We are residents of 394 Brayton Road Marulan (Location 16/Figure 6.4/pge 112/Lynwood Quarry Mod 4 - EIS Part 1) which is situated approx 1.9kms east of the proposed Granite Pit, approx 2kms north-east of the Approved Pit, approx 2kms south-east of Gunlake Quarry and approx 700 metres south-west of Holcim Johnniefelds Quarry. In addition to this, we are approx 2.7kms west of the Hume Highway. Our location makes us vulnerable to the cumulative impacts of noise, dust, traffic and transportation generated by the operations of the quarrying industry in Marulan. It is our opinion that Lynwood Quarry Modification 4 should not be considered in isolation by the Department of Planning and Infrastructure (Planning Dept) and therefore submit our objection with particular emphasis on the cumulative impacts of Lynwood, Gunlake and Johnniefelds quarries, as follows.

Granite Pit Site

The proposed Granite Pit is located within a portion of land known as Lot 2, DP 1107232. In the Environmental Impact Statement accompanying the Development Application (DA-128-5-2005) of May 2005, prepared by Umwelt (Australia), the following paragraph within Section 1.3.2 Property Description and Land Ownership of the EIS, described the original purpose of this portion of land.

*"Readymix (*now Holcim) *is seeking an agreement with the adjoining landowners to the west of the project area to lease a minimum 1 kilometre wide strip of land for the duration of the project. There is an approved house location within this proposed buffer, however as Readymix intends to hold a lease over this location, potential impacts on this location have not been assessed in this EIS."*

Holcim now owns this portion of land *(Mod 4 EIS - Section 1.6 - Land Ownership)* yet has not provided for any further buffer zones for the Granite Pit other than small sections of land reclaimed due to the reduction of the Approved Pit. An additional amenity bund and vegetative screen are proposed for the western edge of the Granite Pit however due to constraints on the eastern edge, i.e. two high pressure gas pipelines, Goulburn Mulwaree water pipeline and fibre optic cable, all of which are located within a fully cleared easement of up to 44m wide, any permanent structures are prohibited. Our property and residence are east of both the Approved Pit and the Granite pit and will be directly exposed to the revised overburden emplacement areas and additional haul roads. *(Figure 1.3)* but will not have the protection of any amenity bunds.

A small ridge separates the Approved Pit and the proposed Granite Pit with the north-east corner of the ridge rising to an elevation of approx 710mAHD. The Southern Overburden Emplacement Area is planned to have a capacity of approx 9.2 million cubic metres, a footprint of 43 hectares and an elevation of 695mAHD. An amenity bund to the west of the Granite Pit will be developed to reduce the visual impacts of the pit to properties in the Towrang area, **some 9kms away**. This amenity bund of overburden will reach heights of between 12 and 14 metres, making it equal to or higher than the mAHD of the pit in places, and will continue to be constructed until Stage 3 of the project, or approx 1.5 to 2 years. The elevation of our property ranges between 620 and 670mAHD and will be downwind of all aspects of the revised Approved Pit and the proposed Granite Pit.

As mentioned above, no assessment of the potential impacts has been previously carried out on the location of the proposed pit as it was to be quarantined as a buffer zone for the duration of the approved development application, i.e**. until 1 January 2038.** An assessment of the area has identified potential environmental impacts on a residence 1.5kms from the Granite pit area as a result of the easterly summer winds yet has failed to identify any potential dust and noise impacts on nearby residences, including ours, which are affected by the predominant westerly winds of autumn, winter and spring.

In addition to the proposed Holcim Granite Pit, Gunlake Quarries currently has a development application with the Planning Department for an extension to their existing pit. *(Gunlake Quarry - 07-0074 Modification 4)*. If approved, the Lynwood Granite Pit and the Gunlake Quarry Extension Pit, will increase the footprint of both quarries to approx 293ha i.e. Lynwood, 230ha and Gunlake 63ha. In addition to this, the combined disturbance footprint of both Holcim Quarries is approx 510ha, i.e. Lynwood (499ha)and Johnniefelds Quarry (11ha). Moreover, there will only be approx 500m distance between the two pits, boundary to boundary.

Air Quality

Between 16 and 30 June 2014, Holcim arranged for dust and noise monitoring to be carried out at our property in order to assess the impact of quarrying in the area, including Lynwood Quarry which was yet to be fully operational. Results of the data collected are attached **(Attachments 1 and 2)**. In addition to this monitoring, Umwelt has recently been commissioned by Holcim to prepare an assessment of the cumulative environmental impacts on our property from the three quarries in close proximity to us, i.e. Lynwood, Gunlake and Johnniefelds. The report was finalised and provided to us in November 2015.

Pacific Environment Limited (Pacific) carried out the air quality component of the assessment and reported that the maximum 24 hour average PM10 concentration for Lynwood quarry on a day in June 2014 was 10.8 ug/m3 yet results from monitoring at our property for the same period shows concentrations at approx 38 ug/m3. As the predominate winter winds are from a westerly direction, then it stands to reason that the impact at that time was more than likely coming from Lynwood quarry. As there is no unsealed road nor was there any agricultural activity being carried out at Location 1 of the dust monitoring on our property, additional background contribution of dust would most likely be from all three quarries, i.e. Lynwood, Gunlake and Johnniefelds as well as from the high volume of traffic on Brayton Road.

As per the Umwelt EIS, 2005, no environmental assessment had been carried out previously on the location of the proposed Granite pit. The above-mentioned real-time site specific data could have been made available to Pacific when undertaking the assessment of air quality for the Lynwood modification however as modelling was used, the results of that data collection would have contradicted their predictions. Considering Lynwood was not fully operational in June 2014 and dust emissions would have been contained at a minimum to construction, transportation and wind erosion, then the impact on us is expected to be far greater now that Lynwood is operational, and in the future, irrespective of whether or not the new pit is approved and even more so if it is.

We have been advised that it is common practice within the quarrying industry to combine certain materials such as recycled concrete, cement and flyash to the aggregate in order to meet client specifications. These materials have a particle size of less than PM10. Over a period of time in 2014, Holcim carried out trial mixes of Lynwood quarry product with cement and flyash, for use on the internal roads at Lynwood. The roadbase product was transported to Johnniefelds quarry where the materials were blended using a front end loader. It is our belief that fine particulate matter from these introduced materials were deposited on the interior and exterior of our residence on numerous occasions. As a result, we repeatedly requested that Holcim provide dust monitoring units on our property, in particular a High Volume Air Sampler, to record future emissions of dust and fine particulate matter that passes through our property. In response to our requests, a dust deposition gauge has been located at our residence since 17 July 2015 and the results to date have seen a marked increase in Ash Content and an increasing level of insoluble solids. We have strong concerns that introduced materials such as flyash may be escaping from existing project areas and believe the storage facilities

and handling processes of these materials should be assessable within any EA process, as they are a significant component of much of the saleable product and can be as damaging to health as free silicas. To date, a High Volume Air Sampler has not been successfully installed on our property, leaving this direction the sole unmonitored location for PM10 emissions from all three quarries.

Pacific has access to the Lynwood quarry weather station data results which recorded that between March 2014 and February 2015 only 2.9% of the days were calm. Out of the remaining 97.1%, the winds were predominately from the west with the majority having speeds of greater than 7.5m/s. After a recent interpretation of the wind roses compiled out of data from the weather station, Pacific concluded that ***'It is therefore logical that Lynwood Quarry would be the largest contributor of dust emissions at the* (our) *residence'.*** That comment aside, at any one time, all wind directions have the potential to carry dust and noise towards our property from either Lynwood, Gunlake or Johnniefelds quarries, whether through the means of operations, traffic or transportation, therefore making the impacts on us constantly present. It should also be noted that easterly winds are usually moist (i.e. sea breeze) and can carry fine particles further, thus the impact of dust from Johnniefelds becomes greater under these conditions.

In the abovementioned November 2015 report on the cumulative impact of quarrying on our property, Pacific estimated the annual total dust emissions for Lynwood, Gunlake and Johnniefelds would be as follows:

Lynwood Quarry - 515,218 kgs/yr TSP and 111,643 kgs/yr PM10 or **626.9 tonnes of the combined dust emissions**;

Gunlake Quarry - 79,891 kgs/yr and 25,606kgs/yr PM10 or **105.5 tonnes of the combined dust emissions**;

Johnniefelds Quarry - 31,323 kgs/yr TSP and 18,211 kgs/yr or **49.5 tonnes of the combined dust emissions**.

If we are to acknowledge that the modelling process used by Pacific is accurate then the above figures indicate that each year approx **781.9 tonnes of combined dust emissions (TSP and PM10)** would be produced out of the maximum combined 6 mtpa of product from the three quarries. Despite best practices being implemented, it is unlikely that this amount of dust could be contained within the confines of the quarry sites, and that the predominant meteorological conditions of the area could disperse up to **2.14 tonnes, or 2,140,000g of dust per day**.

However, the above figures are for the current maximum approved extraction levels of each quarry whereas Gunlake Quarry has a development application to modify their extraction from 750,000mtpa to 2mtpa, an increase of 150%. Based on the modelling process above, if approved, the additional dust emissions from Gunlake quarry would increase the combined daily dust emissions to **2.58 tonnes, or 2,580,000g of dust per day.** Once again, despite best practices, it is highly unlikely that this extraordinary amount of dust could be suppressed in order to meet the EPA's Air Quality Goals for Dust Deposition of 4g/sqm/m **(Table 6.6).**

We believe that the Air Quality portion of the EA is incomplete as it has not addressed any impact on our residence and property if development of the Granite Pit is approved, such as:

- the cumulative impact of Johnniefelds quarry remaining operational until Lynwood Approved Pit is fully productive;

- the cumulative impact of both Johnniefelds quarry and the Lynwood Approved Pit being operational during construction of the Granite Pit;
- the impact of dust being carried on westerly winds during the removal of topsoil and overburden from the pit location as well as during construction of the amenity bund and haulage road;
- the cumulative impact of dust emissions from the haulage of rock from the Granite Pit and Approved Pit to the primary crusher, 7am to 10pm, 7 days per week; and
- the impact of dust emissions from introduced materials such as recycled concrete, cement and flyash.

We would also like to express our concern that Pacific Environment Ltd was engaged to produce the Air Quality portion of the Lynwood Quarry Modification 4 EA, as this company has also been engaged for the Gunlake Quarry modification EA. In our opinion, and in the interest of transparency, an independent assessor would have leant more credibility and provided more integrity to the EA.

Blasting

In the absence of any data to compare results contained within the EA, we can only report on our observations. We hear the blasts, feel the blasts and note movements of windows and items within our house to varying degrees from all three quarries at times of blasting. We have also noted damage to the brickwork of our garden fence which is becoming increasingly more apparent. Hairline cracks have also recently started appearing in the gyprock inside our house which, after almost 25 years since construction, cannot be attributed to settlement and is more likely to be as a result of more frequent blasting as well as blasting into rock deeper into the pit at Johnniefelds.

The impact of having three operational quarry pits, i.e. Lynwood, Gunlake and Johnniefelds, plus more under construction if both Lynwood and Gunlake modifications are approved, is that blasting will occur more frequently. The anticipated blasting regime of all three quarries in the area would be:

- Lynwood Approved Pit - 1 to 2 times per week;
- Gunlake Quarry Approved Pit- approx once per week;
- Johnniefelds Quarry - approx 1 to 2 times per fortnight;
- Lynwood Proposed Granite Pit - 1 or more times per week;
- Gunlake Proposed Extension - 2 times per week.

On average, blasting would occur on a daily basis, with the exception of Sundays and public holidays, and at times, would occur more than once on any given day. As blasting can already be heard and felt from all three quarries at our property, it is unlikely that we would have any respite from the noise and vibration. Another disturbing observation of the cumulative impact of quarrying in the area is that when blasting occurs, particularly from Gunlake and Johnniefelds quarries, the whole valley towards Red Hills Road fills with a thick cloud of dust.

Noise

At the same time that the dust monitoring was undertaken in June 2014, a noise assessment was also carried out. **(Attachment 2)**. Umwelt (Australia) Ltd was involved in the analysis of the data collected from that monitoring however, once again, modelling has been used for Granite Pit EA and the previously collected data would have contradicted their predictions. The real-time data of June 2014 shows the noise during that period far exceeded the recommended maximum LAeq limits of Table 1: Operational Noise Limits**,** i.e. on some days reaching as high as 70dB, yet alone the acceptable amenity levels of day, evening and night. Industrial noise from Lynwood quarry cannot be excluded from the abovementioned data as construction, drilling and blasting was ongoing at that time.

It is also contradictory for Umwelt to state that *"An assessment of construction noise impacts was not required for the Modification Project as all construction activities (e.g. haul road construction) will be undertaken as part of the initial operations of the quarry and will therefore be under the operational noise criteria, and as such, have been assessed as operational noise".* **Table 1.1 Comparison of Approved Project and the Modification Project** clearly lists construction of a haul road to the proposed extraction area, the commencement of the amenity bund and water management as being part of the 'Construction Phase' and should be assessed as such. The operational area of the Approved Project is more than 2kms from the proposed haul road and amenity bund therefore the construction phase of the Modification Project should be assessed separately. The construction phase of the modification project will have a significant impact on properties to the east of the Granite Pit and without proper inclusion in the assessment process renders the EA incomplete.

Operational noises including warning sirens, blasting and trains shunting from the Approved Project operations at Lynwood are already clearly audible at our property and residence. Consistent with the existing development consent conditions, loading and haulage of rock from the Granite Pit to the primary crusher will occur between 7 am and 10 pm seven days per week. It is therefore logical that the predominant westerly winds will carry an excessive amount of noise from these activities to our property and residence.

In addition to the impact of noise from the operations from Lynwood's Approved Project and the potential of the Modification Project, is the cumulative impact of operations from Gunlake and Johnniefelds quarries. The operations from Johnniefelds is clearly audible at our residence and property, particularly during the summer months and periods of north-easterly winds. Both Johnniefelds and Gunlake transport their product via road with our property having a 1.6km frontage along the Brayton Road haulage route of both quarries. Johnniefelds transports product via approx 60-80 trucks (120-160 movements) per day between 6am and 7pm whereas the Gunlake Quarry Modification 4 is seeking approval for 440 truck movements 24hr/day, 6 days/wk. This is a potential combined total of 600 truck movements/day.

The haulage route along Brayton Road is incapable of maintaining the level of traffic currently generated by these two quarries despite a recent upgrade to meet safety standards. The refurbishment, which was carried out using sub-base product supplied by Holcim and top roadbase supplied by Gunlake quarry has not stood up to the constant pounding of heavily laden semi-trailers and B-double trucks and has deteriorated to an unacceptable level of potholes and stripped surface of road along the haulage route. Not only is this a dangerous hazard for road users, as seen in a recent truck accident on Brayton Road, but a road in disrepair creates additional noise pollution through tailgate banging and rattling of empty trucks. This is particularly evident during night-time transportation where the ambient levels for noise are far exceeded.

Further to the above, we would like to submit anecdotal evidence of the intrusion that cumulative industrial and road traffic noise has on the amenity at our residence. In October 2014, a Sound Engineer visited our property to discuss his intention to undertake an attended noise assessment as a follow-up to the June 2014 monitoring. This was due to 'spikes' in the results that he could not identify and needed to investigate in order to form a correct analysis of the data. On several occasions our conversation with the sound engineer, which was being conducted at our garden fence, needed to be halted due to the noise from passing trucks. The sound engineer also noted operational noises emanating from Johnniefelds quarry, including trucks crossing the cattle grid at the entrance to the quarry and reversing beepers ('quackers'), which he believed we should not be hearing. The sound engineer was due to return the following day to carry out the attended assessment however did not appear then and has not returned since, despite our repeated requests to Holcim staff for this to occur.

Noise has a significant affect on our amenity ranging from, but not limited to, traffic and quarry operations. We have experienced sleep disturbance as a result of night-time quarry activities and no longer enjoy the social aspect of entertaining, particularly outdoors, nor are we able to extend invitations to guests for overnight stays at our one-time rural retreat.

Resources

As the overburden thickness across the Project Site ranges from 0.4 to 22.0 metres, with an average thickness of 12.9 metres, it will most likely be at least 2 years before the high grade PRF is located and excavated. In the meantime, 9.2 million cubic metres, or approx 14mt of waste will removed and stockpiled in the Southern Overburden Emplacement Bund. In addition to that, an unspecified amount of overburden will construct the 12 to 14 metre high amenity bund.

Table 3.1 - JORC reportable 'Measured' and 'Indicated' Resources Adopted for the Conceptual Granite Pit shows that the combined amount of **measured** Overburden and Interburden (waste), i.e. 25.6 mt, is 19.5% of the combined amount of 106mt High and Low Grade **measured** Granite Primary Raw Feed (PRF). When you look at the figures for the **indicated** resources, the percentages alter to **waste being 42%.** Out of the total 154.6mt, only 115mt is unweathered, unaltered and competent granite and suitable as PRF with the remaining **39.6mt, or 25.6%, being low grade or waste**. We have always been led to believe that Holcim expected there would only be 5% wastage from the Lynwood Approved Pit however the Granite Pit will produce at least 5 times more wastage.

Figure 3.6 - Regional Airborne Total Magnetic Intensity Image indicates that the proposed Granite Pit will be located within a 'highly magnetic' area. A Geoscience Australia fact sheet on Magnetic Surveys and Magnetism in Rocks) states, *'A rock itself will be magnetic if at least one of the minerals it is composed of is magnetic. The strength of the rock's magnetism is related not only to the amount of magnetic minerals they contain but also to the physical properties, such as grain size, of those minerals. The main magnetic mineral is magnetite (Fe3O4) - a common mineral found disseminated through most rocks in differing concentrations.'*

The report goes on to state that - '*When interpreting the aeromagnetic image it is useful to know that magnetite is found in greater concentrations in igneous and metamorphic rocks. In some localities it is in such high concentrations it is mined as an iron ore. Magnetite can also be weathered or leached from rocks and redeposited in other locations, such as faults.'*

The EA does not mention the presence of magnetite in the rock mass however it is highly likely, going by the information above, that there is. What assessment has been done to evaluate the concentration of

magnetite in the granite rock formation and the potential for it to redeposit in the faults and dykes that are present in the rock mass? Also, has there been any assessment of the iron content in the granite which could contribute to oxidisation in the groundwater and downstream watercourses which are part of the Sydney Water Catchment?

Groundwater

The Groundwater Impact Assessment states that the Granite Pit is likely to intercept the groundwater table in the first year and, for the duration of the project, some of the pit will be below the groundwater table. It will also be necessary to control groundwater inflows to the quarry and there is potential for the quarry to impact on the local groundwater system.

The total amount of groundwater on the planet, held in rock and soil, is estimated to be 23 million cubic kms. Only 6%, referred to as 'modern groundwater', is near the surface and most quickly renewed, yet is the most sensitive to climate change and human contamination. *(BBC News - 17 November 2015). 'It's a vital resource that we need to manage better. Old water is highly variable. Some places it can be quite deep, in some places not. The next step (of the study) was to try and work out just how fast some water stores were being depleted.'* (Dr Tom Gleeson, University of Victoria, Canada).

The level of 'modern groundwater' for most of Australia is less than 1m. (Attachment 3). With Marulan's annual average rainfall being approx 665mm and the evaporation rate higher than the precipitation at around 1204mm, the amount of surface run -off is lessened as more water is retained for large scale operations such as the quarrying industry in Marulan. As surface run-off is vital to replenishing groundwater, this resource is most sensitive to human and environmental changes and could ultimately run out. So serious is the plight of global water resources and climate change, that Heads of State meet annually to discuss how better the world can manage the environment. The impact that quarrying could have on groundwater cannot and should not be ignored.

Radon gas

Radon is a natural radiactive gas that occurs in rocks and soils and can only be detected with special equipment. It can accumulate in buildings and provides about 50% of the total radiation dose to the average person in the UK. Radon decays to form radioactive particles that can enter the body by inhalation which has been linked to an increase in the risk of developing lung cancer and is the second largest cause after smoking. Apart from lung cancer, there is no epidemiological proof of radon causing any other type of cancer however the dose to the stomach from ingested radon can be significant and implies an increased risk of stomach cancer. Radon dissolved in groundwater can migrate over long distances along fractures and caverns depending on the velocity of fluid flow. (British Geological Survey - May 2012).

Certain types of geology, such as granite and volcanic soils, are more likely to contain radon. The adverse health effects of exposure to radon are caused primarily to damage due to alpha-particles. Radon as a noble gas is rapidly exhaled after being breathed in however radon progeny, combined with other molecules in the air and with particles of dust, readily deposit in the airways of the lung. Exposure to radon in houses can also lead to lung cancer, and it is believed more than 15,000 deaths from lung cancer occur due to radon exposure in the United States.

"Any radon exposure has some risk of causing lung cancer. The lower the radon level in your home, the lower your family's risk of lung cancer." (US EPA). Radon is present in all air however is greater

indoors as buildings can trap radon gas. Modern construction of houses that are well sealed against cold and heat creates ideal conditions for trapping radon gas and those built on concrete slabs are more likely to have higher levels of trapped radon than well ventilated homes. (Australian Radiation Protection and Nuclear Safety Agency - ARPANSA- Fact sheet - Attachment 4). Average radon levels in homes along the Great Dividing Range are generally higher than those on the coastal plain, mainly due to the geology, i.e. rock and soils. (ARPANSA Fact sheet - Attachment 5). Betley Park, is a rural residential development close to Lynwood Quarry less than 20 years old and the houses would be classed as being of modern construction.

Radioactivity of radon is measured in becquerels (Bq). Goulburn and the Goulburn region, at 21 and 18 bqs respectively, have one of the highest readings in Australia. (ARPANSA). Action levels for radon gas exposure vary throughout the world however it is widely accepted that there is no known safe level of exposure. Radon monitors are available for testing of levels in homes and as there has been a significant disturbance of the landscape due to the quarrying industry in Marulan and the surrounding region, it would be timely to carry out assessments to gauge what levels are currently being reached in both households and workplaces.

Diesel Emissions

In 2012, The International Agency for Research on Cancer (IARC) confirmed diesel emissions were carcinogenic. Diesel is understood to be the larger contributor to air pollution given that diesel emits 56 times more oxides of nitrogen compared to unleaded fuel. Limits on diesel emissions from vehicles in Europe was introduced in September 2009, known as "Euro V" however Australia has been slow to tighten rules on emissions for diesel vehicles. (Reference - Daily Telegraph, October 2013).

Diesel engines have long been regarded as 'green' by car manufacturers, governments and environmental groups because they are more fuel efficient and emit less CO2 than petrol engines. Diesel vehicle sales have increased significantly over the past decade or so, however 'clean diesels' are more of a health hazard, i.e. the more finely tuned diesel engine the greater the risk. Diesel emissions have a particulate matter of less than PM10 and the fumes contain nitrous oxides.

It has been reported that there is approx 29,000 deaths/year in the UK that could be related to diesel fine particles; 23,500 deaths/year could be attributed to nitrogen dioxide; and 1:12 deaths in affluent parts of London, such as Chelsea and Kensington, can be linked to these diesel emissions. (BBC News, Oct 2015). Plant, equipment and vehicles used in the quarrying industry are generally run on diesel fuel and mixed together with fine dust particles, diesel emissions can have a significant adverse affect on air quality. Diesel driven rail transportation would also be a contributor of nitrous oxide emissions.

It is estimated that there will be at least 32 off-road vehicles and mobile equipment that will be used for the life of the Lynwood Quarry. Gunlake Quarry presently utilises approx 11 such pieces of equipment however this number would certainly increase if the pit expansion is approved. In addition to off-road vehicles, approx 164 trucks (328 movements) would be required to transport product on a daily basis from Lynwood. Together with Gunlake Quarry's proposed 220 trucks (440 movements) and Johnniefelds quarry average of 60-80 trucks (120-160 movements), it is estimated the combined movements generated by the three quarries would be over 900 movements per day. Taking into account that a number of light vehicles such as company utes would also run on diesel fuel, then it is more than likely that over a 1,000 vehicles, including diesel train engines, would be emitting nitrous oxides from the quarry sites.

Recent studies have found that car company figures for diesel pollution are unreliable and that actual

emissions are far greater. This has certainly been the case with European car manufacturers such as Volkswagen, Audi and Porsche, amongst others, who have admitted to having falsified the diesel pollution management controls in their vehicles. Not only were these companies found guilty of deceiving customers, but governments and interested parties alike. This is a classic example of multi-nationals (big business) putting profits before people, proving that modelling can be manipulated to give the desired results as the situation demands.

Summary

We submit the following points which summarise our comments and observations above:

- Modelling can be manipulated to provide favourable predictions in the absence of real-time data;
- Lynwood Quarry is likely to be the largest contributor of dust to our property;
- An independent assessor, other than Pacific Environmental Ltd, would have leant more credibility and provided more integrity to the Air Quality section of the Modification Project EA;
- The cumulative noise from Lynwood, Gunlake and Johnniefelds operations and traffic are more pronounced and have a greater impact in reality than in theory;
- More frequent blasting from three quarries will have an ongoing destabilising and damaging affect on our residence;
- Our water will become increasingly more contaminated with dust deposition as larger areas of the ground's surface is exposed and quarry pits are excavated;
- Our property and residence will constantly be impacted upon by dust, industrial noise and traffic from quarrying in the area; and
- Serious health issues as a result of constant exposure to silica dust, diesel particulate matter, nitrous oxides and radon gas are a legitimate cause of concern for us.

Conclusion

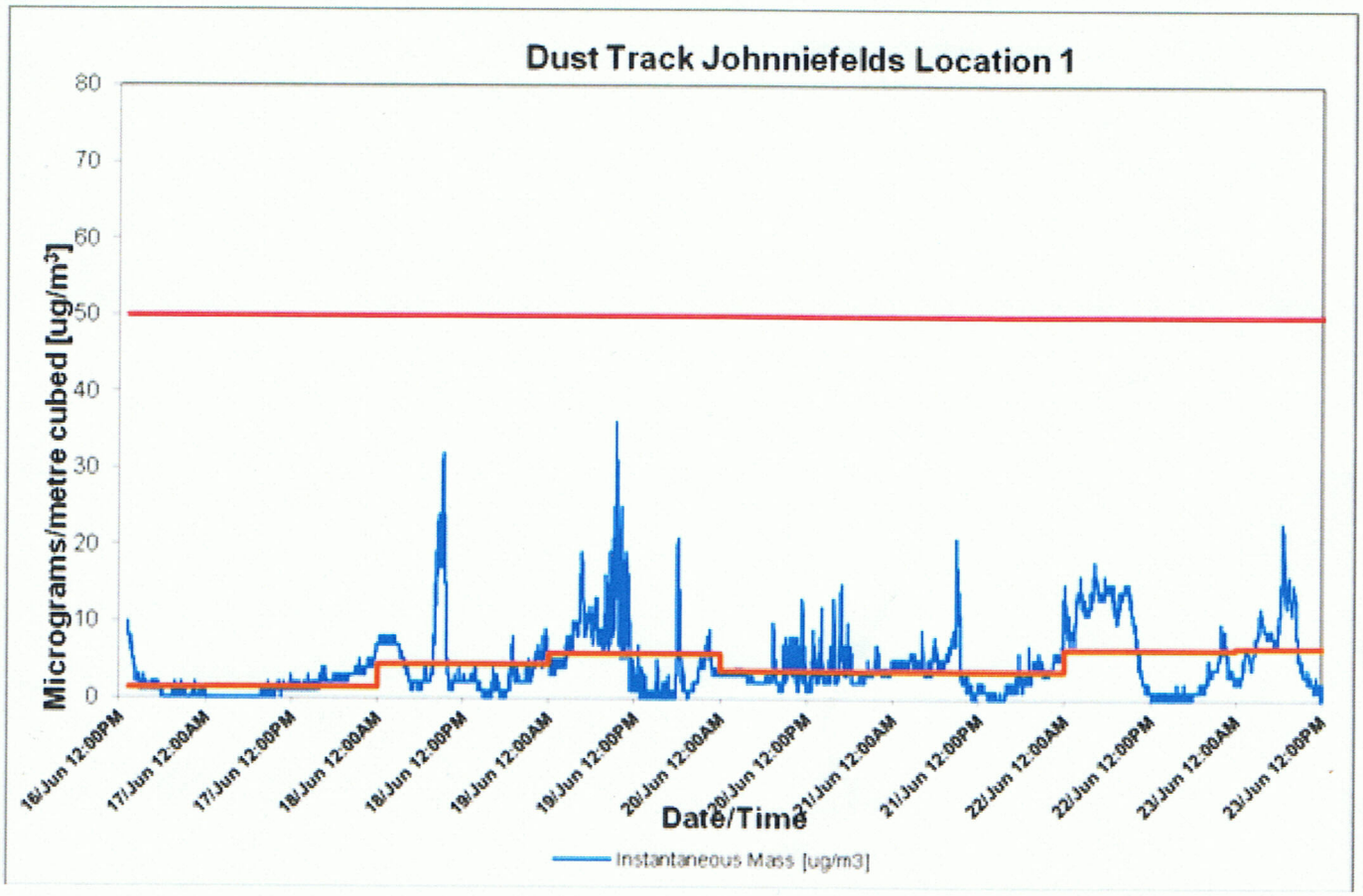
Throughout this submission, we have endeavoured to bring to the Planning Department's attention the environmental impacts that the Modification Project would have on residents to the east of the Granite Pit. Although we do not discount the impact the Granite Pit may have on the visual amenity of some residents in the Towrang area, too much focus has been placed on this inert impact which does not present the health hazards of dust, noise and sleep disturbance. Although the EA has identified one residence that will be affected at night by easterly (summer) winds, it has failed to identify residents affected by noise and dust by the predominant westerly winds of the remaining 75% of the year.

In order to gain approval for the Granite Pit modification, Holcim has taken steps to reduce the impact of its operations on one residence to the south as well as the few properties in Towrang. Those steps taken are achievable however in our opinion, by not acknowledging any impact on residents to the east, it is quite obvious that nothing can be done. The ongoing, developing and recurring modifications to Johnniefelds, Lynwood and Gunlake quarries has rendered obsolete any plans we may have had for our retirement, severely reduced our quality of life and affected our health and wellbeing. Over the past 25 years, the quarrying industry has intruded into our life by various means and destroyed so many

aspects of our amenity that it has now reached crisis point. We believe there are no further mitigating measures that could be implemented to alleviate the impact of dust, industrial noise and traffic on us that would be considered reasonable.

The EA states '*the 'do nothing' alternative would effectively result in the under utilisation of the existing infrastructure and impact adversely on the significant contribution of Lynwood Quarry to the local, regional and State economies through supply of high quality construction materials, ongoing expenditure and employment*'. Although this statement may be true from a corporate point of view, the risk to the environment and health of the community should be paramount when this proposal is being considered by the Planning Department. It is not uncommon for Corporations to make investment errors however when they do, it should not be left up to innocent bystanders, such as landowners, to have to pay the price for their poor judgement.

Colin and Catherine Beattie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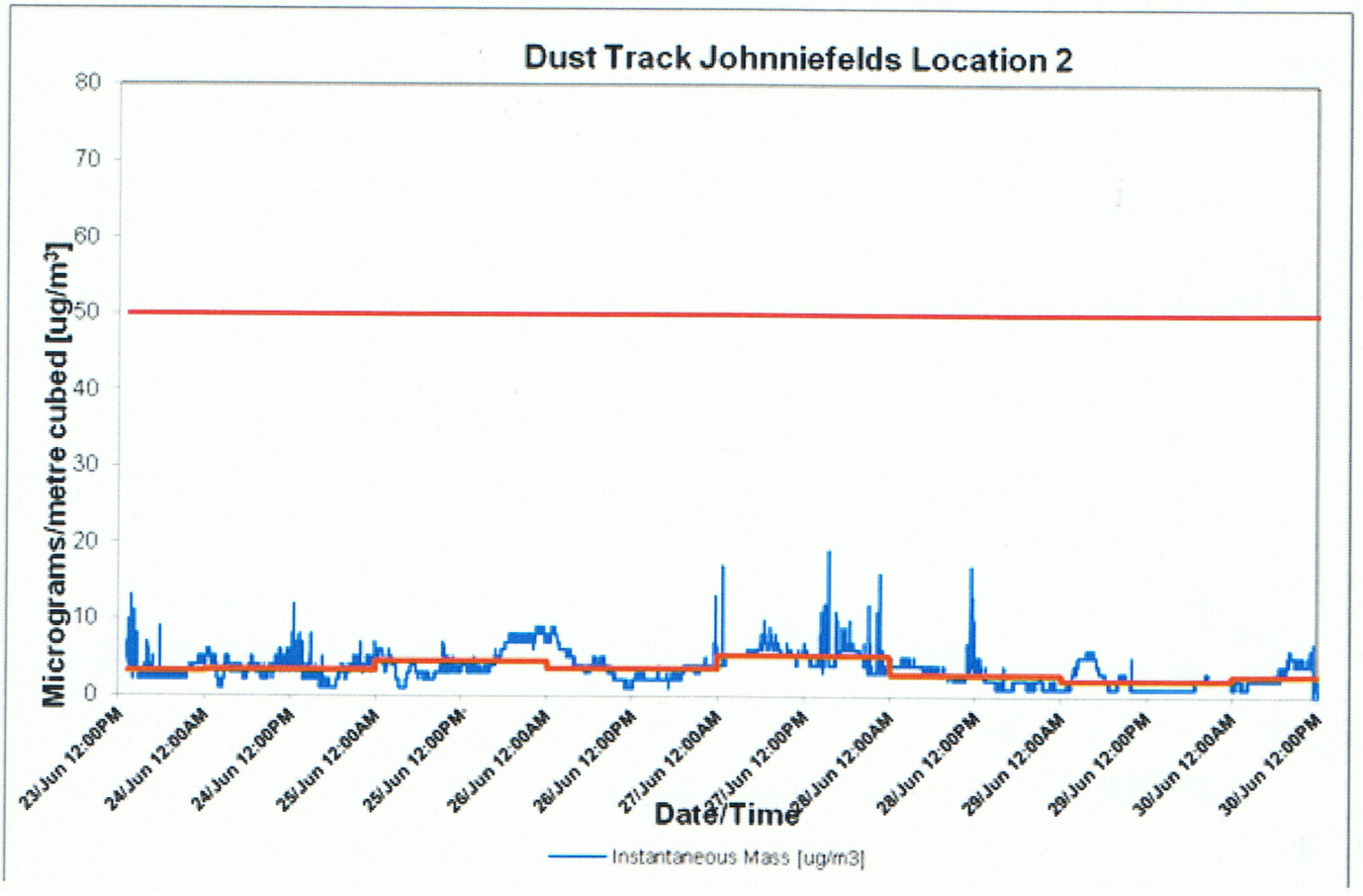
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Micrograms/metre cubed [ug/m³]
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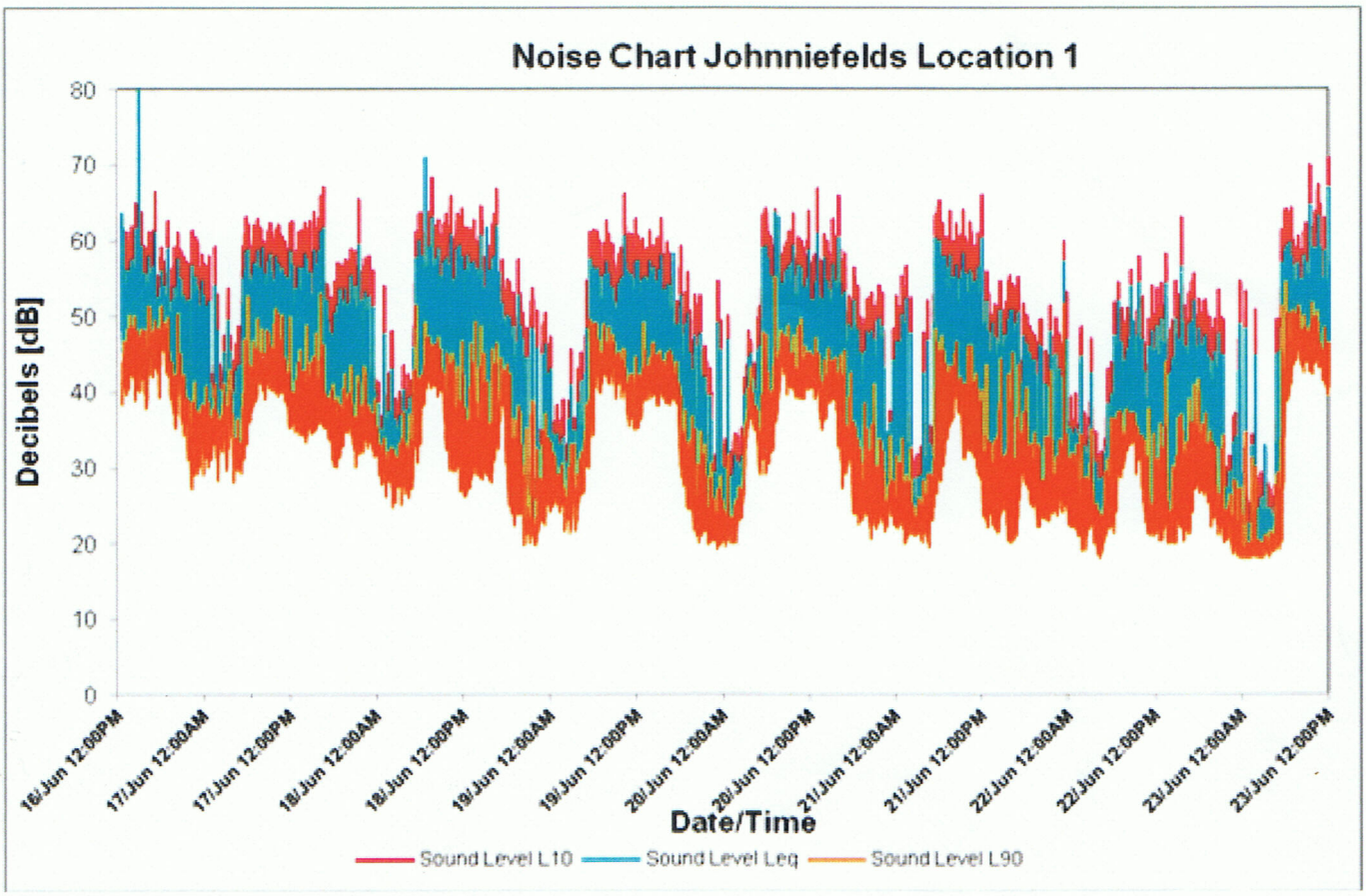
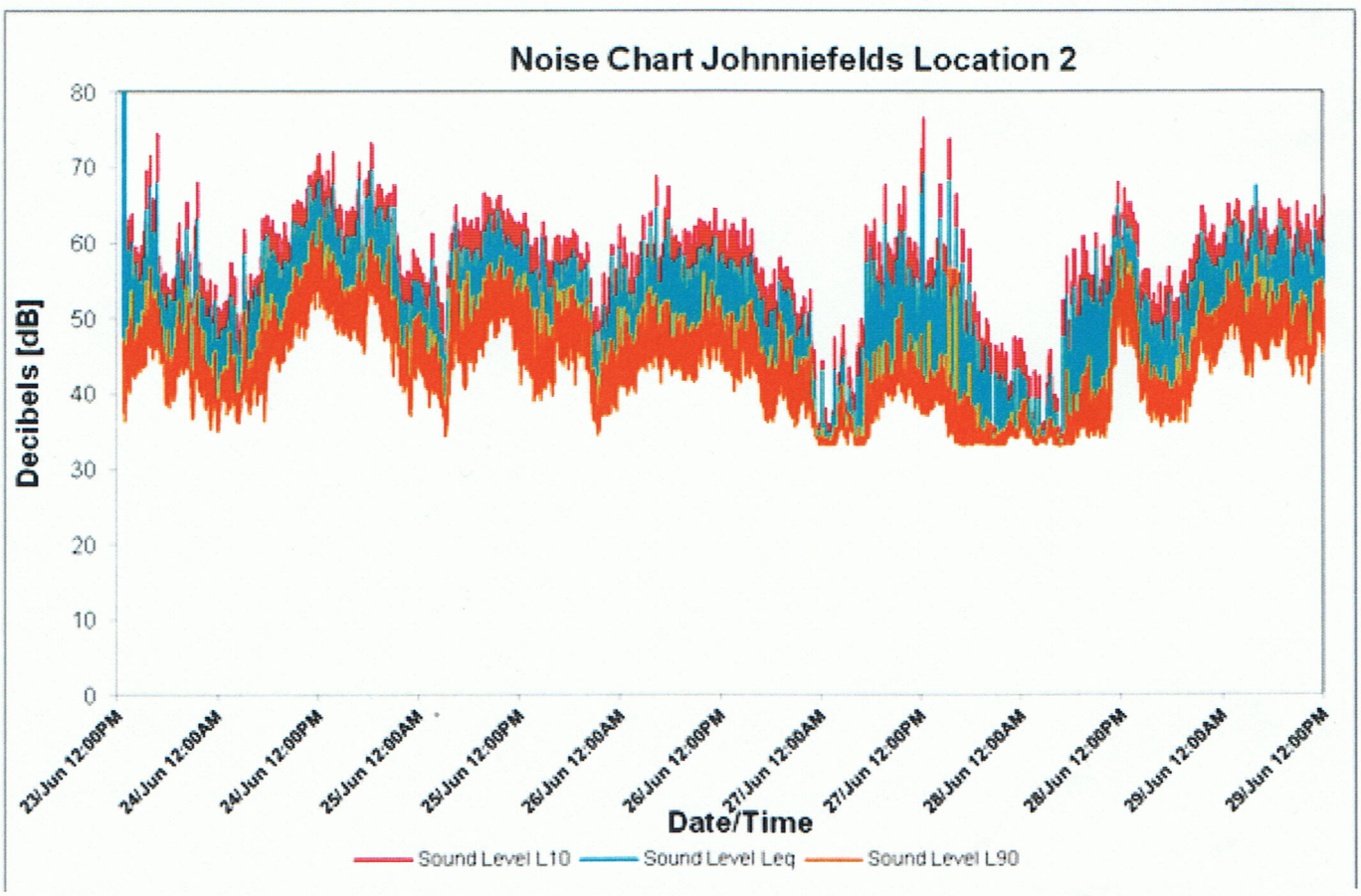
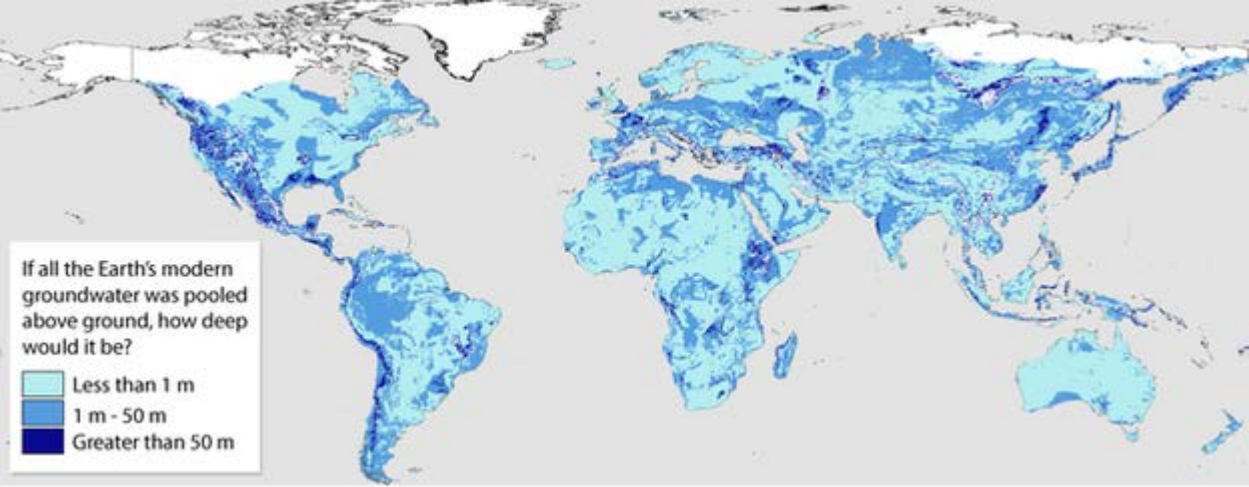
Date/Time
Instantaneous Mass [ug/m3]


Noise Chart Johnniefelds Location 1
Decibels [dB]
80
70
60
50
40
30
20
10
0
16/Jun 12:00PM
17/Jun 12:00AM
17/Jun 12:00PM
18/Jun 12:00AM
18/Jun 12:00PM
19/Jun 12:00AM
19/Jun 12:00PM
20/Jun 12:00AM
20/Jun 12:00PM
21/Jun 12:00AM
21/Jun 12:00PM
22/Jun 12:00AM
22/Jun 12:00PM
23/Jun 12:00AM
23/Jun 12:00PM
Date/Time
Sound Level L10
Sound Level Leq
Sound Level L90


Noise Chart Johnniefelds Location 2
Decibels [dB]
80
70
60
50
40
30
20
10
0
23/Jun 12:00PM
24/Jun 12:00AM
24/Jun 12:00PM
25/Jun 12:00AM
25/Jun 12:00PM
26/Jun 12:00AM
26/Jun 12:00PM
27/Jun 12:00AM
27/Jun 12:00PM
28/Jun 12:00AM
28/Jun 12:00PM
29/Jun 12:00AM
29/Jun 12:00PM
Date/Time
Sound Level L10
Sound Level Leq
Sound Level L90


If all the Earth's modern groundwater was pooled above ground, how deep would it be?
Less than 1 m
1 m - 50 m
Greater than 50 m

Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet

Radon Map of Australia

ARPANSA has prepared an updated interactive radon map of Australia that shows the average indoor radon levels for each census district.

1990 Australian Radon Survey

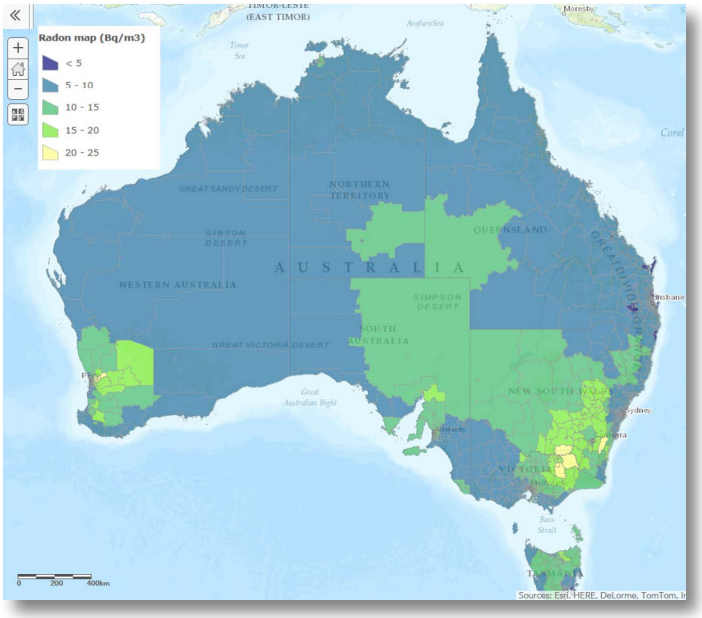
Inhalation of the naturally occurring radioactive gas radon and its progeny can be a health concern. In 1990, the Australian Radiation Protection and Nuclear Safety Agency conducted a nationwide survey of more than 3300 Australian homes to determine the radiation dose to the Australian population from exposure to natural background radiation, including radon. Based on this survey, the average concentration of radon in Australian homes is about 10 Bq m^{-3}. This is less than in many other countries and compares to a global average indoor value of 40 Bq m^{-3}. Average radon levels in Australian homes are only a little larger than the radon levels in outside air and are of minimal concern to the health.

Updated radon map for Australia

The survey found a very wide range of radon levels across Australia. The results have been previously reported in the form of a radon map based on postcode districts. This map has now been updated to provide district averages radon based on the SA2 regions from the 2011 census.

This new interactive radon map displays interpolated values in census districts, for typical Australian homes. While factors such as house type, construction materials and ventilation can affect the radon levels, the effect of these factors is small relative to effects due to the local geology and soil type. Taking account of the house type, the actual radon levels in a particular home may be up to a factor of two different for that shown on the map.

The radon map shows that average radon levels in homes along the Great Dividing Range are typically higher that levels in homes on the coastal plan, mainly due to differences in the nature of the underlying geology (rock and soil).



How to use the interactive map

An interative map is provided on ARPANSA's website at <www.arpansa.gov.au/ RadiationProtection/Factsheets/is_RadonMap.cfm>. Using the map, you can zoom in on the area you would like to view, then left click on the region to show a pop-up box with the average radon level (example shown). Alternatively, you can use the search bar in the top right corner to directly search for an address or region.

Region name: Numurkah
Radon level: **13** Bq/m3

What does this mean for my family

Although the typical radon levels in Australia are low, the values on the map are the average values for each census district. For a particular house in a specific location factors such as the local geology and house type could lead to different values. If you are concerned about the radon levels in your home it is easy to have it tested. Radon monitors are available at low cost from APRANSA.

619 Lower Plenty Road, Yallambie VIC 3085
Telephone: +61 3 9433 2211
Fax: + 61 3 9432 1835

Useful Links

Radon Exposure and Health
www.arpansa.gov.au/radiationprotection/factsheets/is_Radon.cfm

Radon monitors for purchase
www.arpansa.gov.au/services/prms/charges.cfm

Australian Bureaut of Statistics - SA2 regions from the 2011 census
www.abs.gov.au/ausstats/abs@.nsf/Lookup/2901.0Chapter23102011

Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet

Radon Exposure and Heath

In Australia, radon exposure is generally lower than the worldwide average. Increased exposure is associated with an increased risk of developing lung cancer.

What is radon? Where does it come from?

Radon is a naturally occurring radioactive gas, which has no smell, colour or taste. It comes from the radioactive decay of radium, which is present in small amounts in rocks and soil. Radon is chemically inert, so it can easily escape from the ground into the air where it can be inhaled.

How does radon affect health?

When we breathe in radon, it decays releasing radioactive particles. These particles can cause damage to the lung tissue. Such damage can lead to lung cancer. There is a delay of many years between the initiation of a cancer by radiation and its growth to a size which can be observed clinically. The risk of developing lung cancer from exposure to radon depends on how much radon we breathe in. The more radon there is in the air, the bigger the risk. Similarly, the longer we spend breathing in that radon, the bigger the risk. There is also scientific evidence that smoking increases the risk associated with exposure to radon.

Where can I be exposed to radon?

Radon is present in all air. In outdoor air, radon concentrations are very low. Indoors, however, the concentration of radon can be higher, as buildings have the effect of trapping radon. Radon levels are typically very variable, depending on the type of house and the flow of air through the home. There are places where radon levels can be very high: in some caves, for example, or in a poorly ventilated underground mine.

What are the radon levels in Australian homes?

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has conducted a nationwide survey of radon in homes. The results showed that the

average concentration of radon in Australian homes is low, and is about 4 times less than the worldwide average. Consequently, there is little cause for concern that the health of the population is at undue risk from radon in homes. However this survey did find that approximately one in a thousand homes may have high levels of radon. Generally, homes that are well ventilated, made of timber or built on stumps have lower radon levels compared to homes on concrete slabs with brick walls. However, the only way to be certain of radon levels in your home is to get it tested. Radon monitors are available for purchase from APRANSA.

When should action be taken to reduce radon?

ARPANSA recommends the following action levels:

- 200 Bq m^{-3} for households, and
- 1000 Bq m^{-3} for workplaces.

Should the radon level exceed the above levels, the appropriate state, territory or Commonwealth radiation health authority should be contacted for advice. For those homes and workplaces that exceed this Action Level, there are some simple measures that can be taken to bring radon levels down, such as increasing ventilation.

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Useful Links

Radon map of Australia
www.arpansa.gov.au/radiationprotection/factsheets/is_RadonMap.cfm

Contact details for radiation health authorities
www.arpansa.gov.au/Regulation/regulators

Radon monitors for purchase
www.arpansa.gov.au/services/prms/charges.cfm

Recommendations for Limiting Exposure to Ionizing Radiation ,Radiation Protection Series No. 1, Annex C
www.arpansa.gov.au/Publications/codes/rps1.cfm