarry must control any plant declared noxious in the Shoalhaven Local Government Area in accordance with the relevant control order (refer to <a href="http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed">http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed</a> ).
<i>Rural Fires Act 1994 (Part 4)</i>	It is the duty of the owner or occupier of land to take steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from, that land.
<i>National Parks and Wildlife Act 1974 (Part 6)</i>	A permit, granted pursuant to the provision of this Act, must be obtained to disturb or move any Aboriginal object within the quarry land.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	<p>The Act encourages the most efficient use of resources, to minimise the consumption of natural resources and the final disposal of waste, and to reduce environmental harm in accordance with the principles of ecologically sustainable development.</p> <p>Resource management options should be considered against a hierarchy of the following order:</p> <ul style="list-style-type: none"> <li>(i) Avoidance of unnecessary resource consumption;</li> <li>(ii) Resource recovery (including reuse, reprocessing, recycling and energy recovery); and then</li> <li>(iii) Disposal.</li> </ul> <p>Avoid unnecessary water consumption in buildings and grounds maintenance. Recycle water where appropriate.</p>

## 2.3 Other Statutory Approvals and Licences

In addition to meeting the conditions set out in the Project Approval, the project requires additional statutory instruments to carry out certain activities. These are listed in Table 2-2 below and further described in subsequent sections.

Each licence and/or approval contains various conditions that need to be adhered to. An amendment to the existing EPL to increase the annual extraction limit to 500,000 tonnes has been submitted to DECCW. Through the review process outlined in Section 1.6, any additional

environmental strategies, conditions, monitoring and reporting requirements specified in these licences/approvals will be incorporated into the EMS, when received.

**Table 2-2 Statutory Approvals and Licences**

Licence / Approval and Relevant Legislation	Relevant Authority	When is it required?	Responsibility
Environmental Protection Licence (EPL) <i>Protection of the Environment Operations Act 1997</i>	NSW Environmental Protection Authority (within the DECCW)	An EPL is required for a maximum extraction of 500,000 T and processing a maximum of 500,000 T of quarrying material annually.  A review of the EPL is required either: <ul style="list-style-type: none"><li>▶ When existing EPL is to be reviewed (07 April 2011), or</li><li>▶ When operations are expected to exceed current extraction limit</li></ul>	Mine Manager
Water Access Licence <i>Water Act 1912 (Part 5)</i>	NSW Office of Water (within the DECCW)	A water access licence is required to extract water from the dam.	Mine Manager
Aquifer Interference Approval <i>Water Act 1912 (Part 2)</i>	NSW Office of Water (within the DECCW)	An Aquifer interference Approval is required for quarry pit dewatering and groundwater interception.	Mine Manager

### 2.3.1 Environment Protection Licence

Under the NSW *Protection of the Environment Operations Act 1997* (POEO Act) the project activities require an Environment Protection Licence (EPL) for the following “Scheduled Activities” as listed in Schedule 1 of the POEO Act:

- ▶ Crushing, Grinding or Separating; and
- ▶ Extractive activities.

The Quarry operates under EPL No. 11765 (attached as Appendix B). This EPL covers “Hard-Rock Gravel Quarrying” of between 50,000 tonnes and 100,000 tonnes per annum and “Crushing, Grinding or Separating Works” between 30,000 tonnes and 100,000 tonnes per annum.

The project requires a modification to the EPL to reflect the increased extraction and processing tonnages.

### **2.3.2 Water Access Licences**

The maximum harvestable right dam capacity for the property has been calculated by the NSW Office of Water (NOW) as 2.15 ML megalitres. This is based on the understanding that the Nowra Brickworks lease is 21.5 hectares in area and is located in a rainfall runoff area with a multiplier of 0.10 ML/ha.

As the 50 ML storage dam is in excess of the property's harvestable right and the intention is to extract water from the dam for onsite reuse (ie approx 50 ML/year) for the purposes of dust suppression and material processing, a licence under Part 2, Section 10 of the *Water Act 1912* is required for this dam. This licence would authorise the storage dam and associated pump for the stated purposes.

Groundwater inflows need to be accounted for separately. Based on the estimated inflows of 0.04 ML/day, this equates to approximately 14.6 ML/year. A Licence under Part 5 of the *Water Act 1912* is required for quarry pit dewatering and groundwater interception.

The site contains eight existing piezometers which are licensed under the *Water Act 1912* with Licence Number 10BL602172. Any new piezometers will also be required to be licensed accordingly.

### **2.4 Inconsistencies and Discrepancies**

In accordance with Schedule 2, Condition 3 of the Project Approval, in the event of an inconsistency between the documents listed in section 2.1 above, the conditions of the Project Approval will prevail to the extent of any inconsistency.

Where there is consistency between the conditions contained within the Project Approval, EPL and the Water Access Licences, the more stringent conditions will apply.

### 3. Community Consultation

In accordance with Schedule 5, Condition 1(e) of the Project Approval, a community consultation strategy will be implemented by the SCCCR to:

- ▶ Keep the local community and relevant agencies informed about the operation and environmental performance of the project;
- ▶ Receive, handle, respond to, and record complaints;
- ▶ Resolve any disputes that may arise during the course of the project;
- ▶ Respond to any non-compliance; and
- ▶ Respond to any emergencies.

The quarry's strategy for keeping the local community and relevant agencies informed is provided below and summarised in Figure 3-1 with the community consultation schedule provided as Table 3-1.

#### 3.1 Local Community

The primary community notification mediums that will be used include the *South Coast Register* (local newspaper) and the Nowra Brickworks Quarry website. Notification of nearby landowners of planned activities such as blasting will be by written correspondence, telephone call or personal visit to inform them of the date and time of the intended blast.

Regular articles will be submitted to the *South Coast Register* for publishing. These articles will provide updates on the operations at the quarry including the ongoing implementation of environmental strategies, plans and monitoring.

A Nowra Brickworks Quarry Website will be established. Information will be made available on the Website and will include:

- ▶ An overview of the operations at the quarry;
- ▶ Information on the environmental management of the quarry;
- ▶ A summary of environmental monitoring results;
- ▶ Copies of the Annual Environmental Management Reports; and
- ▶ Copies of the completed audits.

*Note: Nowra Brickworks Quarry, in accordance with Schedule 3 (Condition 10) of the Project Approval, advised landowners within 500 metres of the proposed blasting activities that they are entitled to a property inspection to establish the baseline condition of the property. Some responses were received and the property inspections have been undertaken.*

### **3.1.1 Community Consultative Committee**

A Community Consultative Committee (CCC) is to be established for the project to the satisfaction of the Director-General and in accordance with the Department's *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects*. The CCC will provide a forum for open discussion on issues directly relating to the quarry's operations, environmental performance and community relations. Items to be discussed at CCC meetings will include:

- Implementation of conditions of approval, the mining operations plan and other plans;
- The results of environmental monitoring;
- Annual environmental management reports (AEMRs);
- Outcomes of audit reports; and
- Community concerns and resolution of complaints.

The CCC will comprise:

- An independent chairperson to be appointed by the Director-General;
- Three to five representatives of the local community and other stakeholders. These representatives will be appointed by the Director-General, following advertisement in the *South Coast Register* and direct invitation to the Department of Corrective Services, NSW Department of Industry and Investment, NSW Department of Planning and immediate landowners and businesses;
- One representative from the Shoalhaven City Council; and
- The Mine Manager.

At the inaugural meeting of the CCC, the committee will determine the frequency of its meetings. The Department's Guideline suggests that the committee meet at least four times per year during the first two years following commencement of operations. After the first two years of operations under the Project Approval, it is suggested that the committee will meet at least twice per year.

Minutes of all meetings will be kept and will record issues raised and actions to be undertaken, who is responsible for taking those actions and by when.

### **3.1.2 Access to information**

Copies of the strategies, plans, programs, completed audits and AEMRs would be provided to the relevant agencies and the CCC. In addition, copies of the relevant documents will be made publicly available at the quarry.

A summary of the monitoring results will be made publicly available at the quarry, and will be updated on a regular basis (quarterly).

# COMMUNITY NOTIFICATION STRATEGY

## Consultation management

Keeping the local community and relevant agencies informed about the operation and environmental performance

### Exceedance of environmental monitoring criteria

Notify the Director-General and other relevant agencies, affected landowners and tenants

Provide written report within 6 days to the Department and relevant agencies

Describe the date, time and nature of the exceedance

Identify the cause (or likely cause) of the exceedance

Describe what action has been taken to date

Describe the proposed measures to address the exceedance

Provide quarterly monitoring results to Director-General, affected landowners and tenants until compliance with relevant criteria

### Community Consultative Committee (CCC)

Creation and operation of CCC according to Department's Guidelines

Minutes to be kept

### Quarterly updates and provision of information

Copies of information provided to relevant agencies and members of general public on request

Copies of relevant information made publicly available on site at the quarry

Creation and thereafter quarterly updates to website

Include information on environmental management, strategies, plans, monitoring results, AEMRs and completed audits

Include contact telephone line

### Notification of planned blasting activities

The following people will be notified on the working day prior to the blast being initiated:

- Shoalhaven City Council
- NSW Police
- NSW Roads and Traffic Authority
- The resident of 243 Princes Highway
- EPA (of the DECCW)
- The South Coast Correctional Facility

## Response management

Receive, handle, record and respond to complaints, any non-compliance, and emergencies

### Emergency management

### Complaint management

Complaints telephone line

Complaint made

Mine Manager

Initial response within 24 hours

Record date and time of complaint, nature of complaint, date and time of response, initial response and follow-up action taken in log book

Not resolved Resolved

Director-General

Not resolved Resolved

Independent dispute resolution process

### Non-compliance management

Non-compliance identified

Mine Manager for resolution and appropriate steps to ensure compliance is maintained in the future

Annual Environmental Monitoring Report

**Table 3-1 Program for community consultation**

Consultation Requirement	Timing	Action and Responsibility
Pre-blasting property inspections	Prior to any blasting activities undertaken under the Project Approval and this EMS	Consultation was undertaken prior to blasting in accordance with the Project Approval. Responsibility of the Mine Manager
Establish a complaints register	Prior to the commencement of this EMS (refer to Section 3.3)	Complaints received are to be recorded in the complaints register Responsibility of the Mine Manager
Website development	Prior to the commencement of this EMS (refer to Section 3.1)	Responsibility of the Mine Manager
Establish Community Consultation Committee.		Effort has been made to establish the CCC, however there was a lack of response (early 2010). Responsibility of the Mine Manager
<ul style="list-style-type: none"> <li>▶ A further advertisement calling for expressions of interested to be placed in the <i>South Coast Register</i></li> <li>▶ Circulation of newsletter to surrounding landowners to advise of the difficulty in finding representatives for the CCC (including an invitation to submit an EOI for CCC membership)</li> <li>▶ Forward the newsletter to when distributed to the Department of Planning and advise the Department of the progress of CCC membership applications.</li> </ul>	<p>August 2010</p> <p>30 September 2010</p>	
<p>The following people will be notified on the working day prior to the blast being initiated:</p> <ul style="list-style-type: none"> <li>– Shoalhaven City Council</li> <li>– NSW Police</li> <li>– NSW Roads and Traffic Authority</li> <li>– The resident of 243 Princes Highway</li> <li>– EPA (of the DECCW)</li> <li>– The South Coast Correctional Facility</li> </ul>	Prior to blasting	Responsibility of the Mine Manager



### **3.2 Relevant Agencies**

The reporting program, detailed in Section 15 of this EMS, is to be implemented to inform relevant agencies about the operation and environmental performance of the project.

### **3.3 Complaints and Dispute Resolution**

The quarry will maintain a community complaints telephone line and complaint register. The telephone number will be advertised in the Yellow Pages, on signage at the entrance to the quarry and on their website.

Complaints will be received by the quarry Mine Manager. The Mine Manager will:

- ▶ Receive, log, track and respond to complaints in the complaint register.
- ▶ Record the following:
  - The date and time of complaint.
  - The method by which the complaint was made.
  - Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
  - The nature of the complaint.
  - The action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant (including the date of response).
  - If no action was taken, the reasons why no action was taken.

The record of a complaint will be kept for at least four years after the complaint was made.

The quarry will endeavour, as far as possible, to resolve any disputes arising out of the implementation of the Project Approval with relevant public authorities or landowners. In the instance that an agreeable outcome (by all concerned parties) cannot be reached, the matter will be referred to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process.

### **3.4 Non-compliance and Corrective Actions**

If the results of environmental monitoring (provided in Section 14) identify that impacts generated by the project are greater than the relevant impact assessment criteria, then the Mine Manager will notify the Director-General and affected landowners and tenants, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the relevant criteria.

## 4. Emergency Response

Response to an emergency is to be in accordance with the *Nowra Brickworks Quarries Mine Safety Plan*, prepared in accordance with the *NSW Mine Health and Safety Act 2004*. Emergency procedures are located in the SCCCR main office.

The following procedures relate to environmental emergencies which are not covered by the quarry's emergency plan and procedures, *i.e.* spills and environmental harm.

### 4.1 Spills

The principal potential sources of soil or land contamination at the quarry is from spills or leaks of hydrocarbons (fuel, oil, grease, etc). The following pollution control measures will be implemented during the life of the Project:

- ▶ Employees will read the quarry's Environmental Response Plan (attached as Appendix C) for fuel and oil spills, and will refer to the Material Safety Data Sheets (MSDS) located next to the first aid kit located in SCCCR main office.
- ▶ During fuelling, the following will be observed:
  - Fuelling will be undertaken carefully to minimise drips on the ground;
  - Fuelling will be undertaken in a suitable area away from access areas and drainage lines or water courses;
  - Persons undertaking the fuelling will remain present during the entire fuelling operation;
  - If necessary, the emergency shut off switch for plant and machinery is to be used;
  - A spill kit will be kept at or near each fuelling area and on the fuel truck;
  - Spills and dirty absorbent materials will be cleaned up;
  - Fuelling equipment will be inspected for cracks, leaks, corrosion or failure; and
  - Small equipment will be fuelled over a paved or concrete area, away from any stormwater drains or ditches, and a funnel will be used when pouring fuel from a portable can.
- ▶ Any stormwater drains on site will be located and blocked. Spilled fuel will be prevented from reaching drains or waterways.
- ▶ Any spills will be cleaned up thoroughly and promptly. The Dry Method (refer to the Emergency Response Plan attached as Appendix C) will be used for cleaning up fuel spills (diesel or kerosene).
- ▶ If fuels are leaking or have spilled on an impermeable surface, the nearest down gradient drain will be diked or bermed to prevent fluids from flowing. Absorbent material from the spill kit will be applied on the spill area, and after cleaning up the contaminated absorbent material will be swept up, and the berm or dike will be removed from the stormwater drain.

- ▶ If fluids are leaking or have spilled on a permeable surface, the area will be marked and assistance will be sought to clean up.
- ▶ Spills or leaks will never be hosed down.
- ▶ Any spill kit materials will be disposed of in accordance with EPA guidelines.
- ▶ Any spill or discharge of any pollutant will be reported to the Mine Manager. If a spill or leak is of a hazardous substance that exceeds 500 mL, is an unknown substance of any amount, or a spill is too great to control, the NSW Fire Brigade will be called on 000.
- ▶ All applicable employees will be trained in general water pollution prevention and spill response, and a record of the employees trained will be kept.
- ▶ A current copy of the Spill Response Plan will be maintained in the SCCCR main office.

#### **4.2 Notification of Environmental Harm**

The EPA will be notified of incidents causing or threatening material harm to the environment as soon as practicable after the event. The definition of material harm is:

- (i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or*
- (ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations)*

Notifications will be made by telephoning the EPA's Pollution Line services on 131 555.

Additional reporting requirements, as required by the EPL (attached as Appendix B), will also be undertaken.

## 5. Vegetation Removal and Soil Stripping

### 5.1 Description of Activity

Vegetation removal and soil stripping is required to allow the expansion of the quarry extraction area. Vegetation suitable for commercial timber or firewood and not required for rehabilitation will be harvested and removed from site. Removal of the remaining larger vegetation will be undertaken using a bulldozer. Once felled, logs and branches to be retained for rehabilitation are to be either cut or broken into manageable lengths or coarsely mulched and placed on areas undergoing progressive rehabilitation or stockpiled for later use during rehabilitation. Smaller vegetation will be removed during soil stripping operations.

Top soils will be stripped using a scraper, excavator or bulldozer to a depth of between 180 mm and 250 mm below the surface. Subsoils will be stripped to a depth of between 175 mm and 500 mm below the base of the top soil. Stripped soils will then be either stockpiled or placed directly on areas undergoing progressive rehabilitation.

### 5.2 Environmental Management and Safeguards

All vegetation removal and soil stripping operations will be undertaken in accordance with the following plans and programs:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix D);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H);
- ▶ Air Quality Management Plan (attached as Appendix I); and
- ▶ Aboriginal Heritage Management Plan (attached as Appendix J).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to any land preparation, vegetation removal or soil stripping operations. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 5.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 5-1 below along with the controls, monitoring and reporting mechanisms that are to be undertaken to mitigate these risks. Further details are provided in subsequent sections.

**Table 5-1 Vegetation Removal and Stripping Key Environmental Issues and Risks**

Issue	Risk	Controls
Fauna	Death or injury through clearing of hollow-bearing trees	Implementation of environmental safeguards identified below.
Aboriginal objects	Unknown objects may be damaged through the actions of scrapers, excavators and/or bulldozers.	Implementation of environmental safeguards identified below.
Air quality	Dust and particulates may result in health issues or air pollution.	Dust suppression techniques and implementation of the environmental safeguards identified below.
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.

### 5.2.2 General Restrictions

The following general restrictions apply to any land preparation, vegetation removal and soil stripping activities undertaken at the quarry:

- ▶ All operations will be limited to the area required for extraction-related activities for the next 12 months. The boundaries will be clearly marked and no additional areas of vegetation or soils will be disturbed or removed prior to the implementation of the Landscape and Biodiversity Management Plan (refer to Appendix H).
- ▶ Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- ▶ Cleared land is to be stripped within 10 days of vegetation clearing occurring or else a temporary vegetative cover need be applied to lower C-factors to 0.1 within 20 days ( refer to Appendix E).
- ▶ Native vegetation and soils within the Biodiversity Offset Areas (refer to Figure 16-1 and Appendix L) will not be impacted by any land preparation and vegetation removal activities.
- ▶ Surface water and sediment and erosion controls will be installed prior to or during vegetation removal or soil stripping activities in accordance with the quarry's Erosion and Sediment Control Plan (attached as Appendix E).
- ▶ Where practicable, vegetation is to be cleared during winter months to limit the potential for nesting or roosting fauna to be impacted.
- ▶ All mobile equipment is to be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferential.
- ▶ Progressively install frequency modulated reversing alarms on mobile equipment.

### 5.2.3 Preparatory Activities

#### ***Ecological Conservation***

Prior to vegetation removal the following activities are to occur:

1. The footprint of the approved extraction/vegetation removal area is to be surveyed and clearly marked with concrete blocks (approximately 0.5 m<sup>3</sup>) placed at 50 m intervals and painted to be highly visible.
2. Hollow-bearing trees (including those previously marked) within the clearing area will be inspected by a suitably qualified ecological consultant for nesting or roosting fauna. Any fauna found will be relocated by the consultant to a suitable location in the vicinity of the area to be cleared.
3. In circumstances where the inspection of hollows is not immediately followed by vegetation removal, works will be undertaken to exclude fauna re-entering the hollows.
4. Cage traps will be set in the vicinity of hollow-bearing trees for three consecutive nights prior to clearing of native vegetation. Any trapped animals will be kept in captivity by animal carers for the period of clearing. Animals are then to be released within native vegetation after the completion of clearing activities.
5. Representatives of the Nowra Local Aboriginal Land Council (LALC) and Durgan Consultancy will be contacted prior to vegetation removal and soil stripping operations in the area marked as "Area to be monitored" in Figure 16-2 (refer also to Appendix L).

### 5.2.4 Operations

#### ***Vegetation and Ecological Management***

- ▶ Vegetation suitable for commercial timber or firewood and not required for rehabilitation will be harvested and removed from the site.
- ▶ Removal of larger vegetation is to be undertaken by a bulldozer, with the blade positioned just above the ground to minimise soil disturbance.
- ▶ Any clearing of hollow-bearing trees will be conducted during a time that is outside the breeding season for birds and microbats.
- ▶ Vegetation removal and soil stripping will be completed sequentially as listed in the Landscape and Biodiversity Management Plan (attached as Appendix H). This includes the removal of non-hollow-bearing trees first, where practicable, to allow any remaining nesting or roosting animals to leave the area to be disturbed prior to removing hollow-bearing trees.
- ▶ A qualified fauna consultant is to be commissioned and brought on to the site to observe the removal of hollow-bearing trees to rescue any remaining nesting or roosting fauna. The management of rescued animals, either injured or not, will be in accordance with the Landscape and Biodiversity Management Plan (attached as Appendix H).

- ▶ Hollow-bearing trees will be tapped by an excavator prior to removal in an attempt to make resident fauna vacate hollows, trees will then be lowered to the ground and any wildlife found will be managed by a qualified fauna consultant.
- ▶ Once felled, logs and branches to be retained for rehabilitation will be cut or broken into manageable lengths or coarsely mulched and placed on areas undergoing progressive rehabilitation or stockpiled for later use.
- ▶ No vegetation is to be burnt or removed from the site other than that to be used for firewood or commercial timber.
- ▶ No wood piles will be located within 100m of infrastructure to assist in bushfire management.
- ▶ Vegetation stockpiles will be kept manageable to assist in bushfire management.

#### ***Erosion and Sediment Control***

- ▶ Soils will be placed and stockpiled in accordance with Section 9 (Stockpiling) of this EMS.
- ▶ Works will be planned so that, where practicable, the amount of time that soils are exposed to the forces of erosion is minimised.
- ▶ Sediment fencing (in accordance with the Erosion and Sediment Control Plan in Appendix E) will be installed at the downhill edge of cleared areas and in other areas of potential erosion to retain the coarse sediment fraction.
- ▶ Soils will only be handled when they are moist (not wet, nor dry) to minimise the risk of soil structural decline.

#### ***Air Quality***

- ▶ Water sprays and water trucks will be utilised in all areas of potential dust lift-off.
- ▶ Soils will be stripped only when they are moist enough to preserve their structure and not cause excessive dust generation.
- ▶ During windy weather, unprotected areas (including haul roads) will be kept moist (not wet) by sprinkling with water to reduce wind erosion (or use an alternative spray-applied wind-erosion control measure).

### **5.3 Monitoring and Reporting**

The Vegetation Removal and Soil Stripping Record Sheet (attached as Appendix K) has been developed to assist with the preparation and submission of the Annual Environmental Management Report (AEMR) and the independent environmental audit required by the Project Approval. This record sheet is to be filled out prior to any vegetation removal. Completed record sheets are to be filed in a suitable location to facilitate the reporting, auditing, and “access to information” requirements specified in the Project Approval.



Any vegetation removal or soil stripping operations within the area marked as “area to be monitored” in Figure 16-2 (refer also to Appendix L) will be monitored by representatives of the Nowra LALC and Durgan Consultancy.

In addition, noise, air, landscape and biodiversity, and erosion and sediment control monitoring and recording (in accordance with Section 14 and 15 of this EMS) is to be undertaken and records kept.

## 6. Soil Placement and stockpiling (post-stripping)

### 6.1 Description of Activity

Soils derived from the stripping operations are to either be placed directly on to areas undergoing progressive filling and rehabilitation or stockpiled for later use. Placement and compaction of this material is to be undertaken as described in the SEEC Morse McVey (2007) report

### 6.2 Environmental Management and Safeguards

All post soil-stripping stockpiling operations are to be undertaken in accordance with the following plans:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix D);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H); and
- ▶ Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to any soil placement and stockpile operations. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 6.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 6-1 below along with the controls, monitoring and reporting mechanisms that are to be undertaken to mitigate these risks. Further details are described in subsequent sections.

**Table 6-1 Soil Placement and Stockpiling Key Environmental Issues and Risks**

Issue	Risk/s	Controls
Noise	Complaints from adjacent community	<ul style="list-style-type: none"> <li>▶ Complaints register and response</li> <li>▶ Hours of operations restrictions</li> <li>▶ Use of noise-mitigated mobile and processing equipment</li> <li>▶ Implementation of environmental safeguards identified below</li> </ul>

Issue	Risk/s	Controls
Air quality	Complaints from adjacent community Excessive dust generation Dust and particulates may result in health issues.	<ul style="list-style-type: none"> <li>Utilisation of water sprays, mist sprays and wind sheltering equipment.</li> <li>Implementation of environmental safeguards identified below</li> </ul>
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	<ul style="list-style-type: none"> <li>Implementation of environmental safeguards identified below.</li> </ul>

### 6.2.2 General Restrictions

The following general restrictions apply to any post soil-stripping placement and stockpiling operations undertaken at the quarry:

- Native vegetation and soils within the Biodiversity Offset Areas (as shown in Figure 16-1 and Appendix L) will not be impacted by any soil stockpiling activities.
- Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- All mobile equipment is to be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferential.
- Frequency modulated reversing alarms on mobile equipment will be progressively installed.

### 6.2.3 Operations

#### **Air Quality**

- Water sprays and water trucks will be utilised in all areas of potential dust-lift off to minimise dust emissions.
- A maximum speed limit of 10 km/hour is to be maintained within the quarry site.
- Wherever possible, soil is to be placed directly on areas undergoing progressive rehabilitation. The environmental management measures for rehabilitation of soils detailed in Section 13 of this EMS apply.

#### **Erosion and Sediment Control**

- In all areas subject to disturbance and requiring permanent vegetative stabilisation, topsoil and subsoil will be replaced to a minimum depth of 250 mm and 200 mm respectively.
- Following placement of subsoil materials, the surface will be left in a loose, rough condition to promote moisture infiltration and the keying-in of the topsoil layer.
- Topsoil will be left in a scarified or ploughed condition once replaced to help moisture infiltration and reduce the risk of soil erosion.

- ▶ Compaction of recently topsoiled areas will be avoided, and barrier fencing will be established if necessary to keep vehicles out.
- ▶ Works will be planned so that, where practicable, the amount of time that soils are exposed to the forces of erosion is minimised.
- ▶ In situations where direct placement of stripped soils is not possible, soils will be stockpiled in accordance with Section 9 of this EMS.
- ▶ Soils will only be handled when they are moist (not wet, nor dry) to minimise the risk of soil structural decline.

### **6.3 Monitoring and Reporting**

Noise, air, landscape and biodiversity, and erosion and sediment control monitoring and reporting (in accordance with Sections 14 and 15 of this EMS) will be undertaken.

## 7. Drilling and Blasting

### 7.1 Description of Activity

Drilling activities will be undertaken using a hydraulic drill rig which will drill vertical holes of the same length or slightly greater than the proposed face height (approximately 10 m). The drill rig will be equipped with dust and noise suppression equipment, including dust aprons, dust extraction equipment and sound dampened engine compartments. The drilling pattern will be determined by a suitably qualified and experienced blasting engineer to meet specified blasting criteria.

Blasting is to be undertaken by a suitably qualified and experienced blasting engineer or shot-firer. Typically each blast will break between 12,000 and 24,000 bank cubic metres of shale material. Explosives will continue to be brought to the site on the day of the blast by the blasting operator. No explosives are to be stored on the site.

### 7.2 Environmental Management and Safeguards

All drilling and blasting operations are to be undertaken in accordance with the Quarry's Noise Monitoring Program/Blast Management Plan (attached as Appendix D). The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to any drilling and blasting operations. In the event of an inconsistency, the plan (as attached) shall prevail.

All drilling and blasting operations are also to be undertaken in accordance with the following plans:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix D); and
- ▶ Air Quality Management Plan (attached as Appendix I).

#### 7.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 7-1 below along with the controls, monitoring and reporting mechanisms that will be undertaken to mitigate these risks. Further details are described in subsequent sections.

**Table 7-1 Drilling and Blasting Key Environmental Issues and Risks**

Issue	Risk	Controls
Fly-rock	Broken rock could be projected in an unexpected manner towards persons, equipment or buildings.	<ul style="list-style-type: none"> <li>Each blast will be designed to contain all fly-rock within the nominated blast envelope</li> <li>Blasting will be undertaken by appropriately qualified and experienced blasting engineer or shot-firer</li> <li>Implementation of environmental safeguards identified below.</li> </ul>
Noise and vibration	Structural damage and community complaints	<ul style="list-style-type: none"> <li>Complaints register and responses</li> <li>Noise and vibrations register</li> <li>Community and neighbour consultation</li> <li>Implementation of environmental safeguards identified below.</li> </ul>
Air quality	Dust and particulates	Dust suppression techniques and implementation of the environmental safeguards identified below.

### 7.2.2 Preparatory Activities for Blasting

Prior to blasting, the following activities will occur:

- Suitable arrangements will be made with land owners or tenants on private land within 200 m of the blast site in order to minimise the risk of flyrock-related impact to life and property. These arrangements will be submitted for approval to the Director-General prior to any blasting.
- Appropriate arrangements with the owners and occupiers of 243 Princes Highway will be arranged.
- The following people will be notified on the working day prior to the blast being initiated:
  - Shoalhaven City Council
  - NSW Police
  - NSW Roads and Traffic Authority
  - The resident of 243 Princes Highway
  - EPA (of the DECCW)
  - The South Coast Correctional Facility
- All mobile equipment is to be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferential.
- Frequency modulated reversing alarms on mobile equipment will be progressively installed.

### **7.2.3 General Restrictions**

- ▶ Standard hours of operations, as specified in the Project Approval (attached as Appendix A) and Section 14.4, will be observed for drilling activities.
- ▶ Blasting hours of operation, as specified in the Project Approval (attached as Appendix A), will be observed as described below:
  - Monday to Friday: 9:00 am to 3:00 pm
  - Saturday, Sunday and Public Holidays: No blasting
  - Note: Only one blast per week is permitted. In the case of documented misfire, a second blast within the week may be carried out.

### **7.2.4 Operation**

#### ***Blasting Requirements***

- ▶ All drilling and blasting-related activities will be supervised by a suitably qualified and experienced blasting engineer or shot-firer. Blasting is to be designed to:
  - Achieve the required degree of fragmentation
  - Satisfy all environmental criteria (especially noise and vibration, refer to Section 14)
  - Contain all blast flyrock within the nominated blast envelope

#### ***Air Quality***

- ▶ Dust aprons, dust extraction systems and/or water injections or sprays will be used during drilling operations.
- ▶ All blast holes will be adequately stemmed with aggregates.

## **7.3 Monitoring and Reporting**

The Blast Design Record Sheet (attached as Appendix K) has been developed to assist with the preparation and submission of the Annual AEMR, the Annual Return Documents required by the EPL, and the independent environmental audit required by the Project Approval. This record sheet is to be filled out prior to drilling and blasting.

Completed record sheets are to be stored and filed in a suitable location to facilitate the reporting, auditing, and “access to information” requirements specified in the Project Approval and EPL.

A register of complaints in accordance with Section 3 of this EMS is also to be kept after each blasting event. On the basis of the noise, vibration, and complaints monitoring subsequent blast designs, mitigation measures and operating procedures may need to be modified (if necessary). The register is to be stored in the SCCCR main office in accordance with the EPL and the Community Consultation Strategy (as described in Section 3).

Air monitoring and reporting, in accordance with Section 14 and 15 of this EMS, will be undertaken.

## 8. Extraction, Importing and Processing

### 8.1 Description of Activity

Following blasting, fragmented material will be directly loaded into the mobile crushing and processing plant using an excavator. The excavator will then load extracted, recycling and blending materials into the crushing and processing plant in the appropriate proportions to produce quarry products with the required specifications.

The mobile processing plant will be located immediately adjacent to the active extraction area to allow an excavator to directly load extracted, recycling and blending materials in appropriate proportions into one or more primary jaw crushers. A proportion of the crushed material will require further processing and will be stockpiled for use as select fill or other purposes. The remaining crushed material will be transferred to the secondary cone crusher for further crushing and shaping and then a screening plant for final sizing.

Each component of the mobile crushing plant will continue to be equipped with dust and noise suppression equipment to limit the generation of airborne dust and reduce the potential for adverse noise impacts on the surrounding community.

### 8.2 Environmental Management and Safeguards

All vegetation removal and soil stripping operations are to be undertaken in accordance with the following plans and programs:

- Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- Erosion and Sediment Control Plan (attached as Appendix E); and
- Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to any land preparation, vegetation removal or soil stripping operations. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 8.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 8-1 below along with the controls, monitoring and reporting mechanisms that are to be undertaken to mitigate these risks. Further details are described in subsequent sections.

**Table 8-1 Extraction, Importing and Processing Key Environmental Issues and Risks**

Issue	Risk/s	Controls
Noise	Complaints from community	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Use of noise-mitigated mobile and processing equipment</li> <li>Implementation of environmental safeguards identified below</li> </ul>
Air quality	Complaints from adjacent community Excessive dust generation Dust and particulates may result in health issues.	<ul style="list-style-type: none"> <li>Utilisation of water sprays, mist sprays and wind sheltering equipment.</li> <li>Implementation of environmental safeguards identified below</li> </ul>
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	<ul style="list-style-type: none"> <li>Implementation of environmental safeguards identified below.</li> </ul>
Traffic	Complaints from community Excessive dust generation	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Implementation of environmental safeguards identified below.</li> </ul>

### 8.2.2 General Restrictions

The following general restrictions apply to any extraction, importation and processing operations undertaken within the quarry:

- All activities will be limited to the area required for extraction-related activities for the next 12 months. The boundaries will be clearly marked and no additional areas of vegetation and soils will be disturbed or removed.
- Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- All processing operations will be undertaken within the deepest section of the quarry.
- All mobile and processing equipment will be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferential.
- Frequency modulated reversing alarms on mobile equipment will be progressively installed.

### **8.2.3 Operations**

#### ***Air Quality***

A combination of some and/or all of these measures will be used during operation:

- ▶ Water sprays and water trucks will be used in all areas of potential dust-lift off to minimise dust emissions.
- ▶ Efficient mist sprays and wind sheltering equipment will be used on processing equipment.
- ▶ A maximum speed limit of 10 km/hour is to be maintained within the quarry site.
- ▶ A chemical dust lift-off suppression system will be used with mobile processing plants.

#### ***Erosion and Sediment Control***

- ▶ Quarry products and material to be processing into quarry products will be stockpiled, as far as practicable, within the processing and extraction area. The management measures for stockpiles as detailed in Section 9 of this EMS will be applied.
- ▶ Soils will only be handled when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.

### **8.3 Monitoring and Reporting**

Noise, air quality and erosion and sediment control monitoring and reporting (in accordance with Section 14 and 15 of this EMS) will also be undertaken.

## 9. Stockpiling

### 9.1 Description of Activity

The following materials are likely to be stockpiled:

- ▶ Virgin Excavated Natural Material (VENM) for blending and processing into quarry products
- ▶ VENM, top-soil, subsoil and weathered shale for quarry backfilling operations
- ▶ Blending materials, such as crusher dust and road base, for processing into quarry products
- ▶ Recyclable materials, such as select construction waste, concrete and bitumen for processing and blending into quarry products
- ▶ Quarry products

As far as practicable, all stockpiling will be undertaken within the extraction area.

### 9.2 Environmental Management and Safeguards

All stockpiling operations will be undertaken in accordance with the following plans:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H); and
- ▶ Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to and whilst undertaking stockpile. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 9.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 9-1 below along with the controls, monitoring and reporting mechanisms that will be undertaken to mitigate the risks. Further details are described in subsequent sections.

**Table 9-1 Stockpiling Key Environmental Issues and Risks**

Issue	Risks	Controls
Noise	Complaints from adjacent community	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Use of noise-mitigated mobile equipment</li> <li>Implementation of environmental safeguards identified below.</li> </ul>
Air quality	Complaints from adjacent community  Excessive dust generation  Dust and particulates may result in health issues.	<ul style="list-style-type: none"> <li>Use of water sprays, mist sprays and wind sheltering equipment.</li> <li>Implementation of dust suppression techniques and implementation of the environmental safeguards identified below.</li> </ul>
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.

### 9.2.2 General Restrictions

The following general restrictions apply to any stockpiling operations undertaken within the quarry:

- Native vegetation and soils within the Biodiversity Offset Areas (refer to Figure 16-1 and Appendix H) will not to be impacted by any stockpiling activities.
- Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- Surface water and sediment and erosion controls will be installed prior to or during soil stockpiling activities in accordance with the *Erosion and Sediment Control Plan* (attached as Appendix E).
- All mobile equipment will be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferred.
- Progressively install frequency modulated reversing alarms on mobile equipment.

### 9.2.3 Operations

#### **Air Quality**

- Water sprays and water trucks will be used in all areas of potential dust-lift off to minimise dust emissions.
- A maximum speed limit of 10 km/hour is to be maintained within the quarry site.

- ▶ Soils will be handled only when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.

#### ***Erosion and Sediment Control***

- ▶ Quarry products and material to be processed into quarry products will be stockpiled, as far as practicable, within the processing and extraction area (refer to Section 9).
- ▶ Non-recyclable wastes (e.g. from construction materials) will be extracted and disposed of at a licensed waste facility.
- ▶ Wherever possible, soil and VENM is to be placed directly on areas undergoing progressive rehabilitation. Soil placement procedures outlined in Section 13 of the EMS are to be followed.
- ▶ Topsoil and subsoil will be stockpiled separately and the details of each stockpile recorded appropriately.
- ▶ In situations where direct placement of topsoil is not possible, topsoil will be stockpiled in accordance with the following:
  - Any soil stockpiles will be located at least 2 m from existing vegetation, areas of likely concentrated or high-velocity surface water flows (e.g. creeks, swales, diversion drains etc.), and roads and other hazardous areas such as the margins of the extraction area.
  - Topsoil and subsoil stockpiles will be low (less than 2 m high), flat, elongated mounds with side slopes no steeper than 1(V):2(H) on eastern and southern faces and 1(V):3(H) on western and northern faces. Wherever practicable, top soil stockpiles will be less than 1m high.
  - A sediment fence, approximately 1m from the toe of the downslope side of soil stockpiles is to be erected.
  - Any soil stockpiles anticipated to be in place for more than ten days will be stabilised through the application of mulched or broken vegetation, hydro-seeding, hydro-mulching or equivalent.
  - Any stockpiled soil material is to be utilised for rehabilitation-related operations within six months of stripping and stockpiling.
- ▶ Plan works so that, where practicable, the amount of time that soils are exposed to the forces of erosion is minimised.

### **9.3 Monitoring and Reporting**

Noise, air quality, erosion and sediment control, and landscape and biodiversity management monitoring and reporting (in accordance with Section 14 and 15 of this EMS) will be undertaken.

## 10. Loading, Dispatch and Transportation

### 10.1 Description of Activity

Quarry product is to be loaded and dispatched using road registered heavy vehicles. An average of approximately 300,000 tonnes per year, to a maximum of approximately 500,000 tonnes per year, of quarry products will be dispatched from the site.

### 10.2 Environmental Management and Safeguards

All quarry product loading, dispatch and transportation operations will be undertaken in accordance with the following plans and programs:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E); and
- ▶ Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to undertaking any loading, dispatch or transportation. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 10.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 10-1 below along with the controls, monitoring and reporting mechanisms that are to be undertaken to mitigate these risks. Further details are described in subsequent sections.

**Table 10-1 Loading, Dispatch and Transportation Key Environmental Issues and Risks**

Issue	Risk	Controls
Noise	Complaints from adjacent community	<ul style="list-style-type: none"> <li>▶ Complaints register and response</li> <li>▶ Hours of operations restrictions</li> <li>▶ Use of noise-mitigated mobile and processing equipment</li> <li>▶ Implementation of environmental safeguards identified below</li> </ul>
Air quality	Dust and particulates	<ul style="list-style-type: none"> <li>▶ Dust suppression techniques and implementation of the environmental safeguards identified below.</li> </ul>

Issue	Risk	Controls
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	<ul style="list-style-type: none"> <li>Implementation of environmental safeguards identified below.</li> </ul>
Traffic	Complaints from community Excessive dust generation	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Implementation of environmental safeguards identified below.</li> </ul>

### 10.2.2 General Restrictions

- ▶ All mobile equipment will be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels is preferred.
- ▶ Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- ▶ Frequency modulated reversing alarms on mobile equipment will be progressively install.

### 10.2.3 Operations

#### *Air Quality*

- ▶ Water sprays and water trucks will be used in all areas of potential dust lift-off.
- ▶ Operation of a wheel-wash facility, to limit tracking of material onto the Princes Highway;
- ▶ A maximum speed limit of 10 km/hour is to be maintained within the quarry site.
- ▶ The creation of minor roads and access tracks will be minimised.

#### *Erosion and Sediment Control*

- ▶ The width of haul roads will be limited to that which is safe for heavy vehicle passage to minimise soil erosion hazards.
- ▶ During windy weather, unprotected areas (including haul roads) will be kept moist (not wet) by spraying with water to reduce wind erosion (or use an alternative spray-applied wind-erosion control measure).

## 10.3 Monitoring and Reporting

Noise, air quality, and erosion and sediment control monitoring and reporting (in accordance with Section 14 and 15 of this EMS) will be undertaken.

## 11. Importation and use of Virgin Excavated Natural Material (VENM)

### 11.1 Description of Activity

VENM is to be imported to the site for processing and blending to produce quarry products. VENM not used to make quarry products will also be placed within the 'exhausted' extraction area for rehabilitation purposes and to ultimately establish a final landform which mimics the pre-extraction landform.

### 11.2 Environmental Management and Safeguards

Importation and use of VENM is to be undertaken in accordance with the following plans:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H); and
- ▶ Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to the importation of VENM. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 11.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 11-1 below along with the controls, monitoring and reporting mechanisms that will be undertaken to mitigate these risks. Further details are described in subsequent sections.

**Table 11-1 Importation and Use of VENM Key Environmental Issues and Risks**

Issue	Risk	Controls
Contaminated materials	Importation of contaminated soils to site and materials originating from industrial, commercial, mining or agricultural activities, manufactured chemicals and sulphidic ores or soils.	VENM confirmation, certification and record procedures and implementation of environmental safeguards identified below.
Air quality	Dust and particulates degrading water quality.	Dust suppression techniques and implementation of the environmental safeguards identified below.
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.

Issue	Risk	Controls
Traffic	Complaints from community Excessive dust generation	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Implementation of environmental safeguards identified below.</li> </ul>

### 11.2.2 General Restrictions

The following general restrictions apply to the importation and use of VENM:

- Surface water and sediment and erosion controls for the importation, stockpiling, and use of VENM will be implemented in accordance with the Quarry's Erosion and Sediment Control Plan (attached as Appendix E).
- Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- The use of VENM as part of the rehabilitation process will be restricted to the use of VENM as defined in the NSW *Protection of the Environment Operations Act 1997*, i.e.:

*Natural material (e.g. clay, gravel, sand, soil and rock) that is not mixed with any waste that:*

- a) *has been excavated from areas that are not contaminated, as the result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphidic ores or soils, or*
  - b) *consists of excavated natural materials that meet such criteria as may be approved by the EPA"*
- All mobile equipment will be maintained in accordance with the manufacturer's specifications. The selection of equipment with lower sound power levels over higher sound power levels will be preferred.
  - Frequency modulated reversing alarms on mobile equipment will be progressively install.

### 11.2.3 Certificate and Receipt Procedures

- All imported VENM will be certified at its source and certification verified by the Mine Manager (or delegated authority) on receipt in accordance with relevant guidelines current at the time of VENM importation. This is likely to include a visual inspection for signs of contamination and the presence of any other waste material.
- A VENM certification sheet (referred to in Section 11.3 and attached as Appendix K) will be prepared, dated and signed by the person certifying the material.
- The history of the site from which the material is to be excavated will be determined and recorded on the VENM certificate sheet. The following procedures will be implemented depending on the previous land uses (Corkery and City Plan Services 2009):

- Where the site has been used for commercial, industrial, mining or agricultural purposes at any time, or if the site contains fill material, or there is potential for chemical contamination from past or current uses, a testing regime will be implemented to establish that the material sourced from the site can be classified as VENM.
- Where the site is, and has always been, used for residential or agricultural purposes then excavated material from the site, with the exception of surface layers that may be contaminated with physical debris, vegetation, chemicals, fertilisers or asbestos, will be presumed to be classified as VENM.
- ▶ Upon arrival, the Mine Manager (or delegated authority) will require the drivers delivering the VENM material to complete and sign a VENM record sheet. The Mine Manager (or delegated authority) will direct the driver to the receipt where the load will be inspected to ensure it corresponds with the description of the material included on the certificate sheet before it is accepted.
- ▶ Any unsuitable loads (*i.e.* loads that do not meet the description of VENM) will not be accepted and the supplier/driver will be advised to deliver the load to a licensed waste facility.

#### **11.2.4 VENM Stockpiling**

- ▶ When VENM is being processed, it will be placed in the stockpiling and processing area. The environmental management measures for stockpiles detailed in Section 9 of this EMS will be applied.
- ▶ All surface waters will be diverted into the water storage or sump within the extraction area.

#### **11.2.5 VENM Placement and Compaction**

When VENM is to be used to backfill the quarry, the following procedures will be undertaken:

- ▶ Compaction of VENM will not occur within approximately 3.5 m of the proposed final landform (refer to Figure 16-4 and Appendix L).
- ▶ Between approximately 3.5 m and 1.0 m of the final landform VENM comprising weathered material is to be placed without compaction.
- ▶ Between 1.0 and 0.5 below the final landform, weathered shale material will be placed without compaction.
- ▶ Sub-soil and top-soil will be placed over the VENM/weathered shale in accordance with the Landscape and Biodiversity Management Plan (attached as Appendix H).
- ▶ Soils will be handled only when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.

#### **11.2.6 VENM On-site Operations**

- ▶ Water sprays and water trucks will be used in all areas of potential dust lift-off to minimise potential dust emissions.
- ▶ A maximum speed limit of 10 km/hour will be maintained within the quarry site.
- ▶ The width of haul roads will be limited to that which is safe for heavy vehicle passage to minimise soil erosion hazards.

#### **11.3 Monitoring and Reporting**

During all VENM importation operations, records will be kept for each site where imported VENM is to be sourced and for each load of material received. VENM Certificate Record Sheets templates are provided in Appendix K to record each delivery of VENM (and the necessary information). Record sheets must be filled out at the source of VENM for transport to the quarry, and at the quarry for the receiving of VENM. Completed record sheets are to be stored and filed in a suitable location to facilitate the reporting, auditing, and “access to information” requirements specified in the Project Approval and EPL.

Noise, air quality, landscape and biodiversity, and erosion and sediment control monitoring and reporting (in accordance with Section 14 and 15 of this EMS) will be undertaken.

## 12. Soil and Water Management and Use

### 12.1 Description of Activity

The surface waters within the quarry are controlled by the perimeter bunds and site topography. Surface waters from the undisturbed areas are diverted to Nowra Creek.

In the more disturbed sections of the quarry site (extraction and other operational areas), surface waters, and groundwater seepage within the extraction area, will drain into a sump within the active extraction area or in the water storage facility. This water, which is not permitted to flow directly off-site, will be used for dust suppression and rehabilitation. Irrigation areas will also be established within the undisturbed and rehabilitation areas to remove excess water within the water storage facility and to facilitate rehabilitation processes.

### 12.2 Environmental Management and Safeguards

The management of soils and water, and the use of surface and groundwater is to be undertaken in accordance with the following plans:

- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F); and
- ▶ Site Water Balance Report (attached as Appendix G).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed for quarry soil and water management and use and will be reviewed regularly. In the event of an inconsistency, the plan (as attached) shall prevail.

#### 12.2.1 Key Environmental Issues and Risks

The key issues and risks related to this activity are listed in Table 12-1 below along with the controls, monitoring and reporting mechanisms that will be undertaken to mitigate the risks. Further details are described in subsequent sections.

**Table 12-1 Soil and Water Management and Use Key Environmental Issues and Risks**

Issue	Risk	Controls
Groundwater	Extraction operations intercept aquifer.	Water diversion into sump and water storage facility to be used for irrigation or for extraction-related purposes.  Obtain Aquifer Interference Approval and Water Access Licence from the NSW Office of Water (refer to Section 2 of this EMS).

Issue	Risk	Controls
Surface water	Discharge of sediment laden water into Nowra creek.	Surface water diversion structures, sediment containment structures, water storage areas, irrigation systems implementation of the environmental safeguards identified below.
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.

### 12.2.2 General Requirements

The following general restrictions apply to the management and use of surface and groundwater:

- ▶ Contractors will ensure that all soil and water management works as instructed in this document and following the guidelines in the *Guideline Soils and Construction Managing Urban Stormwater* (Landcom 2004) as described in the attached Erosion and Sediment Control Plan (Appendix E).
- ▶ Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- ▶ All workers will be informed of their responsibility for minimising the potential for soil erosion and pollution to downstream areas.
- ▶ Ongoing changes will be made to this EMS and Erosion and Sediment Control Plan (Appendix E) as works proceed, taking into consideration the area of disturbance at any one time.
- ▶ All erosion and sediment control works will remain in place until lands are rehabilitated and successfully stabilised.
- ▶ Surface water and sediment and erosion controls will be installed prior to or during vegetation removal or soil stripping activities in accordance with the Erosion and Sediment Control Plan (Appendix E).

### 12.2.3 Erosion and Sediment Control

The following erosion and sediment control measures will be implemented during the life of the Project:

- ▶ The soil erosion hazard on the site will be kept as low as practical by minimising the overall area of disturbance. This will be achieved by the following.
  - Works will be staged so that only lands to be quarried in the following 12 months are cleared and stripped.
  - Access will be limited to minimise the area of disturbance and limit the amount of land requiring regular applications of water for dust-control.

- The width of the haul roads will be limited to that which is safe for heavy vehicle passage.
- Barrier fencing (note that this can simply be tape wound around star pickets) will be established to delineate no-go areas (i.e. areas that are outside of the regular works zone at that time) and minimise the risk of accidental entry.
- ▶ Works will be planned so that, where practicable, the amount of time that soils are exposed to the forces of erosion is minimised.
- ▶ Stockpiles will be constructed and managed according to Section 9 of this EMS.
- ▶ Lands cleared for the following 12 months of quarrying operations will be stripped within 10 days of vegetation clearing occurring or else a temporary cover will be applied to lower C-factors to 0.1 within 20 days (refer to Table 1 of the Erosion and Sediment Control Plan (Appendix E)). Measures to ensure that the C-factor is not exceeded are provided in the Erosion and Sediment Control Plan (Appendix E).
- ▶ During windy weather, unprotected areas (including haul roads) will be kept moist (not wet) by sprinkling with water to reduce wind erosion (or use an alternative spray-applied wind-erosion control measure).
- ▶ Soils will be handled only when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.
- ▶ Sediment fencing will be installed along the toe of any newly formed perimeter bunds, at the downhill edge of cleared areas and in other areas of potential erosion to retain the coarse sediment fraction.
- ▶ Areas of localised soil erosion will be identified and appropriate preventive measures implemented, as outlined in the Erosion and Sediment Control Plan (Appendix E).
- ▶ Any areas of localised poor drainage will be identified and appropriate remedial action taken, as outlined in the Erosion and Sediment Control Plan (Appendix E).
- ▶ Sediment removed from any trapping device will be disposed of within the area of active backfill within the Extraction Area.
- ▶ Waste receptacles will be emptied as necessary. Non-processed wastes will be disposed of at an approved facility.

#### **12.2.4 Water Management**

The following water management measures will be implemented during the life of the Project.

- ▶ Runoff from the undisturbed areas in the south of the site (mostly “clean”) will be diverted into local watercourses with a minimum of treatment.
- ▶ Potentially sediment-laden runoff from cleared areas (i.e. those lands to be quarried in the following 12 months) is to be diverted into sediment retention structures. Note that sediment basin(s) can be sited in the quarry pit if so desired and runoff directed into it. Sediment

retention structure and sediment basin(s) will be constructed in accordance with the Erosion and Sediment Control Plan (Appendix E).

- ▶ Basic diversion drains, earth bank diversions, temporary earth diversion drains, berms and pipes will be installed as required, and in accordance with the Erosion and Sediment Control Plan (Appendix E)
- ▶ Water for dust suppression and processing will be drawn primarily from the storage pond (i.e. when sufficient volume is available).

### **12.3 Monitoring and Reporting**

Erosion and sediment control, and surface water and groundwater monitoring and reporting (in accordance with Section 14 and 15 of this EMS) will be undertaken.

The NSW Office of Water (NOW) has requested that annual reports also be referred to NOW for consideration and review.

## 13. Rehabilitation

### 13.1 Description of Activity

Areas no longer required for extraction-related activities will be rehabilitated in order to minimise the risk of erosion and sedimentation on the environment surrounding the Project Site. Short term rehabilitation activities will include the stabilisation of all earthworks, drainage lines and disturbed areas.

Low maintenance, stable and safe landform that mimics the pre-extraction landform will be progressively applied as part of longer term rehabilitation objectives. These works will include the re-establishment of land capabilities through the establishment of vegetation communities similar to communities in relatively undisturbed areas adjacent to and surrounding the Project Site.

### 13.2 Environmental Management and Safeguards

All vegetation removal and soil stripping operations will be undertaken in accordance with the following plans and programs:

- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H); and
- ▶ Air Quality Management Plan (attached as Appendix I).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and prior to any land preparation, vegetation removal and soil stripping. In the event of an inconsistency, the plan (as attached) shall prevail.

**Table 13-1 Rehabilitation Key Environmental Issues and Risks**

Issue	Risk	Controls
Surface water	Discharge of sediment laden water into Nowra creek.	Surface water diversion structures, sediment containment structures, water storage areas, irrigation systems implementation of the environmental safeguards identified below.
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.
Weed incursion	Introduction and/or spread of weeds.	Implementation of environmental safeguards identified below.

Issue	Risk	Controls
Contaminated materials	Importation of contaminated soils to site and materials originating from industrial, commercial, mining or agricultural activities, manufactured chemicals and sulphidic ores or soils.	VENM confirmation, certification and record procedures and implementation of environmental safeguards identified below.
Air quality	Dust and particulates degrading water quality.	Dust suppression techniques and implementation of the environmental safeguards identified below.
Erosion and sedimentation	Pollution of Nowra Creek degrading water quality.	Implementation of environmental safeguards identified below.
Traffic	Complaints from community Excessive dust generation	<ul style="list-style-type: none"> <li>Complaints register and response</li> <li>Hours of operations restrictions</li> <li>Implementation of environmental safeguards identified below.</li> </ul>

### 13.2.1 General Requirements

- Standard hours of operations, as specified in the Project Approval and Section 14.4, will be observed.
- Progressively rehabilitate disturbed areas as works are completed. Sediment control structures will remain in place until rehabilitated lands have successfully stabilised and will be removed at the end of the quarry's operation.
- Clearly visible barriers will be installed to limit access to the rehabilitation areas.
- Rehabilitation works to take place sequentially south of the water storage facility will be undertaken in accordance with the Landscape and Biodiversity Management Plan (attached as Appendix H).
- The control of weeds and pests will be undertaken in accordance with the Landscape and Biodiversity Management Plan (attached as Appendix H).

### 13.2.2 Operations

#### Placement of Soils

- Soils will be handled only when they are moist (neither wet, nor dry) to minimise the risk of soil structural decline.
- In all areas subject to disturbance and requiring permanent vegetative stabilisation, topsoil and subsoil will be replaced to a minimum depth of 250 mm and 200 mm respectively, following the completion of placement activities and the constructed landform.
- Following placement of subsoil materials, the surface will be left in a loose, rough condition to promote moisture infiltration and the keying-in of topsoil layer.

- ▶ Topsoil will be left in a scarified or ploughed condition once replaced to help moisture infiltration and reduce the risk of soil erosion.
- ▶ Compaction of recently topsoiled areas will be avoided, and barrier fencing will be established if necessary to keep vehicles out.
- ▶ Final landscaping will be undertaken as soon as possible and within 15 working days from placement of topsoil in a particular area. This will include primary revegetation/mulching to provide a quick, temporary cover before a more permanent cover of native vegetation is established. The final contours will follow closely to those presented in Figure 16-4.

### **Revegetation**

- ▶ Seed for use during final revegetation operations will be collected in the vicinity, generally during summer and autumn. Collected seed will be broadcast over each area to be revegetated, generally during autumn.
- ▶ A temporary cover crop of suitable annual cereal species may be used on areas being revegetated with native species to give natives time to establish and help out-compete weeds. This will be used in conjunction with native mulch (stockpiled from clearing activities in the south of the site) to allow diversion of surface waters away from the extraction area.
- ▶ Selection of vegetation for direct planting and seeding will be in accordance with the Landscape and Biodiversity Management Plan (attached as Appendix H). This is particularly in reference to progressive rehabilitation of bunds, existing storage piles, future storage piles, and final site restoration.
- ▶ Tube stock may be planted to supplement direct seeding and natural revegetation.
- ▶ Species used during final revegetation will be a mixture of indigenous lower, mid and upper storey species.
- ▶ Supplementary planting and inoculation of native species will be undertaken if required (i.e. if the soil seed store is not adequate to re-establish native vegetation).
- ▶ Any areas of concentrated surface water flow will be stabilised with a suitable grass species (not Kikuyu) capable of withstanding concentrated flows. Reinforced turf is recommended for post-construction (i.e. final stabilisation) activities where the flow velocity will not exceed 1.8 m/s in the 100-year ARI storm event.
- ▶ Areas not satisfactorily revegetated will be investigated to determine the reason for failure. Appropriate remedial action, including replacing any lost topsoil and re-sowing the site will then be undertaken.
- ▶ Revegetation areas will be watered regularly until an effective cover has properly established and plants are growing vigorously. Extensive watering will be required to assist in the establishment of vegetation in rehabilitation areas if rainfall is insufficient to promote germination and growth. Adequate fertilising will also be maintained in revegetated areas.

#### ***Management of Remnant Vegetation***

- ▶ The stand of mature vegetation in the north-western section of ML6322 adjacent to Nowra Creek will be avoided. Earthen bunds will not be piled against the trunks of mature trees and the areas of native vegetation to be cleared will be clearly marked.
- ▶ The Southern Biodiversity Offset Area will be managed for at least the term of the lease of the land for the purposes of nature conservation and enhancement of the biodiversity values of the land. Specific biodiversity management measures to be implemented are provided in the Landscape and Biodiversity Management Plan (attached as Appendix H).
- ▶ To assist in the mitigation of bushfires, the siting of all fixed infrastructure (weighbridge and office) is to be more than 70 m from the boundary of mature vegetation.

#### ***Reducing Visual Impacts***

- ▶ The existing perimeter bund along the eastern, southern and western boundaries of the Project Site is to be retained and enhanced. The existing vegetated buffer within the Nowra Creek riparian zone will also be retained and enhanced to limit views of the Project Site from the South Coast Correctional Facility.
- ▶ The existing line of mature trees adjacent to the eastern Project Site boundary will be retained and enhanced, where appropriate. Additional planting of tubestock may be undertaken to augment natural revegetation. Soil from bunding is not to be placed against the trunks of trees.
- ▶ A high standard of housekeeping to achieve a visually attractive site is to be adopted. The Project Site is to be kept clean, tidy and rubbish free at all times.

#### ***Air Quality***

- ▶ Water sprays and water trucks will be used in all areas of potential dust lift-off.

### **13.3 Monitoring and Reporting**

Noise, air, landscape and biodiversity, and erosion and sediment control monitoring and recording (in accordance with Section 14 and 15 of this EMS) is to be undertaken and records kept.

## 14. Environmental Monitoring

### 14.1 Overview

This chapter addresses the environmental monitoring requirements for the quarry, which have been outlined in the following:

- Environmental Assessment (Corkery and City Plan Services 2009);
- Project Approval (Appendix A);
- Environment Licences and Approvals (Appendix B);
- Quarry's Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- Erosion and Sediment Control Plan (Appendix E);
- Surface Water and Groundwater Monitoring and Response Plan (Appendix F);
- Landscape and Biodiversity Management Plan (Appendix H);
- Air Quality Management Plan (Appendix I); and
- Aboriginal Heritage Management Plan (Appendix J).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and whilst undertaking environmental reporting activities. In the event of an inconsistency, the plan (as attached) shall prevail.

### 14.2 Record Sheets

Table 14-1 outlines the record sheets which will be completed when required (as indicated).

**Table 14-1 Summary of Record Sheets**

Record Sheet	When to be used	Where to be stored
Vegetation Removal and Soil Stripping Record Sheet	Every vegetation removal and soil stripping operation	Filed in a suitable location
Blast Design Record Sheet	Every drilling and blasting operation	Filed in a suitable location
VENM Source Certification Record Sheet	Each load retrieved at the VENM source.	Filed in a suitable location
VENM Receiving Certification Record Sheet	Each load of material received	Filed in a suitable location

The completion of these record sheets will assist with the preparation and submission of the AEMR and the independent environmental audit required by the Project Approval. Copies of record sheets are provided in Appendix K.

### **14.3 Blasting Monitoring Criteria and Levels**

#### **14.3.1 Methodology**

Blasting is to be designed to:

- ▶ Achieve the required degree of fragmentation;
- ▶ Satisfy all environmental criteria (especially noise and vibration, see below); and
- ▶ Contain all blast flyrock within the nominated blast envelope.

Blast emissions will be quantified using a portable blast emissions monitor (measurement of airblast and vibration) (refer to Appendix C), which will be positioned at the nearest potentially affected residences and other blast emission sensitive receivers to the plant operations as identified in the Project Approval. Blast monitoring instrumentation will be employed to meet the primary specifications presented in the Noise Monitoring Program/Blast management Plan (Appendix C).

The Blast Design Record Sheet (attached as Appendix K) is to be filled in for individual blast events.

#### **14.3.2 Location and Frequency**

A portable blast emissions monitor (to measure air blast and vibration) will be positioned at the following receivers (with reference to Table 1, Schedule 3 of the Project Approval) (refer to Appendix D and Figure 16-3 of Appendix L):

- a) At the South Coast Correctional Facility (Location 5); and
- b) At Location 1,2 or 4, depending upon which is closest to the blast; and
- c) At the nearest commercial premises (Commercial Premises A in Appendix 3 of the Project Approval); and
- d) At the nearest residence, if this residence is closer to the blast location than those identified in b).

#### **14.3.3 Specific Personnel**

All blasting-related activities will be supervised by a suitably qualified and experienced blasting engineer or shot-firer.

#### **14.3.4 Performance Targets**

Airblast overpressure levels and ground vibration level from blasting should not exceed the criteria in Table 14-2 and Table 14-3, respectively.

**Table 14-2 Airblast overpressure impact assessment criteria**

Receiver	Airblast overpressure level (dB(Lin Peak))	Allowable exceedances
Residential	115	5% of the total number of blasts in any 12 month period
South Coast Correctional Facility	120	0%
Commercial	125	0%

**Table 14-3 Ground Vibration Impact Assessment Criteria**

Receiver	Peak particle velocity (mm/s)	Allowable exceedances
Residential	5	5% of the total number of blasts in any 12 month period
South Coast Correctional Facility	10	0%
Commercial	25	0%

## 14.4 Noise Monitoring

### 14.4.1 Methodology

Intrusive noise emissions from quarrying, processing and transportation operations will be monitored by operator-attended noise measurements and recordings. The maximum ( $LA_{max}$ ) and the average ( $LA_{eq(15minute)}$ ) intrusive noise levels from quarrying and processing operations will be quantified and characterised over a 15 minute measurement period, as well as the overall levels of ambient noise.

During the attended noise measures, the operator will record any significant quarry generated noise sources and collect information regarding the operating equipment and machinery, as well as obtaining copies of the relevant fixed plant and mobile quarrying equipment operating shift logs.

### 14.4.2 Location and Frequency

Noise measurements will be carried out at the closest monitoring location identified in Table 14-4.

Intrusive noise levels and ambient noise will be monitored at the start of operations. Noise measurements will be conducted annually after all components of the project are operating. Noise monitoring may be discontinued if compliance with the nominated criteria is demonstrated at all four monitoring locations on three consecutive noise surveys.

### 14.4.3 Performance Targets

Standard hours of operation, as specified in the Project Approval, will apply, i.e.:

**Monday to Friday:** 7:00 am to 6.00 pm

**Saturday:** 7:00 am to 4:00 pm

**Sunday and Public Holidays:** No works

*Note: Maintenance activities may be conducted outside weekday hours provided that the activities are not audible at any privately-owned residence, or until 6:00 pm on Saturdays. This is subject to the approval of the Mine Manager.*

In accordance with the Project Approval, Noise emissions are not to exceed the criteria in Table 14-4.

**Table 14-4 Operational Noise Impact Assessment Criteria**

Location and Locality	Day $L_{Aeq}$ (15 min) (dBA)	Evening $L_{Aeq}$ (15min) (dBA)	Night $L_{Aeq}$ (15 min) (dBA)
1 - 80 Links Road	39	35	35
2 - 371 Old Southern Road	45	35	35
3 - 243 Princes Highway	49	38	38
4 - South Coast Correctional Facility	51	37	37

## 14.5 Meteorological Monitoring

### 14.5.1 Methodology

To assist in noise monitoring, the automatic weather station will be programmed to continuously record the meteorological parameters in Table 14-5.

**Table 14-5 Meteorological Measurement Parameters**

Measured Parameter	Unit	Sample Interval
Mean wind speed	km/hr (or m/s)	15 minute
Mean wind direction	Degrees	15 minute
Sigma-theta	-	15 minute
Aggregate rainfall	mm	15 minute
Mean air temperature	°C	15 minute
Mean relative humidity	%RH	15 minute

#### **14.5.2 Location and Frequency**

The weather station is to be located on-site. Records will be taken every 15 minutes.

#### **14.5.3 Performance Targets**

The weather station is to be configured with an alarm and/or telemetry notification system to advise the Mine Manager when winds exceed 8 m/s.

### **14.6 Air Quality Monitoring**

#### **14.6.1 Methodology**

Air quality is to be monitored through:

- ▶ Dust deposition monitoring using Dust Deposition Gauges (DDGs)
- ▶ Total Suspended Particulate (TSP) monitoring using High Volume Air Sampler (HVAS)
- ▶ Particulate Matter (PM<sub>10</sub>) monitoring using HVAS fitted with size selective inlet

Monitoring is to be carried out in accordance with the NSW DECCW document *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* and the Quarry's Air Quality Monitoring Program (attached as Appendix I).

#### **14.6.2 Location and Frequency**

Air quality monitoring locations are shown in Figure 16-3 of Appendix L.

Dust Deposition Gauges will be exposed for 30 days (+/- 2 days) to insoluble solids and ash residues. HVAS monitoring of TSP and PM<sub>10</sub> will be conducted on a one-day-in-six cycle for a period of at least one year and at maximum quarry throughput.

#### **14.6.3 Performance Targets**

Standard hours of operation, as specified in the Project Approval, will apply, *i.e.*:

**Monday to Friday:** 7:00 am to 6.00 pm

**Saturday:** 7:00 am to 4:00 pm

**Sunday and Public Holidays:** No works

*Note: Maintenance activities may be conducted outside weekday hours provided that the activities are not audible at any privately-owned residence, or until 6:00 pm on Saturdays. This is subject to the approval of the Mine Manager.*

Deposited dust levels should not exceed the maximum increase in deposited dust level as illustrated in Table 14-6. PM<sub>10</sub> levels should not exceed the 24-hour PM<sub>10</sub> criteria (Table 14-7) attributable to the Nowra Brickworks Quarry occur during this period. Long term impact assessment criteria for TSP matter and particulate matter should not exceed the annual criteria in Table 14-8.

**Table 14-6 Long term impact assessment criterion for deposited dust**

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

**Table 14-7 Short term impact assessment criterion for particulate matter**

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	50 µg/m <sup>3</sup>

**Table 14-8 Long term impact assessment criteria for particulate matter**

Pollutant	Averaging period	Criterion
TSP matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

## 14.7 Erosion and Sediment Control Monitoring

### 14.7.1 Methodology

During the Erosion and Sediment Control Monitoring, observation of the following will be noted:

- ▶ Removal of spilled soil or other materials from near hazard areas;
- ▶ Removal of trapped sediment from sediment fences;
- ▶ The stability of all sediment fences;
- ▶ Whether barrier fencing is maintained and exclusion zones are being observed by all site workers and contractors;
- ▶ Whether progressive and prompt rehabilitation of lands has effectively reduced the erosion hazard (and initiate upgrading or repair as appropriate);
- ▶ Whether additional erosion and/or sediment control works are necessary to ensure the desired water control is achieved, i.e. make ongoing changes to the Surface Water Management Plan; and
- ▶ Whether erosion and sediment control measures are in a functioning condition until such time as all earthwork activities are complete and the site is rehabilitated.

A rain gauge will be installed at the site and is to be monitored by the Mine Manager to determine the severity of any rain events.

All basin outlets will be checked for stability, as well as the operation of all pumps.

#### **14.7.2 Location and Frequency**

An internal auditing program to monitor erosion and sediment controls is to undertaken at the site. The Mine Manager will inspect the site at least fortnightly and maintain a log of inspections.

### **14.8 Landscape and Biodiversity Monitoring**

#### **14.8.1 Methodology**

Biodiversity Offset area monitoring of the Northern and Southern Biodiversity Offset areas will be undertaken, and will involve the observation of any negative impacts on these sites, together with photos taken at permanent photo points, which will be included in the AEMR.

Photos from photographic reference points will also be taken to document activities within the Project Site, including rehabilitation progress.

Areas undergoing rehabilitation will be monitored to determine the success or otherwise of the management, mitigation and ameliorative measures and the rehabilitation programs.

The annual weed inspection will enable weed control activities to be planned and implemented for the following 12 months.

Routine records are to be maintained for following activities:

- Species of weeds treated and the method and timing of control;
- Chemical and quantity used;
- Species of seed collected and timing of collection; and
- Species, quantities, methods and location of revegetation programs.

A Vegetation Removal and Soil Stripping Record Sheet (attached as Appendix K) will be filled out prior to any vegetation removal and soil stripping events.

VENM Certificate Record Sheets (attached as Appendix K) will be filled out at VENM source and receipt.

#### **14.8.2 Location and Frequency**

The following landscape and biodiversity monitoring will be implemented:

- Biodiversity Offset area monitoring on an annual basis for the Northern and Southern Biodiversity Offset areas;
- Rehabilitation areas will be monitored on a six month basis;
- Documentation of photographs from a set of photographic reference points will be taken on a six month basis within the Project Site, including rehabilitation progress; and
- Annual weed inspection within the operational area and biodiversity offset areas.

#### **14.8.3 Specific Personnel**

As part of Biodiversity Offset area monitoring, the Southern Biodiversity Offset area is to be monitored by the operators of the Nowra Correction Facility.

### **14.9 Aboriginal Heritage Monitoring**

#### **14.9.1 Methodology**

If any Aboriginal relics are located the following procedures are to be implemented:

- STEP 1: Stop all earth disturbing works
- STEP 2: Create buffer of 20m x 20m around the relic. No unauthorised entry of earth disturbance is to be permitted within the buffer zone
- STEP 3: Commission an archaeologist to assess the discovery and obtain necessary permits (to destroy, damage or move)

If an Aboriginal object or Aboriginal place is likely to be destroyed, damaged or defaced, an Aboriginal Heritage Impact Permit (AHIP) will need to be applied for under Section 90 of the *NPWS Act*.

#### **14.9.2 Location and Frequency**

Aboriginal heritage monitoring is required for every event where vegetation removal or soil stripping operations occur within the area marked as “area to be monitored” in Figure 16-2 (refer also to Appendix L).

#### **14.9.3 Specific Personnel**

Representatives of the Nowra LALC and Durgan Consultancy will be required to be present during vegetation removal or soil stripping operations within the area marked as “area to be monitored”.

## 14.10 Surface Water Monitoring

### 14.10.1 Methodology

Five locations (S1, S4, C1, C2 and C10) are the location of on-going monitoring and are shown in Figure 16-3 of Appendix L. Further sampling sites will be required within the new extraction areas (similar to the current extraction area sites S1 and S2) as the quarrying activities progress towards the southern boundary of the Project Site (Stage 5 of the project).

Five campaigns will be completed annually after significant rainfall events (i.e. 50 mm or more over 5 days or less) spread uniformly throughout the year.

### 14.10.2 Location and Frequency

Surface Water Monitoring is required to determine if the quarrying activities are causing possible water quality changes over time. All sampling campaigns will be conducted and reported in accordance with protocols discussed in ANZECC & ARMCANZ (2000).

At all locations, field water quality tests for pH, EC, DO, ORP and temperature will be completed. Laboratory testing and analysis of samples obtained from all locations will also be completed, and analytes will include pH, EC, TSS, major cations and anions, TKN, NO<sub>x</sub> nitrogen, ammonia nitrogen, Total-P, Reactive P, and metalloids. A list of the analytes to be monitored and tests as part of a long term monitoring framework will be determined after review of baseline data collected over the initial 12-month period.

Water samples collected from the piezometers will be stored in de-contaminated plastic bottles (charged with appropriate preservatives when required) supplied by a NATA-accredited testing laboratory. The collected samples will be stored at 4°C at all times prior to dispatch to a NATA-accredited laboratory for analysis.

### 14.10.3 Performance Targets

Trigger levels have been assigned, which when exceeded will indicate potential impact to the water quality of Nowra Creek, and are outlined in Table 14-9. Actions and follow-up actions, as outlined in the Surface Water and Groundwater Monitoring and Response Plan (Appendix F), will be required when trigger levels are exceeded.

**Table 14-9 Trigger Levels for Surface Water Quality**

Indicator	Trigger Levels
pH	A 'significant' decrease i.e. pH < 6.5 or a change of 1 pH unit is observed over the baseline data
EC	An increase of 20% or more than that observed in the background monitoring site (C1)
Cation/anion concentrations	An increase of 20% or more than that observed in the background monitoring site (C1)

Indicator	Trigger Levels
Nitrate nitrogen	0.7 mg/L
Ammonia nitrogen	0.9 mg/L
Total phosphorus	0.05 mg/L
Arsenic (III form)	0.94 mg/L
Arsenic (V form)	0.42 mg/L
Aluminium	0.080 mg/L
Zinc	0.015 mg/L
Dissolved iron	Insufficient data to set a guideline value based on health conditions

\* Derived from ANZECC & ARMICANZ (2000) for the protection of 90% of all freshwater species in slightly disturbed lowland rivers of south-east Australia. Where baseline data for certain assessment indicator values are already higher than the ANZECC/ARMICANZ (2000) values it will be more appropriate to use stable (averaged over a 12-month period) baseline values as background or control values for comparison purposes.

## 14.11 Nowra Creek Health Monitoring

### 14.11.1 Methodology

Photographs of the creek section adjacent to the Project Site (between Sampling Sites C1 and C2 - Figure 16-3 of Appendix L) will be taken and kept as records of the visual inspections. These photographs will be used to monitor any changes that occur with time in Nowra Creek, and will be used to deduce if the observed changes relate to quarrying activities at the Site. Any evidence of changes in Nowra Creek will be investigated.

The following Nowra Creek health indicators will be observed:

- ▮ Colour and appearance of water
- ▮ Water surface condition, water flow and level
- ▮ Presence of odour or frothing
- ▮ Presence of floating debris or grease
- ▮ Presence of oily films on surface or on shoreline
- ▮ Presence of nuisance organisms (e.g. macrophytes, Phytoplankton scums, algal mats)
- ▮ Appearance of sediment plumes
- ▮ Evidence of erosion and scouring
- ▮ Loss of vegetation
- ▮ Channel width and depth

#### **14.11.2 Location and Frequency**

Visual inspections of the Nowra Creek will be undertaken regularly. These inspections will be conducted during and after rainfall events exceeding 50 mm over 5 days or less.

#### **14.11.3 Specific Personnel**

A qualified consultant will be contracted by Nowra Brickworks Quarry to investigate if the changes have arisen from the quarrying activities at the site, and will propose remedial and mitigation measures as appropriate.

### **14.12 Groundwater Monitoring**

A number of groundwater monitoring programs are required, as follows:

- ▶ Groundwater level monitoring
- ▶ Groundwater rockface seepage monitoring
- ▶ Groundwater quality monitoring
- ▶ Groundwater inflow into the extraction area

#### **14.12.1 Methodology**

Each sampling campaign is to be conducted and reported in accordance with protocols laid down in National Water Quality Management Strategy, No 7, *Australian Guidelines for Water Quality Monitoring and Reporting* (ANZECC & ARMCANZ, 2000); NSW EPA Guidelines for Solid Waste Landfills, 1996).

##### ***Groundwater level monitoring***

Monitoring of water level changes over time is required to assist in determining if the proposed quarry operations are impacting on groundwater level. During monitoring, standing water level, ambient temperature, atmospheric pressure and rainfall will be obtained.

##### ***Groundwater rockface seepage monitoring***

Inspection of groundwater seepage from rockfaces is required.

##### ***Groundwater quality monitoring***

Groundwater quality monitoring is required to determine if quarrying activities are impacting on groundwater quality over time.

Field water quality tests for pH, EC, DO, ORP and temperature will be completed. Laboratory testing and analysis of samples obtained will also be completed and parameters will include pH, EC, TDS, alkalinity, major cations and anions, TKN, NO<sub>x</sub>-nitrogen, ammonia-nitrogen, Total-P, Reactive P, and metals. A list of the analytes to be monitored and tests to be conducted in the long term monitoring framework will be determined after review of baseline data collected over the initial 12-month monitoring period.

Water samples collected from the piezometers will be stored in de-contaminated plastic bottles (charged with appropriate preservatives when required) supplied by a NATA accredited testing laboratory. All samples will be stored at 4°C at all times prior to and during transport to a NATA-accredited laboratory for analysis.

#### ***Groundwater inflow into the extraction area***

Water balance calculations using regular surveys are required from the extraction area pit to determine groundwater inflow into the extraction area. During monitoring, the area and depth of water in the extraction area pit is required.

### **14.12.2 Location and Frequency**

#### ***Groundwater level monitoring***

Groundwater level will be monitored at piezometers P1, P2, P3, P4, P5, P7 and P8 (refer Figure 16-3 of Appendix L). It should be noted that piezometer P6 as been lost due to quarrying activities and monitoring is not required at this location. Water level monitoring is required on a three monthly basis initially and is to be reviewed after the collection of the initial 12-month monitoring period.

#### ***Groundwater rockface seepage monitoring***

Inspection of groundwater seepage on rockfaces within the operation area.

#### ***Groundwater quality monitoring***

Groundwater level will be monitored at piezometer locations P2, P3, P5, P7 (refer Figure 16-3 of Appendix L). Sampling will be undertaken ever three months, and the frequency of sampling will be reviewed after the initial 12-month monitoring period.

#### ***Groundwater inflow into the extraction area***

Monitoring of the extraction area pit is required regularly or following rain events or sudden increase in water level.

### **14.12.3 Specific Personnel**

#### ***Groundwater rockface seepage monitoring***

Inspection of groundwater seepage on rockfaces is required to be conducted every six months by a geotechnical engineer.

### **14.12.4 Performance Targets**

#### ***Groundwater level monitoring***

Further actions and follow-up actions (refer to the Surface Water and Groundwater Monitoring and Response Plan, attached as Appendix F) will be required in the event that significant change is noted and water level triggers are exceeded. These triggers include:

- ▶ A 'significant' decrease in water level over time or that occurs over a much shorter period in any one or a number of onsite piezometers.
- ▶ A 'significant' decrease is defined as water level decreases of 1.5 m in any of the piezometers over a six month period. This decrease represents a 50% change in the maximum water level decrease observed in the current baseline data. This water level trigger value will be reviewed when data have been collected over a 12-month period.

#### ***Groundwater rockface seepage monitoring***

If seepage is noted on rockfaces, actions and follow-up actions will be required, as discussed in the Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F).

#### ***Groundwater quality monitoring***

Trigger levels for the indication of groundwater quality change are indicated as a 'significant' deterioration in the water quality and increase of pollutant level. 'Significant' refers to decreasing pH (<6.0), increasing EC, TSS and major cation/anion concentrations over time (an increase of >20% of the corresponding baseline data) or sudden increases between quarterly datasets. The water quality trigger levels will be reviewed when data have been collected over a 12-month period.

Actions and follow-up actions will be required when trigger levels are exceeded, and are listed in the Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F).

#### ***Groundwater inflow into the extraction area***

If the groundwater inflow is calculated as greater than 14 ML/year, actions and follow-up actions will be required as listed in the Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F).

## 14.13 Environmental Monitoring Summary

Table 14-10 outlines the environmental monitoring required for the duration of quarry operation.

**Table 14-10 Event based Environmental Monitoring Summary**

Monitoring	Frequency/Event	Location	Monitoring procedures	Personnel	Recording requirements	Additional Information
<b>Blasting events</b>						
Air blast overpressure and ground vibration	During blasting events	a) South Coast Correctional Facility (Location 5) b) At Location 1, 2 or 4, depending upon which is closest to the blast c) At the nearest commercial premises (Commercial Premises A) d) At the nearest residence, is this residence is closer to the blast location than those identified in b) (refer Figure 16-3 of Appendix L)	Monitor air blast overpressure and ground vibration	Mine Manager to employ a suitably qualified and experienced blasting engineer or shot-firer	Complete a Blast Design Record Sheet (Appendix K)	Section 7
<b>vegetation removal or soil stripping</b>						
Vegetation removal and soil stripping	When undertaking vegetation removal or soil stripping	Within the area scheduled to be cleared	Complete the Vegetation Removal and Soil Stripping Record Sheet prior to commencement of the event (Appendix K)	Mine Manager	Complete the Vegetation Removal and Soil Stripping Record Sheet (Appendix K)	Section 5
Aboriginal heritage monitoring	When undertaking vegetation removal or soil stripping	Within the area identified as the South Western Section in Figure 16-2 of Appendix L	Monitor events for Aboriginal relics	Mine Manager and representatives from the Nowra LALC and Durgan Consultancy	Complete the Vegetation Removal and Soil Stripping Record Sheet (Refer to Section 5.3)	Section 5
Fauna in hollow-bearing trees	When undertaking vegetation removal or soil stripping	Within the area scheduled to be cleared	Relocate native fauna and/or care for injured fauna	The commissioned fauna consultant	Complete the Vegetation Removal and Soil Stripping Record Sheet prior to commencement of the event (Appendix K)	Section 5
<b>General</b>						
Meteorological Monitoring	Every 15 minutes	On-site monitoring station	Automatic record of parameters	Mine Manager	Automatic records of meteorological parameters	Section 14.5
Dust deposition monitoring	Every 30 (+/-2) days	DDG 1, DDG 2, DDG 3 and DDG 4 (refer Figure 16-3 of Appendix L)	Record of g/m <sup>2</sup> /month of dust deposition	Mine Manager	To be recorded as g/m <sup>2</sup> /month	Section 14.6
Total Suspended Particulate (TSP) monitoring	One-day-in-six cycle for a period of at least on year and at maximum quarry throughput	HVAS North and South (refer Figure 16-3 of Appendix L)	Record of µ/m <sup>2</sup> of TSP for short-term and long-term monitoring	Mine Manager	To be recorded as µ/m <sup>2</sup>	Section 14.6
Particulate Matter (PM <sub>10</sub> ) monitoring	One-day-in-six cycle for a period of at least on year and at maximum quarry throughput	HVAS North and South (refer Figure 16-3 of Appendix L)	Record of µ/m <sup>2</sup> of PM <sub>10</sub> for long-term monitoring	Mine Manager	To be recorded as µ/m <sup>2</sup>	Section 14.6
Erosion and Sediment Control Monitoring	At least fortnightly	Where appropriate across the site	Maintain a log of the effectiveness of the erosion and sediment control systems in place	Mine Manager	Record of inspections to be kept	Section 14.7
Importation and use of VENM	During weighing, sourcing, placement and VENM verification	At the source of the VENM and receipt at the quarry	Weigh, inspect, and determine source of VENM Certify that the excavated material can be classified as VENM (refer to Section 11)	VENM supplier at the source; VENM driver upon delivery to the quarry; Mine Manager or delegated authority during the unloading of the VENM	Complete VENM Certificate Record Sheets (Section 11.3)	Section 11

Monitoring	Frequency/Event	Location	Monitoring procedures	Personnel	Recording requirements	Additional Information
Rain gauging	After rain events	Where rain gauge is installed	Record of severity of any rain events	Mine Manager	Records to be kept	Section 14.7
Basin outlets and pump operation	None allocated	Where installed	Stability of basin outlets and operation of all pumps to be checked	Mine Manager	Record of inspections and maintained on site	Section 14.7
Surface Water Monitoring	During five campaigns over 12 months	S1, S4, C1, C2 and C10 (refer Figure 16-3 of Appendix L)	Field water quality tests, and laboratory testing and analysis	Mine Manager	Water quality results to be kept	Section 14.9
Nowra Creek Health Monitoring	During and after rainfall events exceeding 50 mm over 5 days or less	Nowra Creek, between Sites C1 and C2 (refer Figure 16-3 of Appendix L)	Photographs and records and dates of visual inspections of Nowra Creek	Mine Manager	Photographs and records to be kept	Section 14.11
Groundwater Inflow into the Extraction Area Monitoring	Regularly or following rain events or sudden increase in water level	Extraction area pit	Area (and depth) of water in the extraction area pit	Mine Manager	Records to be kept on site	Section 14.12
<b>General - Quarterly</b>						
Landscape Progress	Routine (no further information specified)	Where appropriate	Written details of weed management (species, methodology, timing, chemicals and quantity), seed collection (species and timing), revegetation programs (species, quantities, methods and location)	Mine Manager	Written records to be kept	Section 14.8
Groundwater Level Monitoring	Every three months	P1, P2, P3, P4, P5, P7, P8 (refer Figure 16-3 of Appendix L)	Standing water level, ambient temperature, atmospheric pressure, rainfall	Mine Manager	Groundwater information to be kept	Section 14.12
Groundwater Quality Monitoring	Every three months	P2, P3, P5, P7 (refer Figure 16-3 of Appendix L)	Field water quality tests, and laboratory testing and analysis	Mine Manager	Groundwater results to be kept	Section 14.12
<b>General - Biannually</b>						
Rehabilitation areas	Every six months	Rehabilitation areas	Monitoring of success of the management, mitigation and ameliorative measures and the rehabilitation programs.	Mine Manager	Monitoring records to be kept	Section 14.8
Activities with the Project Site, including rehabilitation areas	Every six month	Reference points, within the Project Site	Take photos from photographic reference points	Mine Manager	Photos to be kept	Section 14.8
Groundwater Rockface Seepage Monitoring	Every six months	Rockfaces	Inspection of water seepage on rockfaces	Geotechnical Engineer	Written records of inspection to be kept	Section 14.12
<b>General - Annually</b>						
Operator-attended Noise Survey	At the start of operations and annually after all components of the project are in operation	At the closest monitoring location to the operations	Maximum and average intrusive noise levels, and ambient noise over a 15 minute measurement period	Mine Manager	To be recorded as LA <sub>max</sub> and LA <sub>eq(15minute)</sub>	Section 14.4
Biodiversity offset area monitoring	Annually	Northern and Southern biodiversity offset area reference points	Take photos from photographic reference points for both areas	Mine Manager and the Operators of the Nowra Correction Facility (Southern biodiversity offset area)	Photos to be kept	Section 14.8
Weed inspection	Annually	Areas of operation and the biodiversity offset areas	Inspect weeds to enable weed control activities to be planned and implemented for the following 12 months	Mine Manager	Written records to be kept	Section 14.8

## 15. Reporting

### 15.1 Overview

This chapter addresses the reporting requirements for the quarry, which have been outlined in the following:

- ▶ Environmental Assessment (Corkery and City Plan Services 2009);
- ▶ Project Approval (Appendix A);
- ▶ Environment Licences and Approvals (Appendix B);
- ▶ Noise Monitoring Program/Blast Management Plan (attached as Appendix C);
- ▶ Erosion and Sediment Control Plan (attached as Appendix E);
- ▶ Surface Water and Groundwater Monitoring and Response Plan (attached as Appendix F);
- ▶ Landscape and Biodiversity Management Plan (attached as Appendix H);
- ▶ Air Quality Management Plan (attached as Appendix I); and
- ▶ Aboriginal Heritage Management Plan (Appendix J).

The EMS is based on the content of the plans, programs and reports in the appendices attached. Although the following describes the strategy for compliance with the Project Approval and these plans, the plans should be reviewed regularly and whilst undertaking environmental reporting activities. In the event of an inconsistency, the plan (as attached) shall prevail.

### 15.2 Scheduled Reports

Scheduled Reports required by the Project Approval and EPL are outlined in Table 15-1 below.

**Table 15-1 Scheduled Environmental Reports**

When	What	Relevant Agency	Information required
Every six months	Update Website	None	Summary of monitoring results required under the Project Approval.
April each year <sup>1</sup>	Environmental Protection Licence 'Annual Return'	EPA	The licensee must complete and supply to the EPA an Annual Return in the approved form and in accordance with reporting conditions contained with the licence (attached as Appendix B).
Prior to 1 December annually	Annual Environmental Management Report (AEMR)	Director-General, Department of Planning DECCW NOW	<ul style="list-style-type: none"> <li>▶ The standards and performance measures that apply to the project</li> <li>▶ Works carried out in the last 12 months, and the works that will be carried out in the next 12 months</li> <li>▶ Summary of complaints received in the past year and a comparison of complaints received in the previous year</li> <li>▶ Summary of all the monitoring results (refer to Section 14)</li> <li>▶ An analysis of the monitoring results against:</li> </ul>



When	What	Relevant Agency	Information required
			<ul style="list-style-type: none"> <li>– The impact assessment criteria/limits</li> <li>– Monitoring results from previous years</li> <li>– Predictions in the Environmental Assessment</li> </ul> <ul style="list-style-type: none"> <li>▶ Any observable trends in the monitoring results over the life of the project</li> <li>▶ Any non-compliance during the year</li> <li>▶ Any actions taken to ensure compliance</li> </ul>
Within three years of the first AEMR and every three years thereafter	Independent Environmental Audit Report	Director-General Department of Planning	Refer to Schedule 5 Condition 1 of the Project Approval (attached as Appendix A)

<sup>1</sup> *The Annual Return reporting period means the period of 12 months after the issue of the EPL, and each subsequent period of 12 months. As a result, the scheduled date for the Annual Return specified above may change when a new licence is issued.*

### 15.3 Event Reporting

Reports have to be prepared for any event listed in Table 15-2.



**Table 15-2 Event Reporting**

Event	Reporting Required	Person responsible	Relevant Agency
<b>Environmental Harm Incident</b>	<p>Call the EPA's Pollution Line service on 131 555. The Mine Manager must also provide written details of the notification to the EPA within seven days of the incident.</p> <p>The Department of Planning and other relevant agencies must also be notified within 24 hours of the incident.</p>	Mine Manager and any of SCCCR's employees.	EPA and the Department of Planning.
<b>Blasting event</b>	<p>Written notification and submission of a copy of the completed Blast Design Record Sheet (attached as Appendix K) within seven days of the blasting event.</p> <p>The landowner/occupier of any residence within two kilometres of the quarry pit who registers an interest in being notified about the blasting schedule on site prior to blasting.</p> <p>Develop a notification process to alert residents at least 24 hours before any blast.</p> <p>Operate a blasting hotline and keep public informed.</p>	<p>Mine Manager</p> <p>Mine Manager</p>	<p>EPA</p> <p>Landowner/occupier of residences within two kilometres</p>
<b>Any exceedance of ground vibration and/or airblast overpressure limits (refer to Section 14.3)</b>	<p>Telephone call followed up by written notification and submission of the completed Blast Monitoring Record Sheet of the event (attached as Appendix K), as soon as practicable.</p> <p>Provide notification to affected landowners and tenants.</p>	<p>Mine Manager</p> <p>Mine Manager</p>	<p>EPA and the Department of Planning.</p> <p>Affect landowners and tenants.</p>
<b>Any exceedance of noise, operation hours and/or air quality limits (refer to Sections 14.4 and 14.6)</b>	<p>Telephone call within 24 hours of the exceedance event followed up by written report within six days that:</p> <ul style="list-style-type: none"> <li>Describes the date, time, and nature of the exceedance</li> <li>Identifies the cause of the exceedance</li> <li>Describes what preparation actions have been taken</li> <li>Describes the proposed measures to address the exceedance</li> </ul> <p>Provide subsequent quarterly monitoring results until results show that project is complying.</p> <p>Provide notification to affected landowners and tenants.</p>	<p>Mine Manager</p> <p>Mine Manager</p>	<p>Department of Planning, Director-General.</p> <p>Affect landowners and tenants.</p>
<b>Exceedance of Surface Water and Groundwater Trigger Values (refer to Sections 14.10 and 14.12)</b>	Further reporting on shorter timescales (monthly, quarterly, six-monthly etc.) and consultation with DECCW.	Mine Manager	DECCW
<b>Demonstration of a 'significant' impact to a distant bore user in relation to groundwater level change.</b>	Further reporting on shorter timescales (monthly, quarterly, six-monthly etc.) and consultation with DECCW.	Mine Manager	DECCW
<b>Receipt of complaints from community</b>	<p>Receive, log, track and respond to complaints in the complaints register.</p> <p>Information to be recorded includes date and time of complaint, method complaint was made by, personal details of the complainant, nature of the complaint, action taken by the licensee in relation to the complaint, and in the event that no action was taken, the reasons why.</p> <p>The record of a complaint will be kept for at least four years after the complaint was made.</p> <p>In the instance that an agreeable outcome (by all concerned parties) cannot be reached, the matter will be referred to the Director-General for resolution. If the matter cannot be resolved within 21 days, the Director-General will refer the matter to an Independent Dispute Resolution Process.</p>	Mine Manager	<p>Relevant public authority or landowner</p> <p>Director-General if dispute cannot be resolved</p>



## 16. References

ANZECC & ARMCANZ, 2000. National Water Quality Management Strategy, No 4A, An Introduction to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality

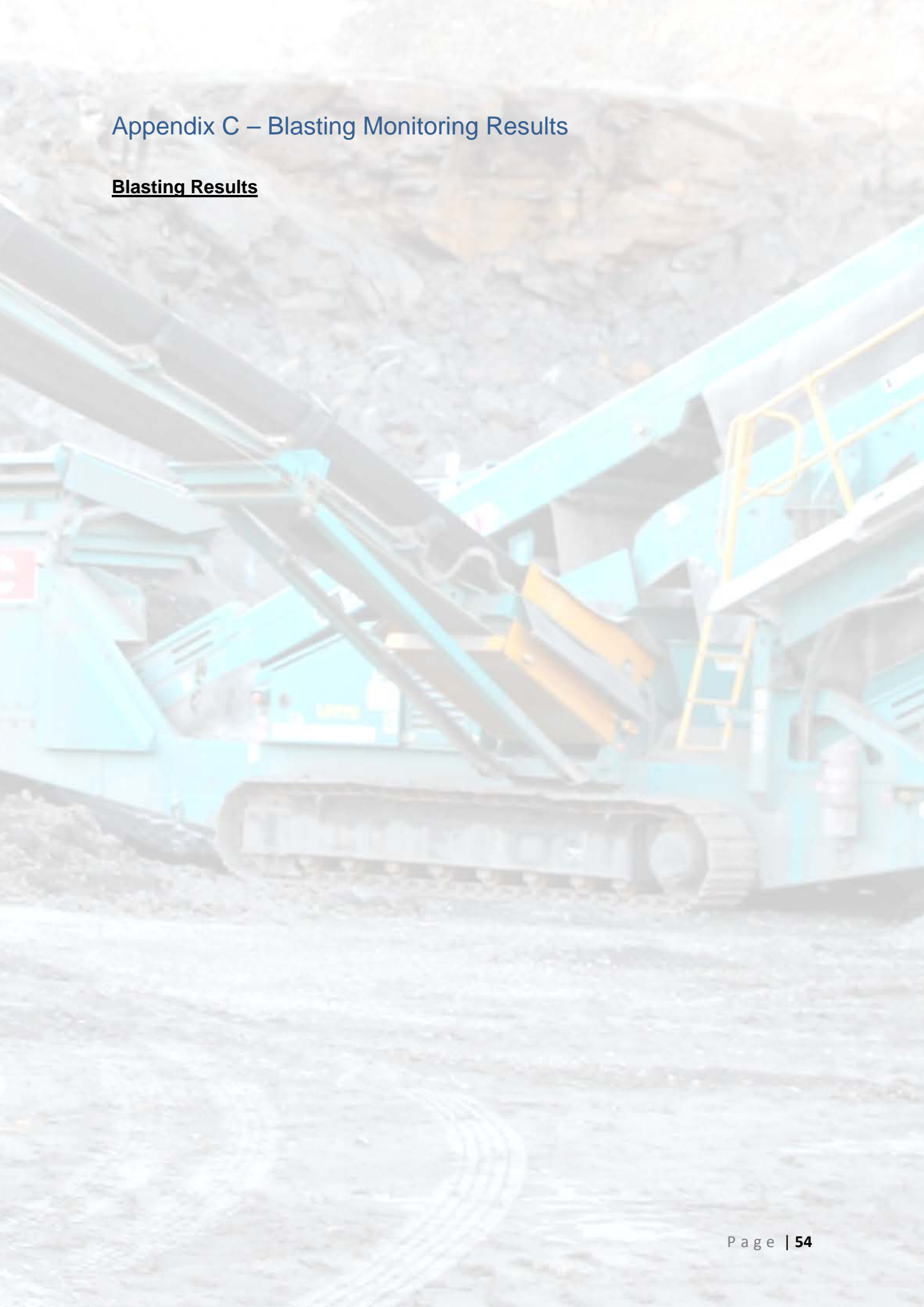
Corkery and City Plan Services (R.W. Corkery and Co. Pty Ltd and City Plan Services), 2009. Environmental Assessment for the Continuation and Expansion of Extractive Operations at the Nowra Brickworks Quarry, South Nowra. Report prepared for South Coast Concrete Crushing and Recycling Pty Ltd for Major Project Application No. 07-0123.

Landcom, 2004. Guideline Soils and Construction Managing Urban Stormwater. Landcom.

SEEC Morse McVey, 2007. Erosion and Sediment Control Plan, prepared on behalf of South Coast Concrete Crushing and Recycling Pty Ltd (Part 7B of the Specialist Consultant Studies Compendium).

## Appendix C – Blasting Monitoring Results

### **Blasting Results**



**Date/Time** Vert at 14:30:03 January 13, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

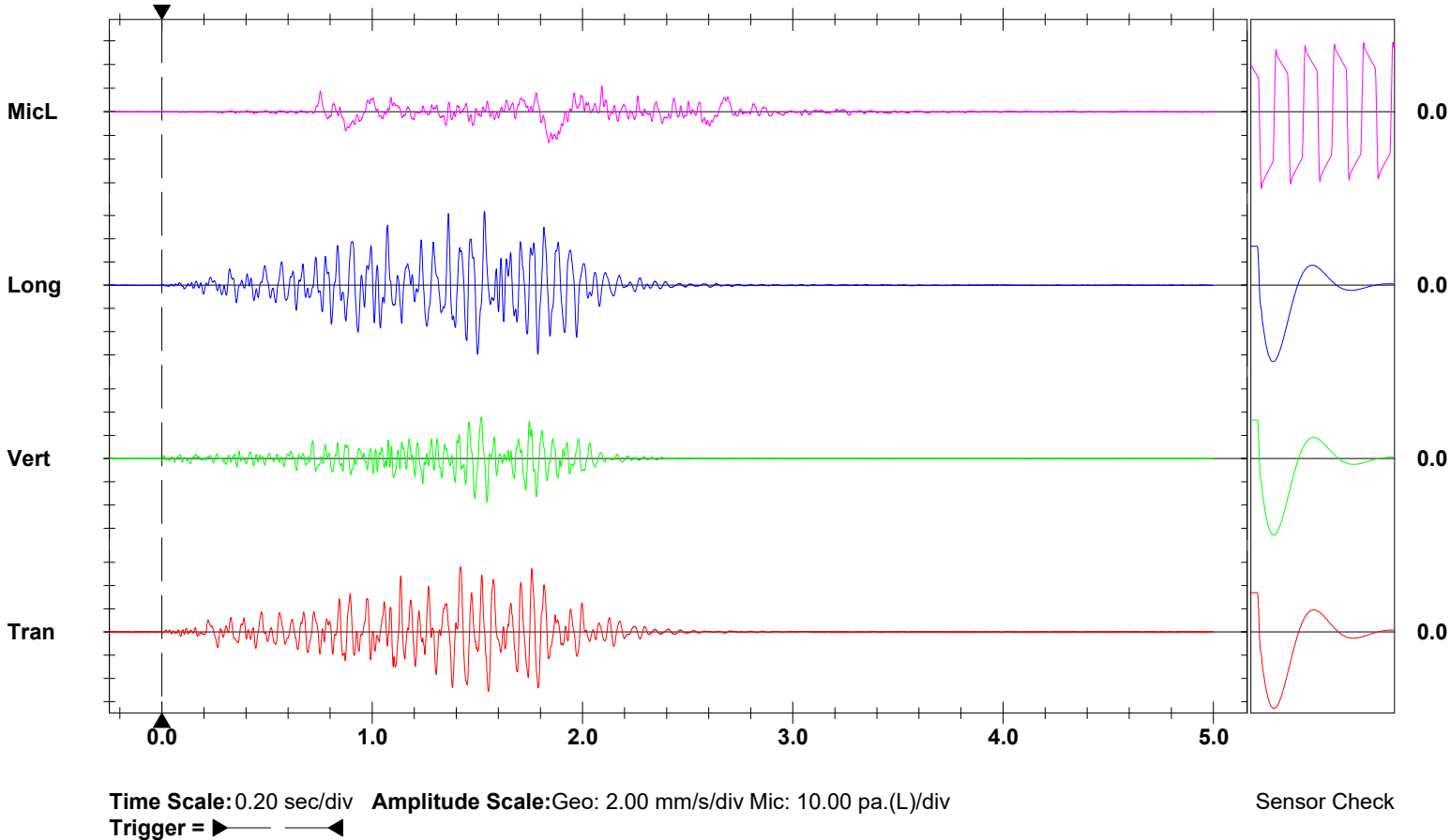
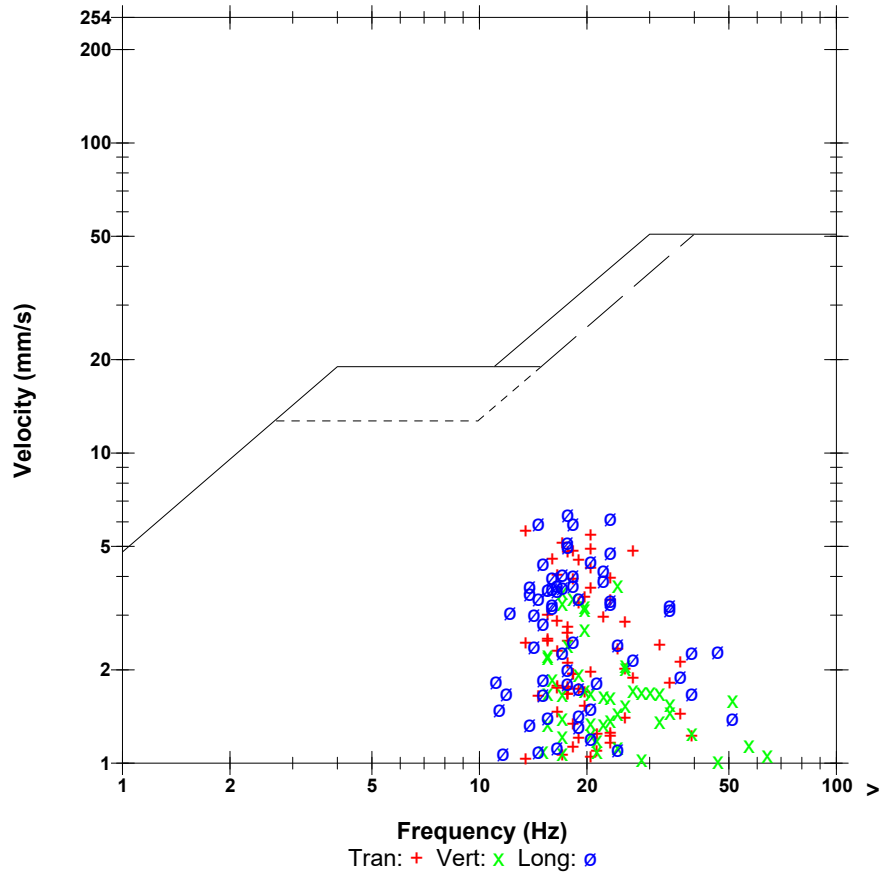
**Serial Number** BE15569 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q569GPVS.A30

**Microphone** Linear Weighting  
**PSPL** 116.3 dB(L) 13.0 pa.(L) at 1.839 sec  
**ZC Freq** 4.2 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 474 mv)

	Tran	Vert	Long	
PPV	5.59	3.76	6.35	mm/s
ZC Freq	13	24	18	Hz
Time (Rel. to Trig)	1.419	1.546	1.534	sec
Peak Acceleration	0.0895	0.0679	0.103	g
Peak Displacement	0.0481	0.0292	0.0554	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.5	Hz
Overswing Ratio	3.5	3.7	3.9	

**Peak Vector Sum** 7.77 mm/s at 1.788 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 14:30:03 January 13, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

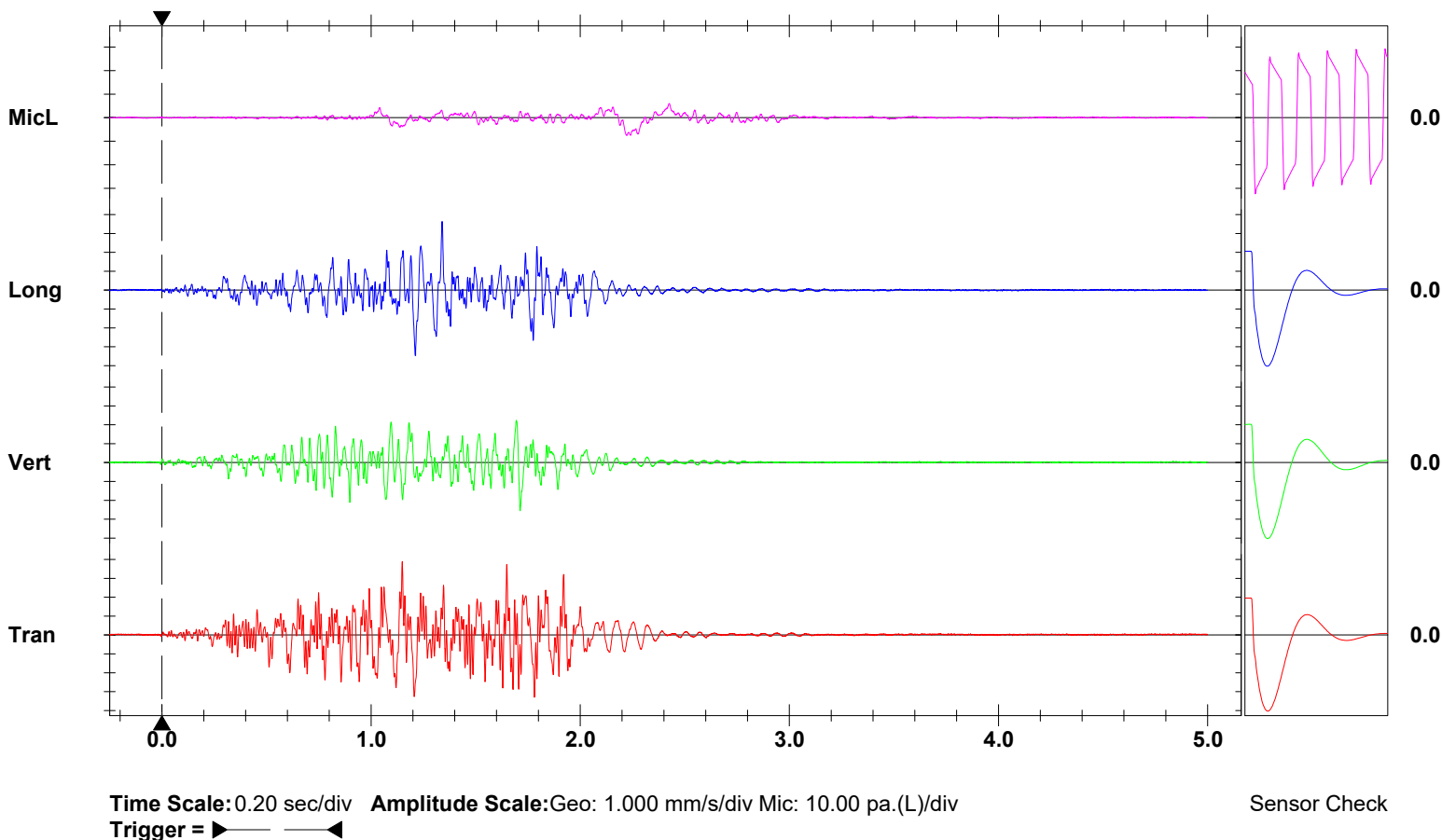
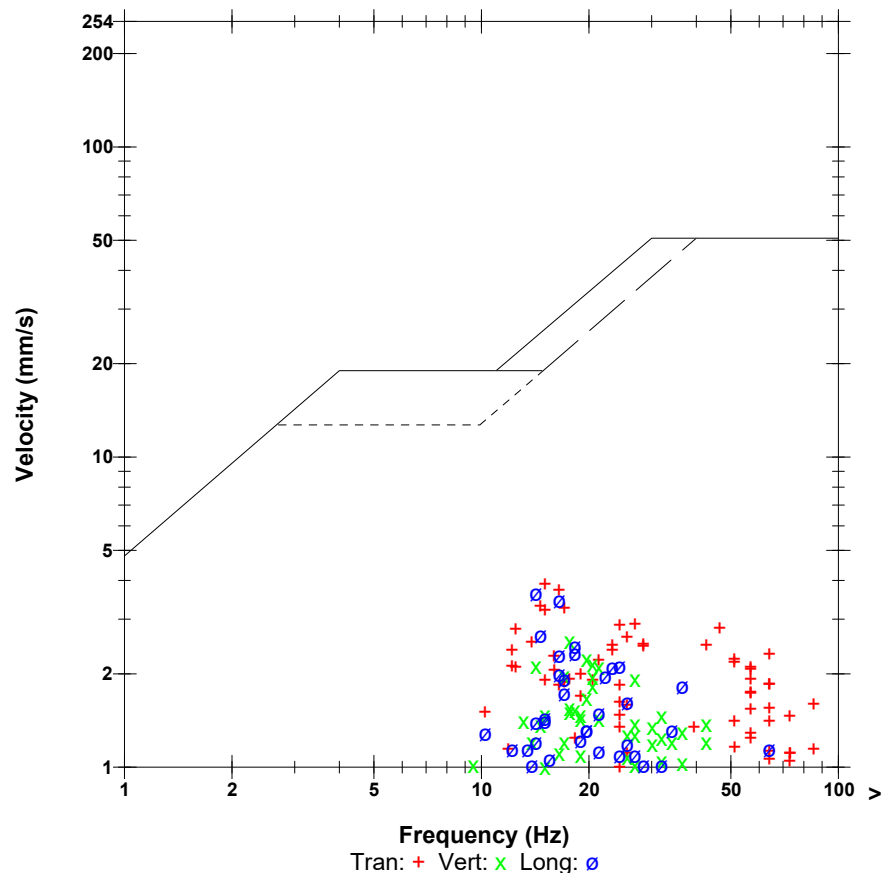
**Serial Number** BE15777 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q777GPVS.A30

**Microphone** Linear Weighting  
**PSPL** 111.5 dB(L) 7.50 pa.(L) at 2.221 sec  
**ZC Freq** 4.1 Hz  
**Channel Test** Passed (Freq = 20.5 Hz Amp = 487 mv)

	Tran	Vert	Long	
PPV	3.89	2.56	3.64	mm/s
ZC Freq	15	18	14	Hz
Time (Rel. to Trig)	1.149	1.713	1.340	sec
Peak Acceleration	0.0961	0.0464	0.0630	g
Peak Displacement	0.0307	0.0205	0.0285	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.4	Hz
Overswing Ratio	3.8	3.3	3.9	

**Peak Vector Sum** 4.72 mm/s at 1.149 sec

## USBM RI8507 And OSMRE



**Date/Time** Tran at 14:30:03 January 13, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

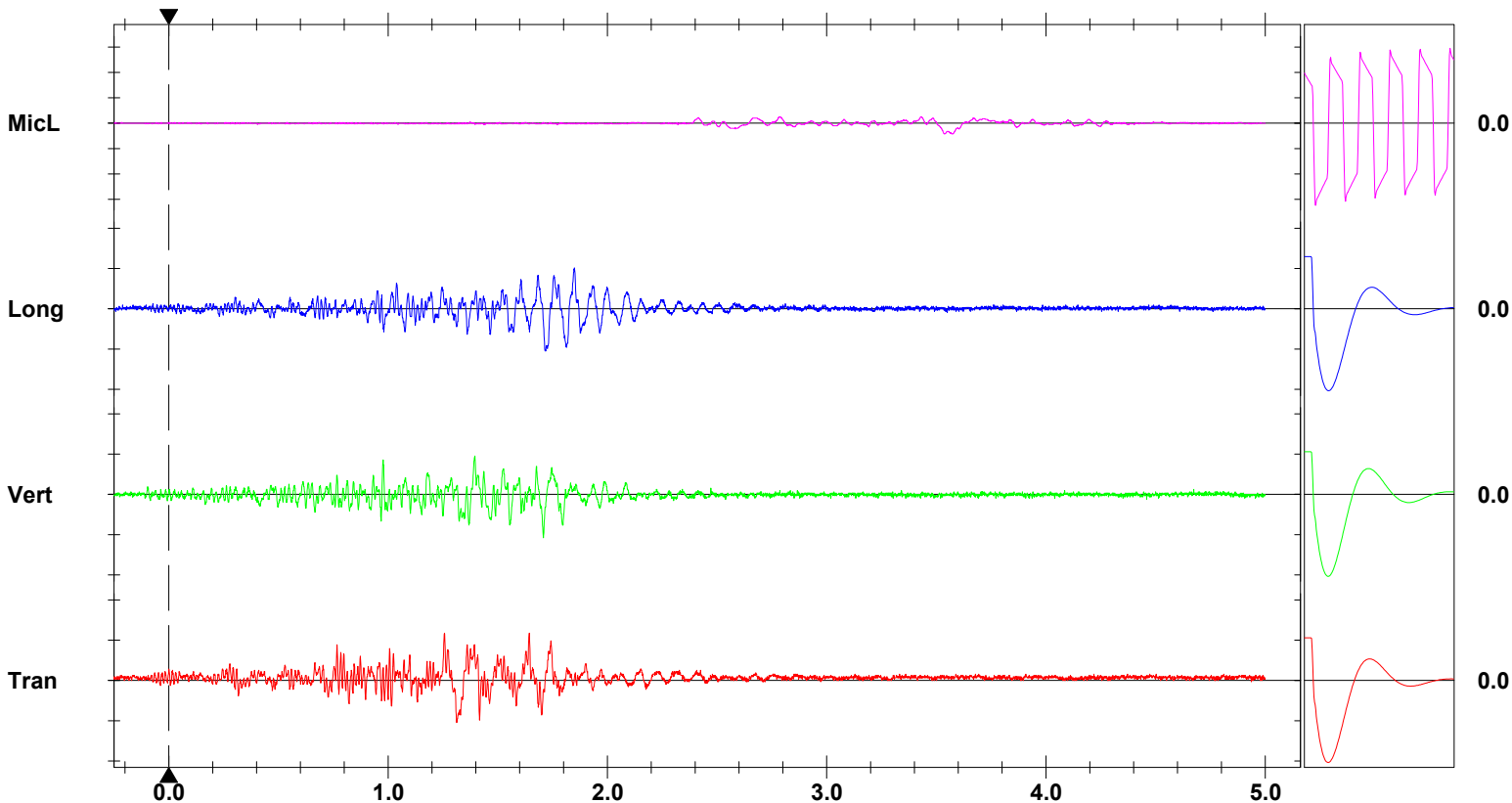
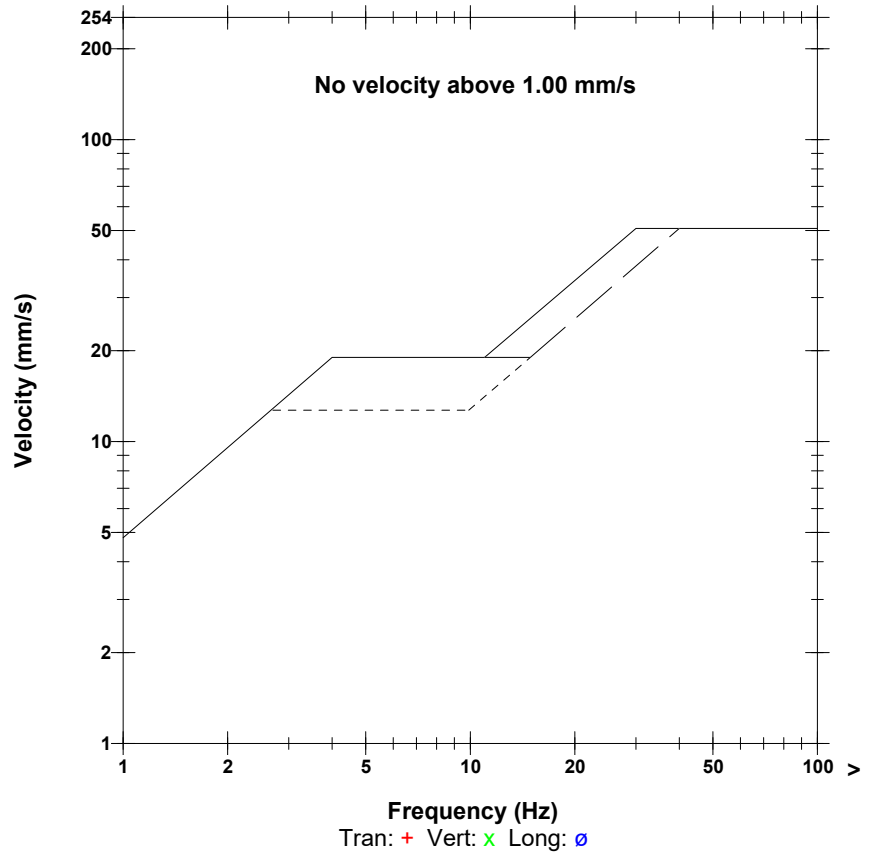
**Serial Number** BE15377 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.5 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q377GPVS.A30

**Microphone** Linear Weighting  
**PSPL** 106.5 dB(L) 4.25 pa.(L) at 3.535 sec  
**ZC Freq** 4.4 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 497 mv)

	Tran	Vert	Long	
PPV	0.587	0.540	0.524	mm/s
ZC Freq	9.5	16	15	Hz
Time (Rel. to Trig)	1.257	1.708	1.716	sec
Peak Acceleration	0.0166	0.0133	0.00994	g
Peak Displacement	0.00858	0.00445	0.00598	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.1	Hz
Overswing Ratio	3.8	3.2	3.8	

**Peak Vector Sum** 0.647 mm/s at 1.394 sec

## USBM R18507 And OSMRE



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Vert at 14:30:02 January 13, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

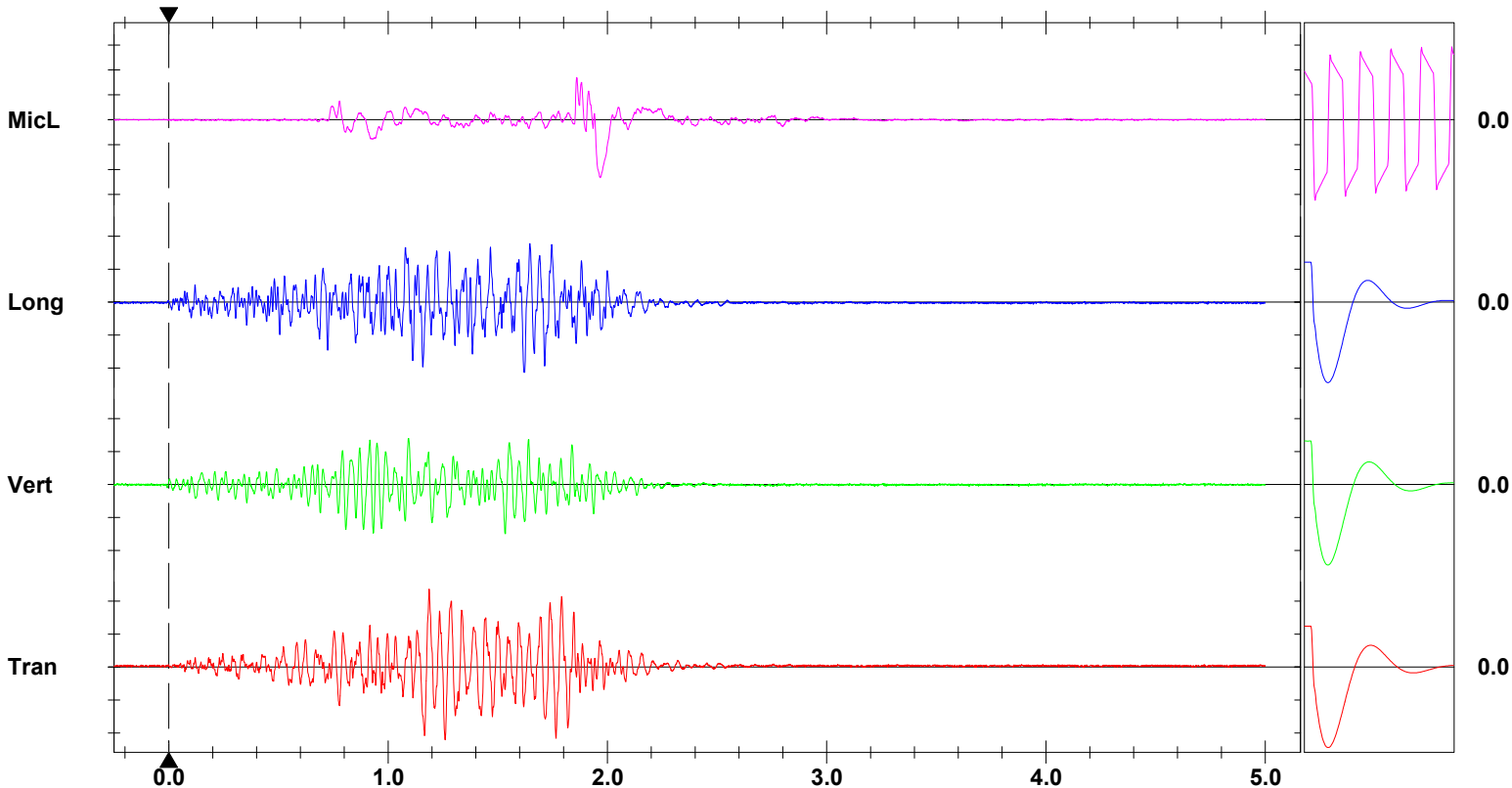
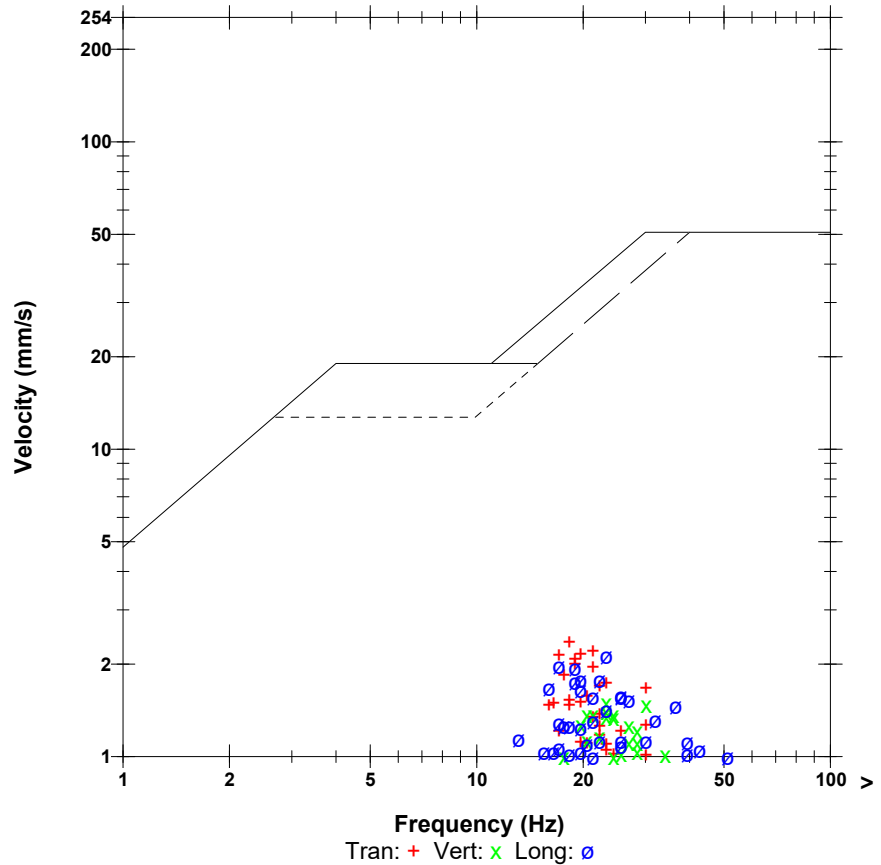
**Serial Number** BE16020 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R020GPVS.A20

**Microphone** Linear Weighting  
**PSPL** 121.3 dB(L) 23.3 pa.(L) at 1.967 sec  
**ZC Freq** 6.9 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 484 mv)

	Tran	Vert	Long	
PPV	2.37	1.49	2.13	mm/s
ZC Freq	18	23	23	Hz
Time (Rel. to Trig)	1.188	1.533	1.619	sec
Peak Acceleration	0.0447	0.0315	0.0447	g
Peak Displacement	0.0178	0.00968	0.0140	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.6	Hz
Overswing Ratio	3.7	3.6	3.7	

**Peak Vector Sum** 2.64 mm/s at 1.619 sec

## USBM RI8507 And OSMRE



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 1.000 mm/s/div Mic: 10.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Long at 13:30:04 February 16, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

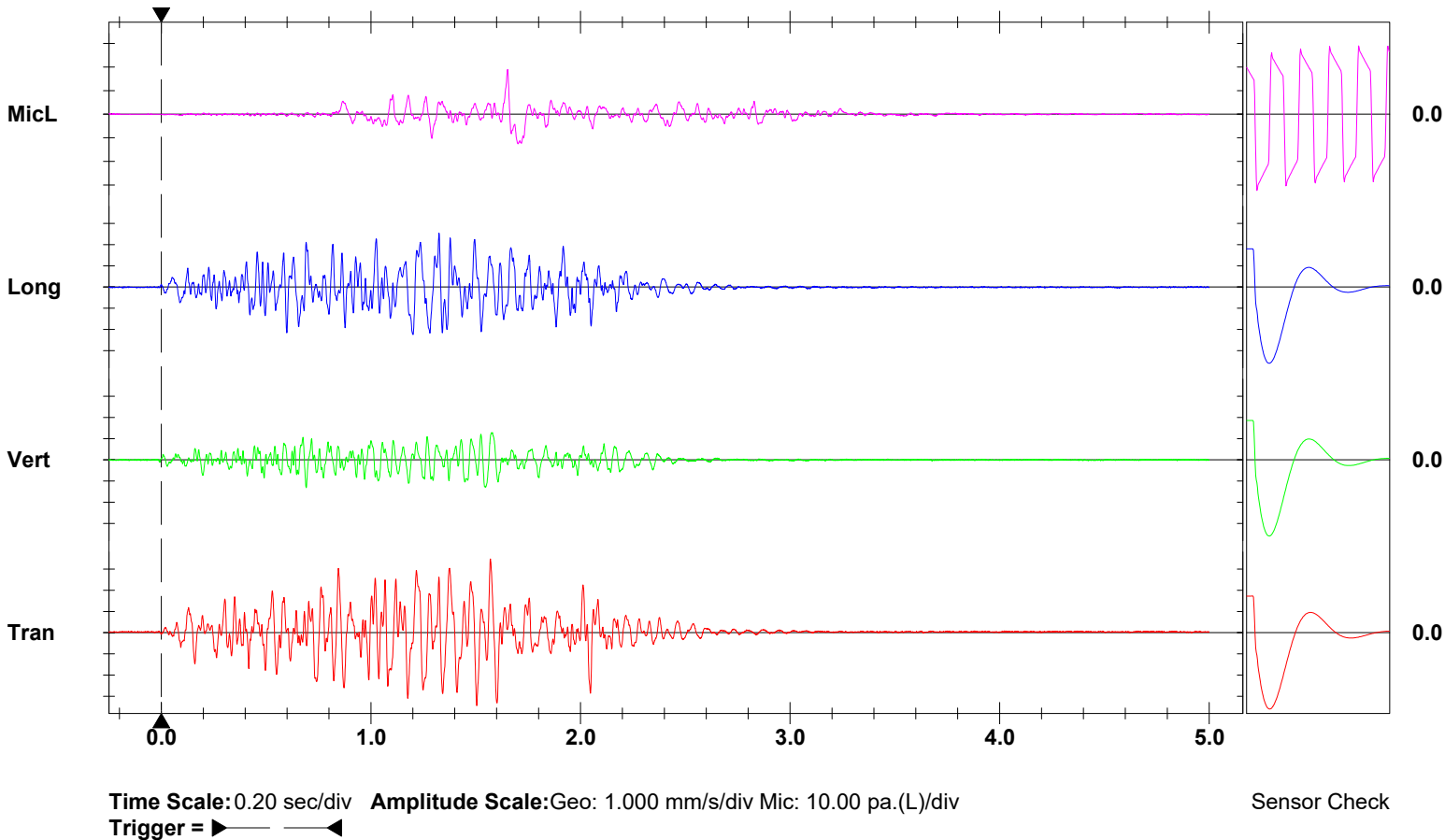
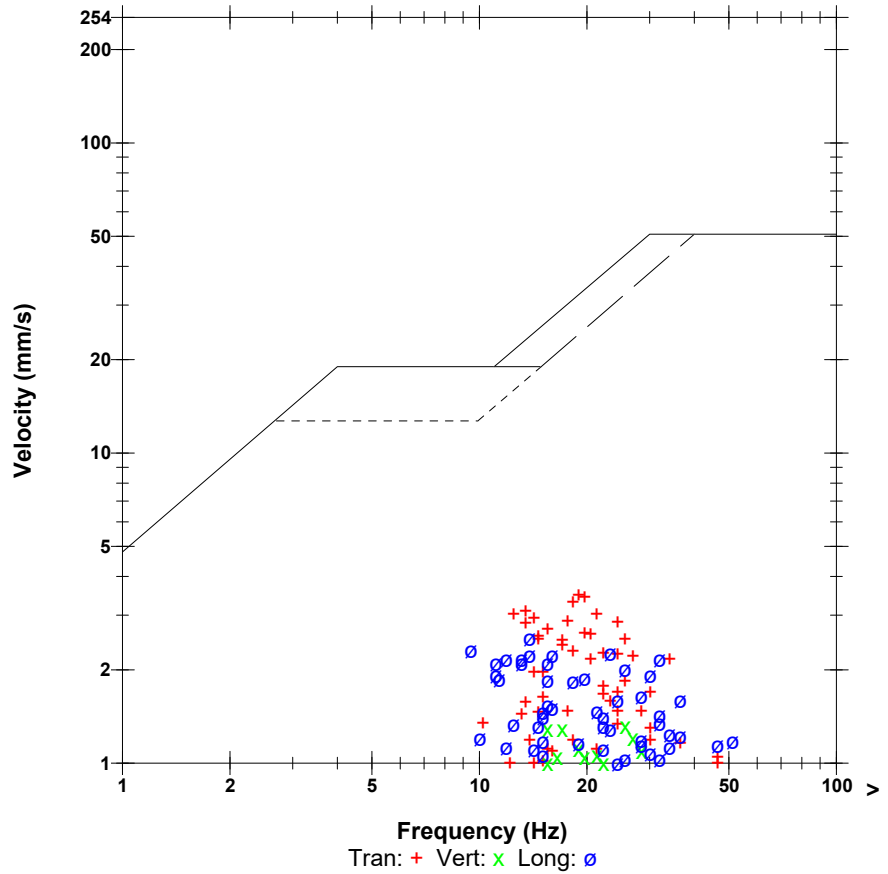
**Serial Number** BE16020 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R020GRMO.640

**Microphone** Linear Weighting  
**PSPL** 119.6 dB(L) 19.0 pa.(L) at 1.652 sec  
**ZC Freq** 15 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 426 mv)

	Tran	Vert	Long	
PPV	3.48	1.32	2.54	mm/s
ZC Freq	19	26	14	Hz
Time (Rel. to Trig)	1.570	0.691	1.325	sec
Peak Acceleration	0.0563	0.0265	0.0547	g
Peak Displacement	0.0335	0.0147	0.0281	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.4	7.4	Hz
Overswing Ratio	3.8	3.7	3.9	

**Peak Vector Sum** 3.86 mm/s at 1.570 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 13:30:03 February 16, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

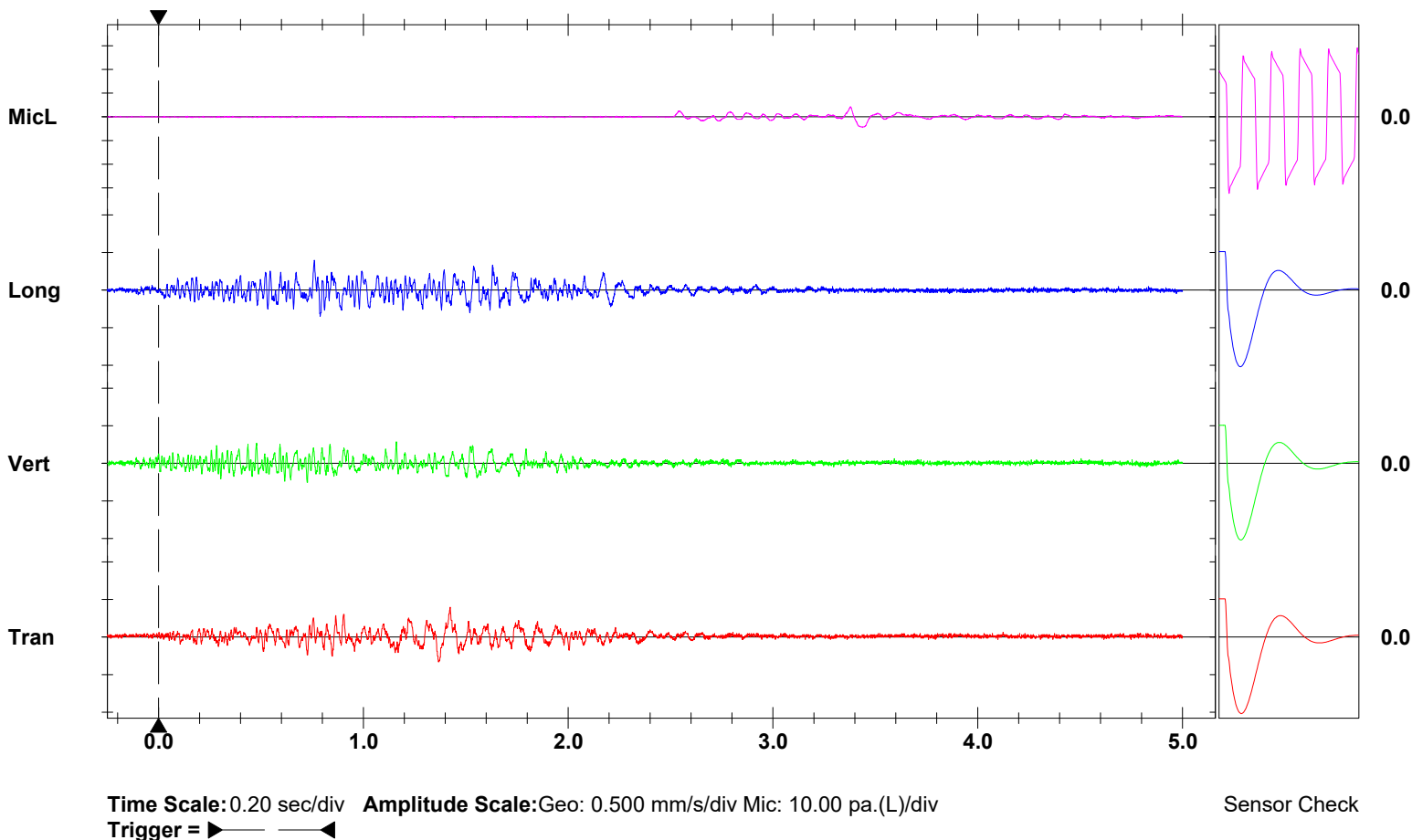
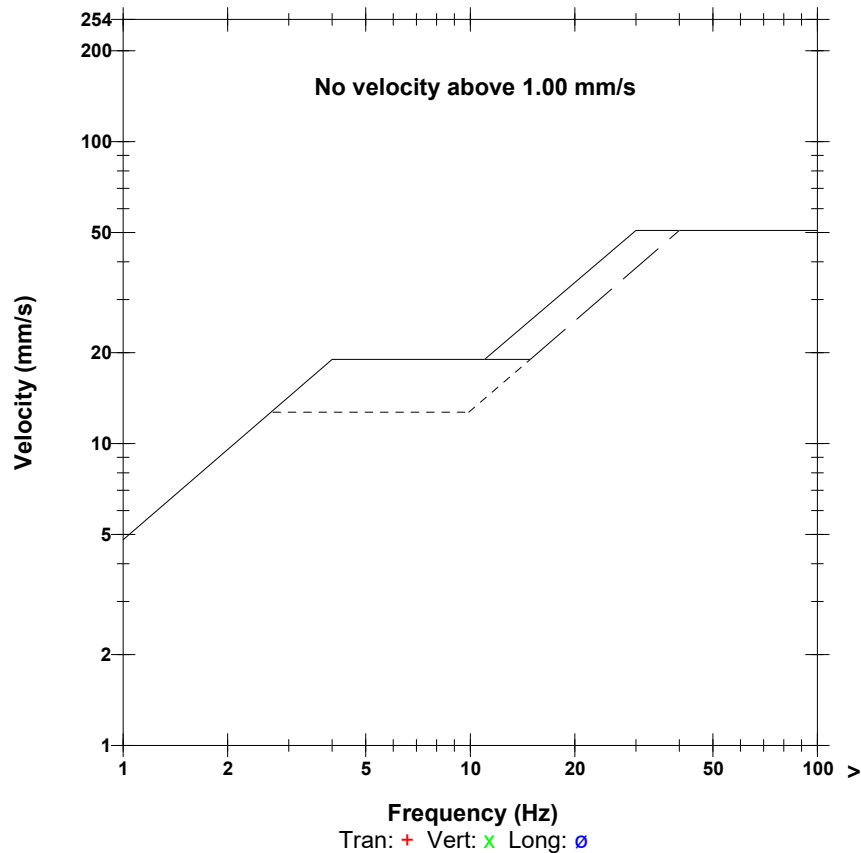
**Serial Number** BE15569 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q569GRMO.630

**Microphone** Linear Weighting  
**PSPL** 107.0 dB(L) 4.50 pa.(L) at 3.437 sec  
**ZC Freq** 6.6 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 561 mv)

	Tran	Vert	Long	
PPV	0.397	0.286	0.397	mm/s
ZC Freq	8.1	43	26	Hz
Time (Rel. to Trig)	1.424	1.160	0.761	sec
Peak Acceleration	0.00829	0.00994	0.0116	g
Peak Displacement	0.00500	0.00219	0.00283	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.6	Hz
Overswing Ratio	3.6	3.7	3.9	

**Peak Vector Sum** 0.441 mm/s at 0.759 sec

## USBM R18507 And OSMRE



**Date/Time** Vert at 13:30:04 February 16, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

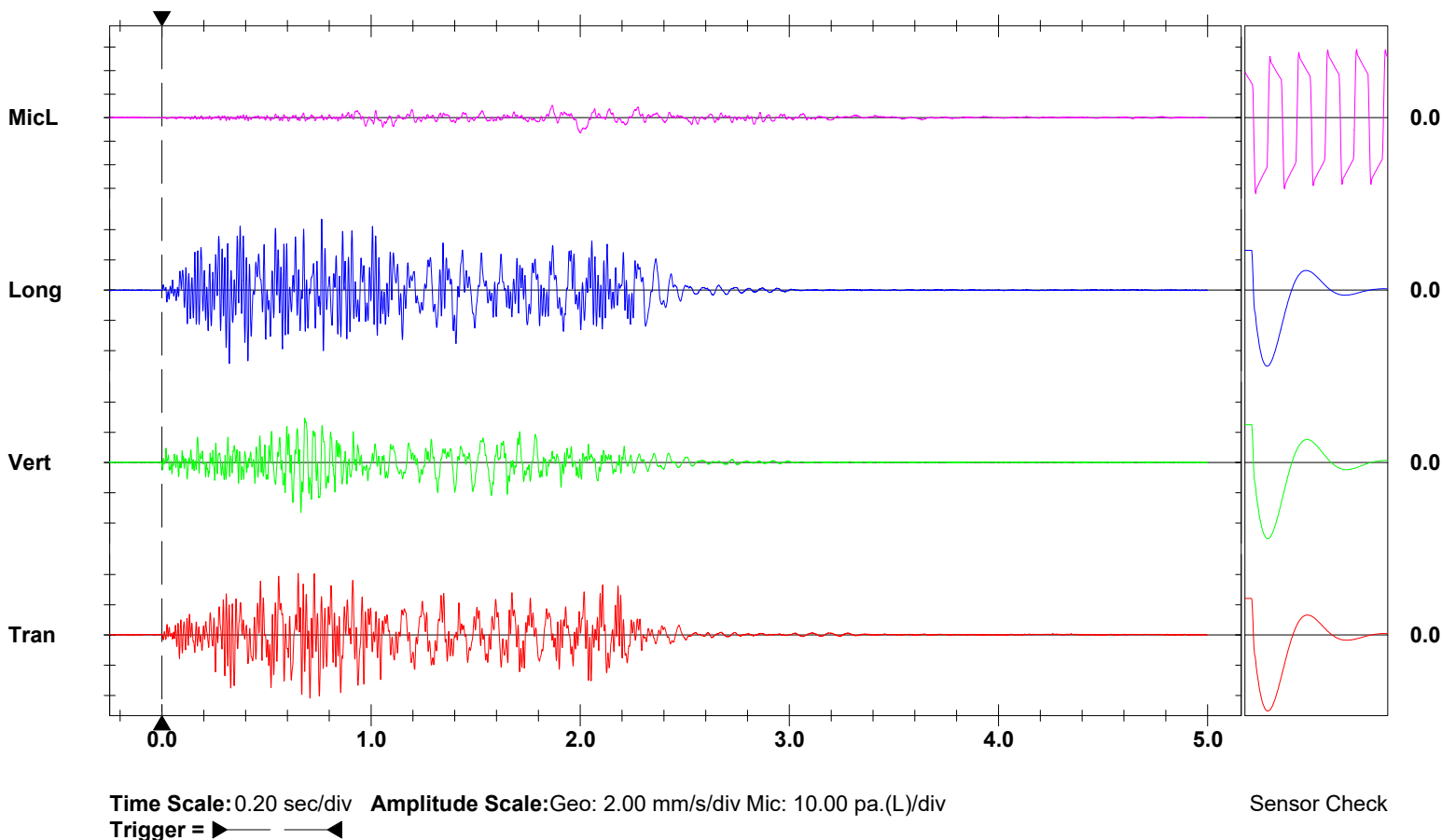
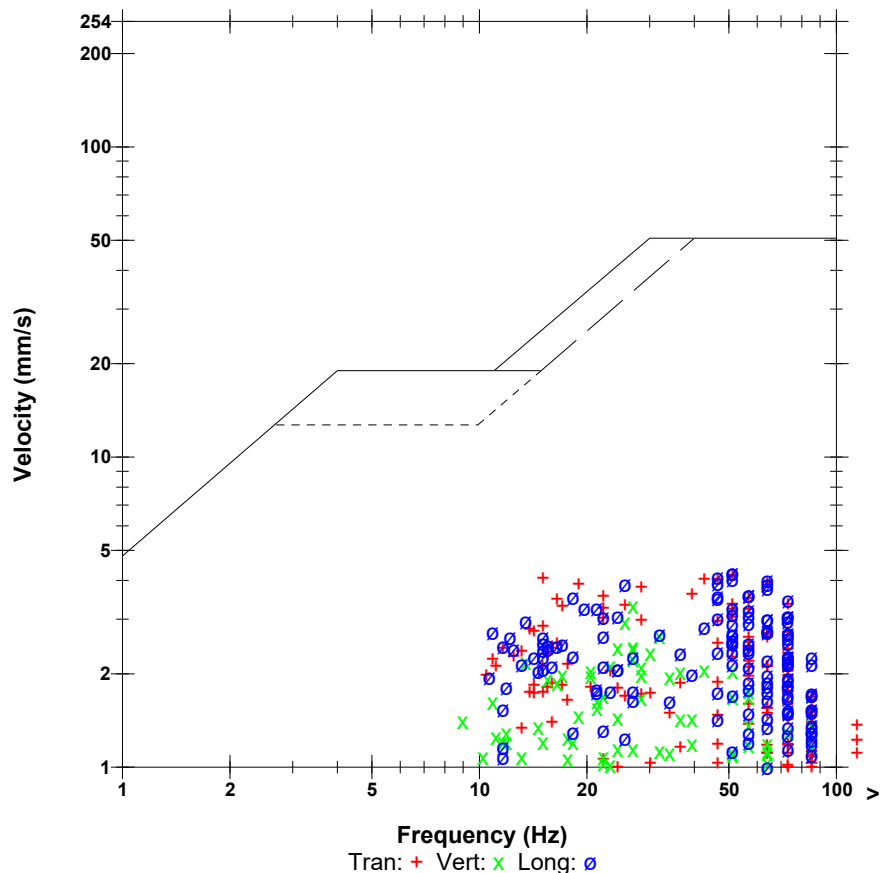
**Serial Number** BE15777 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q777GRMO.640

**Microphone** Linear Weighting  
**PSPL** 110.2 dB(L) 6.50 pa.(L) at 2.000 sec  
**ZC Freq** 6.0 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 480 mv)

	Tran	Vert	Long	
PPV	4.18	3.30	4.86	mm/s
ZC Freq	51	27	51	Hz
Time (Rel. to Trig)	0.708	0.664	0.322	sec
Peak Acceleration	0.166	0.119	0.179	g
Peak Displacement	0.0265	0.0213	0.0305	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	3.8	3.3	3.9	

**Peak Vector Sum** 4.61 mm/s at 0.764 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 13:30:03 February 16, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

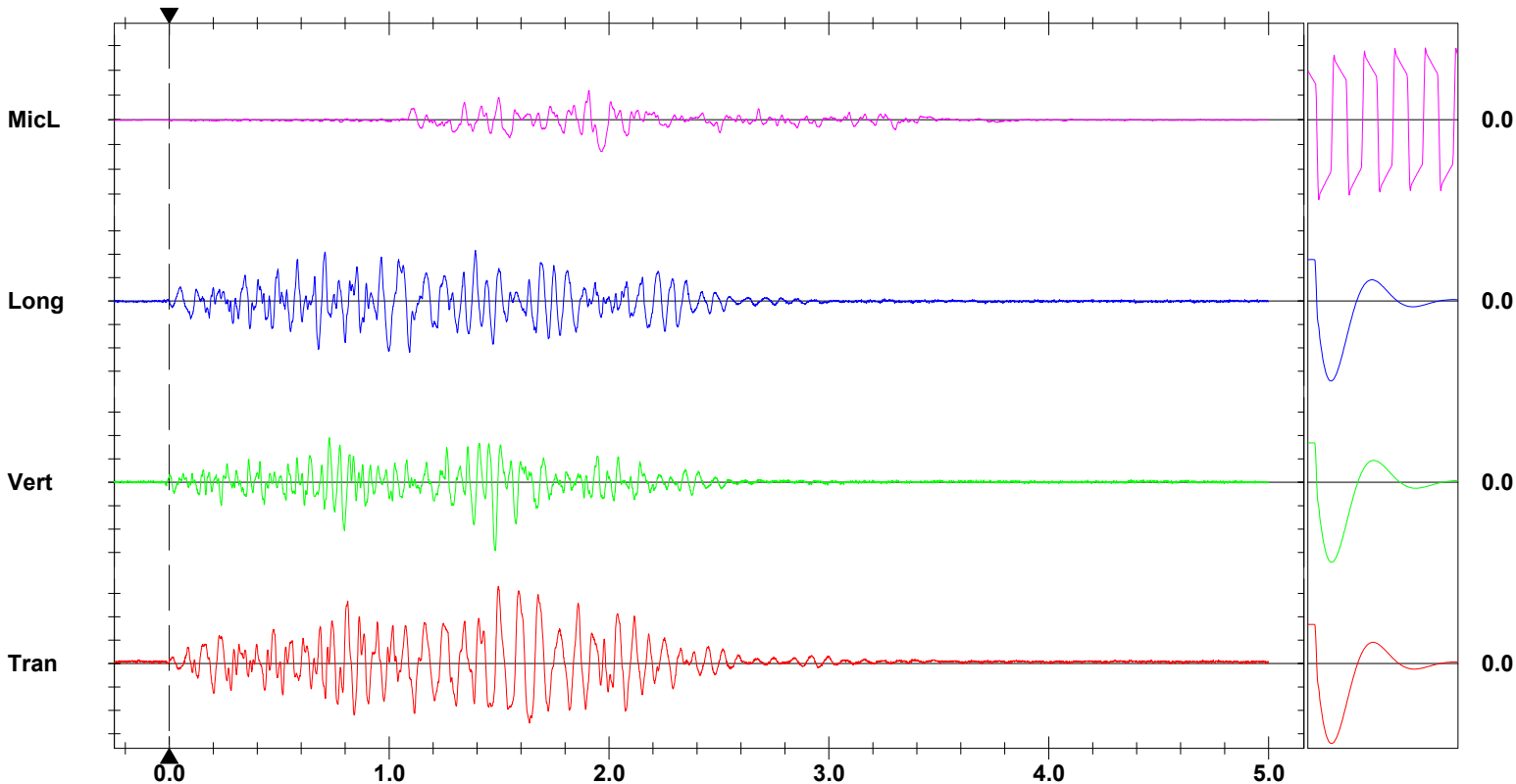
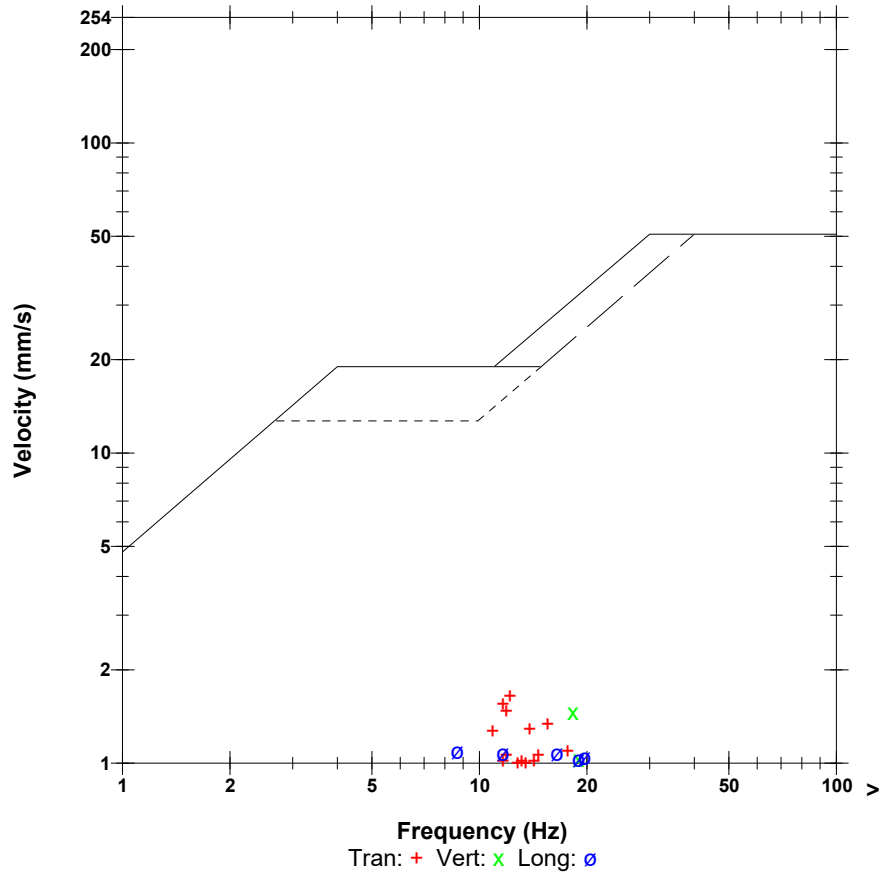
**Serial Number** BE16158 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R158GRMO.630

**Microphone** Linear Weighting  
**PSPL** 116.1 dB(L) 12.8 pa.(L) at 1.962 sec  
**ZC Freq** 6.4 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 459 mv)

	Tran	Vert	Long	
PPV	1.65	1.46	1.10	mm/s
ZC Freq	12	18	8.7	Hz
Time (Rel. to Trig)	1.497	1.483	1.093	sec
Peak Acceleration	0.0199	0.0199	0.0199	g
Peak Displacement	0.0220	0.0120	0.0143	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.6	Hz
Overswing Ratio	3.8	3.7	3.8	

**Peak Vector Sum** 1.81 mm/s at 1.498 sec

## USBM RI8507 And OSMRE



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Vert at 14:00:05 April 6, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

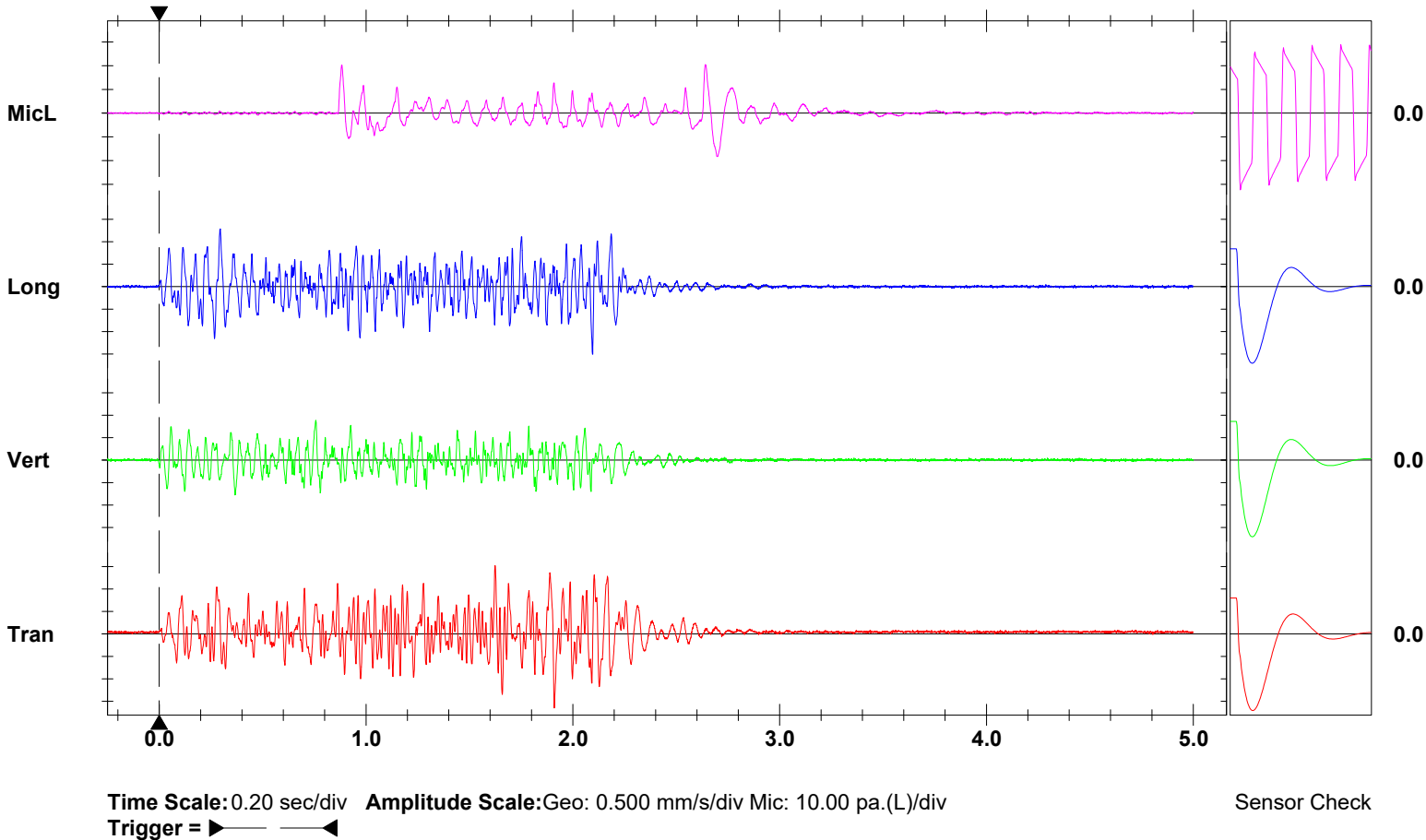
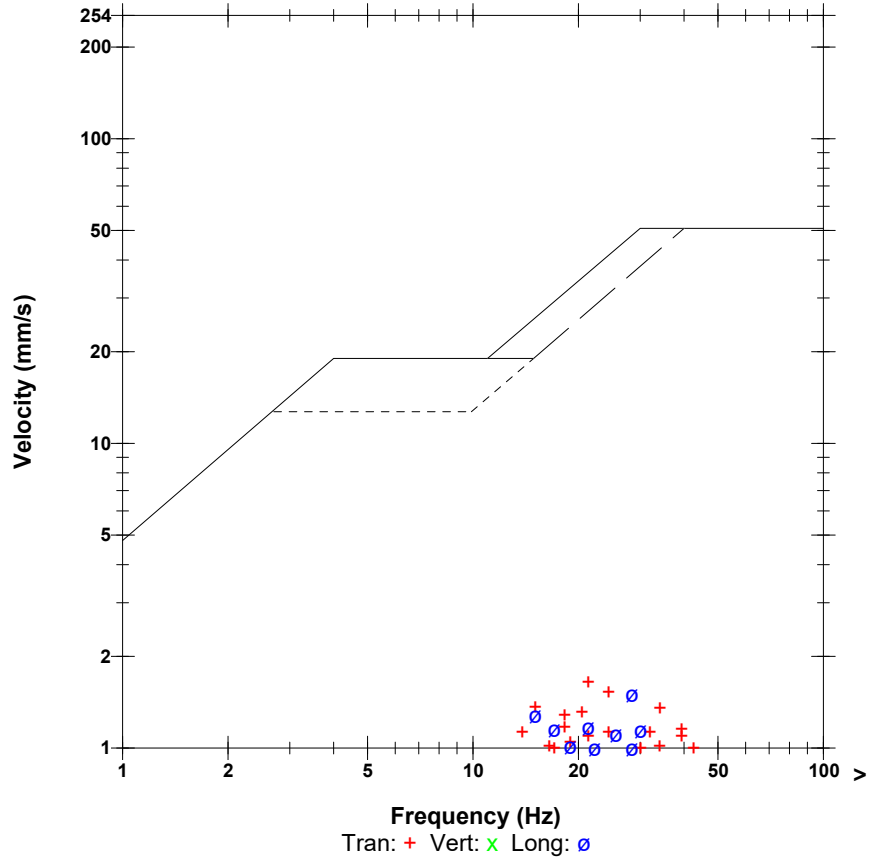
**Serial Number** BE16020 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R020GU5G.850

**Microphone** Linear Weighting  
**PSPL** 120.2 dB(L) 20.5 pa.(L) at 2.641 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 601 mv)

	Tran	Vert	Long	
PPV	1.65	0.889	1.51	mm/s
ZC Freq	21	22	28	Hz
Time (Rel. to Trig)	1.910	0.757	2.095	sec
Peak Acceleration	0.0365	0.0249	0.0365	g
Peak Displacement	0.0128	0.00617	0.00966	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.4	Hz
Overswing Ratio	3.9	3.7	4.0	

**Peak Vector Sum** 1.74 mm/s at 1.910 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 14:00:07 April 6, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

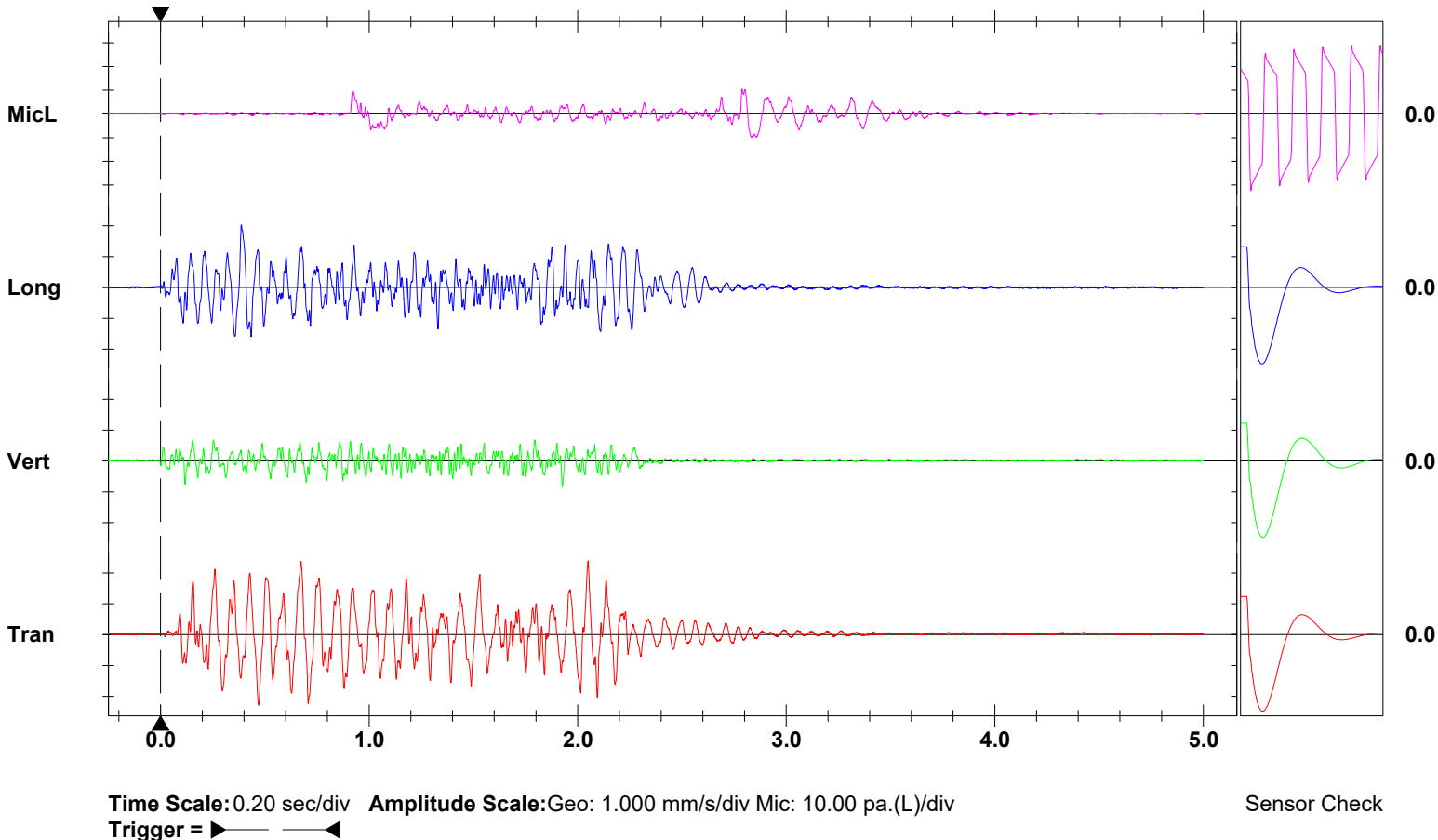
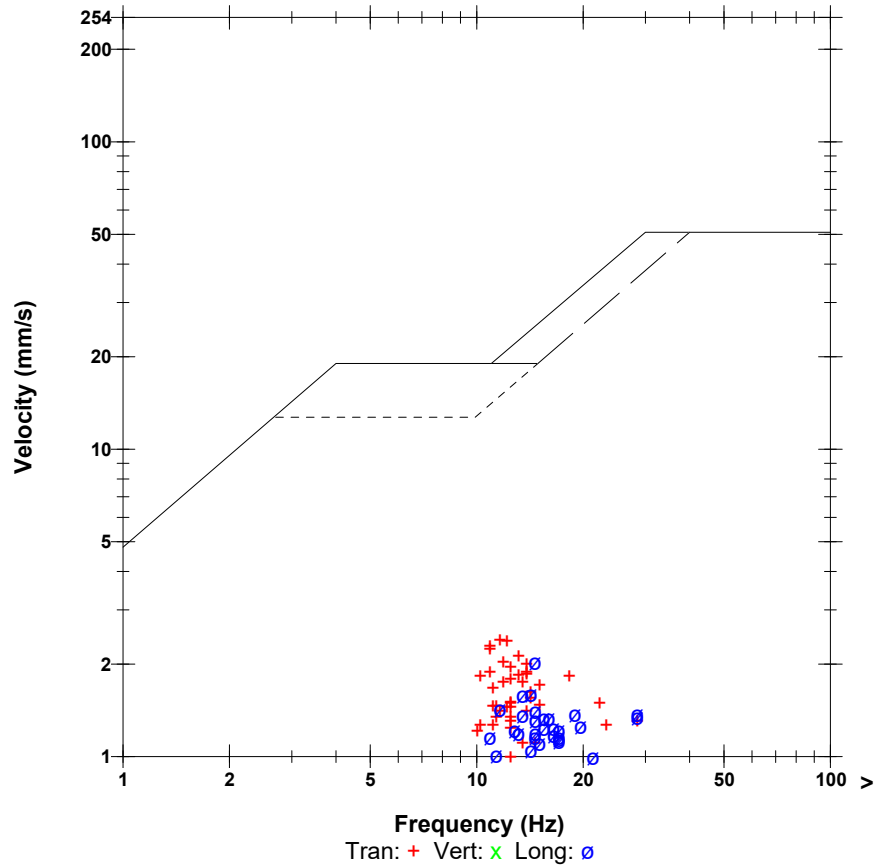
**Serial Number** BE15777 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q777GU5G.870

**Microphone** Linear Weighting  
**PSPL** 114.4 dB(L) 10.5 pa.(L) at 2.788 sec  
**ZC Freq** 14 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 536 mv)

	Tran	Vert	Long	
PPV	2.40	0.810	2.03	mm/s
ZC Freq	12	28	15	Hz
Time (Rel. to Trig)	2.050	1.926	0.387	sec
Peak Acceleration	0.0298	0.0215	0.0315	g
Peak Displacement	0.0294	0.00667	0.0215	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.7	Hz
Overswing Ratio	3.8	3.4	3.9	

**Peak Vector Sum** 2.70 mm/s at 0.674 sec

**USBM RI8507 And OSMRE**



Sensor Check

**Date/Time** Vert at 14:00:05 April 6, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

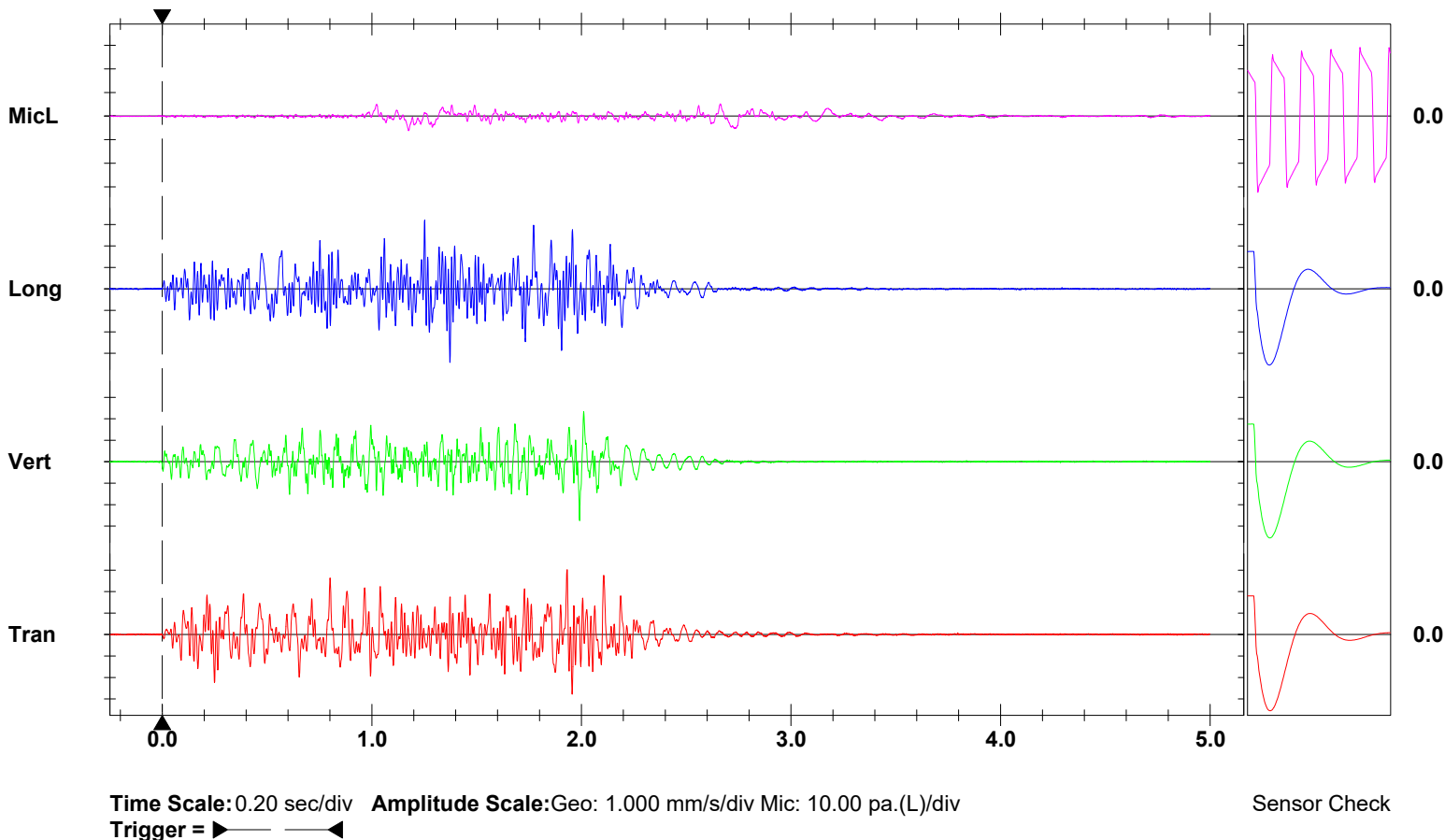
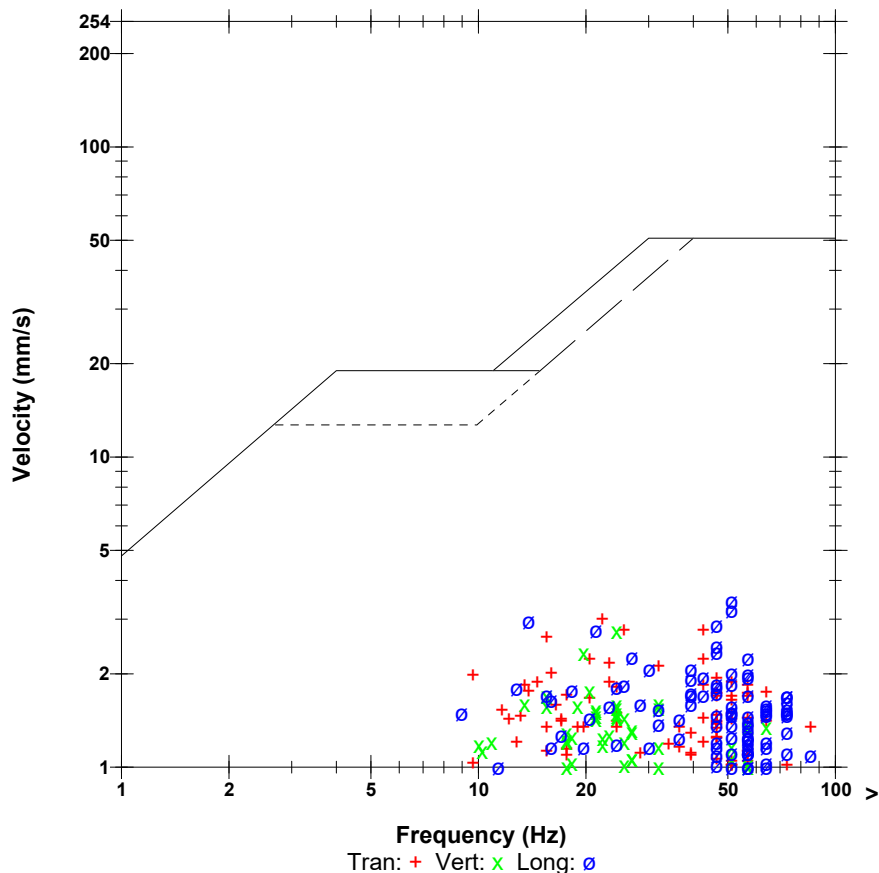
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**Battery Level** 6.5 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q569GU5G.850

**Microphone** Linear Weighting  
**PSPL** 109.9 dB(L) 6.25 pa.(L) at 1.175 sec  
**ZC Freq** 5.3 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 511 mv)

	Tran	Vert	Long	
PPV	3.02	2.75	3.43	mm/s
ZC Freq	22	24	51	Hz
Time (Rel. to Trig)	1.931	1.991	1.373	sec
Peak Acceleration	0.0779	0.0497	0.103	g
Peak Displacement	0.0190	0.0145	0.0197	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.6	Hz
Overswing Ratio	3.6	3.7	3.9	

**Peak Vector Sum** 3.85 mm/s at 1.373 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 14:00:05 April 6, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

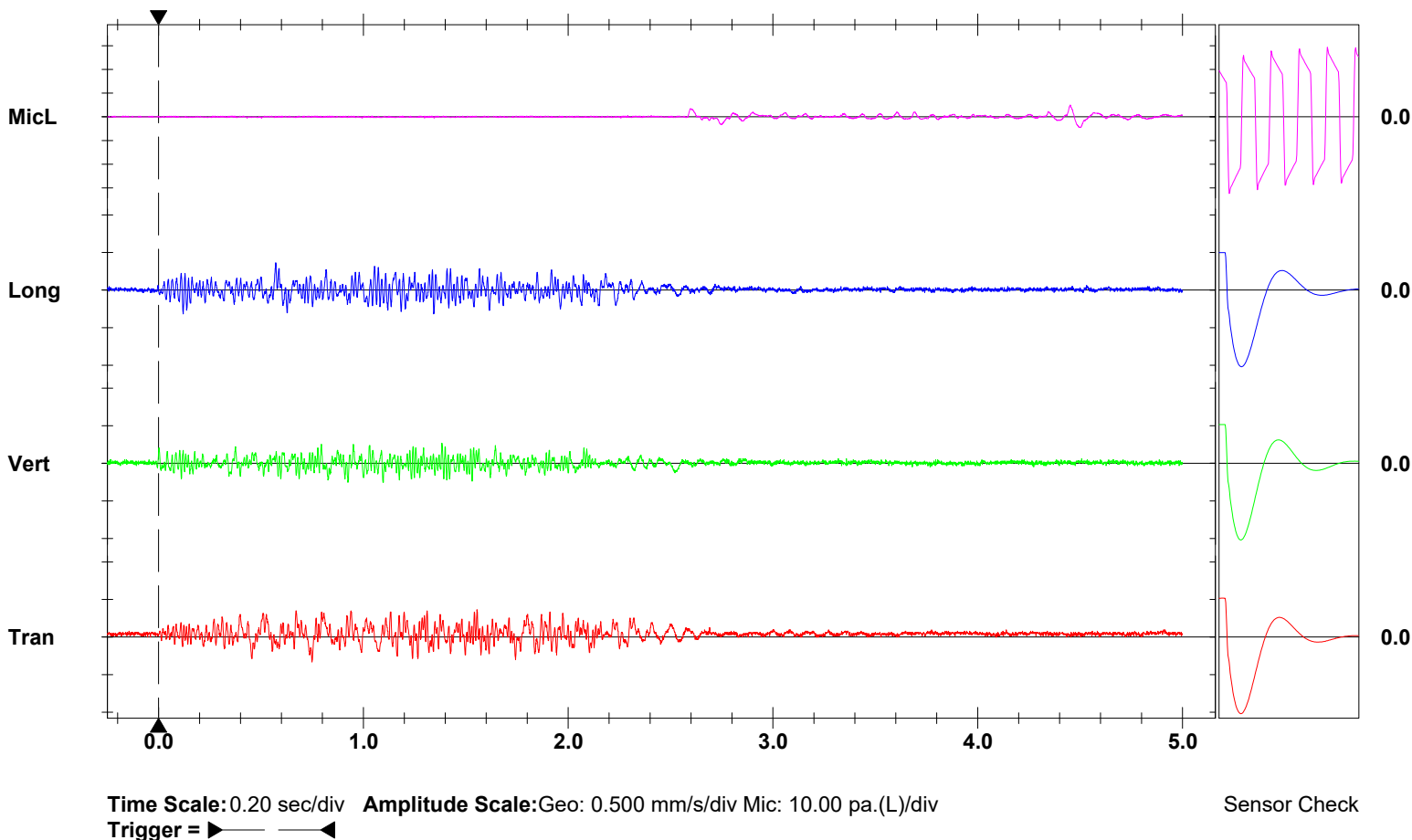
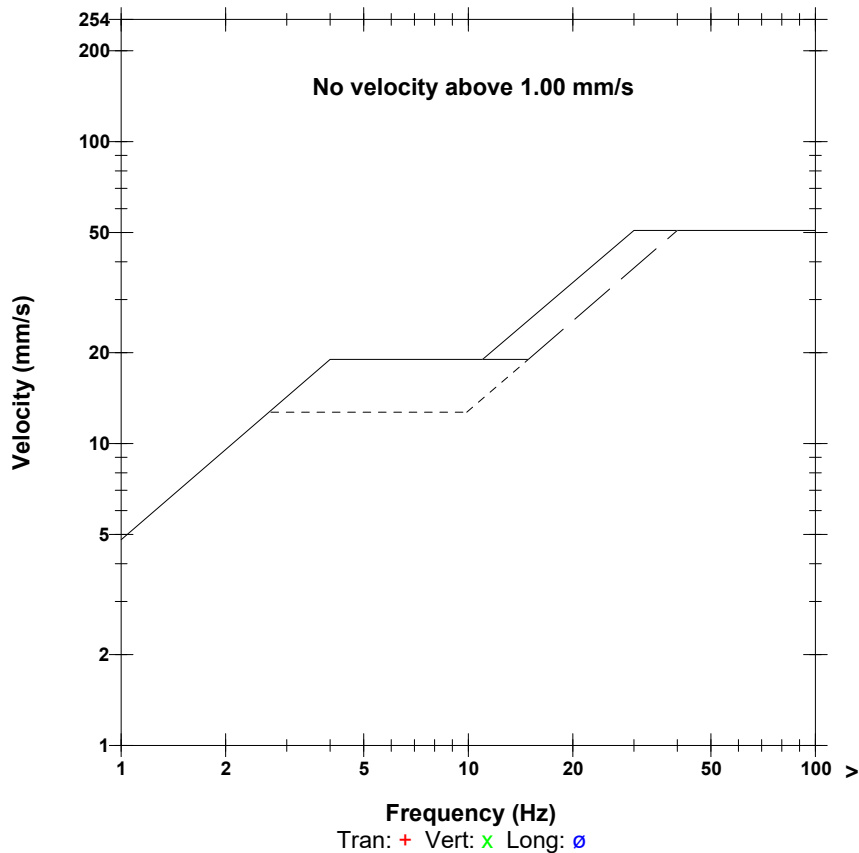
**Serial Number** BE15377 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.5 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q377GU5G.850

**Microphone** Linear Weighting  
**PSPL** 108.0 dB(L) 5.00 pa.(L) at 4.452 sec  
**ZC Freq** 10 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 566 mv)

	Tran	Vert	Long	
PPV	0.365	0.270	0.365	mm/s
ZC Freq	51	51	30	Hz
Time (Rel. to Trig)	1.555	1.384	0.572	sec
Peak Acceleration	0.0133	0.0133	0.0149	g
Peak Displacement	0.00460	0.00157	0.00269	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.7	7.1	Hz
Overswing Ratio	3.9	3.3	3.9	

**Peak Vector Sum** 0.417 mm/s at 0.796 sec

## USBM R18507 And OSMRE



**Date/Time** Vert at 13:00:05 May 15, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

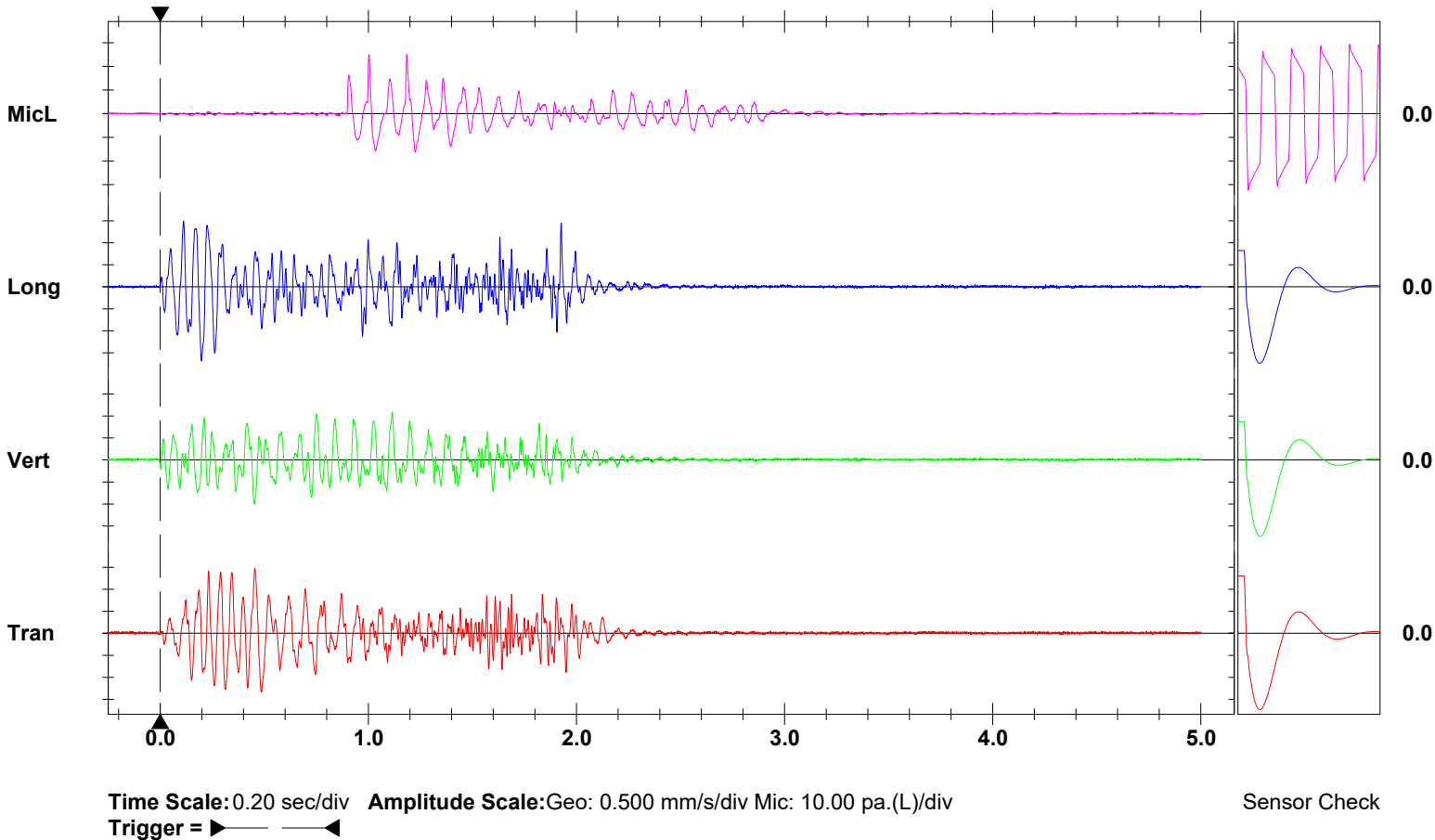
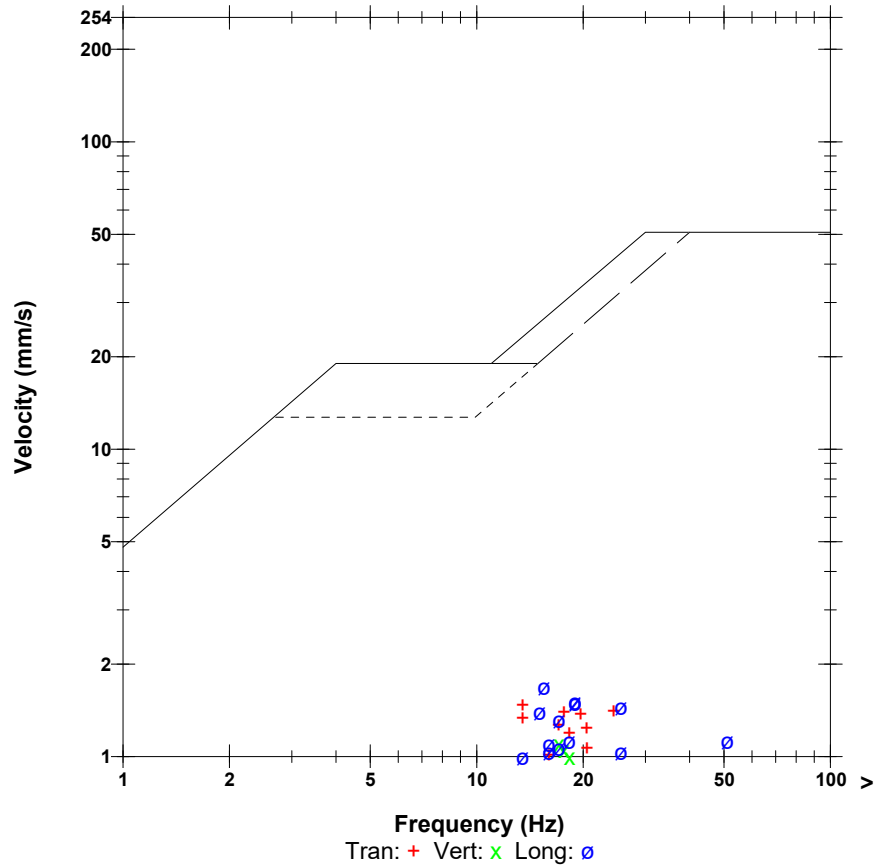
**Serial Number** BE15569 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q569GW5L.G50

**Microphone** Linear Weighting  
**PSPL** 121.9 dB(L) 25.0 pa.(L) at 1.003 sec  
**ZC Freq** 12 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 563 mv)

	Tran	Vert	Long	
PPV	1.48	1.10	1.68	mm/s
ZC Freq	13	17	16	Hz
Time (Rel. to Trig)	0.454	1.114	0.197	sec
Peak Acceleration	0.0365	0.0215	0.0398	g
Peak Displacement	0.0150	0.00988	0.0169	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.5	7.6	Hz
Overswing Ratio	3.6	3.8	4.0	

**Peak Vector Sum** 1.93 mm/s at 0.231 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 13:00:05 May 15, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

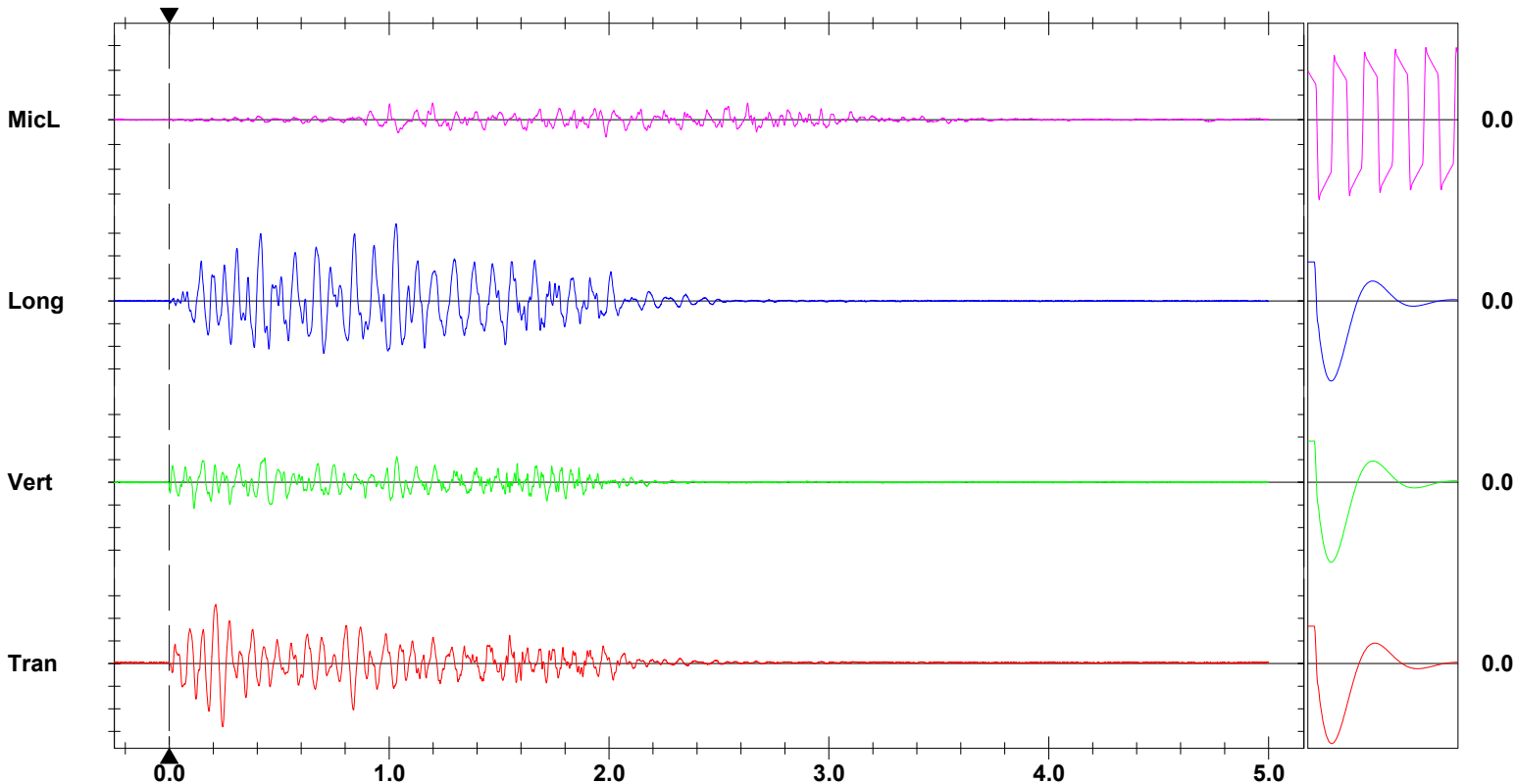
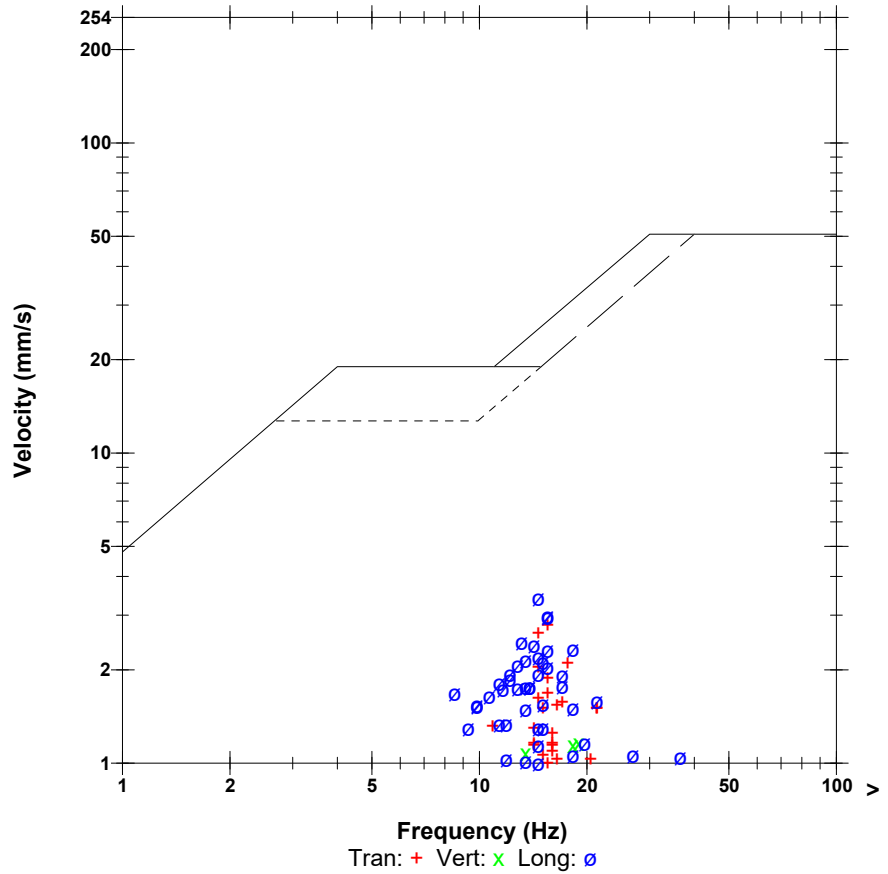
**Serial Number** BE16020 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.4 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R020GW5L.G50

**Microphone** Linear Weighting  
**PSPL** 110.9 dB(L) 7.00 pa.(L) at 1.986 sec  
**ZC Freq** 16 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 567 mv)

	Tran	Vert	Long	
PPV	2.79	1.16	3.41	mm/s
ZC Freq	16	19	15	Hz
Time (Rel. to Trig)	0.243	0.112	1.031	sec
Peak Acceleration	0.0315	0.0265	0.0398	g
Peak Displacement	0.0292	0.0137	0.0377	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.5	7.4	Hz
Overswing Ratio	3.9	3.8	4.0	

**Peak Vector Sum** 3.67 mm/s at 1.032 sec

## USBM RI8507 And OSMRE



**Time Scale:** 0.20 sec/div **Amplitude Scale:** Geo: 1.000 mm/s/div Mic: 10.00 pa.(L)/div  
**Trigger =**

Sensor Check

**Date/Time** Vert at 13:00:05 May 15, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

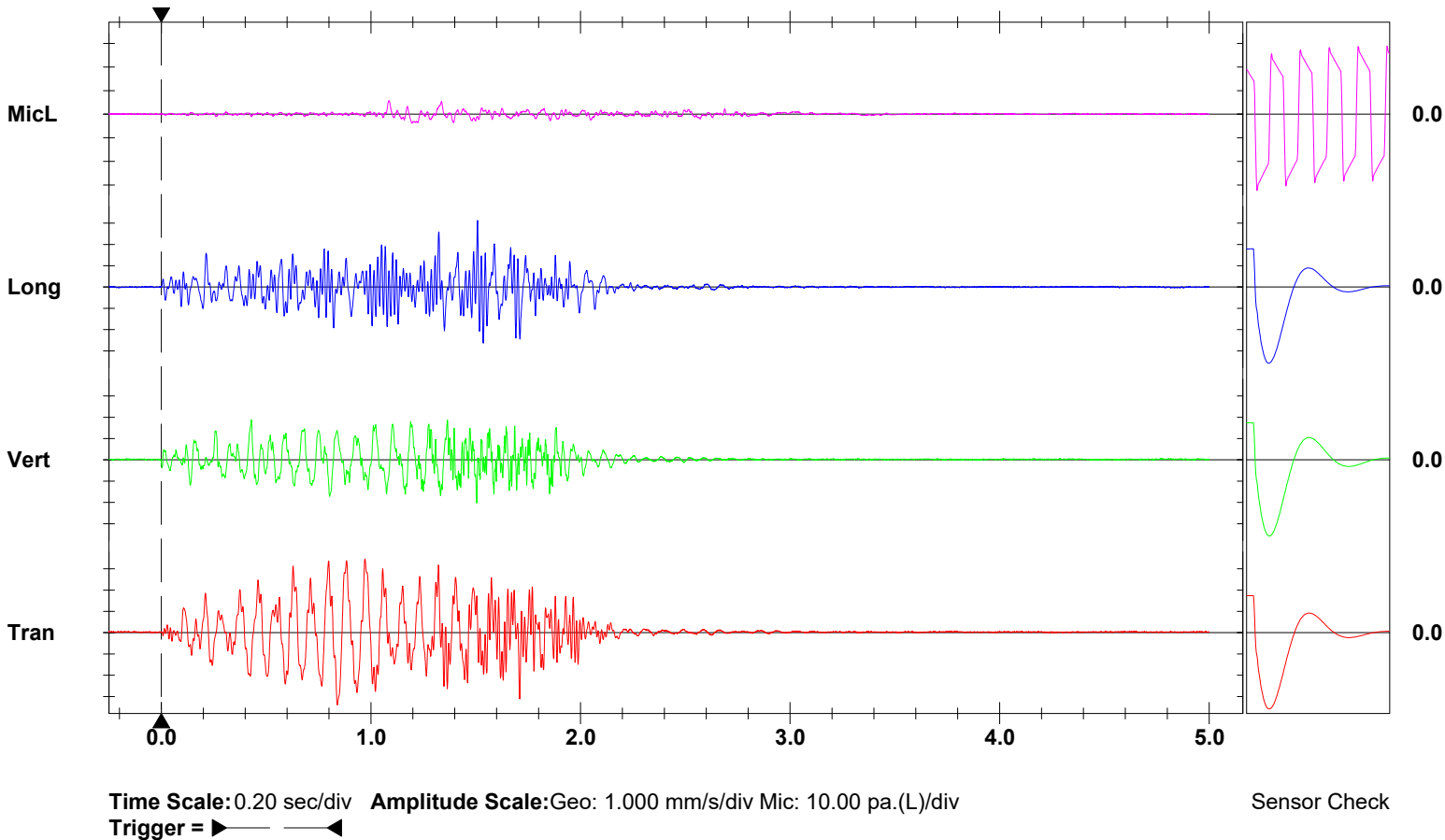
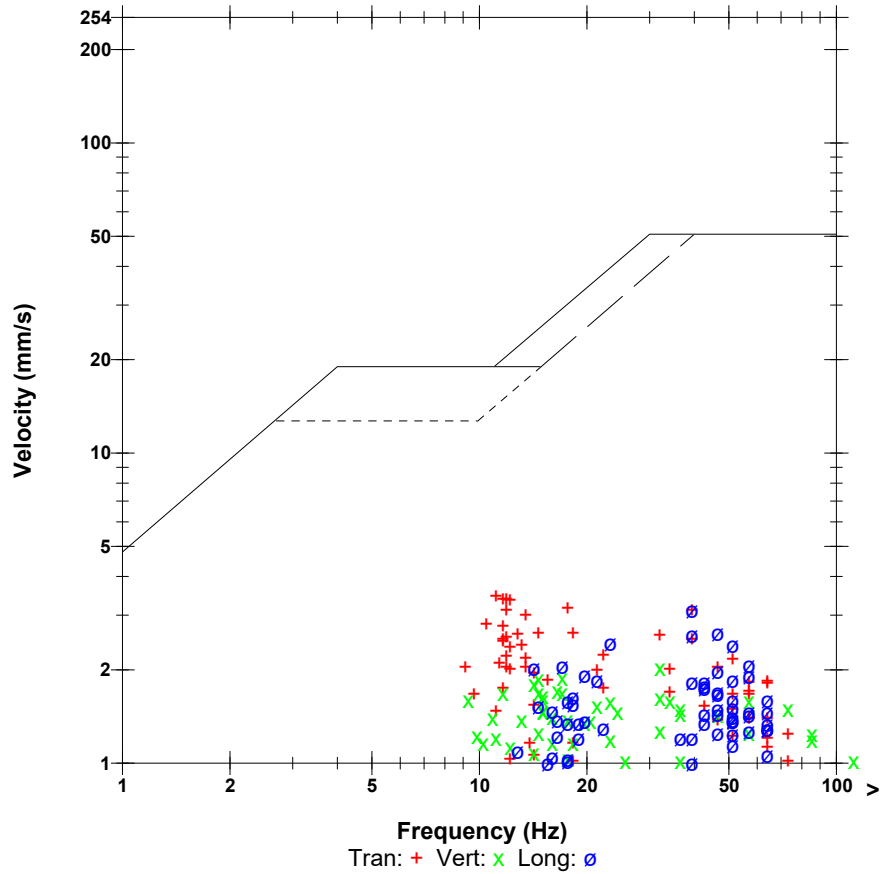
**Serial Number** BE15777 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q777GW5L.G50

**Microphone** Linear Weighting  
**PSPL** 109.2 dB(L) 5.75 pa.(L) at 1.085 sec  
**ZC Freq** 18 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 615 mv)

	Tran	Vert	Long	
PPV	3.46	2.03	3.13	mm/s
ZC Freq	11	32	39	Hz
Time (Rel. to Trig)	0.971	1.505	1.509	sec
Peak Acceleration	0.0845	0.0812	0.0845	g
Peak Displacement	0.0436	0.0178	0.0134	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.5	7.4	Hz
Overswing Ratio	3.9	3.4	4.0	

**Peak Vector Sum** 4.23 mm/s at 1.323 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 13:00:08 May 15, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

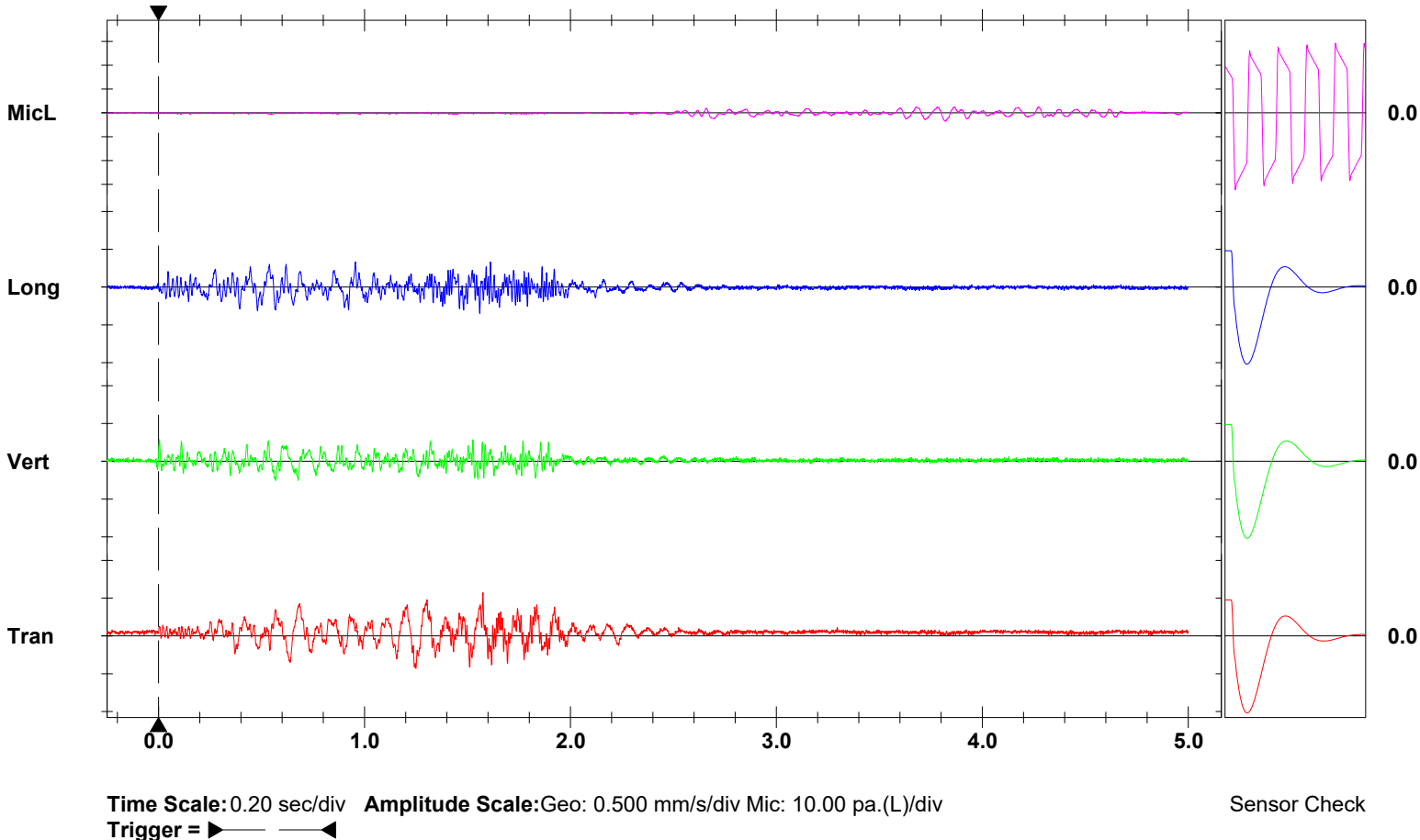
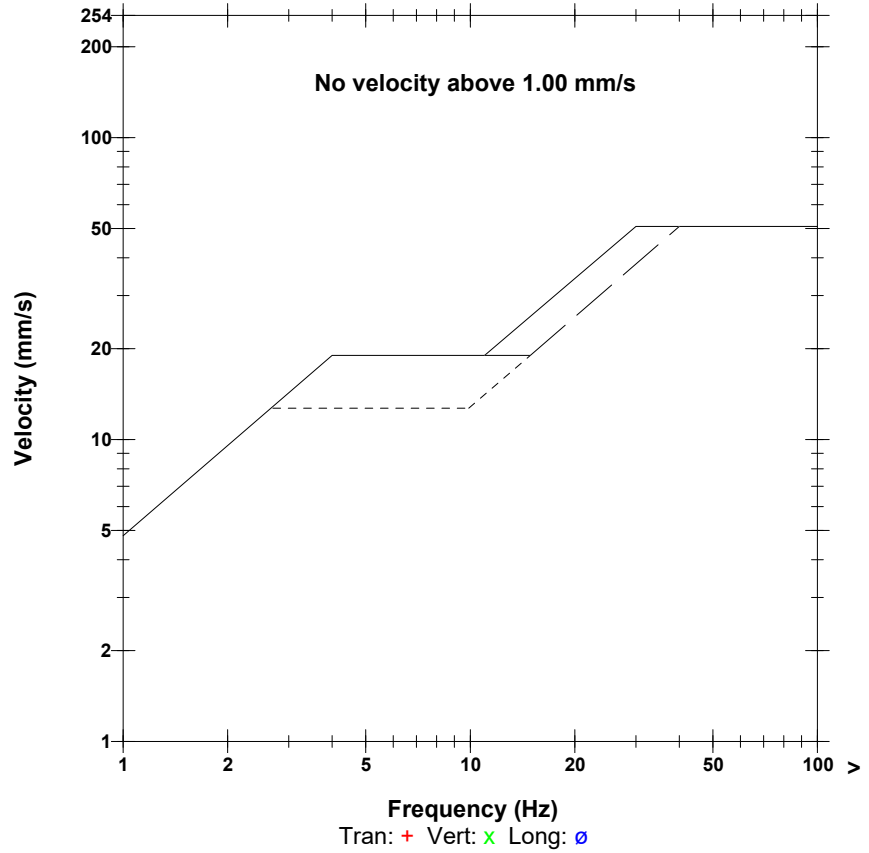
**Serial Number** BE16158 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R158GW5L.G80

**Microphone** Linear Weighting  
**PSPL** 104.9 dB(L) 3.50 pa.(L) at 3.817 sec  
**ZC Freq** 12 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 549 mv)

	Tran	Vert	Long	
PPV	0.571	0.286	0.349	mm/s
ZC Freq	9.1	47	51	Hz
Time (Rel. to Trig)	1.575	0.004	1.560	sec
Peak Acceleration	0.0166	0.0133	0.0149	g
Peak Displacement	0.00994	0.00325	0.00325	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.4	7.6	Hz
Overswing Ratio	3.9	3.8	3.8	

**Peak Vector Sum** 0.590 mm/s at 1.575 sec

## USBM R18507 And OSMRE



**Date/Time** Vert at 14:30:04 June 14, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

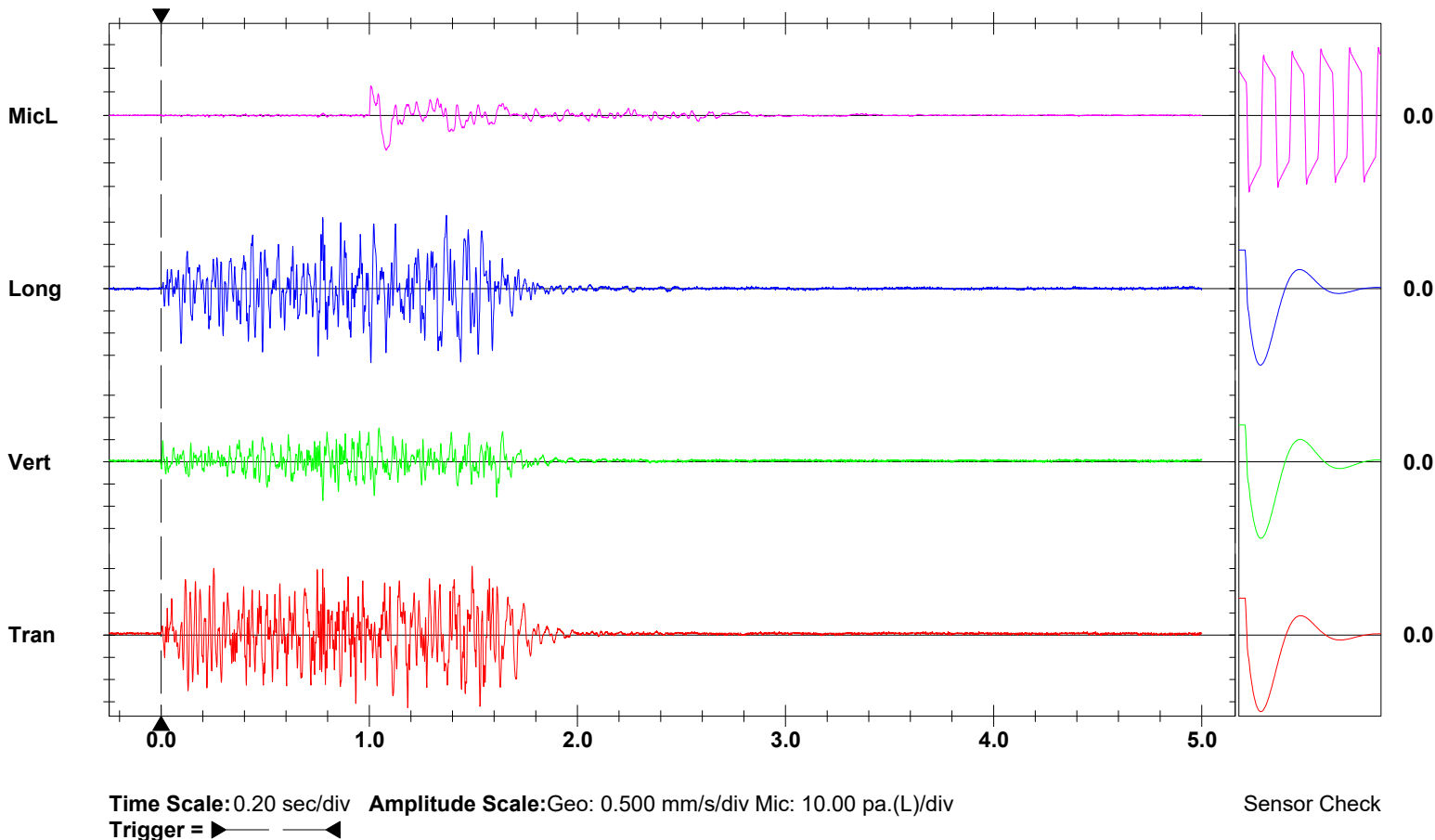
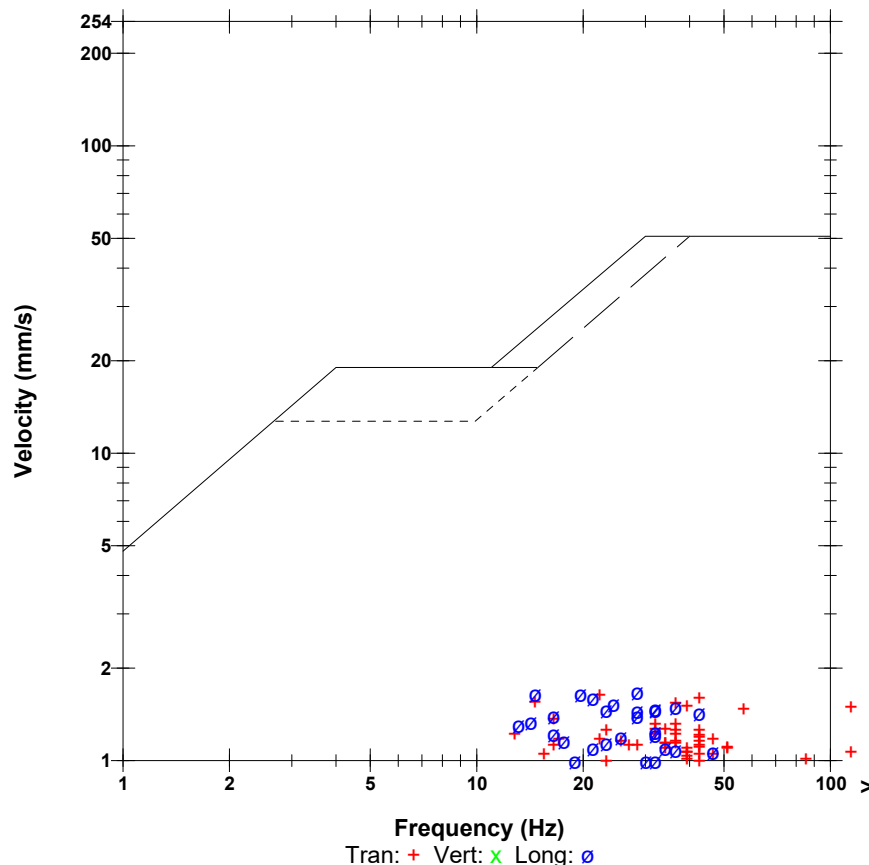
**Serial Number** BE15777 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q777GXP9.M40

**Microphone** Linear Weighting  
**PSPL** 117.4 dB(L) 14.8 pa.(L) at 1.081 sec  
**ZC Freq** 7.9 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 587 mv)

	Tran	Vert	Long	
PPV	1.64	0.873	1.67	mm/s
ZC Freq	22	28	28	Hz
Time (Rel. to Trig)	1.185	0.777	1.008	sec
Peak Acceleration	0.0795	0.0282	0.0580	g
Peak Displacement	0.0118	0.00526	0.0145	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.6	Hz
Overswing Ratio	3.9	3.4	4.0	

**Peak Vector Sum** 2.35 mm/s at 0.776 sec

**USBM RI8507 And OSMRE**



**Date/Time** Vert at 14:30:05 June 14, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

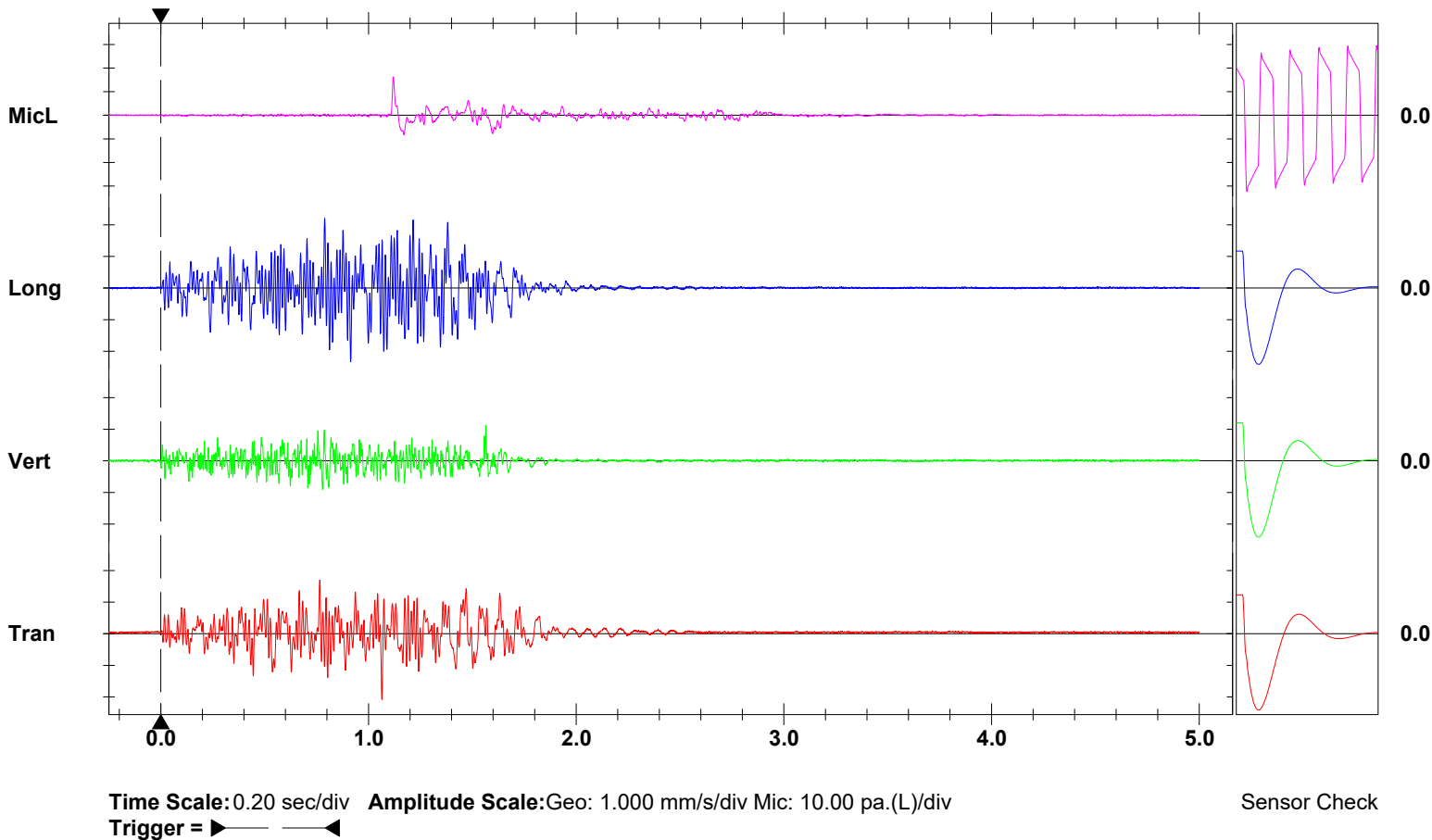
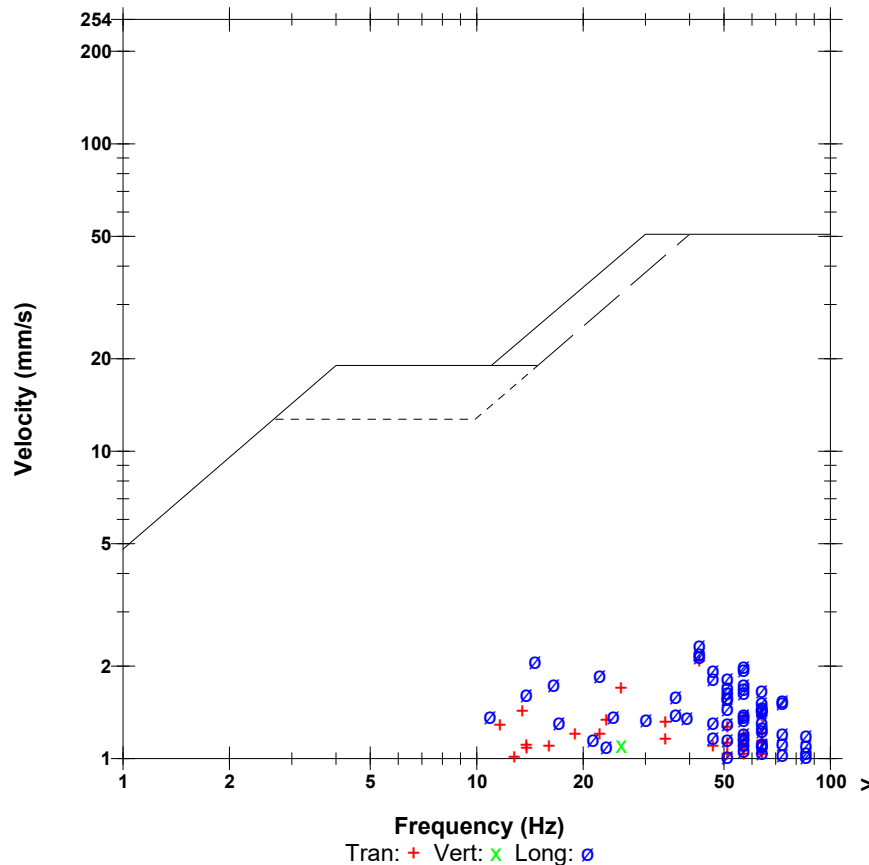
**Serial Number** BE16020 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R020GXP9.M50

**Microphone** Linear Weighting  
**PSPL** 114.9 dB(L) 16.1 pa.(L) at 1.119 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 549 mv)

	Tran	Vert	Long	
PPV	2.08	1.11	2.33	mm/s
ZC Freq	43	26	43	Hz
Time (Rel. to Trig)	1.064	1.565	0.914	sec
Peak Acceleration	0.0530	0.0497	0.0729	g
Peak Displacement	0.0156	0.00464	0.0167	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.4	7.4	Hz
Overswing Ratio	3.9	3.8	4.0	

**Peak Vector Sum** 2.50 mm/s at 0.788 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 14:30:04 June 14, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

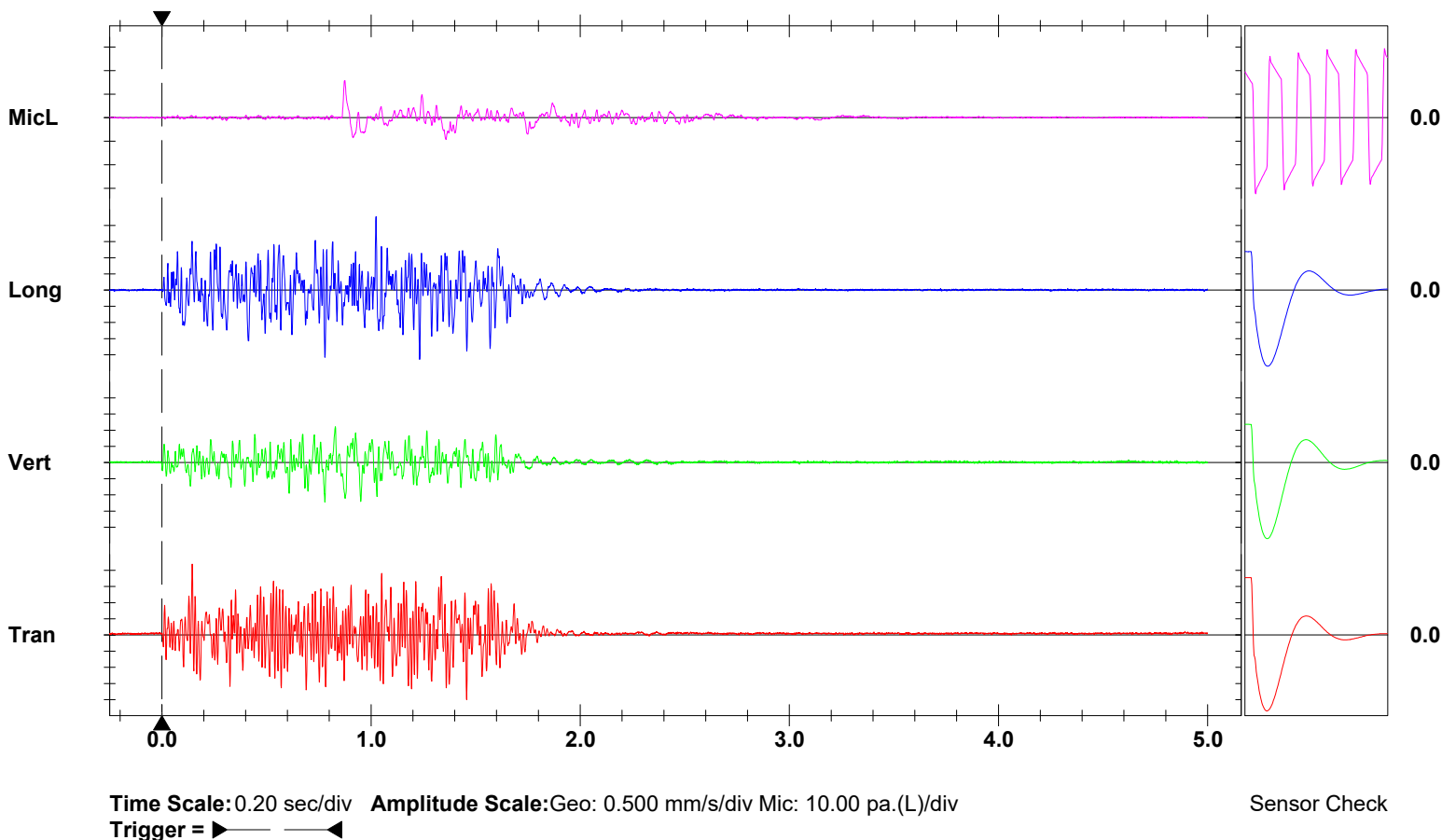
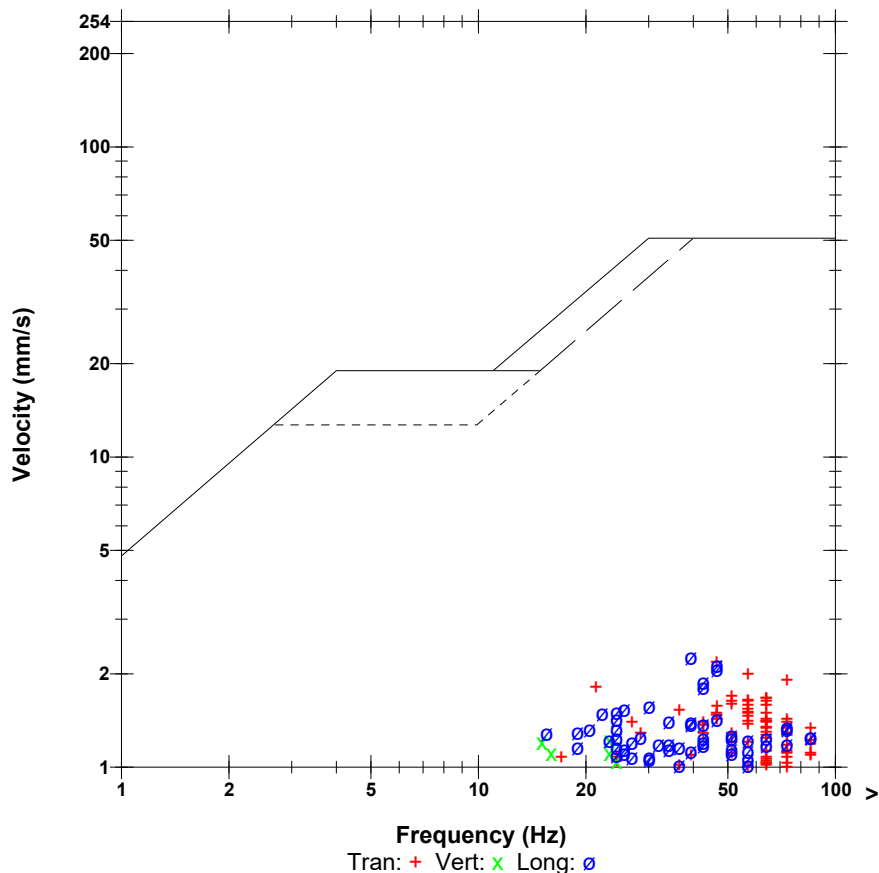
**Serial Number** BE15377 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** Q377GXP9.M40

**Microphone** Linear Weighting  
**PSPL** 114.9 dB(L) 15.8 pa.(L) at 0.873 sec  
**ZC Freq** 13 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 609 mv)

	Tran	Vert	Long	
PPV	2.19	1.22	2.27	mm/s
ZC Freq	47	23	39	Hz
Time (Rel. to Trig)	0.145	0.779	1.023	sec
Peak Acceleration	0.0779	0.0348	0.0696	g
Peak Displacement	0.0117	0.0111	0.0102	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.1	Hz
Overswing Ratio	4.0	3.4	4.0	

**Peak Vector Sum** 2.71 mm/s at 1.457 sec

## USBM RI8507 And OSMRE



**Date/Time** Vert at 14:30:04 June 14, 2017  
**Trigger Source** Geo: 0.130 mm/s  
**Range** Geo: 31.7 mm/s  
**Record Time** 5.0 sec at 1024 sps  
**Notes**

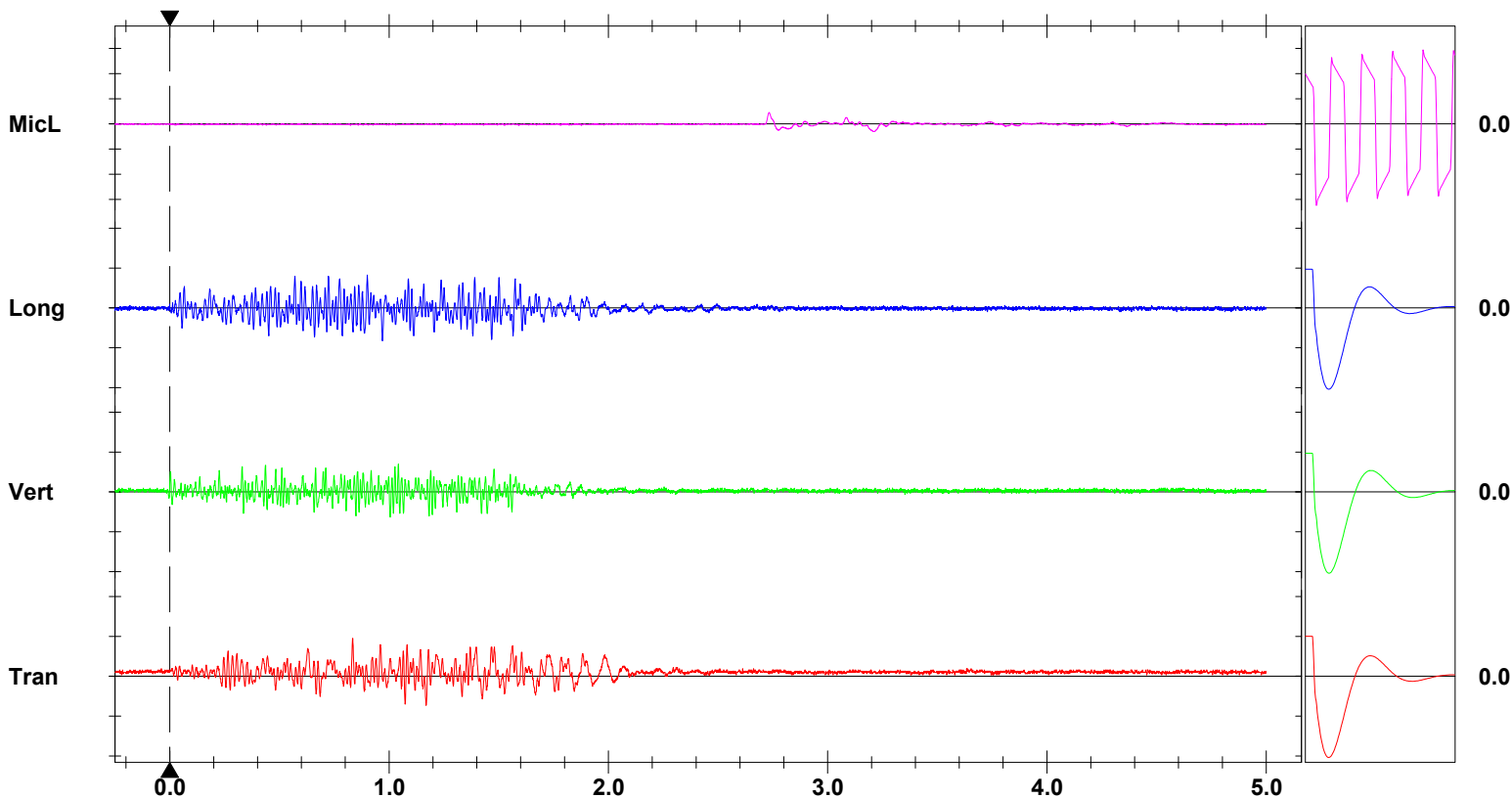
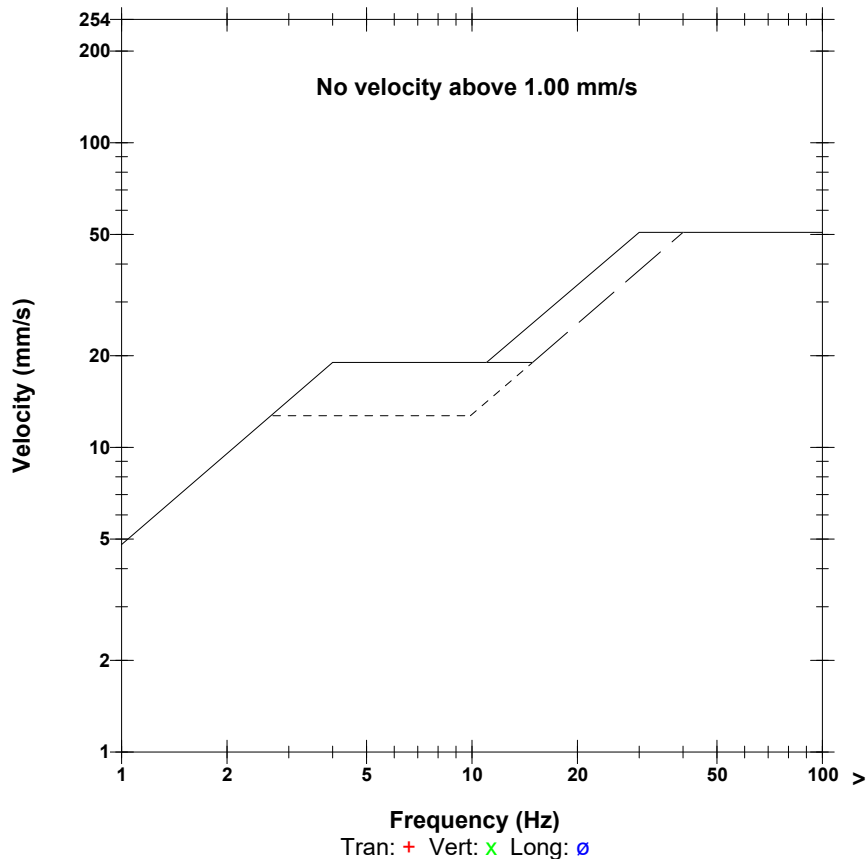
**Serial Number** BE16158 V 10.72-1.1 Minimate Blaster  
**Battery Level** 6.3 Volts  
**Unit Calibration** October 31, 2016 by Saros (Int)  
**File Name** R158GXP9.M40

**Microphone** Linear Weighting  
**PSPL** 107.0 dB(L) 4.50 pa.(L) at 2.731 sec  
**ZC Freq** 14 Hz  
**Channel Test** Passed (Freq = 20.1 Hz Amp = 563 mv)

	Tran	Vert	Long	
PPV	0.476	0.349	0.413	mm/s
ZC Freq	37	64	47	Hz
Time (Rel. to Trig)	0.833	1.042	0.900	sec
Peak Acceleration	0.0149	0.0182	0.0149	g
Peak Displacement	0.0119	0.00099	0.00166	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.4	7.5	Hz
Overswing Ratio	4.0	3.8	3.9	

**Peak Vector Sum** 0.561 mm/s at 0.834 sec

## USBM RI8507 And OSMRE



## Appendix D – Air monitoring results

DDG results

TsP results

Pm10 results



## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1604693**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **08-Dec-2016 15:39**  
**Date Analysis Commenced** : **15-Dec-2016**  
**Issue Date** : **19-Dec-2016 16:39**



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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.

Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Jennifer Targett	Laboratory Technician	Newcastle, Mayfield West, 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

Sub-Matrix: FILTER (TSP/RSP) (Matrix: AIR)				Client sample ID		TSP South 9195155	TSP North 9195153	PM10 North 9195152	PM10 South 9195156	----		
Client sampling date / time				01-Dec-2016 15:30		02-Dec-2016 15:30		01-Dec-2016 15:30		02-Dec-2016 15:30		----
Compound	CAS Number	LOR	Unit	EW1604693-001		EW1604693-002		EW1604693-003		EW1604693-004		-----
				Result		Result		Result		Result		----
EA143: Particulates in Air - HVAFs												
ø Total Suspended Particulates	----	0.1	µg/m³	12.3		11.2		----		----		----
ø PM10	----	0.1	µg/m³	----		----		17.6		10.2		----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	7.2		6.6		----		----		----
PM10 (mass per filter)	----	0.1	mg/filter	----		----		10.3		6.0		----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1604838**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 19-Dec-2016 15:49  
**Date Analysis Commenced** : 22-Dec-2016  
**Issue Date** : 22-Dec-2016 16:22



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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.

Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Jennifer Targett	Laboratory Technician	Newcastle, Mayfield West, 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9195159	TSP North 9195157	PM10 North 9195160	PM10 South 9195158	----
Client sampling date / time				09-Dec-2016 15:30	08-Dec-2016 15:30	09-Dec-2016 15:30	08-Dec-2016 15:30	----
Compound	CAS Number	LOR	Unit	EW1604838-001	EW1604838-002	EW1604838-003	EW1604838-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	7.7	14.4	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	12.2	2.9	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	4.5	8.4	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	7.2	1.7	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1604905**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **20-Dec-2016 12:20**  
**Date Analysis Commenced** : **28-Dec-2016**  
**Issue Date** : **03-Jan-2017 10:21**



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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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>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle, Mayfield West, 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.

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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9195163	TSP North 9195161	PM10 North 9195164	PM10 South 9195162	----
Client sampling date / time				16-Dec-2016 15:30	15-Dec-2016 15:30	16-Dec-2016 15:30	15-Dec-2016 15:30	----
Compound	CAS Number	LOR	Unit	EW1604905-001	EW1604905-002	EW1604905-003	EW1604905-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	9.6	10.0	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	13.5	9.0	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.5	5.7	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	7.8	5.2	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1604915**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **8**  
**No. of samples analysed** : **8**

**Page** : 1 of 4  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 21-Dec-2016 15:40  
**Date Analysis Commenced** : 23-Dec-2016  
**Issue Date** : 04-Jan-2017 14:14



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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW
Jennifer Targett	Laboratory Technician	Newcastle, Mayfield West, NSW



## General Comments

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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.

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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in  $\text{g}/\text{m}^2\cdot\text{mth}$  as sampling data was provided by the client.
- Sample exposure period is 21 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.



## Analytical Results

Sub-Matrix: DEPOSITIONAL DUST  
 (Matrix: AIR)

Client sample ID

				Station 1 30/11/16 to 21/12/16	Station 2 30/11/16 to 21/12/16	Station 3 30/11/16 to 21/12/16	Station 4 30/11/16 to 21/12/16	----
Client sampling date / time				21-Dec-2016 00:00	21-Dec-2016 00:00	21-Dec-2016 00:00	21-Dec-2016 00:00	----
Compound	CAS Number	LOR	Unit	EW1604915-005	EW1604915-006	EW1604915-007	EW1604915-008	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	0.1	<0.1	0.1	0.2	----
Ash Content (mg)	----	1	mg	1	<1	1	3	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	0.1	<0.1	0.1	0.4	----
Combustible Matter (mg)	----	1	mg	2	<1	1	5	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.2	<0.1	0.2	0.6	----
Total Insoluble Matter (mg)	----	1	mg	3	<1	2	8	----



## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9195165	TSP North 9195166	PM10 North 9195168	PM10 South 9195167	----
Client sampling date / time				20-Dec-2016 15:30	21-Dec-2016 15:30	21-Dec-2016 15:30	20-Dec-2016 15:30	----
Compound	CAS Number	LOR	Unit	EW1604915-001	EW1604915-002	EW1604915-003	EW1604915-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
Ø Total Suspended Particulates	----	0.1	µg/m³	24.3	22.7	----	----	----
Ø PM10	----	0.1	µg/m³	----	----	17.4	12.1	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	14.2	13.3	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	10.2	7.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700286**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks - Bores**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **SY/466/10 V2**  
**No. of samples received** : **8**  
**No. of samples analysed** : **8**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **23-Jan-2017 15:14**  
**Date Analysis Commenced** : **24-Jan-2017**  
**Issue Date** : **31-Jan-2017 14:16**



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### Signatories

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Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong



## General Comments

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- EK071G: LOR raised for Reactive Phosphorus analysis on sample ID: P7, due to matrix interferences.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Field data supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	P1	P2	P3	P4	P5
Client sampling date / time					23-Jan-2017 13:30	23-Jan-2017 12:50	23-Jan-2017 14:10	23-Jan-2017 14:00	23-Jan-2017 14:40
Compound	CAS Number	LOR	Unit		EW1700286-001	EW1700286-002	EW1700286-003	EW1700286-004	EW1700286-005
					Result	Result	Result	Result	Result
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		6.8	----	6.9	----	7.4
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7600	----	9140	----	7500
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		<1	----	<1	----	<1
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		<1	----	<1	----	<1
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		450	----	526	----	786
Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L		450	----	526	----	786
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		143	----	434	----	391
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1970	----	3180	----	2500
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		150	----	197	----	99
Magnesium	7439-95-4	1	mg/L		186	----	240	----	134
Sodium	7440-23-5	1	mg/L		1070	----	1810	----	1620
Potassium	7440-09-7	1	mg/L		18	----	17	----	22
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L		67.5	----	109	----	94.4
Total Cations	----	0.01	meq/L		69.8	----	109	----	87.0
Ionic Balance	----	0.01	%		1.64	----	0.23	----	4.06
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--		----	Damaged	----	Dry	----
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m		19.1	----	17.6	----	6.89



## Analytical Results

Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )				Client sample ID	P6	P7	P8	----	----
Client sampling date / time					23-Jan-2017 00:00	23-Jan-2017 13:10	23-Jan-2017 13:50	----	----
Compound	CAS Number	LOR	Unit		EW1700286-006	EW1700286-007	EW1700286-008	-----	-----
				Result	Result	Result		----	----
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		----	6.8	----	----	----
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		----	6480	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		----	<1	----	----	----
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		----	<1	----	----	----
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		----	570	----	----	----
Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L		----	570	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		----	437	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		----	3920	----	----	----
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		----	305	----	----	----
Magnesium	7439-95-4	1	mg/L		----	324	----	----	----
Sodium	7440-23-5	1	mg/L		----	1880	----	----	----
Potassium	7440-09-7	1	mg/L		----	22	----	----	----
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L		----	131	----	----	----
Total Cations	----	0.01	meq/L		----	124	----	----	----
Ionic Balance	----	0.01	%		----	2.68	----	----	----
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--	Not accessible	----	Dry	----	----	----
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m		----	15.0	----	----	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700301**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **23-Jan-2017 15:59**  
**Date Analysis Commenced** : **30-Jan-2017**  
**Issue Date** : **01-Feb-2017 16:19**



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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9280680	TSP North 9280682	PM10 North 9280679	PM10 South 9280681	----
Client sampling date / time				19-Jan-2017 00:00	20-Jan-2017 00:00	19-Jan-2017 00:00	20-Jan-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1700301-001	EW1700301-002	EW1700301-003	EW1700301-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	14.2	19.4	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	12.5	4.7	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	8.2	11.2	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	7.2	2.7	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700303**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 23-Jan-2017 16:03  
**Date Analysis Commenced** : 30-Jan-2017  
**Issue Date** : 01-Feb-2017 16:19



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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

Sub-Matrix: FILTER (TSP/RSP) (Matrix: AIR)				Client sample ID		TSP South 9280675	TSP North 9280677	PM10 North 9280676	PM10 South 9280683	----		
Client sampling date / time				13-Jan-2017 00:00		12-Jan-2017 00:00		13-Jan-2017 00:00		12-Jan-2017 00:00		----
Compound	CAS Number	LOR	Unit	EW1700303-001		EW1700303-002		EW1700303-003		EW1700303-004		-----
				Result		Result		Result		Result		----
EA143: Particulates in Air - HVAFs												
ø Total Suspended Particulates	----	0.1	µg/m³	10.1		11.0		----		----		----
ø PM10	----	0.1	µg/m³	----		----		6.7		3.8		----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.9		6.4		----		----		----
PM10 (mass per filter)	----	0.1	mg/filter	----		----		3.8		2.2		----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700597**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **10-Feb-2017 11:17**  
**Date Analysis Commenced** : **14-Feb-2017**  
**Issue Date** : **20-Feb-2017 11:50**



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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- General Comments
- Analytical Results

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### 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.

Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, 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.

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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.  
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 Ø = ALS is not NATA accredited for these tests.  
 ~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.
- Sample exposure period is 48 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.

## Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**  
 (Matrix: **AIR**)

Client sample ID

				Station 1 21.12.16 to 7.2.17	Station 2 21.12.16 to 7.2.17	Station 3 21.12.16 to 7.2.17	Station 4 21.12.16 to 7.2.17	----
Client sampling date / time				07-Feb-2017 10:00	07-Feb-2017 10:07	07-Feb-2017 10:13	07-Feb-2017 10:20	----
Compound	CAS Number	LOR	Unit	EW1700597-001	EW1700597-002	EW1700597-003	EW1700597-004	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	<b>0.2</b>	<b>0.1</b>	<b>0.2</b>	<0.1	----
Ash Content (mg)	----	1	mg	<b>7</b>	<b>2</b>	<b>7</b>	<b>1</b>	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	<b>0.1</b>	<0.1	<b>0.2</b>	<b>0.1</b>	----
Combustible Matter (mg)	----	1	mg	<b>2</b>	<b>1</b>	<b>3</b>	<b>1</b>	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	<b>0.3</b>	<b>0.1</b>	<b>0.4</b>	<b>0.1</b>	----
Total Insoluble Matter (mg)	----	1	mg	<b>9</b>	<b>3</b>	<b>10</b>	<b>2</b>	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700598**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 10-Feb-2017 11:28  
**Date Analysis Commenced** : 15-Feb-2017  
**Issue Date** : 17-Feb-2017 15:45



Accreditation No. 825  
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 ISO/IEC 17025 - Testing

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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, 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.

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 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9280690	TSP North 9280688	PM10 North 9280691	PM10 South 9280689	----
Client sampling date / time				03-Feb-2017 15:30	02-Feb-2017 15:30	03-Feb-2017 15:30	02-Feb-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1700598-001	EW1700598-002	EW1700598-003	EW1700598-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	4.3	5.4	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	7.3	4.2	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	2.5	3.1	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	4.2	2.4	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700599**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 10-Feb-2017 11:40  
**Date Analysis Commenced** : 15-Feb-2017  
**Issue Date** : 17-Feb-2017 15:45



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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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 ^ = This result is computed from individual analyte detections at or above the level of reporting  
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 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9280686	TSP North 9280687	PM10 North 9280685	PM10 South 9280684	----
Client sampling date / time				25-Jan-2017 15:30	24-Jan-2017 15:30	25-Jan-2017 15:30	24-Jan-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1700599-001	EW1700599-002	EW1700599-003	EW1700599-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	9.4	12.8	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	21.3	17.4	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.4	7.4	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	12.3	10.0	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700703**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **16-Feb-2017 14:12**  
**Date Analysis Commenced** : **20-Feb-2017**  
**Issue Date** : **24-Feb-2017 16:53**



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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- Analytical Results

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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP North 9280694	TSP South 9280692	PM10 North 9195169	PM10 South 9280693	----
Client sampling date / time				09-Feb-2017 00:00	10-Feb-2017 00:00	10-Feb-2017 00:00	09-Feb-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1700703-001	EW1700703-002	EW1700703-003	EW1700703-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	18.8	19.3	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	8.4	15.6	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	10.7	11.0	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	4.8	8.9	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700851**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **Matt Holt**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **24-Feb-2017 17:00**  
**Date Analysis Commenced** : **01-Mar-2017**  
**Issue Date** : **06-Mar-2017 09:11**



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Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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

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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.

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 ^ = This result is computed from individual analyte detections at or above the level of reporting  
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 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9399747	TSP North 9399750	PM 10 North 9399749	PM 10 South 9399746	----
Client sampling date / time				24-Feb-2017 15:30	23-Feb-2017 15:30	24-Feb-2017 15:30	23-Feb-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1700851-001	EW1700851-002	EW1700851-003	EW1700851-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	18.0	11.3	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	15.1	11.4	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	10.4	6.5	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	8.7	6.6	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700852**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **Matt Holt**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **24-Feb-2017 17:00**  
**Date Analysis Commenced** : **01-Mar-2017**  
**Issue Date** : **03-Mar-2017 16:35**



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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9206345	TSP North 9206343	PM 10 North 9168734	PM 10 South 9206344	----
Client sampling date / time				17-Feb-2017 15:30	16-Feb-2017 15:30	17-Feb-2017 15:30	16-Feb-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1700852-001	EW1700852-002	EW1700852-003	EW1700852-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	<0.1	2.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	30.5	<0.1	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	<0.1	1.2	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	17.6	<0.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701245**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 20-Mar-2017 13:43  
**Date Analysis Commenced** : 22-Mar-2017  
**Issue Date** : 28-Mar-2017 12:51



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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- General Comments
- Analytical Results

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### 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.

Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, 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.

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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.

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 Ø = ALS is not NATA accredited for these tests.  
 ~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.
- Sample exposure period is 24 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.

## Analytical Results

Sub-Matrix: DEPOSITIONAL DUST  
 (Matrix: AIR)

Client sample ID

				Station 1 7.2.17-3.3.17	Station 2 7.2.17-3.3.17	Station 3 7.2.17-3.3.17	Station 4 7.2.17-3.3.17	----
Client sampling date / time				20-Mar-2017 00:00	20-Mar-2017 00:00	20-Mar-2017 00:00	20-Mar-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701245-005	EW1701245-006	EW1701245-007	EW1701245-008	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	<0.1	0.1	0.1	<0.1	----
Ash Content (mg)	----	1	mg	<1	1	1	<1	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	0.1	0.2	<0.1	0.3	----
Combustible Matter (mg)	----	1	mg	2	3	1	4	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.1	0.3	0.1	0.3	----
Total Insoluble Matter (mg)	----	1	mg	2	4	2	4	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701247**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 20-Mar-2017 13:55  
**Date Analysis Commenced** : 23-Mar-2017  
**Issue Date** : 24-Mar-2017 16:52



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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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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.  
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 ^ = 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9399757	TSP North 9399755	PM10 North 9399758	PM10 South 9399756	----
Client sampling date / time				10-Mar-2017 00:00	09-Mar-2017 00:00	10-Mar-2017 00:00	09-Mar-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701247-001	EW1701247-002	EW1701247-003	EW1701247-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	17.4	16.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	26.2	18.6	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	10.0	9.3	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	15.1	10.7	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701248**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **20-Mar-2017 14:05**  
**Date Analysis Commenced** : **23-Mar-2017**  
**Issue Date** : **24-Mar-2017 16:51**



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Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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 LOR = Limit of reporting  
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 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9399753	TSP North 9399751	PM10 North 9399754	PM10 South 9399752	----
Client sampling date / time				03-Mar-2017 00:00	02-Mar-2017 00:00	03-Mar-2017 00:00	02-Mar-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701248-001	EW1701248-002	EW1701248-003	EW1701248-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	17.4	16.0	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	22.9	21.0	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	10.0	9.2	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	13.2	12.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701683**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **12-Apr-2017 13:46**  
**Date Analysis Commenced** : **27-Apr-2017**  
**Issue Date** : **27-Apr-2017 15:58**



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 ISO/IEC 17025 - Testing

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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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.

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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  
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 ø = ALS is not NATA accredited for these tests.  
 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the µg/m³ results.
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9359338	TSP North 9359337	PM10 North 9359335	PM10 South 9359336	----
Client sampling date / time				30-Mar-2017 00:00	31-Mar-2017 00:00	31-Mar-2017 00:00	30-Mar-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701683-001	EW1701683-002	EW1701683-003	EW1701683-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	µg/m³	0.6	1.1	----	----	----
ø PM10	----	0.1	µg/m³	----	----	1.4	2.4	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	0.4	0.7	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	0.9	1.6	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701684**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **12-Apr-2017 13:56**  
**Date Analysis Commenced** : **27-Apr-2017**  
**Issue Date** : **27-Apr-2017 15:58**



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Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9359341	TSP North 9359339	PM10 North 9359342	PM10 South 9359340	----
Client sampling date / time				07-Apr-2017 00:00	06-Apr-2017 00:00	07-Apr-2017 00:00	06-Apr-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701684-001	EW1701684-002	EW1701684-003	EW1701684-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	4.3	<0.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	0.5	<0.1	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	2.5	<0.1	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	0.3	<0.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701685**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **12-Apr-2017 14:02**  
**Date Analysis Commenced** : **26-Apr-2017**  
**Issue Date** : **27-Apr-2017 15:58**



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Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



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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.

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 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9399763	TSP North 9359333	PM10 North 9399764	PM10 South 9359334	----
Client sampling date / time				24-Mar-2017 00:00	23-Mar-2017 00:00	24-Mar-2017 00:00	23-Mar-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701685-001	EW1701685-002	EW1701685-003	EW1701685-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	1.9	2.8	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	1.0	1.2	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	1.1	1.6	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	0.6	0.7	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701687**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 12-Apr-2017 14:14  
**Date Analysis Commenced** : 18-Apr-2017  
**Issue Date** : 24-Apr-2017 10:31



Accreditation No. 825  
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- Analytical Results

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### 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>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, 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.

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 ^ = 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.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.
- Sample exposure period is 33 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.

## Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**  
 (Matrix: **AIR**)

Client sample ID

				Station 1 03/03/17 to 05/4/17	Station 2 03/03/17 to 05/4/17	Station 3 03/03/17 to 05/4/17	Station 4 03/03/17 to 05/4/17	----
Client sampling date / time				05-Apr-2017 00:00	05-Apr-2017 00:00	05-Apr-2017 00:00	05-Apr-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1701687-005	EW1701687-006	EW1701687-007	EW1701687-008	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Ash Content (mg)	----	1	mg	1	1	1	1	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	<0.1	<0.1	<0.1	<0.1	----
Combustible Matter (mg)	----	1	mg	1	<1	1	<1	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Total Insoluble Matter (mg)	----	1	mg	2	1	2	1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702233**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 19-May-2017 09:29  
**Date Analysis Commenced** : 23-May-2017  
**Issue Date** : 26-May-2017 09:48



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### Signatories

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Signatories	Position	Accreditation Category
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics, Mayfield West, 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.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.

## Analytical Results

Sub-Matrix: DEPOSITIONAL DUST  
 (Matrix: AIR)

Client sample ID

				Station 1 5/4/17 - 5/5/17	Station 2 5/4/17 - 5/5/17	Station 3 5/4/17 - 5/5/17	Station 4 5/4/17 - 5/5/17	----
Client sampling date / time				05-May-2017 00:00	05-May-2017 00:00	05-May-2017 00:00	05-May-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1702233-005	EW1702233-006	EW1702233-007	EW1702233-008	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Ash Content (mg)	----	1	mg	1	1	1	1	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	<0.1	<0.1	<0.1	<0.1	----
Combustible Matter (mg)	----	1	mg	1	1	1	<1	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Total Insoluble Matter (mg)	----	1	mg	2	2	2	1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702234**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 18-May-2017 10:01  
**Date Analysis Commenced** : 25-May-2017  
**Issue Date** : 26-May-2017 14:09



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### Signatories

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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, 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.

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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.

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 ^ = 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9419921	TSP North 9419919	PM10 North 9419922	PM10 South 9419920	----
Client sampling date / time				12-May-2017 15:30	11-May-2017 15:30	12-May-2017 15:30	11-May-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702234-001	EW1702234-002	EW1702234-003	EW1702234-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	40.5	12.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	8.5	21.3	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	23.4	7.0	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	4.9	12.3	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702235**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 18-May-2017 10:05  
**Date Analysis Commenced** : 25-May-2017  
**Issue Date** : 29-May-2017 14:54



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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

Sub-Matrix: FILTER (TSP/RSP) (Matrix: AIR)				Client sample ID	TSP South 9419917	TSP North 9419915	PM10 North 9419918	PM10 South 9419916	----
Client sampling date / time				05-May-2017 15:30	04-May-2017 15:30	05-May-2017 15:30	04-May-2017 15:30	----	
Compound	CAS Number	LOR	Unit	EW1702235-001	EW1702235-002	EW1702235-003	EW1702235-004	-----	
				Result	Result	Result	Result	----	
EA143: Particulates in Air - HVAFs									
ø Total Suspended Particulates	----	0.1	µg/m³	8.7	11.3	----	----	----	
ø PM10	----	0.1	µg/m³	----	----	8.8	15.8	----	
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.0	6.5	----	----	----	
PM10 (mass per filter)	----	0.1	mg/filter	----	----	5.1	9.1	----	

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702236**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
                   **Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
                   4/13 Geary Pl, North Nowra 2541  
                   Australia NSW  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 18-May-2017 10:09  
**Date Analysis Commenced** : 25-May-2017  
**Issue Date** : 29-May-2017 14:54



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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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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.

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 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9359345	TSP North 9359343	PM10 North 9359346	PM10 South 9359344	----
Client sampling date / time				14-Apr-2017 15:30	13-Apr-2017 15:30	14-Apr-2017 15:30	13-Apr-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702236-001	EW1702236-002	EW1702236-003	EW1702236-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	5.7	8.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	6.9	8.8	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	3.3	4.7	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	4.0	5.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702237**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 18-May-2017 10:13  
**Date Analysis Commenced** : 25-May-2017  
**Issue Date** : 29-May-2017 14:54



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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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

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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9419913	TSP North 9359351	PM10 North 9419914	PM10 South 9359352	----
Client sampling date / time				28-Apr-2017 15:30	27-Apr-2017 15:30	28-Apr-2017 15:30	27-Apr-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702237-001	EW1702237-002	EW1702237-003	EW1702237-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	6.8	5.5	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	10.2	7.8	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	3.9	3.2	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	5.9	4.5	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702238**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 18-May-2017 10:16  
**Date Analysis Commenced** : 25-May-2017  
**Issue Date** : 29-May-2017 14:54



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Signatories	Position	Accreditation Category
Jennifer Targett	Laboratory Technician	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9359349	TSP North 9359347	PM10 North 9359350	PM10 South 9359348	----
Client sampling date / time				21-Apr-2017 15:30	20-Apr-2017 15:30	21-Apr-2017 15:30	20-Apr-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702238-001	EW1702238-002	EW1702238-003	EW1702238-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	8.7	9.5	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	10.6	8.3	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.0	5.5	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	6.1	4.8	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702587**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**  
  
**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8975**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 09-Jun-2017 14:36  
**Date Analysis Commenced** : 20-Jun-2017  
**Issue Date** : 22-Jun-2017 08:50



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 ISO/IEC 17025 - Testing

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- Analytical Results

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### Signatories

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Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



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 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9416396	TSP North 9416394	PM10 North 9416397	PM10 South 9416395	----
Client sampling date / time				09-Jun-2017 15:30	08-Jun-2017 15:30	09-Jun-2017 15:30	08-Jun-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702587-001	EW1702587-002	EW1702587-003	EW1702587-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	1.0	3.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	6.6	2.2	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	0.6	1.8	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	3.8	1.3	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702589**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **09-Jun-2017 15:15**  
**Date Analysis Commenced** : **20-Jun-2017**  
**Issue Date** : **22-Jun-2017 08:50**



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Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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 ~ = Indicates an estimated value.

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- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9419931	TSP North 9416392	PM10 North 9419932	PM10 South 9416393	----
Client sampling date / time				02-Jun-2017 15:30	01-Jun-2017 15:30	01-Jun-2017 15:30	02-Jun-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702589-001	EW1702589-002	EW1702589-003	EW1702589-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	4.8	2.6	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	9.1	0.7	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	3.3	1.8	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	6.3	0.5	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702591**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **09-Jun-2017 15:36**  
**Date Analysis Commenced** : **20-Jun-2017**  
**Issue Date** : **22-Jun-2017 08:50**



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Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



## General Comments

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- Sample #002 was returned with a piece missing.
- No atmospheric corrections were used in the calculation of the µg/m³ results.
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9419929	TSP North 9419927	PM10 North 9419930	PM10 South 9419928	----
Client sampling date / time				25-May-2017 15:30	26-May-2017 15:30	26-May-2017 15:30	25-May-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1702591-001	EW1702591-002	EW1702591-003	EW1702591-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
Ø Total Suspended Particulates	----	0.1	µg/m³	8.8	<0.1	----	----	----
Ø PM10	----	0.1	µg/m³	----	----	6.6	9.0	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.1	<0.1	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	3.8	5.2	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702592**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8910**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : 1 of 2  
**Laboratory** : Environmental Division NSW South Coast  
**Contact** : Kristy Boje  
**Address** : 1/19 Ralph Black Dr, North Wollongong 2500  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : 02 4423 2063  
**Date Samples Received** : 09-Jun-2017 15:41  
**Date Analysis Commenced** : 20-Jun-2017  
**Issue Date** : 22-Jun-2017 08:50



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Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



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 ø = ALS is not NATA accredited for these tests.  
 ~ = Indicates an estimated value.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

Sub-Matrix: FILTER (TSP/RSP) (Matrix: AIR)				Client sample ID		TSP South 9419925	TSP North 9419923	PM10 North 9419926	PM10 South 9419924	----		
Client sampling date / time				19-May-2017 15:30		18-May-2017 15:30		19-May-2017 15:30		18-May-2017 15:30		----
Compound	CAS Number	LOR	Unit	EW1702592-001		EW1702592-002		EW1702592-003		EW1702592-004		-----
				Result		Result		Result		Result		----
EA143: Particulates in Air - HVAFs												
ø Total Suspended Particulates	----	0.1	µg/m³	27.4		6.2		----		----		----
ø PM10	----	0.1	µg/m³	----		----		11.1		6.4		----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	15.8		3.6		----		----		----
PM10 (mass per filter)	----	0.1	mg/filter	----		----		6.4		3.7		----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1702594**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8975**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **09-Jun-2017 15:56**  
**Date Analysis Commenced** : **15-Jun-2017**  
**Issue Date** : **20-Jun-2017 09:18**



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Signatories	Position	Accreditation Category
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



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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.

- Sample exposure period 33 days which is outside AS3850.10.1 specifications of 30 +/- 2 days.
- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.

## Analytical Results

Sub-Matrix: DEPOSITIONAL DUST  
 (Matrix: AIR)

Client sample ID

				Station 1 5/5/17 - 7/6/17	Station 2 5/5/17 - 7/6/17	Station 3 5/5/17 - 7/6/17	Station 4 5/5/17 - 7/6/17	----
Client sampling date / time				07-Jun-2017 00:00	07-Jun-2017 00:00	07-Jun-2017 00:00	07-Jun-2017 00:00	----
Compound	CAS Number	LOR	Unit	EW1702594-001	EW1702594-002	EW1702594-003	EW1702594-004	-----
				Result	Result	Result	Result	----
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Ash Content (mg)	----	1	mg	1	2	1	1	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	<0.1	<0.1	<0.1	<0.1	----
Combustible Matter (mg)	----	1	mg	<1	<1	1	1	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	0.1	0.1	0.1	0.1	----
Total Insoluble Matter (mg)	----	1	mg	1	2	2	2	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1703227**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8975**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **27-Jul-2017 09:56**  
**Date Analysis Commenced** : **03-Aug-2017**  
**Issue Date** : **07-Aug-2017 14:37**



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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



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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.

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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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9423331	TSP North 9423329	PM10 North 9423332	PM10 South 9423330	----
Client sampling date / time				16-Jun-2017 15:30	15-Jun-2017 15:30	16-Jun-2017 15:30	15-Jun-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1703227-001	EW1703227-002	EW1703227-003	EW1703227-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	2.2	5.9	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	2.1	<0.1	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	1.3	3.4	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	1.2	<0.1	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1703228**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8975**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **27-Jul-2017 10:12**  
**Date Analysis Commenced** : **03-Aug-2017**  
**Issue Date** : **07-Aug-2017 14:37**



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

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>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, 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.

- No atmospheric corrections were used in the calculation of the  $\mu\text{g}/\text{m}^3$  results.
- NATA accreditation is not held for results reported in  $\mu\text{g}/\text{m}^3$ . Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9423347	TSP North 9423345	PM10 North 9423348	PM10 South 9423346	----
Client sampling date / time				23-Jun-2017 15:30	22-Jun-2017 15:30	23-Jun-2017 15:30	22-Jun-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1703228-001	EW1703228-002	EW1703228-003	EW1703228-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	$\mu\text{g}/\text{m}^3$	9.2	6.1	----	----	----
ø PM10	----	0.1	$\mu\text{g}/\text{m}^3$	----	----	4.0	2.4	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	5.3	3.5	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	2.3	1.4	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1703229**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM8975**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **27-Jul-2017 10:21**  
**Date Analysis Commenced** : **03-Aug-2017**  
**Issue Date** : **07-Aug-2017 14:37**



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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, 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.

- No atmospheric corrections were used in the calculation of the µg/m³ results.
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

## Analytical Results

Sub-Matrix: FILTER (TSP/RSP)  
 (Matrix: AIR)

Client sample ID

				TSP South 9423335	TSP North 9423333	PM10 North 9423336	PM10 South 9423334	----
Client sampling date / time				30-Jun-2017 15:30	29-Jun-2017 15:30	30-Jun-2017 15:30	29-Jun-2017 15:30	----
Compound	CAS Number	LOR	Unit	EW1703229-001	EW1703229-002	EW1703229-003	EW1703229-004	-----
				Result	Result	Result	Result	----
<b>EA143: Particulates in Air - HVAFs</b>								
ø Total Suspended Particulates	----	0.1	µg/m³	<0.1	<0.1	----	----	----
ø PM10	----	0.1	µg/m³	----	----	<0.1	9.4	----
Total Suspended Particulates (mass per filter)	----	0.1	mg/filter	<0.1	<0.1	----	----	----
PM10 (mass per filter)	----	0.1	mg/filter	----	----	<0.1	5.4	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1703233**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks**  
**Order number** : **SM9104**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **HVAS SY/466/10 V2**  
**No. of samples received** : **4**  
**No. of samples analysed** : **4**

**Page** : **1 of 2**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **27-Jul-2017 10:53**  
**Date Analysis Commenced** : **02-Aug-2017**  
**Issue Date** : **07-Aug-2017 10:58**



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 ISO/IEC 17025 - Testing

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- Analytical Results

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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>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, 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.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m<sup>2</sup>.mth as sampling data was provided by the client.

## Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**  
 (Matrix: **AIR**)

Client sample ID

Sub-Matrix: <b>DEPOSITIONAL DUST</b> (Matrix: <b>AIR</b> )				Client sample ID	Station 1 7/6/17 - 7/7/17	Station 2 7/6/17 - 7/7/17	Station 3 7/6/17 - 7/7/17	Station 4 7/6/17 - 7/7/17	----
Client sampling date / time					07-Jul-2017 10:53	07-Jul-2017 10:53	07-Jul-2017 10:53	07-Jul-2017 10:53	----
Compound	CAS Number	LOR	Unit	EW1703233-005	EW1703233-006	EW1703233-007	EW1703233-008	-----	
				Result	Result	Result	Result	----	
EA120: Ash Content									
Ash Content	----	0.1	g/m².month	0.1	0.1	0.1	0.1	----	
Ash Content (mg)	----	1	mg	1	1	1	1	----	
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month	<0.1	<0.1	<0.1	<0.1	----	
Combustible Matter (mg)	----	1	mg	1	<1	<1	1	----	
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month	0.1	0.1	0.1	0.1	----	
Total Insoluble Matter (mg)	----	1	mg	2	1	1	2	----	

## Appendix E – Erosion and Sediment Control Log



## Sediment and Erosion Control Log

Monitoring In Accordance with AEMR timeframe which coincides with the Project approval. ie December to end of November each year

Inspections to be carried out fortnightly unless heavy rainfall occurs in the interim when sediment fences should be inspected following the heavy rain to check for signs of sediment buildup and functionality.



### Monitoring Plan 1: December 2016 until June 2017

Inspection #	Location within Quarry	Date Inspected	Time Inspected	Inspected By	Reason for inspection	Any sediment removed from fences	Are sediment fences stable	Is there any further erosion hazard	Are any further sediment and erosion control required	Is there any damage to existing sediment control structures	Are exclusion zones being maintained by all workers and subcontractors	Comments	Signed
265	Riparian Protection Zones	1/12/2016	6:00am	John Green	1.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
266	Riparian Protection Zones	6/12/2016	6:00am	John Green	5.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
267	Riparian Protection Zones	7/12/2016	6:00am	John Green	0.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
268	Riparian Protection Zones	15/12/2016	6:00am	John Green	22.8mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
269	Riparian Protection Zones	16/12/2016	6:00am	John Green	21mm Rainfall	NO	YES	NO	NO	NO	YES		JG
270	Riparian Protection Zones	17/12/2016	6:00am	John Green	5.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
271	Riparian Protection Zones	31/12/2016	6:00am	John Green	3.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
272	Riparian Protection Zones	4/01/2017	6:00am	John Green	2.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
273	Riparian Protection Zones	7/01/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
274	Riparian Protection Zones	10/01/2017	6:00am	John Green	7.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
275	Riparian Protection Zones	12/01/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
276	Riparian Protection Zones	16/01/2017	6:00am	John Green	1.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
277	Riparian Protection Zones	19/01/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
278	Riparian Protection Zones	23/01/2017	6:00am	John Green	3.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
279	Riparian Protection Zones	25/01/2017	6:00am	John Green	1.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
280	Riparian Protection Zones	1/02/2017	6:00am	John Green	2.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
281	Riparian Protection Zones	2/02/2017	6:00am	John Green	6.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
282	Riparian Protection Zones	7/02/2017	6:00am	John Green	24.4mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
283	Riparian Protection Zones	8/02/2017	6:00am	John Green	41.2mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from ALL Fences	JG
284	Riparian Protection Zones	9/02/2017	6:00am	John Green	17.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
285	Riparian Protection Zones	12/02/2017	6:00am	John Green	3.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
286	Riparian Protection Zones	13/02/2017	6:00am	John Green	0.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
287	Riparian Protection Zones	19/02/2017	6:00am	John Green	7.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
288	Riparian Protection Zones	25/02/2017	6:00am	John Green	0.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
289	Riparian Protection Zones	26/02/2017	6:00am	John Green	13.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
290	Riparian Protection Zones	27/02/2017	6:00am	John Green	23.4mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
291	Riparian Protection Zones	28/02/2017	6:00am	John Green	1.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
292	Riparian Protection Zones	1/03/2017	6:00am	John Green	2.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
293	Riparian Protection Zones	2/03/2017	6:00am	John Green	29.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
294	Riparian Protection Zones	3/03/2017	6:00am	John Green	19.6mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
295	Riparian Protection Zones	4/03/2017	6:00am	John Green	71.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
296	Riparian Protection Zones	5/03/2017	6:00am	John Green	16.6mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from ALL Fences	JG
297	Riparian Protection Zones	6/03/2017	6:00am	John Green	1.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
298	Riparian Protection Zones	7/03/2017	6:00am	John Green	1.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
299	Riparian Protection Zones	8/03/2017	6:00am	John Green	3.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
300	Riparian Protection Zones	9/03/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
301	Riparian Protection Zones	14/03/2017	6:00am	John Green	7.8mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from ALL Fences	JG
302	Riparian Protection Zones	15/03/2017	6:00am	John Green	60.2mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
303	Riparian Protection Zones	16/03/2017	6:00am	John Green	6.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
304	Riparian Protection Zones	17/03/2017	6:00am	John Green	68mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
305	Riparian Protection Zones	18/03/2017	6:00am	John Green	23mm Rainfall	NO	YES	NO	NO	NO	YES		JG
306	Riparian Protection Zones	19/03/2017	6:00am	John Green	17.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
307	Riparian Protection Zones	20/03/2017	6:00am	John Green	3mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from ALL Fences	JG
308	Riparian Protection Zones	22/03/2017	6:00am	John Green	1.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
309	Riparian Protection Zones	23/03/2017	6:00am	John Green	12.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
310	Riparian Protection Zones	24/03/2017	6:00am	John Green	19.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
311	Riparian Protection Zones	25/03/2017	6:00am	John Green	3.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
312	Riparian Protection Zones	26/03/2017	6:00am	John Green	1.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
313	Riparian Protection Zones	27/03/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
314	Riparian Protection Zones	28/03/2017	6:00am	John Green	0.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
315	Riparian Protection Zones	30/03/2017	6:00am	John Green	1.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
316	Riparian Protection Zones	31/03/2017	6:00am	John Green	5.4mm Rainfall	NO	YES	NO	NO	NO	YES		JG
317	Riparian Protection Zones	3/04/2017	6:00am	John Green	7.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
318	Riparian Protection Zones	4/04/2017	6:00am	John Green	11.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
319	Riparian Protection Zones	5/04/2017	6:00am	John Green	3.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
320	Riparian Protection Zones	6/04/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
321	Riparian Protection Zones	9/04/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
322	Riparian Protection Zones	10/04/2017	6:00am	John Green	6.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
323	Riparian Protection Zones	16/04/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
324	Riparian Protection Zones	20/04/2017	6:00am	John Green	2.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
325	Riparian Protection Zones	21/04/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
326	Riparian Protection Zones	24/04/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
327	Riparian Protection Zones	27/04/2017	6:00am	John Green	4.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
328	Riparian Protection Zones	30/04/2017	6:00am	John Green	0.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
329	Riparian Protection Zones	1/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
330	Riparian Protection Zones	12/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
331	Riparian Protection Zones	14/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
332	Riparian Protection Zones	15/05/2017	6:00am	John Green	4.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
333	Riparian Protection Zones	17/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
334	Riparian Protection Zones	20/05/2017	6:00am	John Green	16.6mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from ALL Fences	JG
335	Riparian Protection Zones	21/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
336	Riparian Protection Zones	22/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
337	Riparian Protection Zones	23/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
338	Riparian Protection Zones	24/05/2017	6:00am	John Green	1.6mm Rainfall	NO	YES	NO	NO	NO	YES		JG
339	Riparian Protection Zones	28/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
340	Riparian Protection Zones	29/05/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
341	Riparian Protection Zones	31/05/2017	6:00am	John Green	2.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
342	Riparian Protection Zones	5/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
343	Riparian Protection Zones	7/06/2017	6:00am	John Green	28.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
344	Riparian Protection Zones	8/06/2017	6:00am	John Green	40.8mm Rainfall	NO	YES	NO	NO	NO	YES		JG
345	Riparian Protection Zones	9/06/2017	6:00am	John Green	1.4mm Rainfall	YES	YES	NO	NO	NO	YES	Removed Sediment from South West Fence	JG
346	Riparian Protection Zones	10/06/2017	6:00am	John Green	5.0mm Rainfall	NO	YES	NO	NO	NO	YES		JG
347	Riparian Protection Zones	11/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
348	Riparian Protection Zones	12/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
349	Riparian Protection Zones	13/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
350	Riparian Protection Zones	18/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
351	Riparian Protection Zones	20/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
352	Riparian Protection Zones	22/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG
353	Riparian Protection Zones	23/06/2017	6:00am	John Green	0.2mm Rainfall	NO	YES	NO	NO	NO	YES		JG

## Appendix F – Landscape and Biodiversity Monitoring



Site Reference Photos

30<sup>th</sup> November 2016















Site Reference Photos

31<sup>st</sup> May 2017



















## Appendix G – Surface water monitoring



## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700600**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks Quarry - Water**  
**Order number** : **SM8695**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **Nowra Brickworks Quarry SY/466/10 V2**  
**No. of samples received** : **5**  
**No. of samples analysed** : **5**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **10-Feb-2017 11:59**  
**Date Analysis Commenced** : **10-Feb-2017**  
**Issue Date** : **20-Feb-2017 11:50**



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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.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		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.

- Ionic Balance out of acceptable limits for sample 2 due to analytes not quantified in this report.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S5	S4	C10	C1	C2
Client sampling date / time					10-Feb-2017 09:10	10-Feb-2017 08:13	10-Feb-2017 07:55	10-Feb-2017 08:25	10-Feb-2017 08:03
Compound	CAS Number	LOR	Unit		EW1700600-001	EW1700600-002	EW1700600-003	EW1700600-004	EW1700600-005
					Result	Result	Result	Result	Result
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit		8.43	5.64	6.00	6.10	6.05
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm		6770	405	177	201	177
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		18	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		190	2	7	9	6
Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L		208	2	7	9	6
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		492	28	6	9	5
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1620	80	35	39	35
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		101	<1	3	4	3
Magnesium	7439-95-4	1	mg/L		163	2	3	4	3
Sodium	7440-23-5	1	mg/L		1060	74	26	29	26
Potassium	7440-09-7	1	mg/L		15	2	5	5	5
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Iron	7439-89-6	0.05	mg/L		<0.05	0.80	1.13	1.12	1.13
<b>EG020T: Total Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L		0.23	9.65	3.09	2.87	2.87
Arsenic	7440-38-2	0.001	mg/L		0.002	0.003	0.001	0.001	0.002
Zinc	7440-66-6	0.005	mg/L		<0.005	0.019	0.012	0.013	0.013
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L		0.02	0.02	<0.01	<0.01	<0.01
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L		0.03	<0.01	<0.01	<0.01	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L		0.90	0.03	0.02	0.02	0.01
<b>EK059G: Nitrite plus Nitrate as N (NO<sub>x</sub>) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L		0.93	0.03	0.02	0.02	0.01
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		<0.01	0.07	0.05	0.04	0.02



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				S5	S4	C10	C1	C2
Client sampling date / time				10-Feb-2017 09:10	10-Feb-2017 08:13	10-Feb-2017 07:55	10-Feb-2017 08:25	10-Feb-2017 08:03
Compound	CAS Number	LOR	Unit	EW1700600-001	EW1700600-002	EW1700600-003	EW1700600-004	EW1700600-005
Result				Result	Result	Result	Result	Result
<b>EN055: Ionic Balance</b>								
Total Anions	----	0.01	meq/L	60.1	2.88	1.25	1.47	1.21
Total Cations	----	0.01	meq/L	64.9	3.43	1.66	1.92	1.66
Ionic Balance	----	0.01	%	3.88	----	----	----	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701276**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks Quarry - Water**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **Nowra Brickworks Quarry SY/466/10 V2**  
**No. of samples received** : **5**  
**No. of samples analysed** : **5**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **17-Mar-2017 09:08**  
**Date Analysis Commenced** : **17-Mar-2017**  
**Issue Date** : **30-Mar-2017 16:44**



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- 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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	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.

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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.

- ED041G: LOR raised for Sulfate due to sample matrix for sample 3, 4 & 5
- Field data supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.



## Analytical Results

Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )				Client sample ID	S5	S4	C10	C1	C2
Client sampling date / time					17-Mar-2017 10:45	17-Mar-2017 10:04	17-Mar-2017 09:41	17-Mar-2017 10:25	17-Mar-2017 09:51
Compound	CAS Number	LOR	Unit		EW1701276-001	EW1701276-002	EW1701276-003	EW1701276-004	EW1701276-005
					Result	Result	Result	Result	Result
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		8.6	5.5	6.7	6.8	6.4
<b>EA010FD: Field Conductivity</b>									
Conductivity @ 25oC	----	1	µS/cm		5380	239	138	140	135
<b>ED037P: Alkalinity by PC Titrator</b>									
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		13	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		175	3	10	13	10
Total Alkalinity as CaCO3	----	1	mg/L		188	3	10	13	10
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		454	28	<10	<10	<10
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1220	33	16	16	16
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		88	<1	2	3	2
Magnesium	7439-95-4	1	mg/L		124	<1	2	2	2
Sodium	7440-23-5	1	mg/L		849	35	15	15	14
Potassium	7440-09-7	1	mg/L		13	2	3	3	3
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Iron	7439-89-6	0.05	mg/L		<0.05	2.14	1.40	1.33	1.48
<b>EG020T: Total Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L		0.24	12.3	3.40	2.71	3.62
Arsenic	7440-38-2	0.001	mg/L		0.003	0.003	0.001	0.001	0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.014	0.011	0.012	0.012
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L		0.14	<0.01	0.01	0.01	0.02
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L		0.08	<0.01	<0.01	<0.01	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L		2.70	0.02	0.10	0.16	0.11
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L		2.78	0.02	0.10	0.16	0.11
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		0.02	0.18	0.09	0.08	0.11



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				S5	S4	C10	C1	C2
Client sampling date / time				17-Mar-2017 10:45	17-Mar-2017 10:04	17-Mar-2017 09:41	17-Mar-2017 10:25	17-Mar-2017 09:51
Compound	CAS Number	LOR	Unit	EW1701276-001	EW1701276-002	EW1701276-003	EW1701276-004	EW1701276-005
Result				Result	Result	Result	Result	Result
<b>EN055: Ionic Balance</b>								
Total Anions	----	0.01	meq/L	47.6	1.57	0.65	0.71	0.65
Total Cations	----	0.01	meq/L	51.8	1.57	0.99	1.04	0.95
Ionic Balance	----	0.01	%	4.26	----	----	----	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701278**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks Quarry - Water**  
**Order number** : **SM8764**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **Nowra Brickworks Quarry SY/466/10 V2**  
**No. of samples received** : **5**  
**No. of samples analysed** : **5**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **17-Mar-2017 09:30**  
**Date Analysis Commenced** : **17-Mar-2017**  
**Issue Date** : **30-Mar-2017 16:42**



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### Signatories

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Wisam Marassa	Inorganics Coordinator	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.

- EG020: Poor matrix spike recovery was obtained for Cu on sample ES11706916-003 due to matrix interference. Confirmed by reanalysis.
- Field data supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S5	S4	C10	C1	C2
Client sampling date / time					09-Mar-2017 11:55	09-Mar-2017 11:14	09-Mar-2017 10:50	09-Mar-2017 11:34	09-Mar-2017 10:59
Compound	CAS Number	LOR	Unit		EW1701278-001	EW1701278-002	EW1701278-003	EW1701278-004	EW1701278-005
					Result	Result	Result	Result	Result
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		8.6	5.4	6.5	6.8	6.4
<b>EA010FD: Field Conductivity</b>									
Conductivity @ 25oC	----	1	µS/cm		5290	235	141	141	140
<b>ED037P: Alkalinity by PC Titrator</b>									
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		12	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		191	4	12	15	14
Total Alkalinity as CaCO3	----	1	mg/L		203	4	12	15	14
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		472	20	<10	<10	<10
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1220	33	16	15	16
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		86	<1	2	3	2
Magnesium	7439-95-4	1	mg/L		124	<1	2	2	2
Sodium	7440-23-5	1	mg/L		842	35	15	15	14
Potassium	7440-09-7	1	mg/L		13	2	3	3	3
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Iron	7439-89-6	0.05	mg/L		<0.05	2.22	1.29	1.26	1.31
<b>EG020T: Total Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L		0.32	12.5	3.56	2.63	3.11
Arsenic	7440-38-2	0.001	mg/L		0.002	0.002	0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.021	0.012	0.010	0.017
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L		0.07	<0.01	0.09	0.02	<0.01
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L		0.08	<0.01	<0.01	<0.01	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L		2.76	0.02	0.10	0.15	0.03
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L		2.84	0.02	0.10	0.15	0.03
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		0.01	0.18	0.08	0.08	0.10



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				S5	S4	C10	C1	C2
Client sampling date / time				09-Mar-2017 11:55	09-Mar-2017 11:14	09-Mar-2017 10:50	09-Mar-2017 11:34	09-Mar-2017 10:59
Compound	CAS Number	LOR	Unit	EW1701278-001	EW1701278-002	EW1701278-003	EW1701278-004	EW1701278-005
				Result	Result	Result	Result	Result
<b>EN055: Ionic Balance</b>								
Total Anions	----	0.01	meq/L	48.3	1.43	0.69	0.72	0.73
Total Cations	----	0.01	meq/L	51.4	1.57	0.99	1.04	0.95
Ionic Balance	----	0.01	%	3.16	----	----	----	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1703223**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks Quarry - Water**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **Nowra Brickworks Quarry SY/466/10 V2**  
**No. of samples received** : **5**  
**No. of samples analysed** : **5**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia NSW**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **27-Jul-2017 15:37**  
**Date Analysis Commenced** : **28-Jul-2017**  
**Issue Date** : **07-Aug-2017 14:37**



Accreditation No. 825  
 Accredited for compliance with  
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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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, 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.

- Field data supplied by ALS Wollongong.
- pH and Conductivity completed on day of receipt.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S5	S4	C10	C1	C2
Client sampling date / time					14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		EW1703223-001	EW1703223-002	EW1703223-003	EW1703223-004	EW1703223-005
					Result	Result	Result	Result	Result
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		7.7	6.3	6.05	6.0	6.0
<b>EA010FD: Field Conductivity</b>									
Conductivity @ 25oC	----	1	µS/cm		5140	187	179	177	190
<b>ED037P: Alkalinity by PC Titrator</b>									
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		223	17	16	16	15
Total Alkalinity as CaCO3	----	1	mg/L		223	17	16	16	15
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		536	14	12	12	13
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1070	32	29	29	32
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		95	4	4	4	4
Magnesium	7439-95-4	1	mg/L		123	4	4	4	4
Sodium	7440-23-5	1	mg/L		832	24	22	22	24
Potassium	7440-09-7	1	mg/L		13	3	4	3	4
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Iron	7439-89-6	0.05	mg/L		<0.05	1.60	1.59	1.65	1.65
<b>EG020T: Total Metals by ICP-MS</b>									
Aluminium	7429-90-5	0.01	mg/L		0.09	3.86	3.22	3.18	3.11
Arsenic	7440-38-2	0.001	mg/L		0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		<0.005	0.014	0.011	0.011	0.013
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L		0.01	<0.01	<0.01	<0.01	<0.01
<b>EK057G: Nitrite as N by Discrete Analyser</b>									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.03	<0.01	0.04	0.04
<b>EK058G: Nitrate as N by Discrete Analyser</b>									
Nitrate as N	14797-55-8	0.01	mg/L		2.32	0.13	0.22	0.18	0.12
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>									
Nitrite + Nitrate as N	----	0.01	mg/L		2.32	0.16	0.22	0.22	0.16
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		<0.01	0.04	0.05	0.05	0.05



## Analytical Results

Sub-Matrix: **WATER**  
 (Matrix: **WATER**)

Client sample ID

				S5	S4	C10	C1	C2
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	EW1703223-001	EW1703223-002	EW1703223-003	EW1703223-004	EW1703223-005
Result				Result	Result	Result	Result	Result
<b>EN055: Ionic Balance</b>								
Total Anions	----	0.01	meq/L	45.8	1.53	1.39	1.39	1.47
Total Cations	----	0.01	meq/L	51.4	1.65	1.59	1.56	1.68
Ionic Balance	----	0.01	%	5.75	----	----	----	----

10<sup>th</sup> February 2017 Creek Photos



Figure 1 10<sup>th</sup> Feb 2017 C1



Figure 2 10<sup>th</sup> Feb 2017 C2



*Figure 3 10<sup>th</sup> Feb 2017 C10*

**9<sup>th</sup> March 2017 Creek Photos**



*Figure 4 9<sup>th</sup> Mar 2017 C1*



*Figure 5 9<sup>th</sup> Mar 2017 C2*



*Figure 6 9<sup>th</sup> Mar 2017 C10*

**17<sup>th</sup> March 2017 Creek Photos**



*Figure 7 17th Mar 2017 C1*



*Figure 8 17<sup>th</sup> March 2017 C2*



*Figure 9 17<sup>th</sup> Mar 2017 C10*

## Appendix H – Ground Water Monitoring



## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1700286**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks - Bores**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **SY/466/10 V2**  
**No. of samples received** : **8**  
**No. of samples analysed** : **8**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **23-Jan-2017 15:14**  
**Date Analysis Commenced** : **24-Jan-2017**  
**Issue Date** : **31-Jan-2017 14:16**



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- Analytical Results

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### 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
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Robert DaLio	Sampler	Laboratory - Wollongong



## 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.

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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.

- EK071G: LOR raised for Reactive Phosphorus analysis on sample ID: P7, due to matrix interferences.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Field data supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	P1	P2	P3	P4	P5
Client sampling date / time					23-Jan-2017 13:30	23-Jan-2017 12:50	23-Jan-2017 14:10	23-Jan-2017 14:00	23-Jan-2017 14:40
Compound	CAS Number	LOR	Unit		EW1700286-001	EW1700286-002	EW1700286-003	EW1700286-004	EW1700286-005
					Result	Result	Result	Result	Result
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		6.8	----	6.9	----	7.4
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		7600	----	9140	----	7500
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		<1	----	<1	----	<1
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		<1	----	<1	----	<1
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		450	----	526	----	786
Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L		450	----	526	----	786
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		143	----	434	----	391
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		1970	----	3180	----	2500
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		150	----	197	----	99
Magnesium	7439-95-4	1	mg/L		186	----	240	----	134
Sodium	7440-23-5	1	mg/L		1070	----	1810	----	1620
Potassium	7440-09-7	1	mg/L		18	----	17	----	22
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L		67.5	----	109	----	94.4
Total Cations	----	0.01	meq/L		69.8	----	109	----	87.0
Ionic Balance	----	0.01	%		1.64	----	0.23	----	4.06
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--		----	Damaged	----	Dry	----
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m		19.1	----	17.6	----	6.89



## Analytical Results

Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )				Client sample ID	P6	P7	P8	----	----
Client sampling date / time					23-Jan-2017 00:00	23-Jan-2017 13:10	23-Jan-2017 13:50	----	----
Compound	CAS Number	LOR	Unit		EW1700286-006	EW1700286-007	EW1700286-008	-----	-----
					Result	Result	Result	----	----
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		----	6.8	----	----	----
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		----	6480	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		----	<1	----	----	----
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		----	<1	----	----	----
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		----	570	----	----	----
Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L		----	570	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		----	437	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		----	3920	----	----	----
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		----	305	----	----	----
Magnesium	7439-95-4	1	mg/L		----	324	----	----	----
Sodium	7440-23-5	1	mg/L		----	1880	----	----	----
Potassium	7440-09-7	1	mg/L		----	22	----	----	----
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L		----	131	----	----	----
Total Cations	----	0.01	meq/L		----	124	----	----	----
Ionic Balance	----	0.01	%		----	2.68	----	----	----
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--		Not accessible	----	Dry	----	----
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m		----	15.0	----	----	----

## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1701747**  
**Client** : **SCCCR QUARRIES**  
**Contact** : **MR BUDD GREEN**  
**Address** : **PO Box 121**  
**Oak Flats 2529**

**Telephone** : **+61 0421 235 308**  
**Project** : **Nowra Brickworks - Bores**  
**Order number** : **----**  
**C-O-C number** : **----**  
**Sampler** : **----**  
**Site** : **----**  
**Quote number** : **SY/466/10 V2**  
**No. of samples received** : **8**  
**No. of samples analysed** : **8**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Kristy Boje**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
**4/13 Geary Pl, North Nowra 2541**  
**Australia**  
**Telephone** : **02 4423 2063**  
**Date Samples Received** : **19-Apr-2017 06:41**  
**Date Analysis Commenced** : **19-Apr-2017**  
**Issue Date** : **09-May-2017 17:40**



Accreditation No. 825  
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- Analytical Results

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Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
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.

- EK071G: LOR raised for Reactive Phosphorus analysis on sample ID: P7, due to matrix interferences.
- Sampling and sample data supplied by ALS Wollongong.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Field data supplied by ALS Wollongong.
- Field tests completed on day of sampling/receipt.

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	P1	P2	P3	P4	P5
Client sampling date / time				19-Apr-2017 14:40	19-Apr-2017 00:00	19-Apr-2017 15:25	19-Apr-2017 00:00	19-Apr-2017 13:40	
Compound	CAS Number	LOR	Unit	EW1701747-001	EW1701747-002	EW1701747-003	EW1701747-004	EW1701747-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	----	7.1	----	7.4	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	7400	----	10200	----	8290	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	<1	----	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	<1	----	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	540	----	541	----	825	
Total Alkalinity as CaCO3	----	1	mg/L	540	----	541	----	825	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	264	----	390	----	367	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	2820	----	3430	----	1940	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	183	----	177	----	90	
Magnesium	7439-95-4	1	mg/L	243	----	224	----	139	
Sodium	7440-23-5	1	mg/L	1160	----	1560	----	1420	
Potassium	7440-09-7	1	mg/L	20	----	13	----	18	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	95.8	----	116	----	78.8	
Total Cations	----	0.01	meq/L	80.1	----	95.4	----	78.2	
Ionic Balance	----	0.01	%	8.94	----	9.58	----	0.44	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	Destroyed	----	Dry	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	19.4	----	17.3	----	6.80	



## Analytical Results

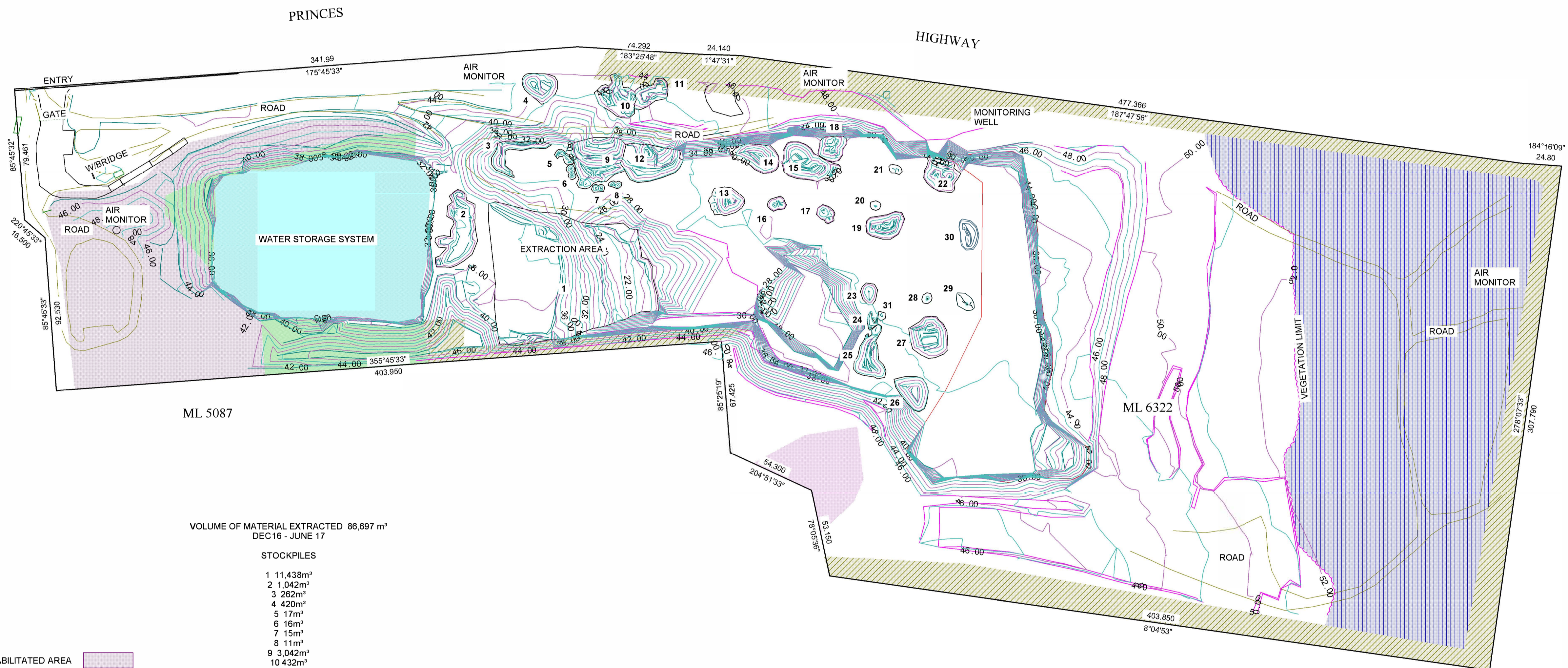
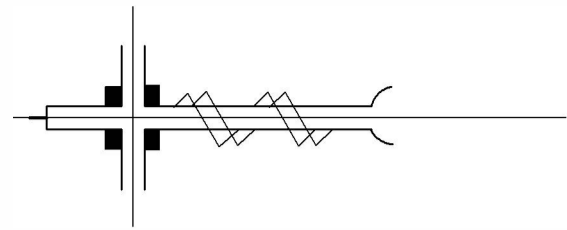
Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )				Client sample ID	P6	P7	P8	----	----
Client sampling date / time					19-Apr-2017 00:00	19-Apr-2017 14:05	19-Apr-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		EW1701747-006	EW1701747-007	EW1701747-008	-----	-----
					Result	Result	Result	----	----
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit		----	7.0	----	----	----
<b>EA010FD: Field Conductivity</b>									
Electrical Conductivity (Non Compensated)	----	1	µS/cm		----	8020	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		----	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		----	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		----	598	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L		----	598	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		----	471	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		----	4120	----	----	----
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		----	281	----	----	----
Magnesium	7439-95-4	1	mg/L		----	326	----	----	----
Sodium	7440-23-5	1	mg/L		----	1740	----	----	----
Potassium	7440-09-7	1	mg/L		----	20	----	----	----
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L		----	138	----	----	----
Total Cations	----	0.01	meq/L		----	117	----	----	----
Ionic Balance	----	0.01	%		----	8.20	----	----	----
<b>EN67 PK: Field Tests</b>									
Field Observations	----	0.01	--		Destroyed	----	Dry	----	----
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m		----	15.4	----	----	----

## Appendix I – Contour Plans of Brickworks Quarry

Site Reference Plans for Brickworks Quarry

Flat Rock Yalwal –





VOLUME OF MATERIAL EXTRACTED 86,697 m<sup>3</sup>  
DEC16 - JUNE 17

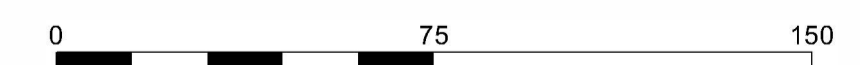
STOCKPILES

- 1 11,438m<sup>3</sup>
- 2 1,042m<sup>3</sup>
- 3 262m<sup>3</sup>
- 4 420m<sup>3</sup>
- 5 17m<sup>3</sup>
- 6 16m<sup>3</sup>
- 7 15m<sup>3</sup>
- 8 11m<sup>3</sup>
- 9 3,042m<sup>3</sup>
- 10 432m<sup>3</sup>
- 11 245m<sup>3</sup>
- 12 2,099m<sup>3</sup>
- 13 404m<sup>3</sup>
- 14 842m<sup>3</sup>
- 15 1,146m<sup>3</sup>
- 16 51m<sup>3</sup>
- 17 75m<sup>3</sup>
- 18 441m<sup>3</sup>
- 19 515m<sup>3</sup>
- 20 17m<sup>3</sup>
- 21 18m<sup>3</sup>
- 22 469m<sup>3</sup>
- 23 134m<sup>3</sup>
- 24 14m<sup>3</sup>
- 25 440m<sup>3</sup>
- 26 534m<sup>3</sup>
- 27 1,018m<sup>3</sup>
- 28 19m<sup>3</sup>
- 29 51m<sup>3</sup>
- 30 196m<sup>3</sup>
- 31 10m<sup>3</sup>

CONTROL EASTING NORTHING RL.  
COORDINATE SYSTEM MGA 94  
HEIGHT DATUM A.H.D.  
SSM-27775 281129.905 6132761.466 47.18  
SSM-103837 281113.781 6132952.428 46.16

LEGEND

- PREVIOUS REHABILITATED AREA
- NEW REHABILITATED AREA
- SHAPED EMPLACEMENT AREA
- SLOPE OVER 10° AND UNDER 18°
- ACCESS ROAD
- UNDISTURBED LAND



DATE	30/06/2017	AMENDMENTS	SURVEY FILE
SURVEYOR	MS		DWG FILE
DRAWN	MS		
CHECKED	MS		

## Appendix J – Complaints Register





### SCCCR Quarries Complaints Register

No	Date	Time	Mode of Complaint	Nature of Complaint	Complaint Comments	Action Taken
1	24/02/2017	2:48pm	Email	Dust Tracking	Email received from Dept. of Planning in regards to them carrying out a drive by and observed dust tracking from our site onto the Highway. Planning questioned if our Wheel Wash was in operation and request we clean the forecourt and highway be cleaned and send them photo evidence	Responded on the 24 <sup>th</sup> of February stating the DPE should have seen management on the day to see the wheel wash in operation as it was in operation. Staff hosed the forecourt again and wet swept the highway and sent through the photos to the DPE.
2	19/04/2017	10:15am	Email	Air Particulates	Received an email from EPA officer in regards to a complaint phoned through to him on the 11/4/17 at 12:33pm stating that trucks are constantly dragging dirt and concrete dust onto a busy part of the highway which ends up in stormwater drains and then into the Shoalhaven River. Officer asked if wheel was is still in operation.	Replied to EPA officer stating wheel wash was still in operation and other measures were also in operation as per normal. EPA officer replied stating he would let complainant know.
3	24/5/2017	4:40pm	Email	Dust/Rock Tracking	Email received from EPA in regards to a complaint from individual on Monday the 22 May 2017 stating that the highway was covered in quarry dust and tennis balled sized rocks.	None, all measures were in place. If any rocks were on the highway it would have been reported by our sweeper operator or truck operators. Emailed EPA stating this.

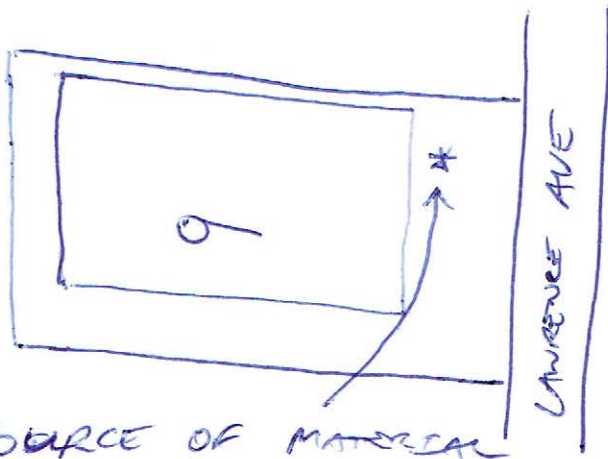
## Appendix K – VENM

Attached VENM certificates



# VENM Source Certification Record Sheet

(To be completed at the Source of VENM)

Address/location of the source of VENM	9 LAWRENCE AVE NOWRA
Sketch plan of the site from which the VENM was sourced	
Previous landuses of the location where the VENM was sourced	DWELLING SITE CUT FROM RL 14.70 DOWN TO RL 14.20
Approximate amount of VENM loaded (cubic metres of tonnes)	12 tonnes

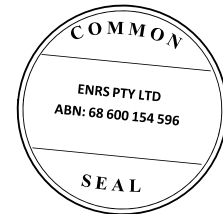
Results of any test work undertaken	(Include details of the tests undertaken to determine contamination and VENM classification) ENRS SOIL CLASSIFICATION CERTIFICATE ENRS 0572
Date of inspection/test	31/3/2016 INSITU TESTING

VENM Verification Statement - Source (to be completed by supplier of VENM)	
I, <u>MARK LORINE</u> , of <u>PATTERSON BUILDING</u> (name of company supplying VENM), verify that the load of VENM to be delivered to SCCCR shows no sign of contamination, such as bricks, concrete, timber, tiles or vegetation and no odours were observed during VENM extraction and loading.	
Signature <u>[Signature]</u>	Date <u>2 / 2 / 2017</u>



ENVIRONMENT & NATURAL RESOURCE SOLUTIONS

25 River Road SHOALHAVEN HEADS NSW 2535  
TEL/FAX 9037 4708 Mobile: 0401 518 443  
ABN 68 600 154 596  
www.enrs.com.au



Patterson Building Group 178  
Suite 34, 51 princess Highway  
Fairy Meadow, NSW, 2519

Date Issued: 7<sup>th</sup> April 2016  
Project No.: ENRS0572

Attention: Michael Emmett  
[michaele@pattersonbuild.com.au](mailto:michaele@pattersonbuild.com.au)  
0438 981 848

**SUBJECT: SOIL CLASSIFICATION CERTIFICATE  
9 LAWRENCE AVENUE, NOWRA, NSW 2541  
LOT B DEPOSITED PLAN 162972**

## INTRODUCTION

*Environment & Natural Resource Solutions (ENRS Pty Ltd) were commissioned as independent environmental consultants by Patterson Building Group (the Client) to prepare a soil classification certificate for soil material at 9 Lawrence Avenue, Nowra, NSW 2541, (herein referred to as the Site).*

This letter report provides final certification of material classification based on the results of NATA certified laboratory analysis. The soil classification was conducted in accordance with; the amended National Environment Protection Measure (NEPM) 'Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater' (NEPC;2013); the EPA Excavated Natural Material (ENM) exemption (2012); the NSW Environment Protection Authority (EPA) Waste Classification Guidelines (EPA;2014); and the Guidelines for Consultants Reporting on Contaminated Sites (OEH;2011).

## BACKGROUND

Preliminary site investigations by GreenCap (2014) provided recommendations for additional soil testing which was subsequently undertaken by Coffey (2015). Coffey identified elevated levels of lead in shallow soil up to 210 mg/kg in the backyard west of the building which exceeds the maximum concentration threshold for Excavated Natural Material (100 mg/kg). Coffey concluded the fill and residual surface soils may be classified as General Solid Waste (GSW) whilst the underlying natural material meets the definition of Virgin Natural Excavated Material (VENM) subject to prior removal of overlying GSW and no mixing during excavation.

## INVESTIGATION AREA

ENRS understand the site proposal is to demolish the building and redevelop the site incorporating basement excavations down to 3.0 metres below the current ground level. The aim of this assessment was to conduct supplementary soil testing to further delineate the extent of lead impacted soils and provide formal classification of the underlying natural material. A photographic record of site ground conditions at the time of this investigation is provided in **Attachment 3**. The soil profile was observed to comprise of fill overlying clay and gravel to a maximum investigation depth of 1.0 mbgl due to refusal on hard rock.

## SAMPLE METHODOLOGY

ENRS conducted in-situ soil sampling on the **31<sup>st</sup> of March 2016** with systematic sampling across the investigation area in accordance with industry standards AS4482.2-1999 and AS4482.1-2005. Sample locations and density were selected with consideration of Table 4 of the EPA (2012) Excavated Natural Material Exemption sampling guidelines. Based on the property area of ~784 m<sup>2</sup> **nine (9) systematic sampling points** were selected which is greater than the recommended quantity of 6 samples points for insitu assessment of up to 1,000 m<sup>2</sup>.

## NATA ACCREDITED ANALYSIS

Samples were submitted to EnviroLab Services (ELS), a NATA approved testing laboratory and analysed for the following Contaminants of Potential Concern (CoPC):

- Total Recoverable Hydrocarbons C<sup>6</sup>-C<sup>40</sup> (TRH);
- Benzene, Toluene, Ethylbenzene, Xylene, (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- 8 Heavy Metals (Mercury, Cadmium, Lead, Arsenic, Total Chromium, Copper, Nickel, Zinc);
- pH; and
- Electrical Conductivity.

## SOIL ASSESSMENT CRITERIA (SAC)

Upon receipt, the NATA accredited laboratory results were tabulated and compared against the following soil assessment criteria:

**Tier 1:** Compare results against NEPM (2013) landuse soil investigation levels to assess for contaminants levels and consider soil suitability for re-use on site if required;

**Tier 2:** Compare results against the EPA (2012) Excavated Natural Material (ENM) waste exemption to assess suitability for offsite disposal or re-use. Characterisation criteria is provided in Table 2 of the ENM (EPA 2012) exemption; and

**Tier 3:** Compare results against the Waste Classification Guidelines (EPA:2014) for offsite disposal as waste. Where results are identified above the Contaminant Threshold (CT) further analysis should be conducted for leachate potential. TCLP results are then compared against the Specific Contaminant Concentration (SCC) criteria as defined by Table 1 and Table 2 of the Guidelines.

## CLASSIFICATION RESULTS

The classification methodology provides for a tiered assessment to determine if the material is suitable for re-use on site and classification for offsite disposal. A summary of the investigation results is provided in **Table 1**:

Table 1: Soil Classification Summary				
Type	Samples	Quantity	Landuse Suitability	Soil/Waste Classification
(I) 0-0.3m Lead in shallow Soil across backyard.	L1 / 0.2m L2 / 0.2m L3 / 0.2m L4 / 0.2m	Up to ~100 m <sup>3</sup>	Suitable to remain on site - results below NEPM A-D	General Solid Waste ( <b>GSW</b> )
(II) 0.3-1.0m Clay	E1 / 0.7m E2 / 1.0m	~650 m <sup>3</sup>	Suitable to remain on site – results	Excavated Natural Material ( <b>ENM</b> )

Table 1: Soil Classification Summary				
Type	Samples	Quantity	Landuse Suitability	Soil/Waste Classification
	E3 / 0.6m E4 / 0.6m E5 / 0.5m		below NEPM A-D	
(III) >1.0m Clay and rock	Not required	~2,000 m <sup>3</sup>	-	Virgin Excavation Natural Material ( <b>VENM</b> )

### SOIL CERTIFICATION

**Type (I):** Shallow soil across backyard to depth of ~0.3 metres contaminated with lead likely from lead paint or imported fill. Given the levels of lead in soil from lead paint the material is suitable for pre-classification as **General Solid Waste** (non-putrescible), and no further TCLP analysis is required. Refer to **Figure 1** for area of **GSW** delineation across the majority of the backyard. The material is required to be disposed offsite as GSW prior to further excavations.

**Type (II):** The underlying natural material from ~0.3-1.0m across the site is suitable for reuse on-site or if required may be disposed off-site as **ENM**. In general ENM is suitable for engineering or earthworks applications.

**Type (III):** Further underlying material below depth of 1.0m across the site meets the definition of Virgin Excavation Natural Material (**VENM**). In general VENM is suitable for engineering or earthworks applications similar to ENM.

The above classifications are subject to visual screening for foreign matter or potential contamination during excavation and loading. Material types should be excavated in the order presented to reduce risk of waste contaminating the underlying natural materials. No mixing or dilution is permitted. All material disposed offsite should be accompanied by a copy of this soil report. Material may only be deposited at sites with a suitable approval or Environmental Protection Licence (EPL) to receive waste or exempt materials. Copies of transport records or disposal receipts should be appended to this document and maintained with site records. Should the reader have any queries regarding this letter report, please do not hesitate to contact ENRS on 0401 518 443 for further information or assistance.

Yours sincerely



**Taite Beeston**

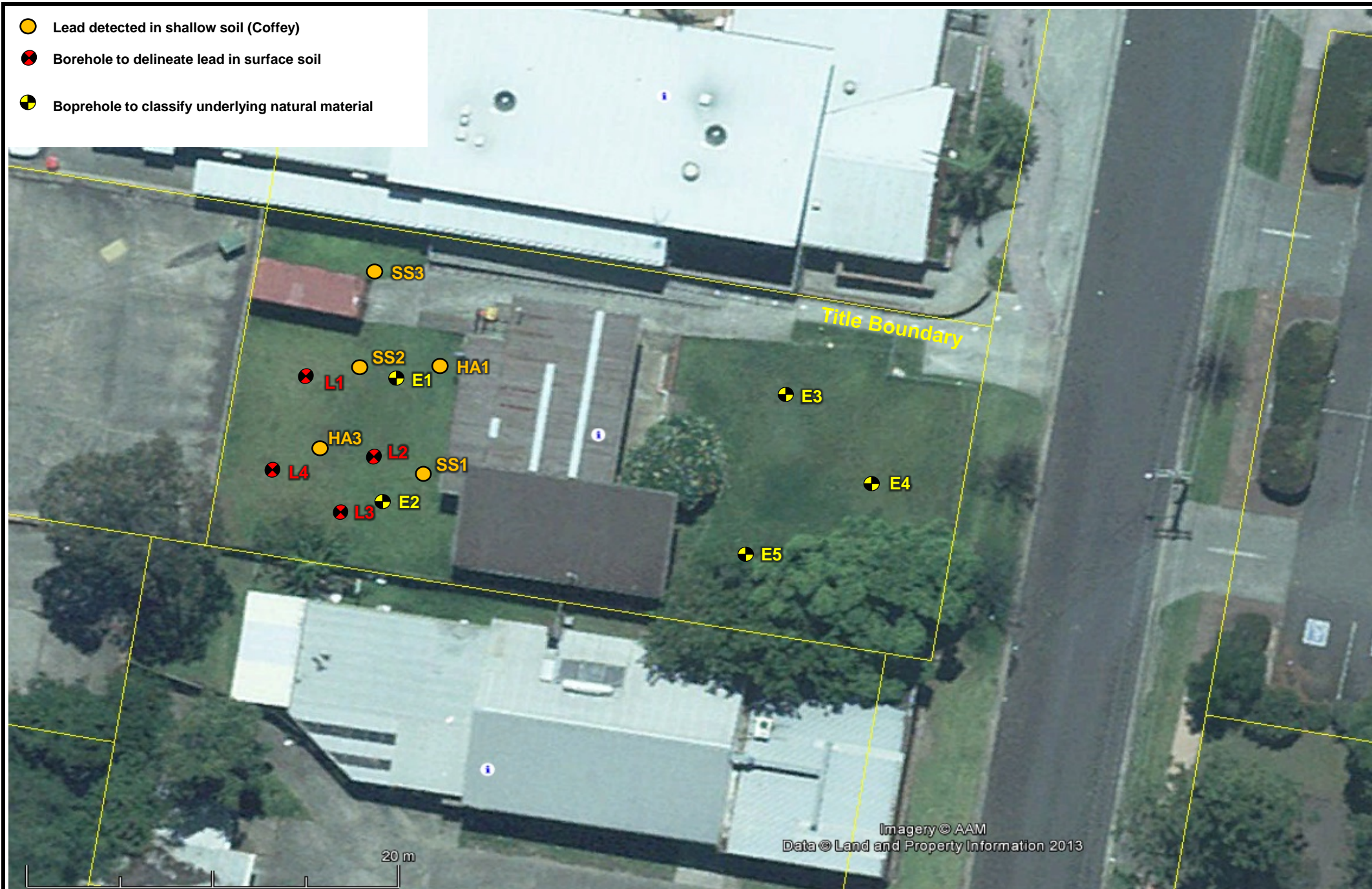
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**Asbestos Competent Person**  
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- Lead detected in shallow soil (Coffey)
- ⊗ Borehole to delineate lead in surface soil
- ⊕ Borehole to classify underlying natural material



**ENRS**

Environment & Natural Resource Solutions

25 River Road, Shoalhaven Heads, NSW, 2535  
T/F 02 90374708 M. 0401518443 projects@enrs.com.au

Scale: **Scale Bar**

Revision: **A**

Checked: **RL**

Status: **Rev 1**

Drawn: **TB**

Approved: **RL**

Client: **Pattersons**

Project: **ENRS0572**

Location: **9 Lawrence St, Nowra**

Title: **Site Plan**

Date: **31-03-16**

Figure: **1**

**Attachment 1:**

**Comparison of Laboratory Results against Soil Classification  
Criteria**

**Table A: Total Soils Concentration Results**  
**Patterson - 9 Lawrence Avenue Nowra**

Analyte					BTEX					Total Recoverable Hydrocarbons					Polycyclic Aromatic Hydrocarbons (PAHs)															Metals/Metalloids										pH	Electrical Conductivity (uS/cm)	EPA ENM / Waste Classification			
					Benzene	Toluene	Ethyl benzene	m+p-Xylene	o-Xylene	TRH C6-C9	F1 TRH C6-C10	F2 TRH C10-C16	F3 TRH C16-C34	F4 TRH C34-C40	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b+j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Total Positive PAHs	Benzo(a)pyrene TEQ calc (zero)	Benzo(a)pyrene TEQ calc(half)	Benzo(a)pyrene TEQ calc(PQL)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury				Nickel	Zinc	
Tier 1: Assessment Criteria - NEPM (2013) Soil Investigation Levels (mg/Kg)																																													
NEPM A (Residential,Primary Schools & Accessible Soil)					-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	300	3	3	3	100	20	100	6000	300	40	400	7400	-	-				
NEPM B (Residential minimal Access to Soils)					-	-	-	-	-	-	-	-	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400	4	4	4	500	150	500	30000	1200	120	1200	60000	-	-				
NEPM C (Recreational Open Space, Secondary Schools)					-	-	-	-	-	-	-	-	170	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300	3	3	3	300	90	300	17000	600	80	1200	30000	-	-				
NEPM D (Industrial and Commercial)					-	-	-	-	-	-	-	-	370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4000	40	40	40	3000	900	3600	240000	1500	730	6000	400000	-	-				
NSW EPA Service Station Guideline for Sensitive Landuse					1	130	50	25	25	65	65	1000	1000	1000	-	-	-	-	-	-	-	-	-	-	1.0	-	-	20	-	-	-	-	-	-	-	300	-	-	-	-	-				
NEPM Ecological Investigation levels (EILs)					50	85	70	105	105	-	180	120	300	2800	170	-	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	-	100	-	400	280 <sub>MHL5</sub>	1100	-	350	590 <sub>MHL5</sub>	-	-				
Tier 2: Excavated Natural Material Exemption (NSW EPA 2012)																																													
Absolute Max. Concentration (Table 2 Column 3)					0.5	65	25	15	15	-	-	500	500	500	-	-	-	-	-	-	-	-	-	1.0	-	-	-	40	-	-	-	40	1	150	200	100	1	60	300	4.5 to 10	3000				
Max. Ave. for Characterisation (Table 2 Column 2)					NA	NA	NA	NA	NA	-	-	250	250	250	-	-	-	-	-	-	-	-	-	0.5	-	-	-	20	-	-	-	20	0.5	75	100	50	0.5	30	150	5 to 9	1500				
Tier 3: NSW EPA Waste Classification Criteria (EPA 2014)																																													
General Solid Waste (GSW)					CT1 mg/Kg	10	288	600	1,000	1,000	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	0.8	-	-	-	N/A <sup>7</sup>	-	-	-	100	20	100	-	100	4	40	-	-	-				
					TCLP1 mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	-	-	-	-	-	-	-	5	1	5	-	5	-	-	-	-			
Restricted Solid Waste (RSW)					SCC1 mg/Kg	18	518	1,080	1,800	1,800	650	650	-	-	-	-	-	-	-	-	-	-	10	-	-	-	200	-	-	-	500	100	1,900	-	1,500	50	1,050	-	-	-					
					CT2 mg/Kg	40	1,152	2,400	4,000	4,000	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	3.2	-	-	-	N/A <sup>7</sup>	-	-	-	400	80	400	-	400	16	160	-	-	-			
					TCLP2 mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16	-	-	-	-	-	-	-	20	4	20	-	20	-	-	-	-	-					
					SCC2 mg/Kg	72	2,073	4,320	7,200	7,200	2,600	2,600	-	-	-	-	-	-	-	-	-	-	-	-	23	-	-	-	800	-	-	-	2000	400	7,600	-	6,000	200	4,200	-	-	-			
Total Concentrations (mg/kg) - PQL					0.2	0.5	1	2	1	25	25	50	100	100	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.1	0.1	0.1	0.5	0.5	0.5	0.5	4	0.4	1	1	1	0.1	1	1	0.1	0.1			
ENM Soil Classification	E1	0.7	Soil	31-03-16	<0.2	<0.5	<1	<2	<1	<25	<25	<25	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	NIL (+)VE	<0.5	<0.5	<0.5	16	<0.4	47	2	23	<0.1	3	18	6.8	22	ENM		
	E2	1.0	Soil	31-03-16	<0.2	<0.5	<1	<2	<1	<25	<25	<25	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	NIL (+)VE	<0.5	<0.5	<0.5	7	<0.4	33	2	23	<0.1	2	15	5.5	52			
	E3	0.6	Soil	31-03-16	<0.2	<0.5	<1	<2	<1	<25	<25	<25	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	NIL (+)VE	<0.5	<0.5	<0.5	5	<0.4	20	2	12	<0.1	2	20	6.2	21				
	E4	0.6	Soil	31-03-16	<0.2	<0.5	<1	<2	<1	<25	<25	<25	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	NIL (+)VE	<0.5	<0.5	<0.5	4	<0.4	24	6	10	<0.1	3	45	6.7	29				
	E5	0.5	Soil	31-03-16	<0.2	<0.5	<1	<2	<1	<25	<25	<25	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	NIL (+)VE	<0.5	<0.5	<0.5	4	<0.4	21	1	9	<0.1	1	26	6.4	18				
Lead in Soil	L1	0.2	Soil	31-03-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	270	-	-	-	-	-	GSW				
	L2	0.2	Soil	31-03-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220	-	-	-	-	-						
	L3	0.2	Soil	31-03-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260	-	-	-	-	-						
	L4	0.2	Soil	31-03-16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160	-	-	-	-	-						
95% Upper Confidence Limit Calculations																																													
Number of samples					5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5			
Average					0.10	0.25	0.50	1.00	0.50	12.50	12.50	12.50	50.00	50.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.03	0.05	0.05	0.05	-	0.25	0.25	0.25	7.2	0.20	29.0	2.6	15.4	0.05	2.20	24.80	6.32	28.40
Maximum					0.10	0.25	0.50	1.00	0.50	12.50	12.50	12.50	50.00	50.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.03	0.05	0.05	0.05	-	0.25	0.25	0.25	16.0	0.20	47.0	6.0	23.0	0.05	3.0	45.0	6.8	52.0
Minimum					0.10	0.25	0.50	1.00	0.50	12.50	12.50	12.50	50.00	50.00	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.10	0.03	0.05	0.05	0.05	-	0.25	0.25	0.25	4.0	0.20	20.0	1.0	9.0	0.05	1.0	15.0	5.5	18.0
Standard deviation					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.0	0.6	0.0	2.1	2.6	121.3	0.0	1.0	13.1	0.3	5.7
Coefficient of Variation					0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.00	0.0	0.1	0.0	0.1	1.0	7.9	0.0	0.5	0.5	0.0	0.2
t statistic at a=0.05					2.13	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	-	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
95% UCL average					0.10	0.25	0.50	1.00	0.50	12.5	12.5	13	50	50	0.05	0.05	0.05	0.05	0.05	0.05	0.1	0.1	0.05	0.05	0.1	0.03	0.05	0.05	0.05	-	0.25	0.3	0.3	7.8	0.2	31.0	5.1	131.1	0.1	3	37.2	6.6	33.8	-	

**Attachment 2:**  
**Laboratory Certificates of Analysis**  
**(COA)**



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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

## CERTIFICATE OF ANALYSIS

144110

### Client:

**ENRS**

25 River Rd  
Shoalhaven Heads  
NSW 2535

**Attention:** Rohan Last

### Sample log in details:

Your Reference:

**ENRS0572 - Patterson - 9 Lawrence Ave Nowra**

No. of samples:

9 soils

Date samples received / completed instructions received

01/04/16 / 01/04/16

### Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

***Please refer to the last page of this report for any comments relating to the results.***

### Report Details:

Date results requested by: / Issue Date:

8/04/16 / 6/04/16

Date of Preliminary Report:

Not Issued

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Accredited for compliance with ISO/IEC 17025.

**Tests not covered by NATA are denoted with \*.**

### Results Approved By:

  
Jacinta Hurst  
Laboratory Manager

Envirolab Reference: 144110  
Revision No: R 00



vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	144110-1	144110-2	144110-3	144110-4	144110-5
Your Reference	-----	E1	E2	E3	E4	E5
Depth	-					
Date Sampled	-----	0.7	1.0	0.6	0.6	0.5
Type of sample		31/03/2016	31/03/2016	31/03/2016	31/03/2016	31/03/2016
		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Date analysed	-	05/04/2016	05/04/2016	05/04/2016	05/04/2016	05/04/2016
TRHC <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
TRHC <sub>6</sub> - C <sub>10</sub>	mg/kg	<25	<25	<25	<25	<25
vTPHC <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	98	98	95	98	97

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	144110-1	144110-2	144110-3	144110-4	144110-5
Your Reference	-----	E1	E2	E3	E4	E5
	-					
Depth	-----	0.7	1.0	0.6	0.6	0.5
Date Sampled		31/03/2016	31/03/2016	31/03/2016	31/03/2016	31/03/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	4/04/2016	4/04/2016	4/04/2016	4/04/2016	4/04/2016
Date analysed	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
TRHC <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	<50	<50
TRHC <sub>15</sub> - C <sub>28</sub>	mg/kg	<100	<100	<100	<100	<100
TRHC <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	<100	<100	<100	<100
TRH>C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50	<50	<50	<50	<50
TRH>C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100	<100	<100	<100	<100
TRH>C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	85	90	87	86	90

PAHs in Soil Our Reference: Your Reference	UNITS ----- -	144110-1 E1	144110-2 E2	144110-3 E3	144110-4 E4	144110-5 E5
Depth	-----	0.7	1.0	0.6	0.6	0.5
Date Sampled		31/03/2016	31/03/2016	31/03/2016	31/03/2016	31/03/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Date analysed	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93	94	100	93	88

Acid Extractable metals in soil						
Our Reference:	UNITS	144110-1	144110-2	144110-3	144110-4	144110-5
Your Reference	-----	E1	E2	E3	E4	E5
	-					
Depth	-----	0.7	1.0	0.6	0.6	0.5
Date Sampled		31/03/2016	31/03/2016	31/03/2016	31/03/2016	31/03/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Date analysed	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Arsenic	mg/kg	16	7	5	4	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	47	33	20	24	21
Copper	mg/kg	2	2	2	6	1
Lead	mg/kg	23	23	12	10	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	2	2	3	1
Zinc	mg/kg	18	15	20	45	26

Acid Extractable metals in soil					
Our Reference:	UNITS	144110-6	144110-7	144110-8	144110-9
Your Reference	-----	L1	L2	L3	L4
	-				
Depth	-----	-	-	-	-
Date Sampled		31/03/2016	31/03/2016	31/03/2016	31/03/2016
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Date analysed	-	04/04/2016	04/04/2016	04/04/2016	04/04/2016
Lead	mg/kg	270	220	260	160

Misc Inorg - Soil Our Reference: Your Reference	UNITS ----- -	144110-1 E1	144110-2 E2	144110-3 E3	144110-4 E4	144110-5 E5
Depth	-----	0.7	1.0	0.6	0.6	0.5
Date Sampled		31/03/2016	31/03/2016	31/03/2016	31/03/2016	31/03/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	05/04/2016	05/04/2016	05/04/2016	05/04/2016	05/04/2016
Date analysed	-	05/04/2016	05/04/2016	05/04/2016	05/04/2016	05/04/2016
pH 1:5 soil:water	pH Units	6.8	5.5	6.2	6.7	6.4
Electrical Conductivity 1:5 soil:water	µS/cm	22	52	21	29	18

Moisture Our Reference: Your Reference	UNITS ----- -	144110-1 E1	144110-2 E2	144110-3 E3	144110-4 E4	144110-5 E5
Depth Date Sampled Type of sample	----- - -----	0.7 31/03/2016 Soil	1.0 31/03/2016 Soil	0.6 31/03/2016 Soil	0.6 31/03/2016 Soil	0.5 31/03/2016 Soil
Date prepared	-	4/04/2016	4/04/2016	4/04/2016	4/04/2016	4/04/2016
Date analysed	-	5/04/2016	5/04/2016	5/04/2016	5/04/2016	5/04/2016
Moisture	%	14	14	10	10	9.0

Moisture Our Reference: Your Reference	UNITS ----- -	144110-6 L1	144110-7 L2	144110-8 L3	144110-9 L4
Depth Date Sampled Type of sample	----- - -----	- 31/03/2016 Soil	- 31/03/2016 Soil	- 31/03/2016 Soil	- 31/03/2016 Soil
Date prepared	-	4/04/2016	4/04/2016	4/04/2016	4/04/2016
Date analysed	-	5/04/2016	5/04/2016	5/04/2016	5/04/2016
Moisture	%	16	13	12	15

MethodID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Soil						Base II Duplicate II %RPD		
Date extracted	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-2	04/04/2016
Date analysed	-			05/04/2016	144110-1	05/04/2016    05/04/2016	LCS-2	05/04/2016
TRHC <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-016	<25	144110-1	<25    <25	LCS-2	98%
TRHC <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-016	<25	144110-1	<25    <25	LCS-2	98%
Benzene	mg/kg	0.2	Org-016	<0.2	144110-1	<0.2    <0.2	LCS-2	99%
Toluene	mg/kg	0.5	Org-016	<0.5	144110-1	<0.5    <0.5	LCS-2	94%
Ethylbenzene	mg/kg	1	Org-016	<1	144110-1	<1    <1	LCS-2	99%
m+p-xylene	mg/kg	2	Org-016	<2	144110-1	<2    <2	LCS-2	100%
o-Xylene	mg/kg	1	Org-016	<1	144110-1	<1    <1	LCS-2	98%
naphthalene	mg/kg	1	Org-014	<1	144110-1	<1    <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	97	144110-1	98    96    RPD: 2	LCS-2	100%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH(C10-C40) in Soil						Base II Duplicate II %RPD		
Date extracted	-			04/04/2016	144110-1	4/04/2016    4/04/2016	LCS-2	04/04/2016
Date analysed	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-2	04/04/2016
TRHC <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-003	<50	144110-1	<50    <50	LCS-2	110%
TRHC <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-003	<100	144110-1	<100    <100	LCS-2	120%
TRHC <sub>28</sub> - C <sub>36</sub>	mg/kg	100	Org-003	<100	144110-1	<100    <100	LCS-2	95%
TRH>C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-003	<50	144110-1	<50    <50	LCS-2	110%
TRH>C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-003	<100	144110-1	<100    <100	LCS-2	120%
TRH>C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-003	<100	144110-1	<100    <100	LCS-2	95%
Surrogate o-Terphenyl	%		Org-003	92	144110-1	85    88    RPD: 3	LCS-2	103%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Date extracted	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-2	04/04/2016
Date analysed	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-2	04/04/2016
Naphthalene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	86%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	98%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	100%
Anthracene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	91%
Pyrene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	97%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	LCS-2	74%
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	144110-1	<0.2    <0.2	[NR]	[NR]

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Soil						Base II Duplicate II %RPD		
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	144110-1	<0.05    <0.05	LCS-2	95%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	144110-1	<0.1    <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	95	144110-1	93    94    RPD: 1	LCS-2	109%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Acid Extractable metals in soil						Base II Duplicate II %RPD		
Date prepared	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-4	04/04/2016
Date analysed	-			04/04/2016	144110-1	04/04/2016    04/04/2016	LCS-4	04/04/2016
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	144110-1	16    10    RPD: 46	LCS-4	109%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	144110-1	<0.4    <0.4	LCS-4	101%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	144110-1	47    41    RPD: 14	LCS-4	106%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	144110-1	2    3    RPD: 40	LCS-4	110%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	144110-1	23    19    RPD: 19	LCS-4	105%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	144110-1	<0.1    <0.1	LCS-4	82%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	144110-1	3    3    RPD: 0	LCS-4	103%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	144110-1	18    16    RPD: 12	LCS-4	105%

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Misc Inorg - Soil						Base II Duplicate II %RPD		
Date prepared	-			05/04/2016	[NT]	[NT]	LCS-1	05/04/2016
Date analysed	-			05/04/2016	[NT]	[NT]	LCS-1	05/04/2016
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	100%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-1	99%

**Report Comments:**

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

### **Quality Control Definitions**

**Blank:** This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

**Duplicate:** This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

**Matrix Spike:** A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

**LCS (Laboratory Control Sample):** This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

**Surrogate Spike:** Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

### **Laboratory Acceptance Criteria**

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

### Attachment 3: Photographic Record

Photograph 1: Investigation Area to the rear of the Site



Photograph 2: Soil Conditions encountered during Auguring





## ENVIROLAB SERVICES




Consultant: ENRS				ENRS Project Name and Number: ENRS0572								Envirolab Services						
Project Mgr: Rohan Last (0401 518 443)				Patterson - 9 Lawrence Ave Nowra								12 Ashley St, Chatswood, NSW, 2067						
Sampler: TB				PO No.: Approval RL								Phone: 02 9910 6200						
Address: 25 River Road, Shoalhaven Heads, NSW, 2535				Envirolab Services Quote No. : -								Fax: 02 9910 6201						
Delivery: TNT ex Nowra				Date results required: STANDARD								E-mail: ahie@envirolabservices.com.au						
Email: rohan@enrs.com.au				Or choose: standard / 1 day / 2 day / 3 day								Contact: Aileen Hie						
Phone: 02 9037 4708 Fax: 02 9037 4708				Note: Inform lab in advance if urgent turnaround is required - surcharge applies														
Sample information				Tests Required												Comments		
Envirolab Sample ID	ENRS Sample ID	Date sampled	Type of sample	HOLD	Combo 3 - TRH, BTEX, PAHs, 8HM	Comb#11 (TPH, BTEX, 12HM, OCP, PCB, Phenol, Cyanide)	EC, pH	Lead	Combo 3a - TRH, BTEX, PAHs, 8HM, Asb.									sample description
1	E1 / 0.7	31-03-15	Soil jar		1		1											
2	E2 / 1.0	31-03-15			1		1											
3	E3 / 0.6	31-03-15			1		1											
4	E4 / 0.6	31-03-15			1		1											
5	E5 / 0.5	31-03-15			1		1											
6	L1	31-03-15						1										
7	L2	31-03-15						1										
8	L3	31-03-15						1										
9	L4	31-03-15						1										
			Total	0	5	0	5	4	0	0	0	0	0	0	0	0	0	
Relinquished by (company): ENRS				Received by (company): ELS.								Samples Received: Cool or Ambient (circle one)						
Print Name: Rohan Last				Print Name: Calum BONSER.								Temperature Recieved at: 19.1 (if applicable)						
Date & Time: 31-03-15				Date & Time: 01042016. 1230								Transported by: Hand delivered / courier						
Signature:				Signature: CB.								Page No: 1 of 1						

Record  
Number

## VENM Source Certification Record Sheet

(To be completed at the Source of VENM)

Address/location of the source of VENM	230 Old Souther Rd, South Nowra
Sketch plan of the site from which the VENM was sourced	
Previous landuses of the location where the VENM was sourced	Greenfield, Undeveloped Land
Approximate amount of VENM loaded (cubic metres of tonnes)	1000 T
Results of any test work undertaken	<p>(Include details of the tests undertaken to determine contamination and VENM classification)</p> <p>Lynch - Old Southern Rd W07-4617-A VENM</p>
Date of inspection/test	16th May 2017

<b>VENM Verification Statement - Source</b> (to be completed by supplier of VENM)	
I, <u>Tim Lynch</u> , of <u>Lynch Civil</u> (name of company supplying VENM), verify that the load of VENM to be delivered to SCCCR shows no sign of contamination, such as bricks, concrete, timber, tiles or vegetation and no odours were observed during VENM extraction and loading.	
Signature <u>Tim Lynch</u>	Date <u>31</u> / <u>05</u> / <u>2017</u>



**Mt Kuring-Gai**  
12/9-15 Gundah Rd  
Mt Kuring-Gai NSW 2080  
T: (02) 8438 0300  
F: (02) 8438 0310

**Wollongong**  
1/140 Industrial Rd  
Oak Flats NSW 2529  
T: (02) 4257 4458  
F: (02) 4257 4463

E: admin@netgeo.com.au  
W: www.netgeo.com.au  
ABN: 35 069 211 561

W07/4617-A SRT

16<sup>th</sup> May 2017

Lynch Civil Contractors  
27 Quinns Lane  
SOUTH NOWRA NSW 2541

Attention: Mr Tim Lynch

By Email: tim@lynchcivil.com

Dear Sir,

**Re: Proposed Subdivision: 230 Old Southern Road, South Nowra  
Virgin Excavated Natural Material**

---

As requested, Network Geotechnics Pty Ltd (NG) has carried out inspections at the above site on 5<sup>th</sup> October 2016 when test pitting was undertaken for pavement thickness design and 15<sup>th</sup> May 2017 during stripping of topsoil and bulk earthworks. Bulk earthworks, road boxing and drainage material have been placed in two onsite stockpiles in preparation for removal offsite.

In view of the above we have been requested to provide advice on classification of excavated material as Virgin Excavated Natural Material (VENM).

During test pitting for pavement design the material encountered comprised generally yellow and red grey clay of high plasticity, overlying grey weathered shale. The quantity of material now stockpiled on site is understood to be about 1,000 tonnes located in two separate stockpiles. Topsoil has been stockpiled separately and does not form part of this report.

Based on the test pitting and visual inspection of the site during bulk earthworks and profiles encountered in road boxing and storm water trenches the following points are noted:

- No visual source of further contamination was observed on site.
- Sub surface soil and rock generally comprised residual yellow and red grey clay of high plasticity overlying grey weathered shale.

Based on the above, yellow and red grey clay of high plasticity and grey weathered shale is assessed to be classified as a Virgin Excavated Natural Material (VENM) in accordance with NSW Waste Guidelines.

This report must be read in conjunction with the attached Information Sheets and any other explanatory notes.

We trust these comments are sufficient to meet your present requirements. Please do not hesitate to contact the undersigned should you have any queries.

For and on behalf of  
**Network Geotechnics Pty Ltd**

Report prepared by:

A handwritten signature in black ink, appearing to read 'S Thorley', with a stylized, cursive script.

Stephen Thorley  
Principal Geotechnician  
Encl     Information Sheets (1 Sheet)

# Information About This Report

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## LIMITATIONS

**Scope of Services:** The report has been prepared in accordance with the scope of services set out in NG's Proposal under NG's Terms of Engagement, or as otherwise agreed with the Client. The scope of services may have been limited and/or amended by a range of factors including time, budget, access and site constraints.

**Specific Purpose:** The report is provided for the specific development and purpose as described in the report. The report may not contain sufficient information for developments or purposes other than that described in the report.

**Currency of Information:** The information in this report is considered accurate at the date of issue with regard to the current conditions of the site.

**Reliance on Information:** In preparing the report NG has necessarily relied upon information provided by the Client and/or their Agents. Such data may include surveys, analyses, designs, maps and plans. NG has not verified the accuracy or completeness of the data except as stated in this report.

**Copyright and Reproduction:** The contents of this document are and remain the intellectual property of NG. This document should only be used for the purpose for which it was commissioned and should not be used for other projects or by a third party. This report shall not be reproduced either totally or in part without the permission of NG. Where information from this report is to be included in contract documents or engineering specification for the project, the entire report should be included in order to minimise the likelihood of misinterpretation.

**Construction Specifications:** Unless otherwise stated, the report, or sections of the report, should not be used as part of a specification for a project, without review and agreement by NG.

**Report Should Not be Separated:** The report must be read in conjunction with the attached Information Sheets and any other explanatory notes and should be kept in its entirety without separation of individual pages or sections.

**Review by Others:** NG cannot be held responsible for interpretations or conclusions from review by others of this report or test data, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

## GENERAL NOTES

**Geotechnical and Environmental Reporting:** Geotechnical and environmental reporting relies on the interpretation of factual information based on judgment and opinion and is far less exact than other engineering or design disciplines. Geotechnical and environmental reports are for a specific purpose, development and site as described in the report and may not contain sufficient information for other purposes, developments or sites (including adjacent sites) other than that described in the report.

**Subsurface Conditions:** Subsurface conditions can change with time and can vary between test locations. For example, the actual interface between the materials may be far more gradual or abrupt than indicated and contaminant presence may be affected by spatial and temporal patterns. Therefore, actual conditions in areas not sampled may differ from those predicted since no subsurface investigation, no matter how comprehensive, can reveal all subsurface details and anomalies. Construction operations at or adjacent to the site and natural events such as floods, earthquakes or groundwater fluctuations can also affect subsurface conditions and thus the continuing adequacy of a geotechnical report. NG should be kept informed of any such events and should be retained to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

**Groundwater:** Groundwater levels indicated on borehole and test pit logs are recorded at specific times. Depending on ground permeability, measured levels may or may not reflect actual levels if measured over a longer time period. Also, groundwater levels and seepage inflows may fluctuate with seasonal and environmental variations and construction activities.

**Interpretation of Data:** Data obtained from nominated discrete locations, subsequent laboratory testing and empirical or external sources are interpreted by trained professionals in order to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions in accordance with any relevant industry standards, guidelines or procedures.

**Soil and Rock Descriptions:** Soil and rock descriptions are based on AS 1726 – 1993, using visual and tactile assessment except at discrete locations where field and / or laboratory tests have been carried out. Refer to the accompanying soil and rock terms sheet for further information.

**Further Advice:** NG would be pleased to further discuss how any of the above issues could affect a specific project. We would also be pleased to provide further advice or assistance including:

- Assessment of suitability of designs and construction techniques;
- Contract documentation and specification;
- Construction control testing (earthworks, pavement materials, concrete);
- Construction advice (foundation assessments, excavation support).



## VENM Source Certification Record Sheet

(To be completed at the Source of VENM)

Address/location of the source of VENM	103 Plunkett St & 18 Haig Av, Nowra NSW
Sketch plan of the site from which the VENM was sourced	
Previous landuses of the location where the VENM was sourced	Commercial Property
Approximate amount of VENM loaded (cubic metres of tonnes)	1,400
Results of any test work undertaken	<p>(Include details of the tests undertaken to determine contamination and VENM classification)</p> <p>AaaNowraVENMCert08May2017</p>
Date of inspection/test	08 May 2017

VENM Verification Statement - Source	
(to be completed by supplier of VENM)	
<p>I, <u>TERRY SHELDRICK</u>, of <u>SHOALHAWK EXCAVATIONS</u> (name of company supplying VENM), verify that the load of VENM to be delivered to SCCCR shows no sign of contamination, such as bricks, concrete, timber, tiles or vegetation and no odours were observed during VENM extraction and loading.</p>	
Signature <u>Terry Sheldrick</u>	Date <u>30 / 06 / 2017</u>

**PACIFIC ENVIRONMENTAL  
AUSTRALIA PTY LTD**  
POSTAL ADDRESS: PO BOX 1222  
MENAI CENTRAL, NSW 2234, AUSTRALIA  
  
TEL: (02) 9543 2825 FAX: (02) 9543 2823  
TEL: INTEL +612  
E-MAIL: [decontam@bigpond.net.au](mailto:decontam@bigpond.net.au)

**Nowra Office:** PO Box 6132  
SUSSEX INLET, NSW 2540  
Phone: 02 44210541



AAA FUEL INSTALLATIONS Pty Ltd  
By Email: [abdul.sahid@aaafuel.com.au](mailto:abdul.sahid@aaafuel.com.au)  
Cc: [admin@aaafuel.com.au](mailto:admin@aaafuel.com.au)

8<sup>th</sup> May 2017

**Attention: Mr. Abdul Sahid**

Dear Sir,

**Reference: Soil Classification VENM – 103 Plunkett Street and 18 Haig Avenue  
Nowra, NSW.**

At your direction we have conducted an inspection of the soils that are at the site at the corner of 103 Plunkett Street and 18 Haig Avenue Nowra, NSW. The soils were the subject of a contamination assessment by Pacific Environmental, dated 5<sup>th</sup> May 2017. There was no evidence of fill soils in the areas proposed to be excavated, below the 100mm bedding layer under the concrete pavement. The Pacific Environmental Contamination assessment confirmed that the virgin soils are suitable for residential development with access to the soils (NEPM A 2013). The site soils to be excavated comprise nominally 560 m<sup>3</sup> and are suitable to remain on site or exported as VENM.

Virgin soils exist at the site at depths ranging from the exposed surface under the 100mm bedding layer (under the concrete pavement) to depth of in excess of 8.5m. In relation to the virgin silty clay they were determined to be:

- ◆ VENM in accordance with:

the NSW EPA (formerly NSW DECC) Guidelines for classifying :

- ◆ “Waste Classification Guidelines PART 1: Classifying Waste –Virgin Excavated Natural Material definition Page 9”.

and

- ◆ As defined by Division 2 Waste Classifications Section 49 Definition of Waste Classifications of the Contaminated Land Management Act.

The NSW EPA’s recommended certification is attached below.

This certificate relates to all soils below 0.2m BGL to be excavated, except those in the vicinity of Parsons Brinkerhoff’s Bore B10 – see attached Parsons Brinkerhoff site plan. Any

soil excavated from this area should be thoroughly inspected for asbestos fragments and treated accordingly if those fragments are present. It is understood that this area does not form part of the proposed excavations.

If you have any questions please do not hesitate to contact Steve Smith on 0416270451,  
Yours faithfully

A handwritten signature in black ink, appearing to be 'Steve Smith', with a stylized flourish at the end.

Steve Smith  
BSc. Eng., MEng. Sc., CPEng  
Director Pacific Environmental Australia

Attached:  
NSW EPA's recommended format;  
Site Photographs;  
Parsons Brinkerhoff's site plan.

## Certification: Virgin excavated natural material

1. I	Stephen Smith
of	Pacific Environmental Australia Pty Ltd PO Box 1222 Menai Central NSW 2234
certify that the waste as set out in section 2 of this notice is Virgin Excavated Natural Material (VENM) as defined in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> .	
This certification is made on behalf of the waste generator	
being	AA FUEL Pty Ltd
of	Email: admin@aafuel.com.au

2. The waste was generated at:	
Street address:	<b>Cnr 103 Plunkett Street and 18 Haig Avenue Nowra NSW</b>
Title reference (Lot/DP, etc.):	Lot 101 DP1176270 and Lot 1 DP 781046
<b><u>The amount of waste (by volume or weight) is:</u></b>	Nominally 560 m <sup>3</sup>

3. I have made the determination that the waste is VENM because:	
<input checked="" type="checkbox"/> <b><u>I have assessed the historical and current land use of the site at which the waste was generated.</u></b>	
<input checked="" type="checkbox"/> <b><u>The waste is not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities.</u></b>	
<input checked="" type="checkbox"/> <b><u>The waste does not contain any sulfidic ores or soils.</u></b>	
<input checked="" type="checkbox"/> <b><u>The waste does not contain any other waste.</u></b>	
<input checked="" type="checkbox"/> <b><u>The waste does not contain asbestos in any form.</u></b>	

Signature(s)



.....

Name(s) (printed)

Stephen Smith

Date

8<sup>th</sup> May 2017

## SITE PHOTOGRAPHS



View of sandy clay being excavated



Views of sandy clay  
under clean (200mm)  
of concrete bedding  
comprising sandy  
clay.



View looking North of capping layer and clays  
under

View of inspection trench in VENM



Bore Hole of Concern with potential asbestos fragments

## Appendix L – Plans

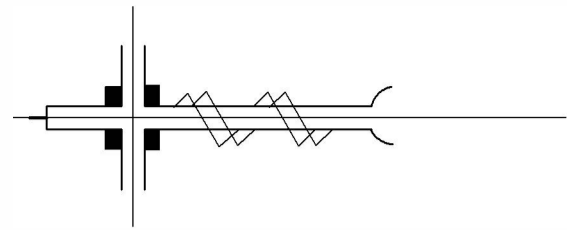
SCCCR Rehab Plan - Mining Activities Plan

Monitoring Locations Plan

VENM emplacement Plan

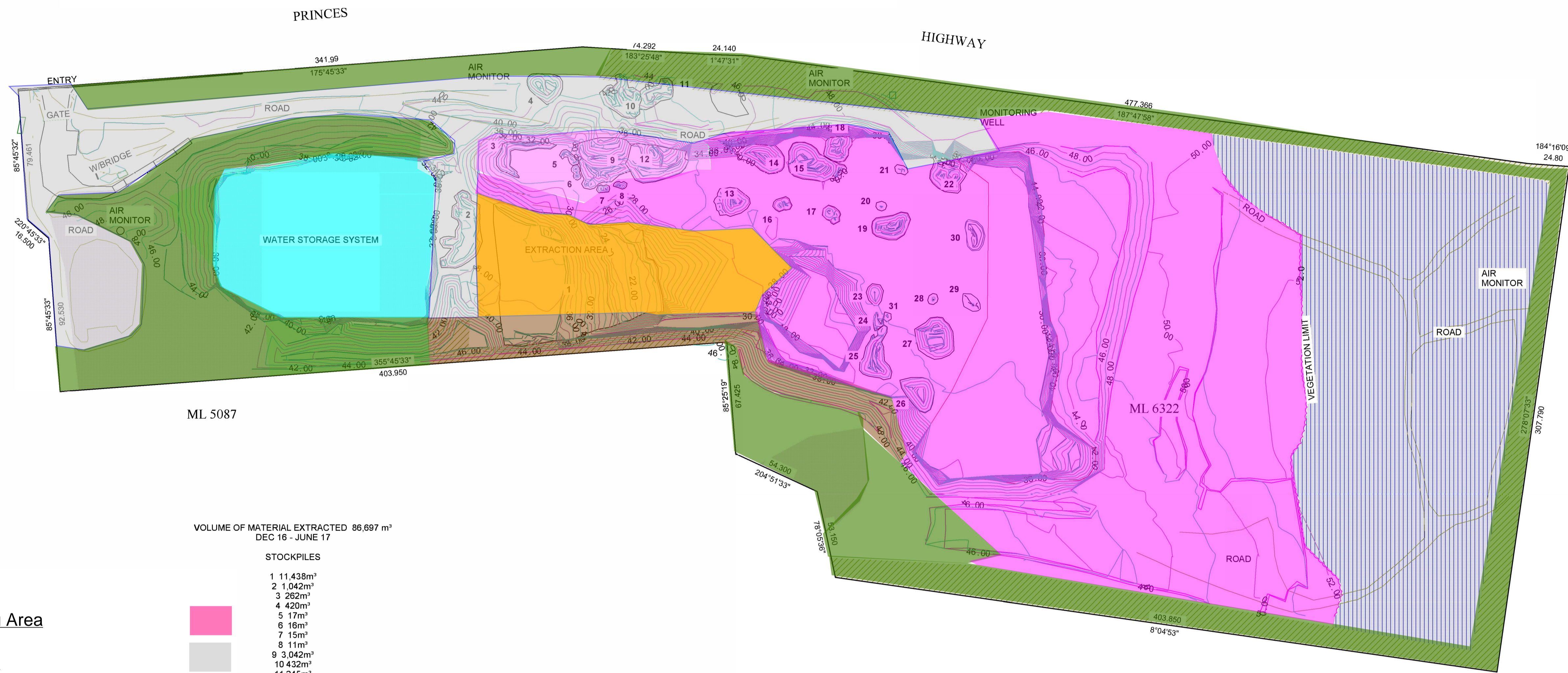
Flat Rock Yalwal AEMR updated plan

MOP Staging Plan



# SCCCR Rehabilitation Plan

## Dec 2016 - June 2017



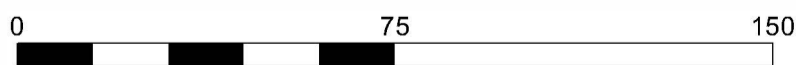
### LEGEND

- Active Mining Area
- Infrastructure
- Shaped Waste Emplacement
- Tailings Emplacement
- E2 - Native Forest
- E4 - Other (Water Storage Dam)

VOLUME OF MATERIAL EXTRACTED 86,697 m<sup>3</sup>  
DEC 16 - JUNE 17







STOCKPILES
1 11,438m <sup>3</sup>
2 1,042m <sup>3</sup>
3 262m <sup>3</sup>
4 420m <sup>3</sup>
5 17m <sup>3</sup>
6 16m <sup>3</sup>
7 15m <sup>3</sup>
8 11m <sup>3</sup>
9 3,042m <sup>3</sup>
10 432m <sup>3</sup>
11 245m <sup>3</sup>
12 2,099m <sup>3</sup>
13 404m <sup>3</sup>
14 842m <sup>3</sup>
15 1,146m <sup>3</sup>
16 51m <sup>3</sup>
17 75m <sup>3</sup>
18 441m <sup>3</sup>
19 515m <sup>3</sup>
20 17m <sup>3</sup>
21 18m <sup>3</sup>
22 469m <sup>3</sup>
23 134m <sup>3</sup>
24 14m <sup>3</sup>
25 440m <sup>3</sup>
26 534m <sup>3</sup>
27 1,018m <sup>3</sup>
28 19m <sup>3</sup>
29 51m <sup>3</sup>
30 196m <sup>3</sup>
31 10m <sup>3</sup>

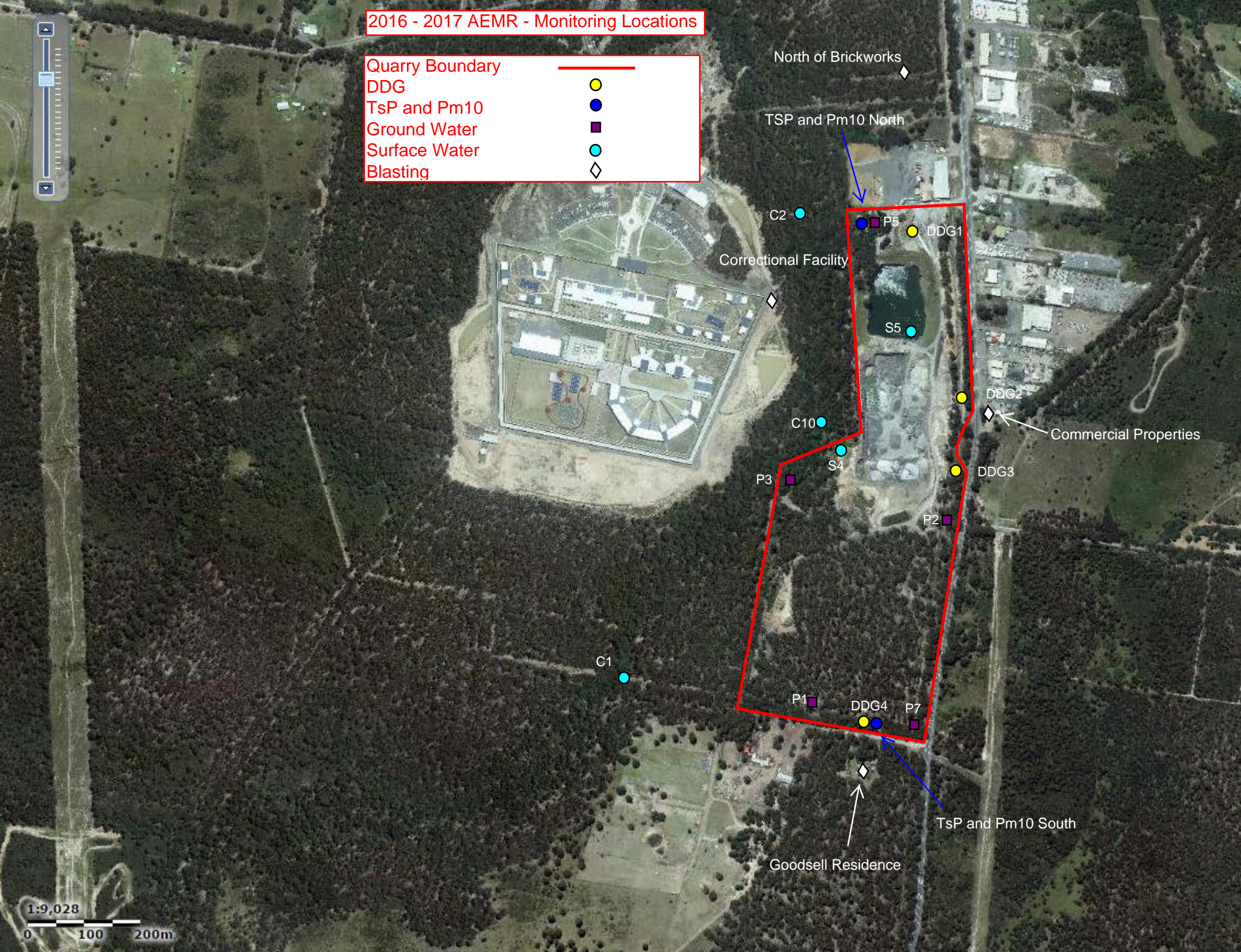
CONTROL	EASTING	NORTHING	RL
COORDINATE SYSTEM MGA 94			
HEIGHT DATUM A.H.D.			
SSM-27775	281129.905	6132761.466	47.18
SSM-103837	281113.781	6132952.428	46.16



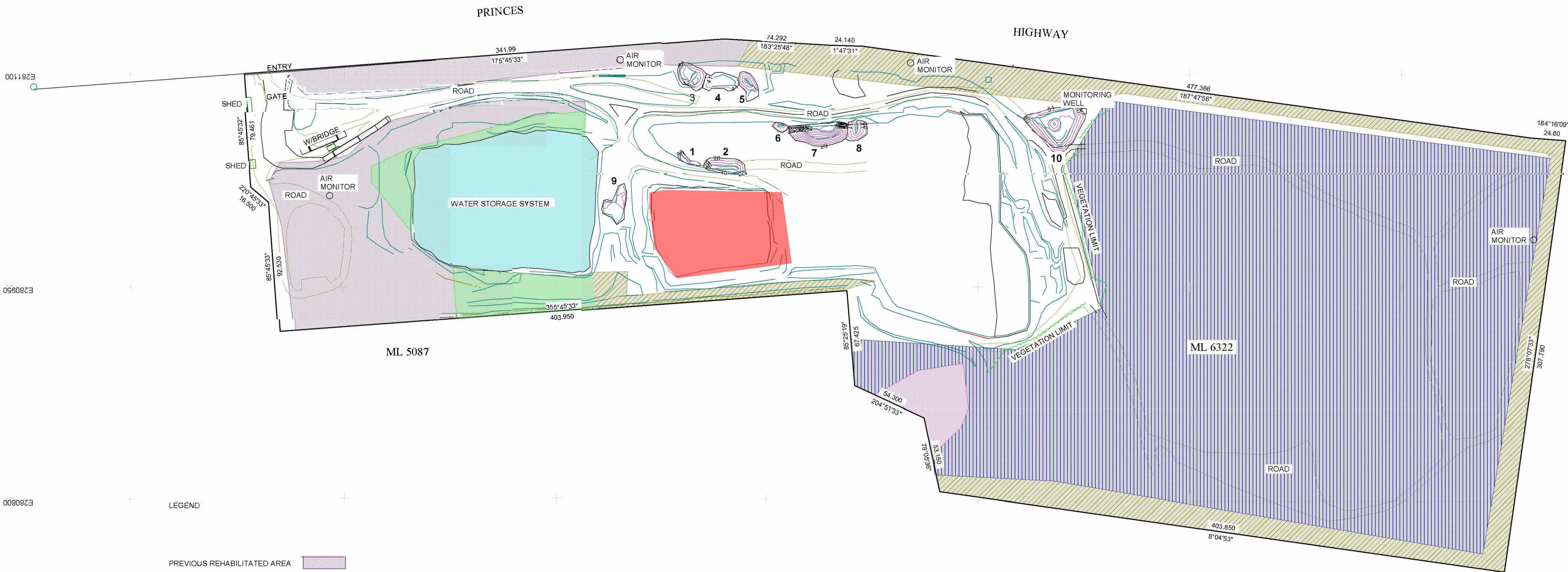
DATE	30/06/2017	AMENDMENTS	SURVEY FILE
SURVEYOR	MS		DWG FILE
DRAWN	MS		
CHECKED	MS		

# 2016 - 2017 AEMR - Monitoring Locations

Quarry Boundary	
DDG	
TsP and Pm10	
Ground Water	
Surface Water	
Blasting	



VENM DISPOSAL AEMR  
Dec 2016 - June 2017



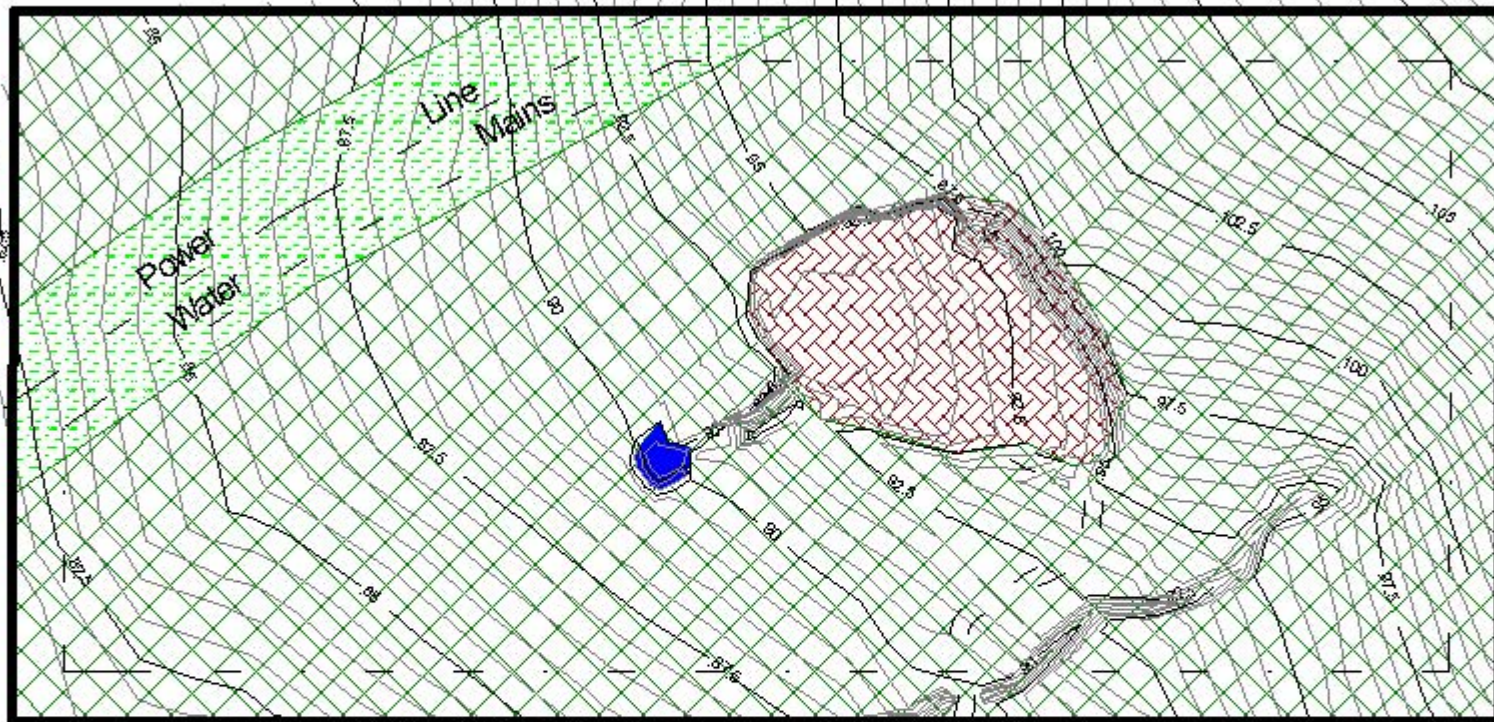
LEGEND

- PREVIOUS REHABILITATED AREA
- NEW REHABILITATED AREA
- SHAPED EMPLACEMENT AREA
- SLOPE OVER 10° AND UNDER 18°
- ACCESS ROAD
- UNDISTURBED LAND
- VENM DISPOSAL

CONTROL	EASTING	NORTHING	RL
COORDINATE SYSTEM MGA 94			
HEIGHT DATUM A.H.D.			
SSM-27775	281129.905	6132761.466	47.18
SSM-103637	281113.781	6132952.428	46.16



DATE	27/08/2015	AMENDMENTS	SURVEY FILE
SURVEYOR	MS		DWG FILE
DRAWN	MS		
CHECKED			



Yalwal Road

— Lease Boundary  
— Limit Of Mining



Native Grasses

Native Endemic Forest

Sedimentation Pond

Disturbed Area

Scale 1:2500  
Datum Assumed  
Contour Interval 0.5m

AEMR Plan

Dec 2016 - June 2017

Mining Lease 531

Flatrock Quarry

Yalwal Rd

No Mining Activity Was Carried Out During The Reporting Period



**Figure 3 Project Development Sequence**