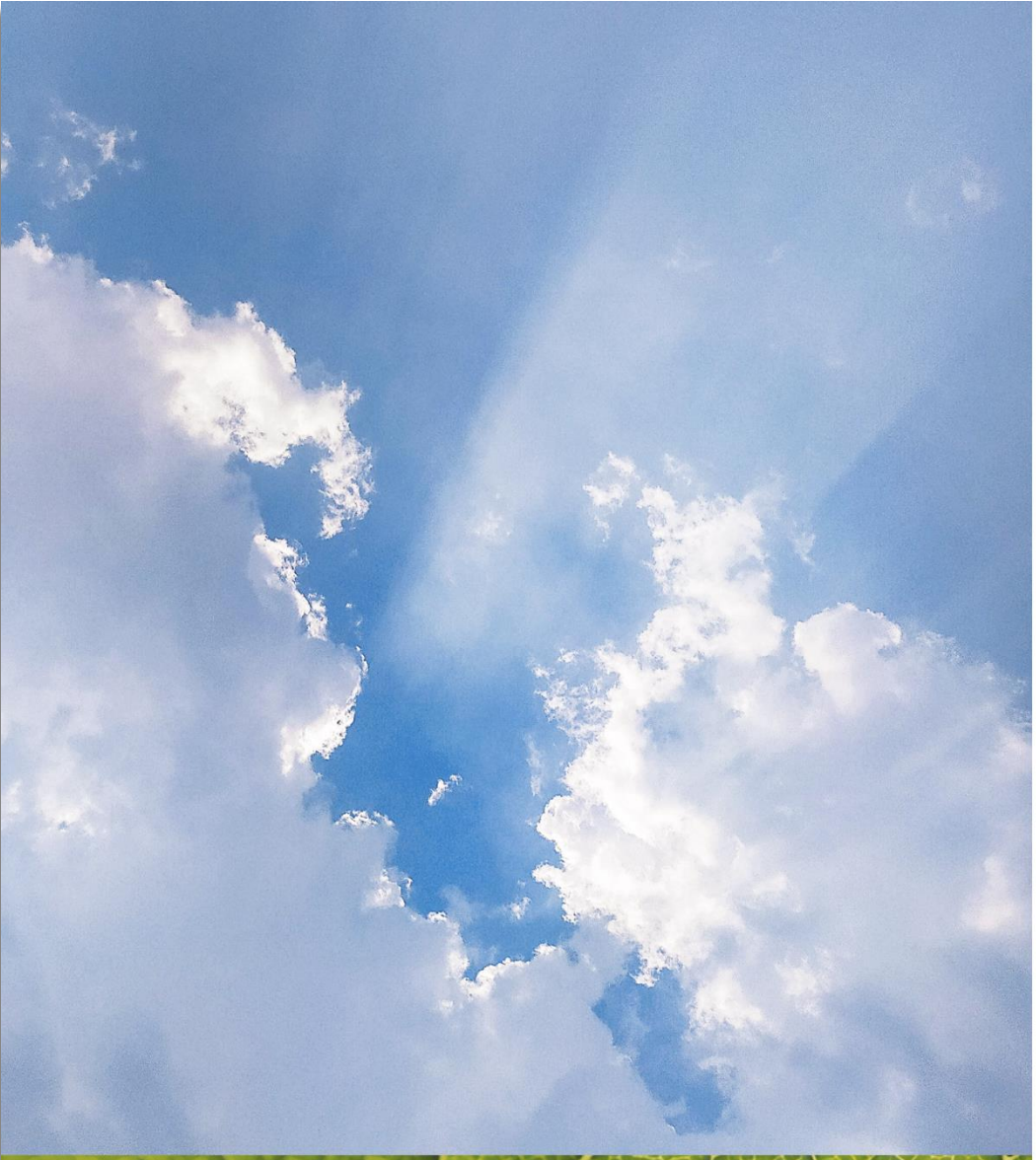

Report

Donnybrook JV Pty Ltd

Expert Buffer Assessment

960 Donnybrook Road, Donnybrook

October 2020

This report has been requested by Gadens on behalf of Donnybrook JV Pty Ltd.

Environment, Health & Safety, and Sustainability Consultants

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Appendix C	Index to Brief of Documents

USE OF REPORT

The preparation of this report has been undertaken for the purpose of providing expert advice in relation to the amenity buffers proposed in the Shenstone Park Precinct Structure Plan for submission to the Planning Panel. The report is to include opinions on the appropriateness of the proposed amenity buffers and the impact of the proposed buffers on the land at 960 Donnybrook Road, Donnybrook, Victoria and it is not intended that this report should be used for any other purpose.

LIST OF ABBREVIATIONS

Act	*Environment Protection Act 1970*
BCS	Biodiversity Conservation Strategy
WA	Work Authority
EPA	Environment Protection Authority Victoria
IRAE	Industrial Residual Air Emissions
PSP	Precinct Structure Plan
SEPP	State Environment Protection Policy
SEPP (AQM)	State Environment Protection Policy (Air Quality Management)
SPPF	State Planning Policy Frameworks

1. INTRODUCTION

I was engaged by Gadens on behalf of their client, Donnybrook JV Pty Ltd, to provide an expert opinion in relation to the amenity buffers proposed in the Shenstone Park Precinct Structure Plan (the PSP) as part of the Amendment C241 to the Whittlesea Planning Scheme. A copy of the letter of instruction from Gadens regarding my expert witness statement is provided as **Appendix A**.

I have been asked to consider the appropriateness of proposed buffers in the PSP and the impacts of the buffers on the land at 960 and 1030 Donnybrook Road, Donnybrook, Victoria (the Site). The Site is owned by Donnybrook JV Pty Ltd and comprises approximately 275 hectares (approximately 44%) of land forming the Shenstone PSP area.

2. EXPERT EVIDENCE DETAILS

2.1 Expert Witness Details

Expert Witness:	Mr Peter Ramsay
Address:	Level 10, 222 Kings Way, South Melbourne, Victoria, 3205
Company:	Peter J Ramsay & Associates Pty Ltd

2.2 Expert's Qualifications and Experience

I am the Managing Director and Principal Consultant of Peter J Ramsay & Associates Pty Ltd. I am a chemical engineer and hold a Graduate Diploma of Management and a Master of Environmental Science. I have over 35 years' experience in environmental auditing, environmental impact assessment, air quality, site assessment and remediation. I also have extensive experience in determining appropriate buffer distances between industrial facilities and sensitive land uses to mitigate the impact of industrial residual air emissions. Prior to establishing Peter J Ramsay and Associates, I was Assistant Director of the Victorian Environment Protection Authority (EPA) and was responsible for Victoria's Air Quality Management Program.

I am a Fellow of Engineers Australia and a Chartered Professional Engineer. I am appointed as an Environmental Auditor under the Victorian *Environment Protection Act 1970* for both Industrial Facilities and Contaminated Land and accredited as a Site Auditor under the New South Wales *Contaminated Land Management Act 1997*. I am a Registered Professional Engineer in Queensland and I have written numerous papers on environmental management.

My curriculum vitae is provided in **Appendix B**.

2.3 Expert's Area of Expertise

My professional career has focused on identifying and resolving environmental issues at industrial and commercial facilities and the interface with residential land uses. This includes assessments of separation distances for industrial premises including landfills. I have expertise and experience in air quality assessments, dispersion modelling, waste management, and environmental auditing of odour emitting facilities.

2.4 Statement of Expertise

In view of my professional qualifications and expertise, I am well qualified to prepare and present this expert witness statement to the panel.

2.5 Other Significant Contributors to the Report

I have been assisted in the preparation of my report by Mr Nathan Williams.

Mr Nathan Williams, Senior Consultant, holds Bachelors' degrees in chemical engineering and science and has seven years' experience in environmental consulting. He is experienced in the preparation of odour impact assessments, air dispersion modelling, and designing and operating equipment for pollution control at industrial facilities. He has specific expertise in assessment of separation distances from industry for amenity impact and environmental auditing of landfill facilities. Nathan has assisted me in the preparation of numerous expert evidence reports in relation to separation distances and amenity impact in Victoria.

2.6 Instructions that Defined the Scope of the Report

I received written instruction from Gadens on behalf of Donnybrook JV Pty Ltd on 27 July 2020. A copy of the instruction from Gadens is provided in **Appendix A**.

The letter of instruction of 27 July 2020 outlines that aspects in relation to buffers be addressed in the expert advice.

My opinions on these aspects are provided in **Section 6** of this report.

2.7 Facts, Matters and Assumptions on which the Report Proceeds

The following facts, matters and assumptions were used in the preparation of this report:

- The site includes 960 Donnybrook Road, Donnybrook, Victoria, defined as Lot 1 on TP374144X (Title Volume 11260 Folio 109), and Lot 1 on TP371225P (Title Volume 11260 Folio 110);
- The site includes 1030 Donnybrook Road, Donnybrook, Victoria, defined as Lot 1 on TP380512K (Title Volume 6229 Folio 723), though this portion of the site is not encroached upon by any of the proposed amenity buffers;
- The site is located in a predominantly rural agricultural area with some extractive industries (on the basis of recent aerial photography);
- Amendment C241 to the Whittlesea Planning Scheme includes the Shenstone Park Precinct Structure Plan (the PSP) (September 2019);
- Amendment C241 rezones the majority of the land within the PSP area as Urban Growth Zone 7;
- The Woody Hill Quarry is located within the PSP Land while the Phillips Quarry is located outside of the PSP Land;
- Various amenity buffers are proposed in the PSP to protect existing and proposed land uses from adverse amenity impact against encroachment of residential land use;

- The facts and matters detailed in the Brief of Documents and Letter of Instruction as provided by Gadens;
- Current Shenstone Park Precinct Structure Plan, surrounding Precinct Structure Plans and zoning provided by the Victorian Planning Authority;
- Regulatory guidelines and other literature; and
- My professional judgement and expertise as specified in my curriculum vitae in **Appendix B**.

2.8 Documents and Other Materials Used to Prepare the Report

The documentation and materials used to prepare this report included:

2.8.1 Reports and Documents provided by Gadens

On 27 July 2020, along with the written instructions, Gadens provided a copy of the follow documents:

- Brief of Documents (Index to Brief of Documents presented in **Appendix C**).

2.8.2 Other Information Sources

- EPA 2013, *Recommended separation distances for industrial residual air emissions*, Publication 1518, Environment Protection Authority Victoria, March 2013;
- The letter provided by from Barro, care of Mr Leon Ponte, 15 October 2020, ref /94094071
- Planning Panel Reports in relation to basalt quarries using blasting in Victoria:
  - Melton C162 Final Panel Report (PSA) [2016] PPV 154, dated 9 December 2016
  - Hume C207 and C208 (PSA) [2017] PPV 138, dated 15 December 2017
  - Moorabool C58 (PSA) [2015] PPV 27, dated 31 March 2015
  - Whittlesea C187 Part A Report (PSA) [2016] PPV 35, dated 1 April 2016.

2.9 Tests or Experiments

No tests or experiments were performed to assist in the preparation of this report.

2.10 Summary of Opinions

My opinions are summarised in **Section 6** of this report.

2.11 Provisional Opinions

The opinions expressed are not considered to be provisional.

2.12 Limitation

I consider myself qualified to prepare and present the report. I have not addressed questions falling outside my area of expertise, and do not consider it incomplete or inaccurate in any respect.

My advice is based on the Brief of Documents, which was provided by Gadens, my review of relevant legislation, guidelines and documents referred to in **Section 2.8** and my experience with undertaking buffer assessments on similar sites.

2.13 Declaration

I declare that:

"I have made all the enquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel".

3. BACKGROUND

The Shenstone Park Precinct Structure Plan (the PSP) is within the boundary of the Whittlesea City Council and is immediately south of the Donnybrook-Woodstock Precinct Structure Plan area and east of the English Street Precinct Structure Plan area. The PSP is bounded by Donnybrook Road to the north and the Sydney-Melbourne railway line to the west. The precinct accommodates a mix of residential housing, town centres, employment and community facilities. The precinct also covers the existing Woody Hill Quarry and a Biodiversity Conservation Strategy (BCS) Conservation Area. Various amenity buffers are proposed in the PSP to protect the existing and proposed land uses from adverse amenity impacts. The buffers have been considered based on the information provided in the following two buffer assessment reports prepared by GHD:

- GHD 2017, *Impact Assessment Report for the Shenstone Park Precinct Structure Plan*, GHD Pty Ltd, December 2017 (the GHD Impact Assessment); and
- GHD 2019, *Shenstone Park Impact Assessment Woody Hill Addendum*, GHD Pty Ltd, September 2019 (the GHD Addendum).

The proposed buffers are shown on Plan 15 of the PSP and as provided on **Figure F3** of this report.

The buffers are considered in relation to:

- The existing Wood Hill Quarry within the Shenstone PSP boundary, operating under Work Authority 492 (**Woody Hill Quarry**) and an approved extension under Work Authority 6437 (the **Woody Hill Extension**); and
- The proposed Philips Quarry located immediately south of the Shenstone PSP boundary under Work Authority 6852 (**Philips Quarry**).

Under the Shenstone PSP, Donnybrook JV's property located at 960 and 1030 Donnybrook Road, Donnybrook, Victoria (the Site) has an area of approximately 275 hectares which comprises approximately 44% of the 628 hectares of land forming the Shenstone PSP area. The location of the Site is shown in **Figure F1** attached. The location of the various local government area boundaries are shown on **Figure F2**, attached. The proposed buffers are shown on **Figure F3**.

The portion of the Site subject to the buffers of Woody Hill Quarry (including the buffer of the potential Woody Hill extension area), is designated for industrial and light industrial uses. A portion on the southern part of the Site identified to be 'future residential area', has been affected by the buffer associated with the Phillips Quarry and development of the area is not planned until the Phillips Quarry buffer is no longer required. The remainder of the Site is identified to be used for residential, town centre, open space and biodiversity conservation purposes.

Gadens instructed me to provide my expert opinion on the appropriateness of the proposed amenity buffers recommended in the GHD Impact Assessment and the GHD Addendum, and those adopted in the PSP, and potential amenity impact from the existing or likely land uses on the potential for the development of land within the Site.

I have considered the buffers for the quarries with respect to the potential impact on the sensitive uses from operation of the quarries as a result of operational noise, blast generated vibration, dust, and blast generated fly-rock.

3.1 Recent Buffers Following Planning Panels in Similar Situations

There are many quarries operating across Victoria and many of these have been subject to potential encroachment by development of new sensitive land uses. The problem being grappled with, with respect to managing the appropriate separation distances around quarries, has been dealt with many times before.

I am not aware of any recent (within the last 5 years) panel recommendation from a Planning Panel that a separation distance from sensitive land use more than 500 m should be applied to a quarry involved in blasting of basalt.

I am aware of four recent Planning Panels where the application of separation distances from quarries involved blasting of basalt. In all four cases the Planning Panels have recommended the adoption of a sensitive use buffer of 500 m and a quarry blast buffer of 200 m, when such buffers were considered. These are summarised in **Table 1** and provide a reference for the typical extent of such buffers.

Table 1 Summary of Similar Planning Panel Outcomes

Reference Number	Report Date	Quarry Material	Sensitive Use Restrictions	Building Restrictions	Notes
Melton C162	9 Dec 2016	Basalt	Quarry Sensitive Use Buffer – 500 m	Quarry Blast Buffer – 200 m	From Approved Extraction Area
Hume C207 and C208	15 Dec 2017	Basalt	Quarry Buffer – 500 m	Not discussed	-
Moorabool C58	31 Mar 2015	Sand with basalt overburden	Quarry Buffer – 500 m for sensitive uses	Not discussed	-
Whittlesea C187	1 Apr 2016	Basalt	Quarry Buffer – 500 m for sensitive use	Construction Restriction Buffer – 200 m	-

4. LEGISLATION, POLICY AND GUIDELINES

4.1 Recommended Separation Distances for Industrial Residual Air Emissions

EPA Publication 1518 “Recommended Separation Distances for Industrial Residual Air Emissions”, (EPA Publication 1518) recommends separation distances to account for the potential impact of industrial residual air emissions (IRAEs) on human health and wellbeing, local amenity and aesthetic enjoyment.

IRAEs are unintended emissions which are often intermittent or episodic, including both fugitive emissions and upset conditions. IRAEs include odour and particulate emissions such as dust. An adequate separation distance should allow IRAEs to dissipate without adverse impacts on sensitive land uses. It is important to note that even ‘state of the art’ facilities cannot be guaranteed to operate without IRAEs 100 per cent of the time.

The EPA recommended separation distances have been determined through reviewing a large set of empirical data for odour and dust emissions from a range of industries. The aim of the Guidelines is to inform planning authorities, as well as responsible authorities, in the preparation and consideration of planning scheme amendments and planning permit applications. I therefore consider it pertinent to consider the Amendment in the context of the separation distances recommended in the Guidelines.

EPA Publication 1518 clearly states that separation distances should be measured from the activity area of the activity with the potential to cause IRAEs.

However, recommended separation distances in this guideline have not been provided for the consideration of noise and vibration impacts.

4.1.1 Effect of Separation Distance on Neighbouring Landowners

Applying a separation distance to a facility does not result in a change to the IRAEs released from the premises. All reasonable measures should still be taken by the commercial or industrial facility to prevent the emission of odours and dust beyond the site boundary. The separation distance is intended to account for intermittent or episodic IRAEs.

All industrial facilities will periodically experience upset conditions which are beyond the control of the facility. On such occasions IRAEs can travel beyond the boundaries of the premises. In order to prevent IRAEs having adverse impacts on sensitive receptors, a separation distance must be maintained around the source of the IRAEs. The separation distance helps to minimize the impact of IRAEs.

4.1.2 Sensitive Receptors

In accordance with the Guidelines, a sensitive land use is *"any land use which requires a particular focus on* protecting *the beneficial uses of the air environment relating to human health and wellbeing, local amenity and aesthetic enjoyment".* Sensitive receptors include residences.

4.1.3 Variation to Recommended Separation Distances

A variation of the recommended separation distance can be sought if there are considered to be exceptional circumstances at the site that will justify a site-specific variation. A site-specific variation should not be granted until the relevant land use issues have been resolved to the satisfaction of the EPA.

Table 4 of the Guidelines provides a guide to the criteria that must be considered during the assessment of a site-specific variation. Consideration of these criteria is a prerequisite for a site-specific variation, but not a guarantee that a variation is justified.

The criteria that may justify a site-specific variation are:

- The industry has formally indicated it will transition out of the area over a specified timeframe;
- Engineering controls have provided a high standard of emission control technology;
- An Environmental Risk Assessment (ERA) justifies a change in the prescribed separation distance;
- The plant is considerably smaller or larger than comparable industries;
- If the site exhibits exceptional meteorological or topographical characteristics which can affect dispersion; and
- Particular IRAEs are either highly likely or highly unlikely to occur.

Detailed site assessments involving modelling should only be undertaken if a variation from the recommended Guidelines values can be justified.

4.2 The State Planning Policy Framework

The State Planning Policy Framework (SPPF) articulates several relevant policies regarding encroachment. Although there are no prescribed, or recommended distances in this document, the SPPF identifies the need for separation distances between commercial and industrial facilities with potential adverse amenity impacts and sensitive land uses.

The following are excerpts of the key provisions:

- Clause 11 states that '*planning is to prevent environmental problems created by siting incompatible land uses close together*'.
- Clause 13.04-2 states that planners should '*ensure, wherever possible, that there is suitable separation between land uses that reduce amenity and sensitive land uses*.'
    - The following reference documents are considered to be relevant in achieving this objective:
        - State Environment Protection Policy (Air Quality Management); and
        - Recommended Buffer Distances for Residual Industrial Air Emissions (EPA Publication 1518, 2013) (The Guidelines which are discussed in Section 4.1).

5. EXPERT OPINION

The letter of instructions of 27 July 2020 from Gadens on behalf of DJV (**Appendix A**) included a request for an expert opinion in relation to the amenity buffers proposed in the Shenstone Park PSP as part of the Amendment C241 to the Whittlesea Planning Scheme. The PSP provides buffers to protect the ongoing operation of the Woody Hill Quarry, proposed extension of the Woody Hill Quarry, and the proposed Phillips Quarry. Buffers for the quarries included separate buffers for operational noise, blast generated vibration and dust, and blast generated fly-rock.

The term separation distance is used in EPA Publication 1518, whereas buffer distance is used in many other documents. These terms are interchangeable as both refer to the distance between the potential generator and receptor of an environmental amenity impact.

I have been provided with a plan of the future works annotated on aerial photography for the Woody Hill Quarry and Extension and Phillips Quarry in the letter from Mr Leon Ponte dated 15 October 2020. In particular, the attached plans Barro Plan 2, 3, and 4 show the proposed extent of the extraction areas on the quarries.

My opinion is provided on the buffers included in the Impact Assessment Report, Impact Assessment Addendum, Plan 15 of the original PSP, the revised PSP Plan 15, and the proposed FUSP, as well as my recommendations for the buffer distance below.

Also, I provide an opinion on the appropriate separation distances for the Woody Hill Quarry, proposed extension of the Woody Hill Quarry and the proposed Phillips Quarry.

5.1 Process for Determination of Buffers

The first set of buffers was considered in the Impact Assessment Report prepared by GHD (2017). The buffers recommended in this assessment are shown in Figure 32 of the Impact Assessment Report. The buffers shown are based on the existing operation of the Woody Hill Quarry, the proposed operation of the Phillips Quarry under WA160, and the potential recycled water treatment plant.

The potential expansion of the Woody Hill Quarry is considered in the second buffer report, the Woody Hill Addendum, prepared by GHD (2019). The scope of the assessment was to determine the potential for expansion of the Woody Hill Quarry east of the existing quarry. This informed the selection of the area marked Woody Hill Possible Extraction in Plan 15 of the original PSP (September 2019). This involved selection of the area that the quarry could expand eastwards into within the proposed noise buffer of 900 m (GHD 2017) from the existing Woody Hill Quarry extraction area.

EPA Publication 1518 provides recommended separation distances for industrial land uses, including extractive industries where there is potential for generation of industrial residual air emissions despite the application of best practice operation. For these land uses, occasional amenity impacts can be expected within the separation distance due to the residual emissions of odour and dust.

IRAEs of odour and dust emissions are typically more difficult to control through application of good practice design and operation. Noise emissions can be controlled at the source through equipment selection, acoustic shields, and construction of physical barriers such as earthen bunds, vegetation screens, and acoustic walls. Such options are not able to control air emissions.

In general, the application of a separation distance as recommended in EPA Publication 1518 will provide sufficient distance to prevent amenity impact of other potential impacts, such as noise and vibration, provided best practice design and operation are implemented.

5.1.1 Variation to EPA Separation Distances

As I have mentioned in Section 4.1.3 of this report, EPA Publication 1518 provides a mechanism for variation to the recommended separation distances. The criteria for a site-specific variation includes consideration of topography and meteorology. As explained in Table 4 of Publication 1518, this allows for change only when, "*There are exceptional topographic or meteorological characteristics which will affect dispersion of IRAEs.*"

A site-specific variation to the recommended separation distances is proposed by GHD through the application of directional buffers in both the Impact Assessment Report and Addendum Report. However, there is no discussion as to whether any of the criteria for a site-specific variation to the recommended separation distances have been considered and met.

The directional buffer has the effect of shifting the separation distance to the east due to a predominance of westerly over easterly winds.

I note that most of Melbourne, indeed most of Victoria is subject to a predominance of westerly rather than easterly winds. Therefore, this is not an exceptional condition. Also, the topography is not considered exceptional.

The use of directional buffers in this context is not appropriate and there is no justification for the use of a site-specific variation to the recommended separation distance. Therefore, the standard linear measurement from the outer extent of the activity area should be applied as recommended in EPA Publication 1518.

5.2 Woody Hill Quarry

The Shenstone Park PSP includes the presence of buffers to protect the ongoing operations of the Woody Hill Quarry. The buffers included in the PSP relate to operational noise, blast-generated vibration and dust and blast generated fly-rock. A number of these buffers encroach on the Site and will preclude the development for some sensitive land uses for the duration of the quarry operation.

5.2.1 Extent of Operational Noise Buffers

In the Impact Assessment Addendum (GHD 2019), GHD suggests an operational noise buffer for Woody Hill Quarry of 600 m from the extraction area boundary. This buffer is prior to any operational noise mitigation being implemented.

In the Impact Assessment Report (GHD 2017), GHD recommends a buffer of 900 m from the approved extraction area for the Woody Hill Quarry.

Plan 15 of the original PSP suggests an operational noise buffer of 900 m from the extraction area boundary; this buffer was not changed in Plan 15 of the revised PSP dated October 2020.

The operational noise buffers proposed by GHD and adopted in the PSP have not considered any mitigating factors such as the presence of new bunding embankments, vegetation screens or other mitigation measures. These separation distances have been modelled on incomplete information, have not been validated by field observation, are much larger than what is in place for many similar quarry operations, and have not included consultation with the quarry operator.

EPA Publication 1518 provides recommended separation distances for quarries; however, it does not consider noise impacts. In practice, the buffers recommended for control of nuisance dust are typically capable of controlling noise impacts. There are many more options available for control of noise emissions, and best practice operation of quarries is typically able to contain noise impacts within the recommended separation distances.

I note that the inputs to the noise modelling provided in the Impact Assessment Report (GHD 2017) and Addendum Report (GHD 2019) provide for elevated noise sources with no noise controls in place. The existing quarry operations from the Woody Hill Quarry could have been monitored rather than modelled. I note that some background noise monitoring was performed for preparation of the Impact Assessment Report (GHD 2017). In this report, GHD includes the following note regarding noise monitoring, "*Note that there was no Woody Hill Quarry operational noise audible at the time of GHD site visit at both monitoring locations"*. This attended monitoring was performed on the 25th of August 2017.

I also note that Figure 22 of the Impact Assessment Report (GHD 2017) suggests the existing quarry operations would have approximately 15 dB(A) difference in predicted noise impact at the monitoring Location 1 and 2. Whereas, the unattended monitoring indicated a measured difference of 2 to 3 dB(A) in daytime ambient noise between the locations, according to a comparison of Tables 9 and 10 of that report.

Therefore, I consider that the acoustic modelling performed in the Impact Assessment Report (GHD 2017) is not reliable. It does not demonstrate the need for a 900 m separation distance between the existing Woody Hill Quarry extraction area and future sensitive land use.

I consider the use of the 500 m separation from the area where blasting may occur (i.e. the Approved Extraction Area within WA492) and the 250 m separation from other areas of potential quarry operation (i.e. the WA492 boundary) to be appropriate to provide protection against noise impacts. This is consistent with the buffers applied to similar quarries as discussed in Section 3.1 in this report.

Figure 1 below shows the proposed operational noise buffers for Woody Hill Quarry.

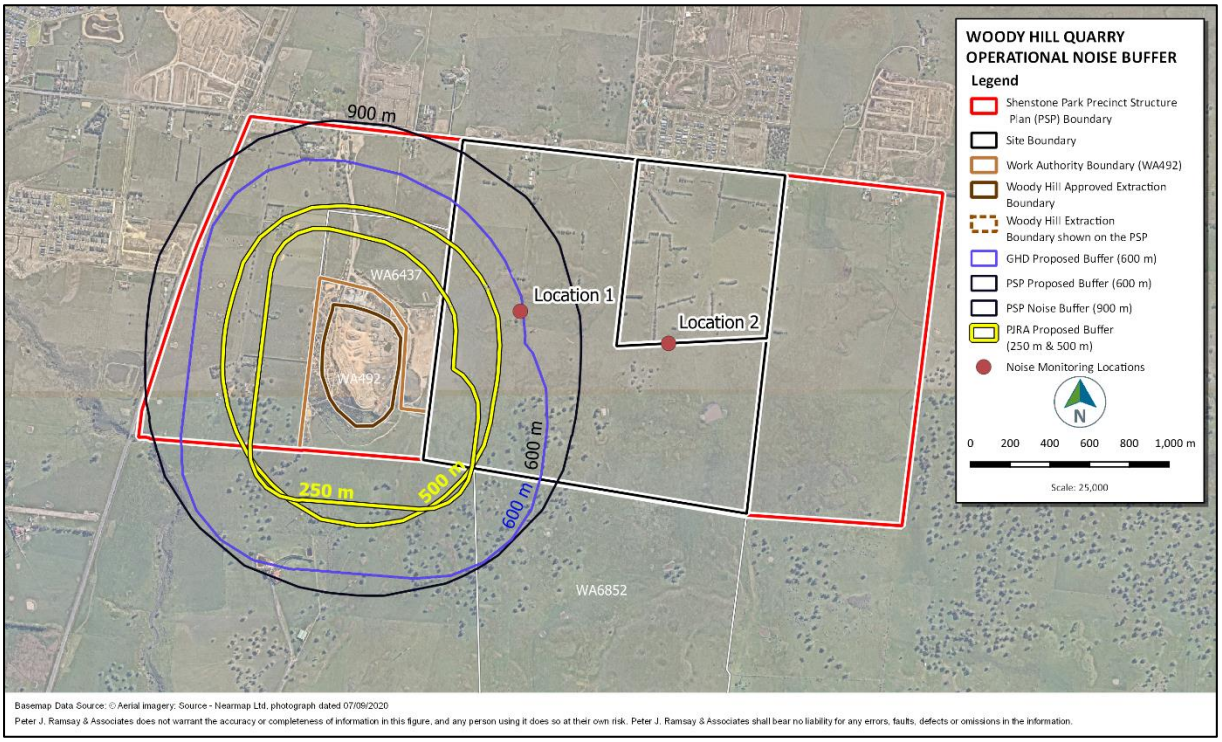


Figure 1 Woody Hill – Extent of Operational Noise Buffers

5.2.2 Extent of Blast Generated Vibration Buffers

GHD recommended a 550 m buffer due to the impact of vibration on sensitive land use (GHD 2017 and GHD 2019). This recommendation was adopted in the original PSP with a sensitive use buffer for Woody Hill Quarry of 550 m from the extraction boundary.

The basis for the separation distance proposed in the GHD Impact Assessment (GHD, 2017) is a vibration assessment from a British Standard. However, GHD did not discuss whether this standard is applicable for this particular setting with regards to the geology and blasting methods. I note that the standard allows for different separation distances based on different blasting methodologies, however the operator of the quarry was not consulted regarding the planned blasting practice.

EPA Publication 1518 provides recommended separation distances for quarries. It does not consider vibration impacts, however in practice the buffers recommended for control of nuisance dust are typically capable of controlling vibration impacts. There are many more options available for control of vibration, including appropriate blast design. Additionally, best practice operation of quarries is typically able to contain vibration impacts within the recommended separation distance for dust.

In most situations that I am aware of, the impact of vibration from quarry blasting is not known to cause adverse impact beyond the 500 m separation distance that is recommended in EPA Publication 1518 to protect against the amenity impact from dust. I understand that best practice blasting does not typically generate vibration impacts beyond 500 m from the extraction area.

I consider the use of the 500 m buffer from an area where blasting may occur, as provided for control of dust impact in EPA Publication 1518, to be appropriate to provide protection against vibration impacts. This is consistent with the buffers applied to similar quarries as discussed in Section 3.1 of this report.

Figure 2 below shows the proposed blast generated vibration buffers for Woody Hill Quarry.

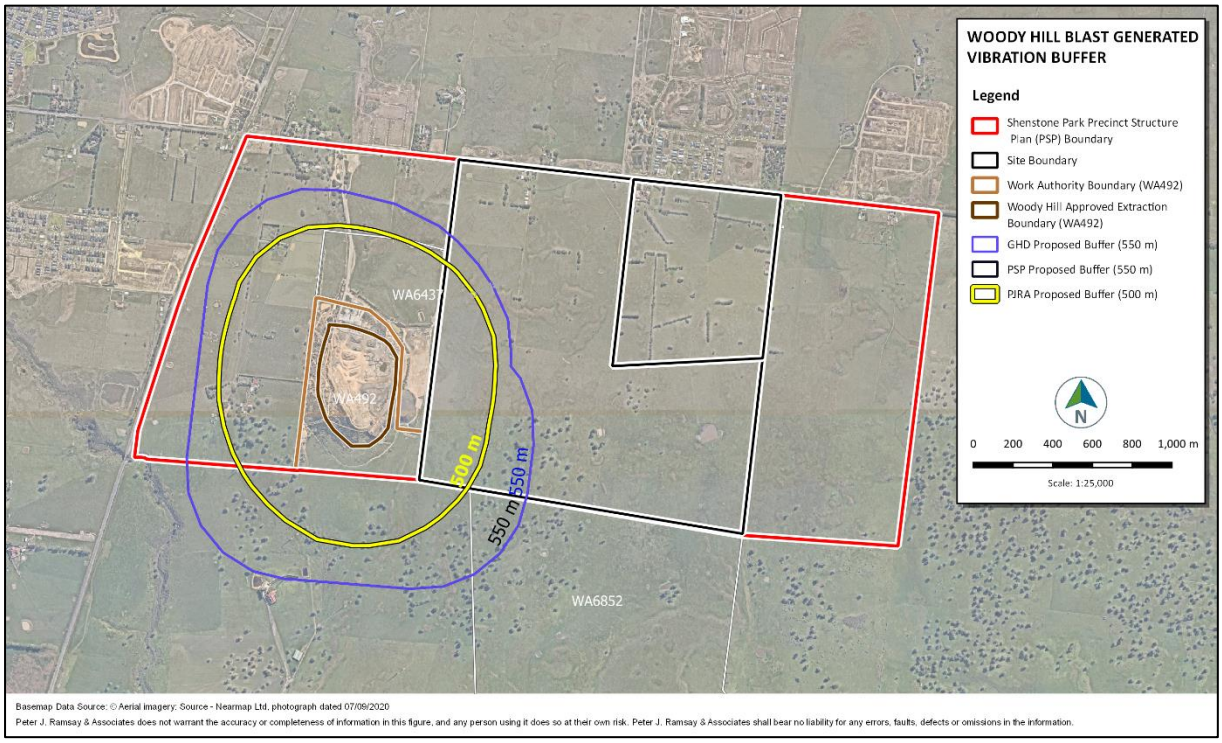


Figure 2 **Woody Hill – Extent of Blast Generated Vibration Buffers**

5.2.3 Extent of Blast Generated Dust Buffers

The PSP provides a 550 m buffer from the outer extent of the area marked “Woody Hill possible extraction expansion” on Plan 15 of the PSPs to protect against dust impacts from the quarry operations. I assume that this is intended to provide protection against blasting activities and other quarry activities at the Woody Hill Quarry.

GHD (2019) recommends using a 500 m directional buffer to protect against dust impacts from quarry operations. The buffer is proposed to extend more than 500 m east of the Work Authority Boundary.

I consider the use of the 500 m buffer from an area where blasting may occur, as outlined in EPA Publication 1518, to be appropriate to provide protection against dust for more sensitive uses. There is no justification for the use of a directional buffer, therefore this should be a linear separation distance from the outer extent of the Approved Extraction Area on WA492. This is recommended in EPA Publication 1518 and is consistent with the buffers applied to similar quarries as discussed in Section 3.1 of this report.

Figure 3 below shows the proposed blast generated dust buffers for the proposed Woody Hill Quarry.

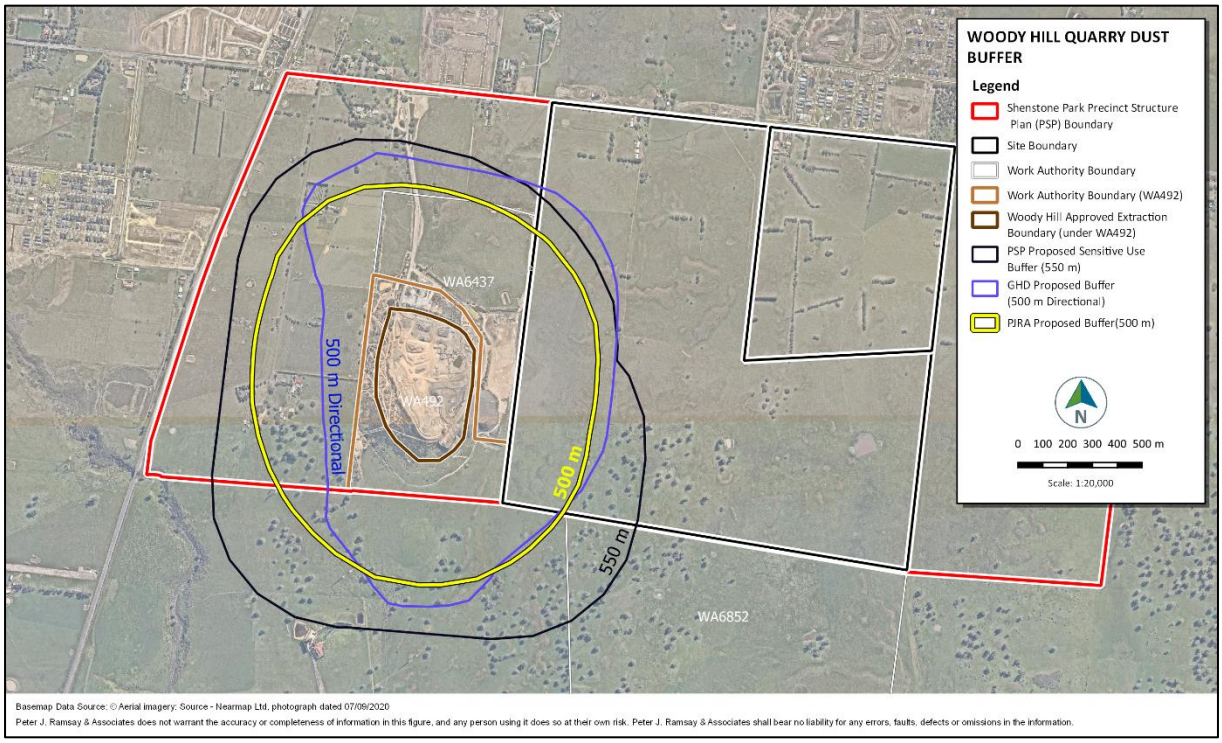


Figure 3 Woody Hill – Extent of Blast Generated Dust Buffers

5.2.4 Blast Generated Fly-Rock Buffers

I consider the use of a 200 m buffer from the proposed extraction area to be appropriate to provide protection against blast generated fly-rock impacts. This is consistent with the buffers provided to similar quarries as discussed in **Section 3.1** of this report.

Figure 4 below shows the proposed blast generated fly-rock buffers for the proposed Woody Hill Quarry expansion.

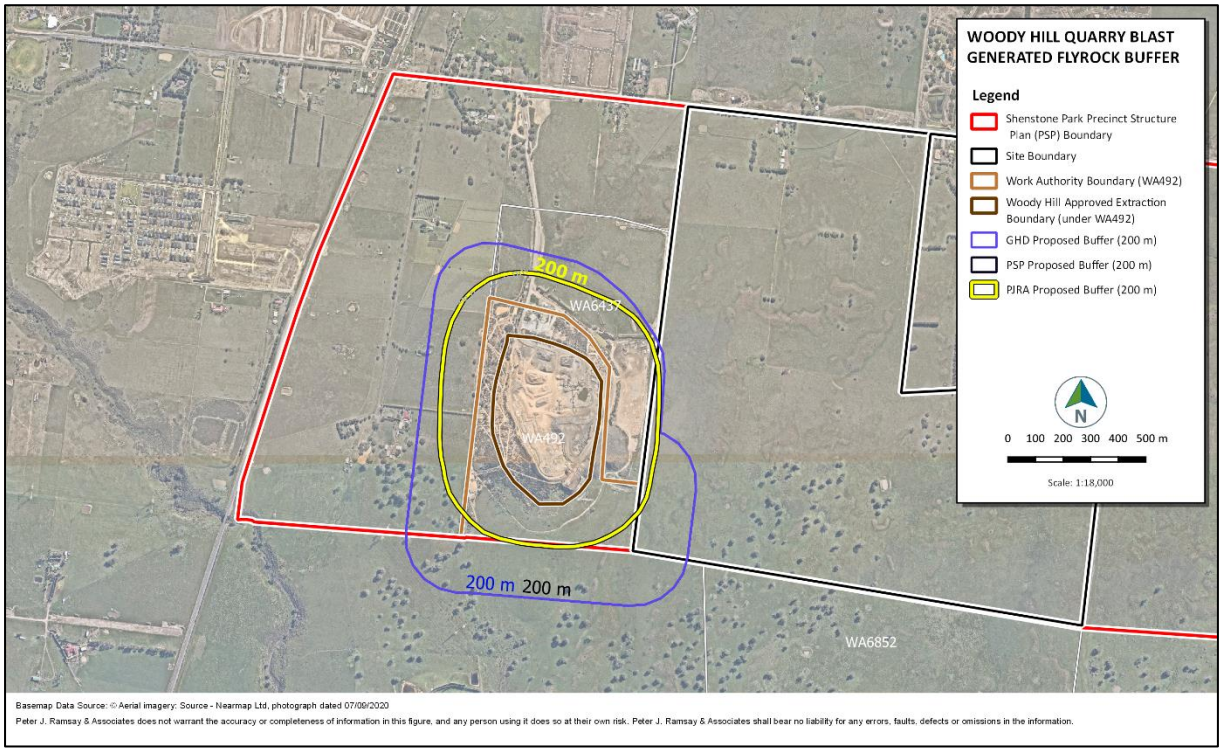


Figure 4 Woody Hill – Blast Generated Fly-Rock Buffers

5.3 Woody Hill Quarry Expansion

The operator of the Woody Hill Quarry has applied for an expansion to the extraction area and the area of the Work Authority to include land under WA006437. This includes a proposed expansion of the extraction area for the land subject to WA492.

The PSPs provide for an expansion to the extraction area for the Woody Hill Quarry in Plan 15 of the original PSP dated September 2019, and the revised PSP dated October 2020.

From review of the Impact Assessment Addendum (GHD 2019), it appears that this marks out a hypothetical maximum extraction area while remaining within the proposed 900 m separation distance from the existing Woody Hill Quarry excavation area.

I do not consider that the 900 m separation distance is required to protect the future sensitive receptors from the operations of the existing Woody Hill Quarry. Therefore, the basis for assessing the potential expansion area is not valid.

The extent of the proposed extraction area for the Woody Hill Quarry expansion is described in the information provided by Barro and is contained within the boundaries of WA492 and WA006437.

I understand that the land marked *Future Extractive Industries* on the DJV preferred FUSP to the east of WA492 and WA006437 is intended for use as a screening bund and access route to connect the Phillips and Woody Hill Quarries. It should be noted that no extraction and no quarry activities are proposed beyond the boundaries of WA492 or WA006437.

The area shown as *Woody Hill possible extraction expansion* on Plan 15 of the original and revised PSPs that extends onto 960 Donnybrook Road should not be considered in assessing the recommended separation distances for the PSP.

5.3.1 Extent of Operational Noise Buffers

GHD (2019) recommends an operational noise buffer for the Woody Hill Expansion of 600 m from the possible extraction area boundary. The original PSP also adopts the operational noise buffer of 600 m from the possible extraction area boundary.

As discussed in **Section 5.2.1**, I consider that the methodology for assessing the extent of the separation distance is flawed. As also discussed in **Section 5.2.1**, I consider the adoption of a 250 m buffer from the outer boundaries of the land subject to WA492 and WA006437 appropriate to provide protection against noise impacts.

Figure 5 below shows the proposed operational noise buffers for the proposed Woody Hill Quarry expansion.

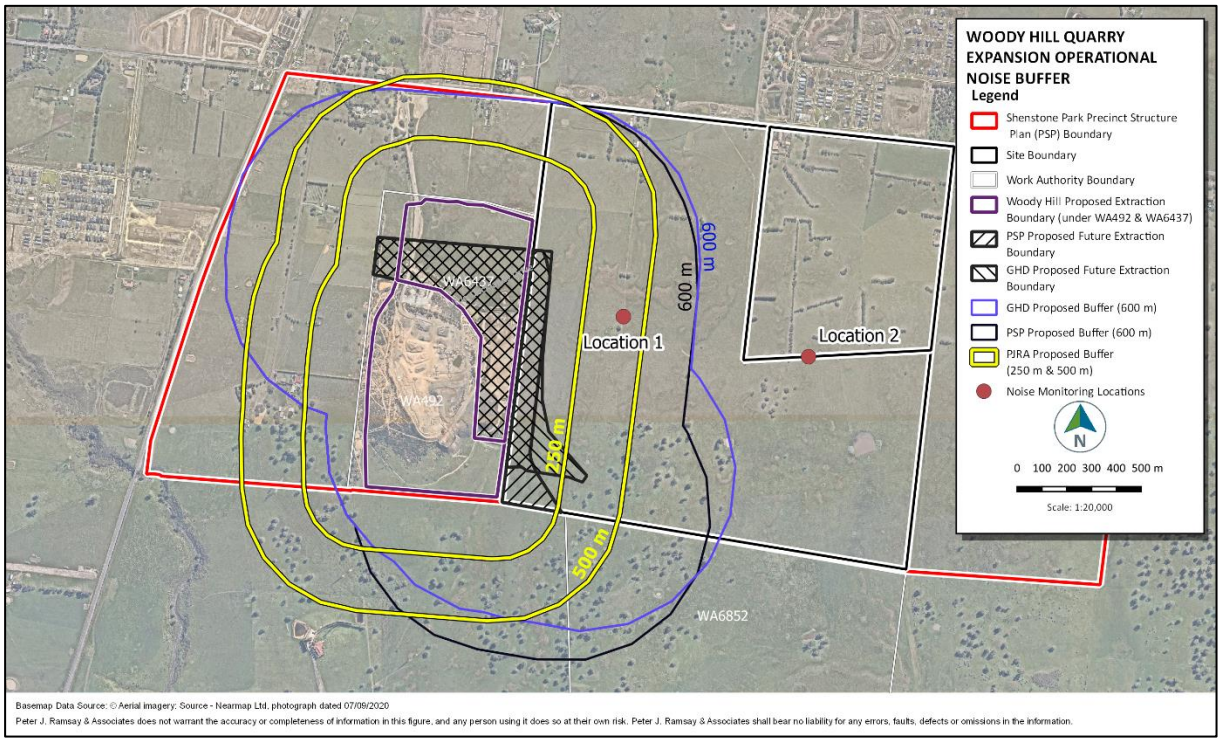


Figure 5 Woody Hill Expansion – Extent of Operational Noise Buffers

5.3.2 Extent of Blast Generated Vibration Buffers

As discussed in **Section 5.2.1**, I consider that a separation distance of 500 m from the proposed extraction areas on the land subject to WA492 and WA006347 appropriate to protect sensitive receptors from vibration due to blasting.

Figure 6 below shows the proposed blast generated vibration buffers for the proposed Woody Hill Quarry expansion.

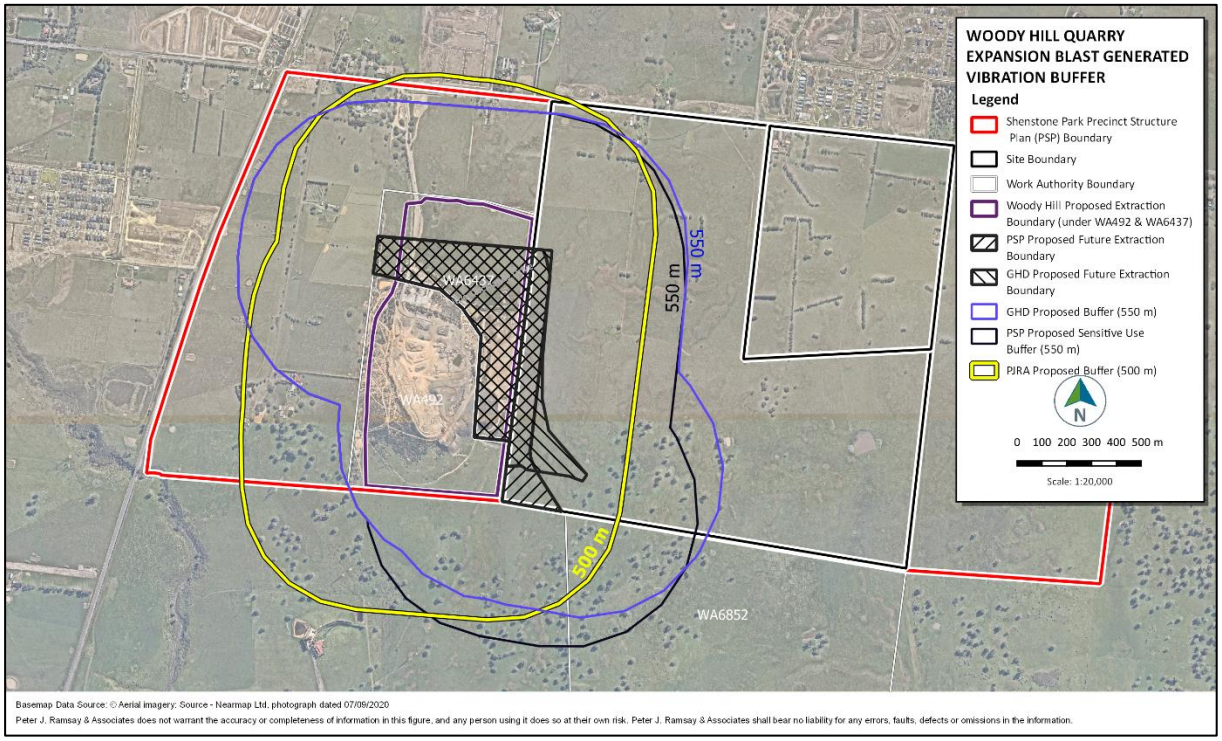


Figure 6 Woody Hill Expansion – Extent of Blast Generated Vibration Buffers

5.3.3 Extent of Blast Generated Dust Buffers

As discussed in **Section 5.2.1**, I consider that a separation distance of 500 m from the proposed extraction areas on the land subject to WA492 and WA006347 is appropriate to protect sensitive receptors from vibration due to blasting.

Figure 7 below shows the proposed blast generated dust buffers for the proposed Woody Hill Quarry expansion.

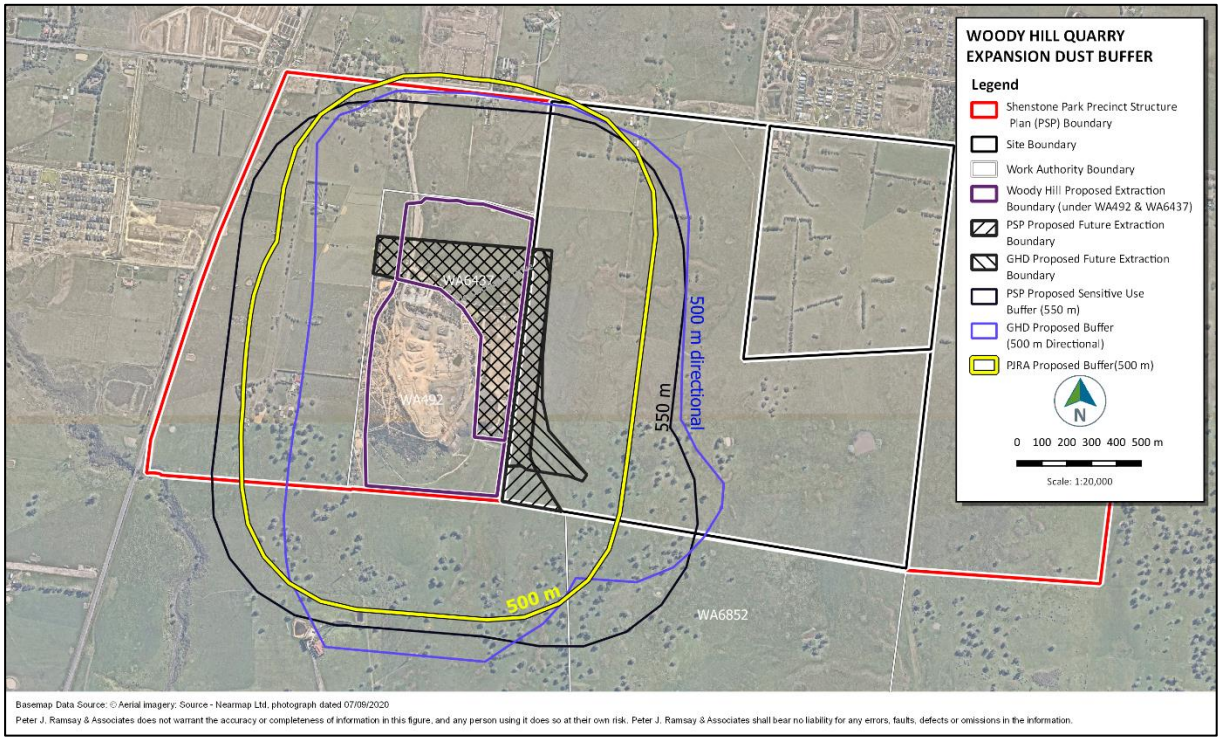


Figure 7 Woody Hill Expansion – Extent of Blast Generated Dust Buffers

5.3.4 Extent of Blast Generated Fly-Rock Buffers

GHD (2017) recommends a 200 m separation distance for protection against blast generated fly-rock. This was adopted in Plan 15 of the original PSP dated September 2019 and retained in Plan 15 of the revised PSP dated October 2020.

I consider the adoption of a 200 m buffer from the proposed extraction boundary within WA492 and WA006437 to be appropriate to provide protection against blast generated fly-rock impacts.

Figure 8 below shows the proposed blast generated fly-rock buffers for the proposed Woody Hill Quarry expansion.

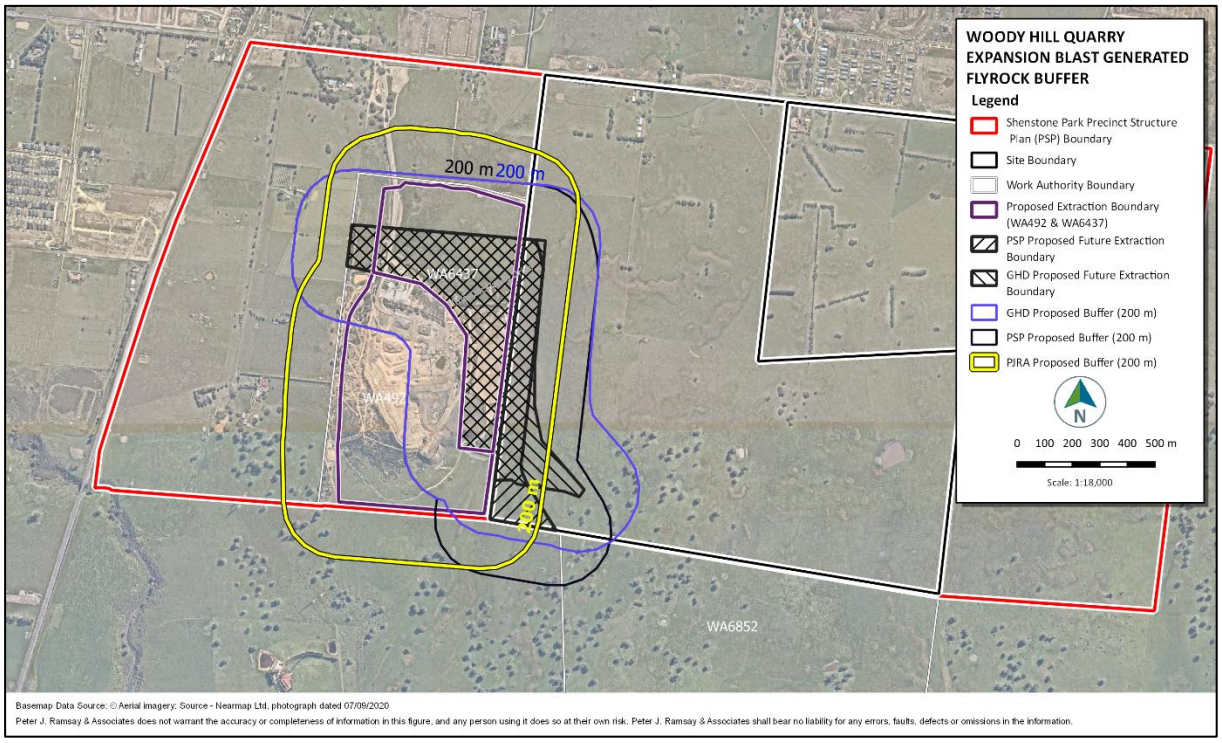


Figure 8 Woody Hill Expansion – Extent of Blast Generated Fly-Rock Buffers

5.4 Phillips Quarry

Phillips Quarry has been proposed under WA006852 and would be located to the south of the site. The Shenstone Park PSP includes buffers to protect the operations of the proposed Phillips Quarry. The buffers included in the PSP relate to operational noise, blast-generated vibration and dust and blast generated fly-rock. A number of these buffers encroach on the site. I provide my opinion on the buffers included in the Impact Assessment Report (GHD 2017), Impact Assessment Addendum (GHD 2019) and Plan 15 of the PSP dated September 2019, and Plan 15 of the PSP dated October 2020.

5.4.1 Extent of Operational Noise Buffers

GHD (2017) recommends an operational noise buffer from the proposed Phillips Quarry of 600 m from the proposed extraction boundary.

The PSP adopted a noise buffer for the proposed Phillips Quarry of 300 m from the proposed works authority boundary.

The same methodology was used to assess the future impact of the Phillips Quarry as was used to assess the potential noise impact from the Woody Hill Quarry and Woody Hill Quarry Expansion. As discussed in **Section 5.2.1**, a 250 m separation from areas of the quarry operations and 500 m separation from the proposed extraction area for the Phillips Quarry, are appropriate to provide protection against noise impacts.

Figure 9 below shows the proposed operational noise buffers for the proposed Phillips Quarry.

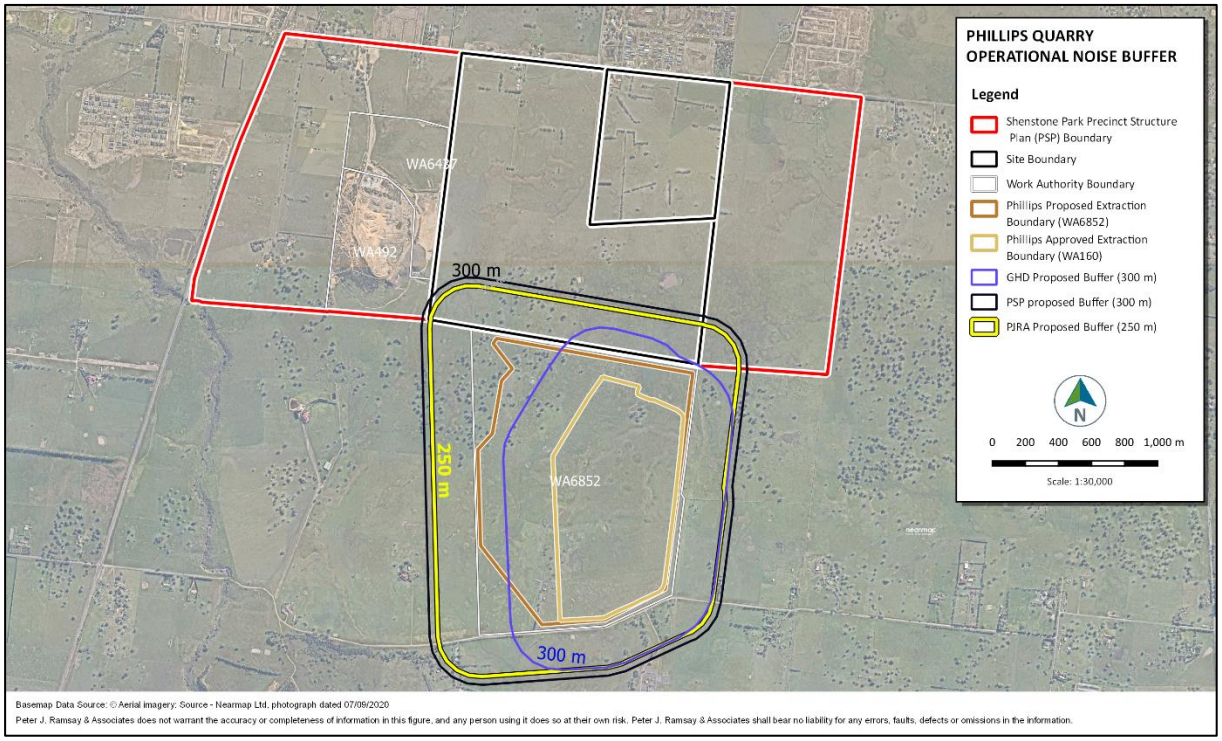


Figure 9 Phillips Quarry – Extent of Operational Noise Buffers

5.4.2 Extent of Blast Generated Vibration Buffers

GHD (2019) recommends a blast generated vibration buffer from the proposed Phillips Quarry of 550 m from the approved extraction boundary.

The PSP adopts this under the sensitive land use buffer from the proposed Phillips Quarry of 550 m from the proposed works authority boundary.

For the reasons discussed in section 5.2.4 of this report, I consider the use of a 500 m buffer from the approved extraction boundary to be appropriate to provide protection against blast generated vibration impacts.

Figure 10 below shows the proposed blast generated vibration buffers for the proposed Phillips Quarry.

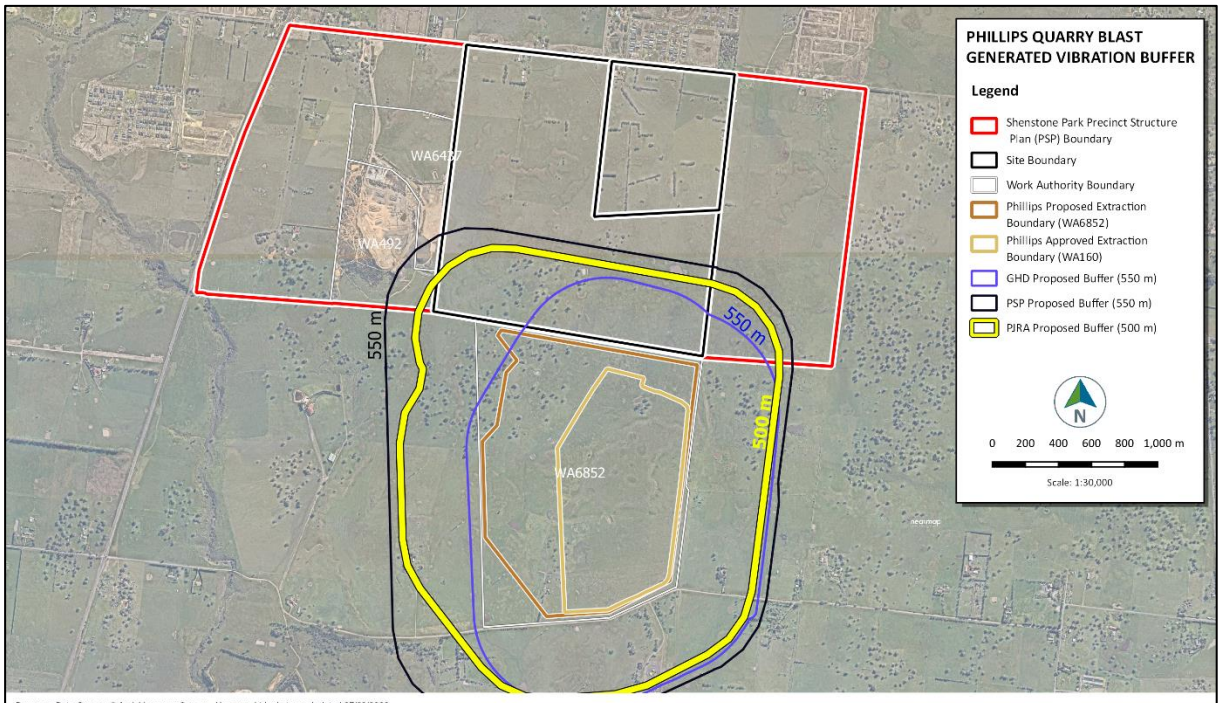


Figure 10 Phillips Quarry – Extent of Blast Generated Vibration Buffers

5.4.3 Extent of Blast Generated Dust Buffers

The PSP recommends a blast generated dust buffer from the proposed Phillips Quarry of 550 m from the proposed works authority boundary.

Both GHD (2019) and I consider the use of a 500 m buffer from the approved extraction boundary to be appropriate to provide protection against blast generated dust impacts.

Figure 11 below shows the proposed blast generated dust buffers for the proposed Phillips Quarry.

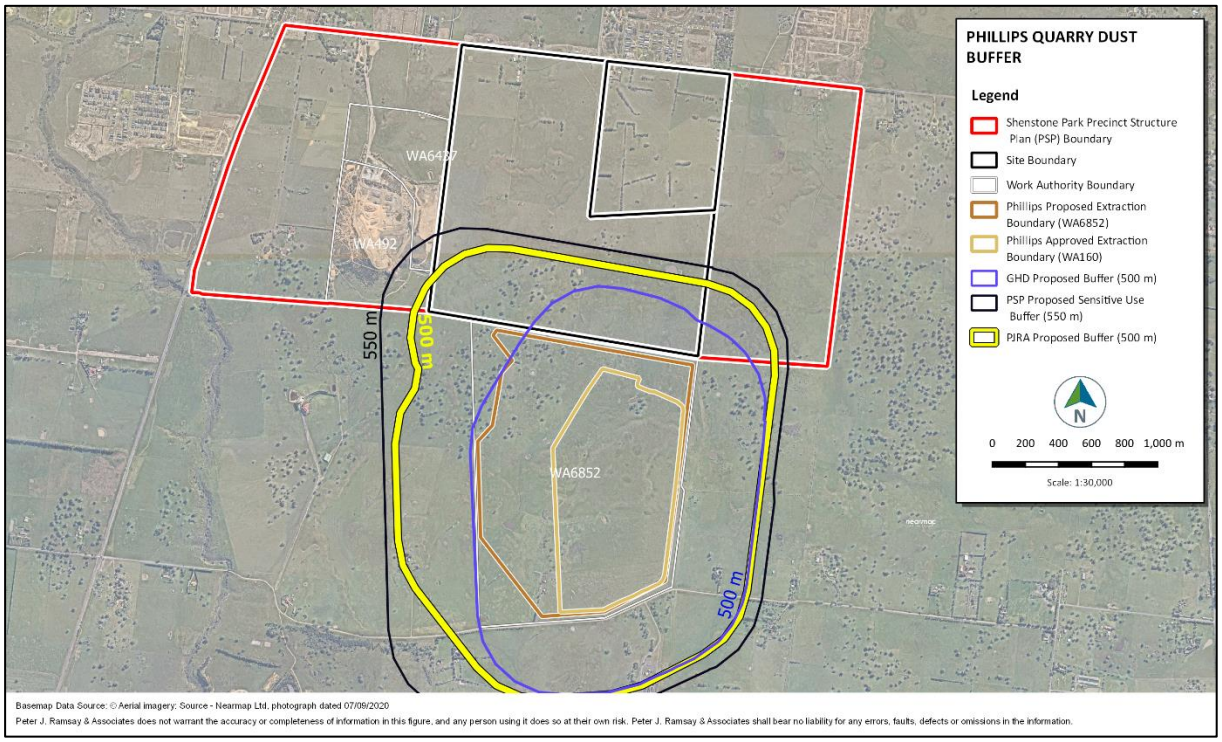


Figure 11 Phillips Quarry – Extent of Blast Generated Dust Buffers

5.4.4 Extent of Blast Generated Fly-rock Buffers

In the Impact Assessment Report (GHD 2017), GHD recommends a 200 m separation distance for protection against blast generated fly-rock. This was adopted in Plan 15 of the original PSP dated September 2019 and retained in Plan 15 of the revised PSP dated October 2020.

I consider the adoption of a 200 m buffer from the proposed extraction boundary within WA006852 to be appropriate to provide protection against blast generated fly-rock impacts.

Figure 12 below shows the proposed blast generated fly-rock buffers for the proposed Phillips Quarry.

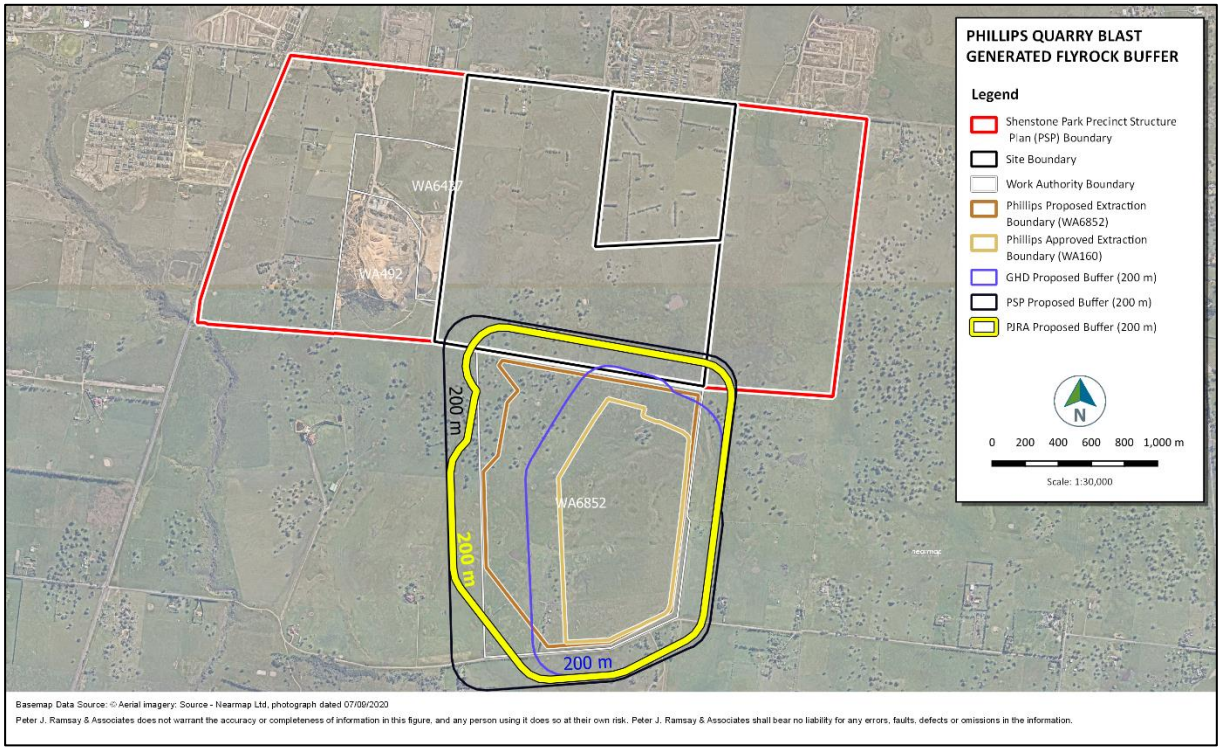


Figure 12 Phillips Quarry – Extent of Blast Generated Fly-Rock Buffers

6. CONCLUSION AND SUMMARY OF OPINION

The methodology used to determine the appropriate buffers by GHD in the GHD Impact Assessment Report (GHD, 2017) and the GHD Addendum Report (GHD, 2019) is not consistent with the methodology outlined in EPA Publication 1518.

In accordance with EPA Publication 1518 separation distances should be measured from the relevant activity area. In the case of impacts associated with blasting and excavation, where reliable information is available regarding the areal extent of such works, then the separation distances should be measured from this extent.

The findings are not in accordance with the recommended separation distances between hard rock quarries using blasting techniques in similar geology, that have been applied in other recent situations where a separation distance has been put in place.

The separation distances I have recommended are typically those that are applied to quarries which are operating to industry standard best practice.

I have also considered the likely area of quarry operation based on the information provided by Barro as to the proposed extent of the Phillips Quarry under WA006852, and the extent of the endorsed extraction area proposed for expansion of the Woody Hill Quarry under WA492 and WA006437.

The extent of these separation distances is shown on **Figure 13** below.

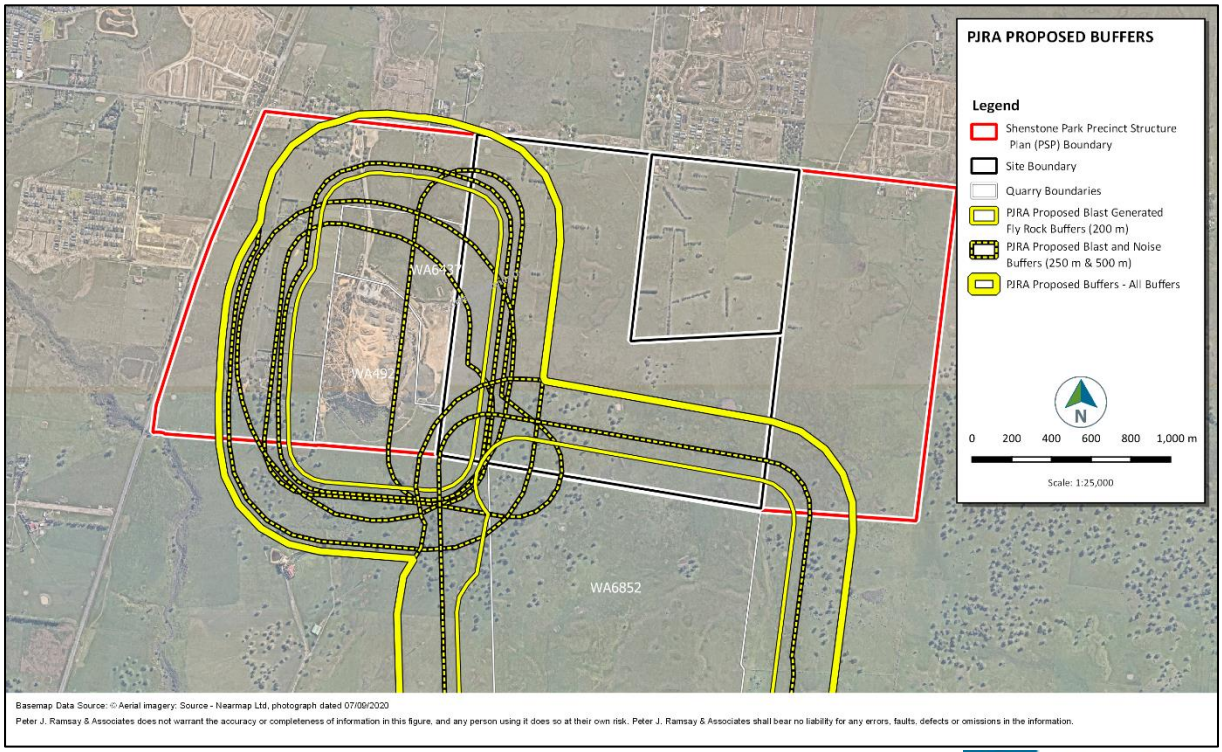


Figure 13 Summary of Recommended Separation Distances

The buffers do not align with the interface land uses proposed in the initial PSP, shown in **Figure 14**; or to the land uses proposed in the revised PSP which are shown in **Figure 15**.

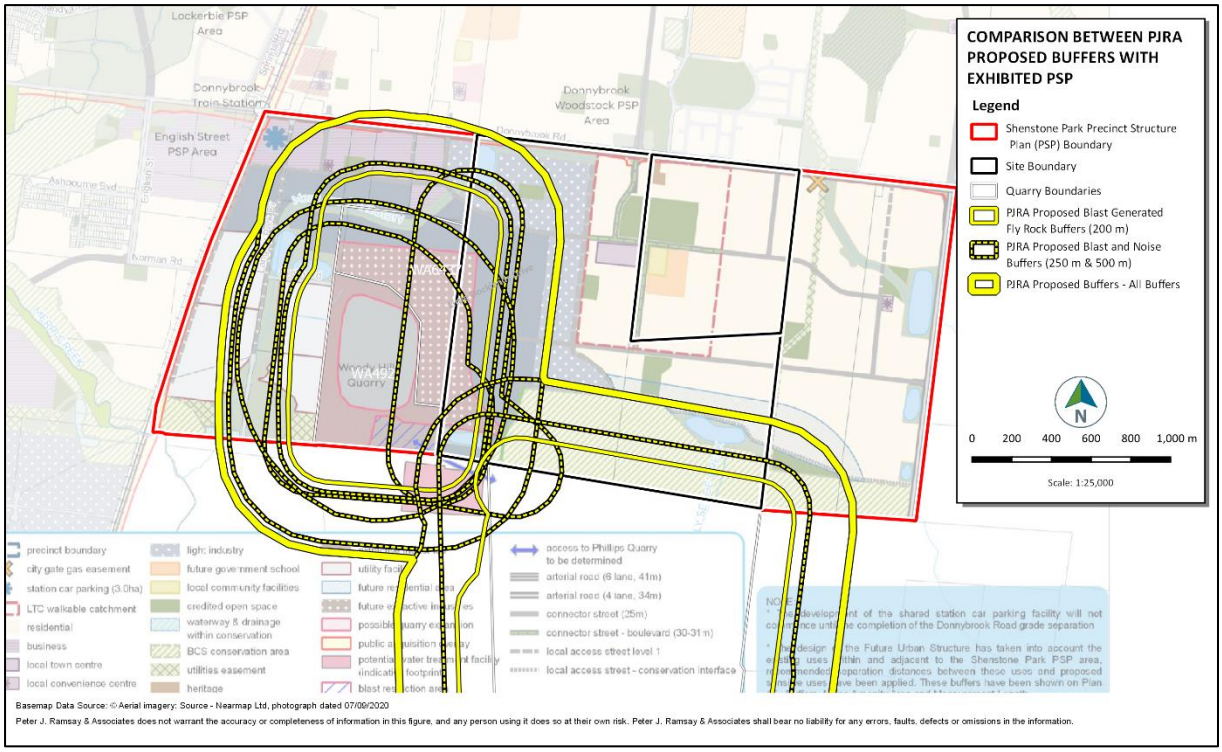


Figure 14 Summary of Recommended Separation Distances on Exhibited PSP

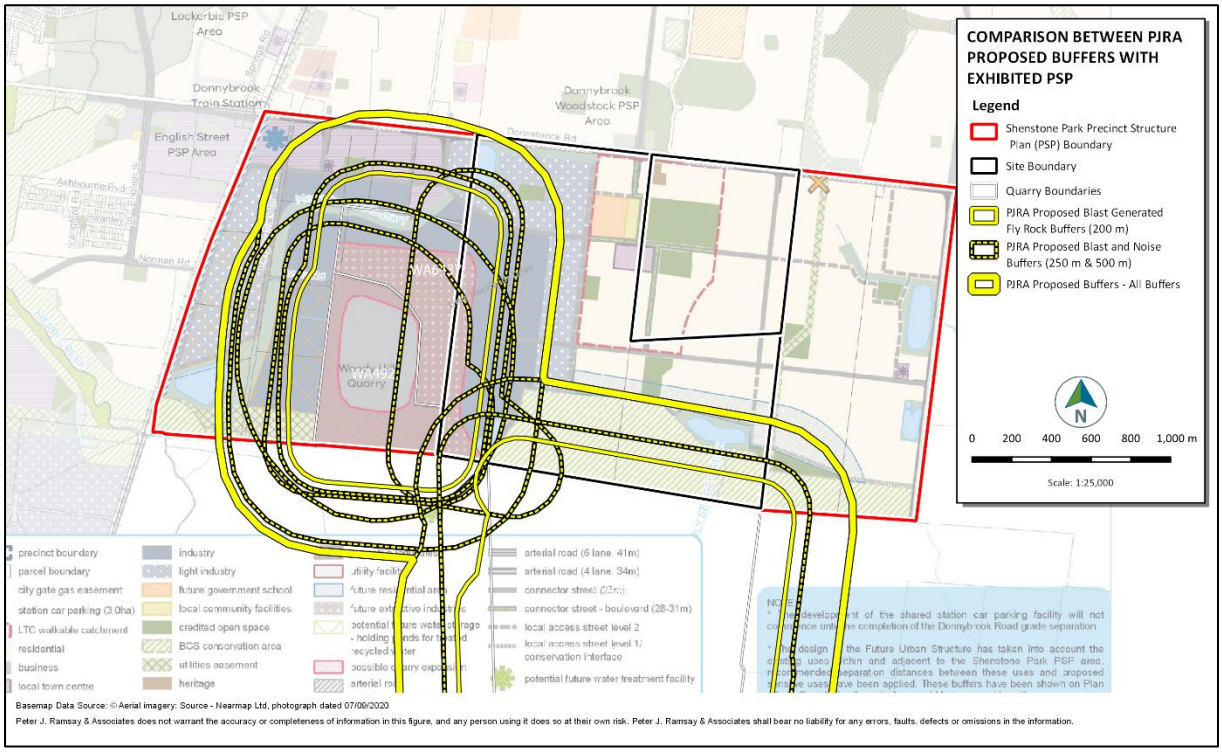
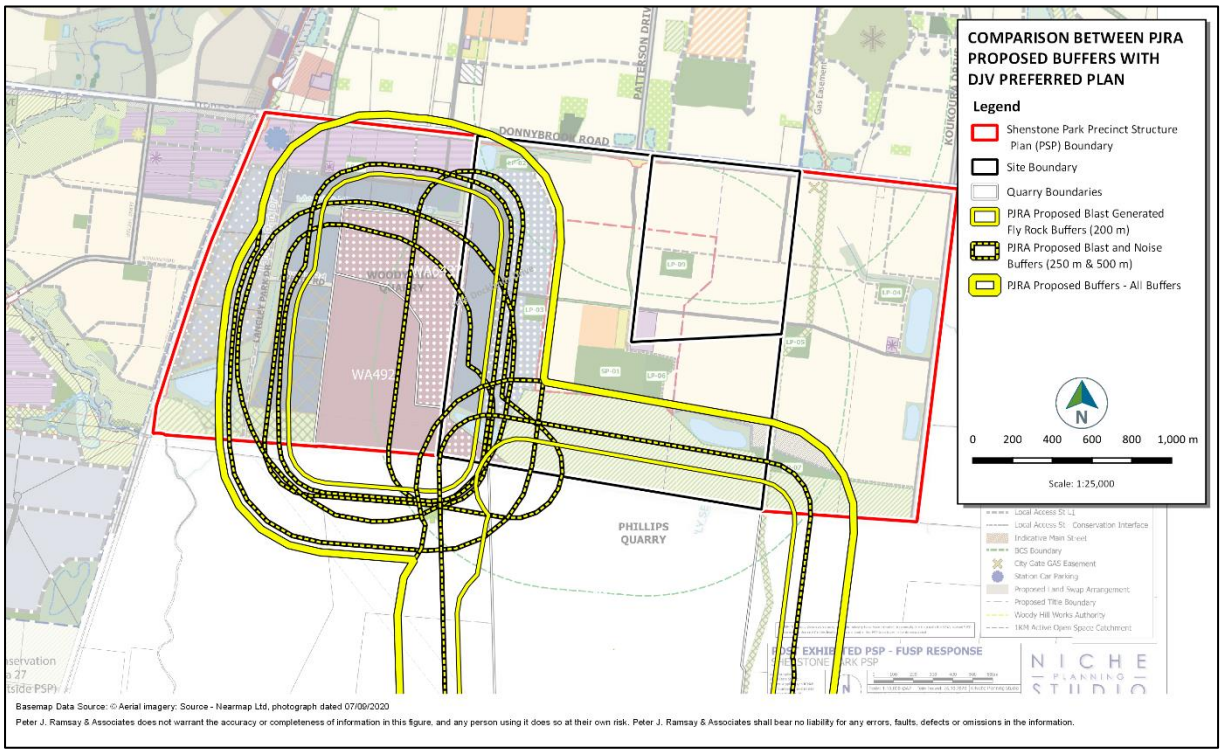


Figure 15 Summary of Recommended Separation Distances on Revised PSP

505 The interface land uses proposed in the FUSP put forward by the Donnybrook Joint Venture align with
506 the separation distances and interface land uses I recommend. This is shown in **Figure 16**.



507 **Figure 16 Summary of Recommended Separation Distances against DJV Proposed Land Use**

508 Therefore, the land uses proposed by DJV in the figure, Post Exhibited PSP – FUSP Response, 26
509 October 2020 are compatible with the planned expansion of the Woody Hill Quarry under WA492 and
510 WA006437 and with the proposed development of the Phillips Quarry under WA006852.

511 In addition, the PSP should be amended to clearly show the extent of the proposed expansion of the
512 Woody Hill Quarry to the north as proposed under WA006437.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