Hanson Lysterfield Quarry
Community Reference Group

MINUTES OF MEETING

Meeting No.:	**12**	**Status of Minutes:**	**APPD**
Meeting Date:	2 May 2018	**Meeting Time:**	6:00pm
Meeting Location:	The Anderson Room, Waverley Golf Club, 82 Bergins Road, Rowville		
Minutes Confirmed:	Consensus		

Chairman:	Brian Oates (BO)

Present:

Members:	Wendy Belli (WB) Virginia Bright (VB) Paul Lees (PL) Shane Logan (SL) Gina Mastromano (GM) Alice McKenzie (AM) Sally Orr (SO)
Presenters/Observers:	Cr Darren Pearce, City of Knox Council (DP) Geoffrey Gilbert, DEDJTR (GG) Paul Dickie, Knox City Council (PD) Daniel Fyfe, Hanson (DF) Andrew Ritchie, Hanson (AR) Bruce Webster, Hanson (BW) Lyndel Hunter, Hanson consultant (LH)

Item	Issue	Action	By
1	**Welcome** Apologies received from: Clayton Collins Trudi Dicker John Farrar Trevor Harley Doug Smith Tory Winnell, Hanson		
2	**Minutes of previous meeting** Minutes of Meeting 11 were approved by consensus. **Action Tracker** **Issue:** *Approved and signed letter re Wellington Road issues to be emailed EcoDev*. LH advised that letter had been emailed to R McGowan, however he left position not long after. LH then resent email to new CEO, A Hurst but had not yet received a reply. GG advised that email had been received and was being addressed. **Issue:** *CRG to be notified of City of Knox Council meeting date for discussion of PAO.* PD advised that PAO will be discussed by council at meeting on Monday 28 May 2018.		

	Issue*: CRG newsletter to printed and distributed to members*. Undertaken. Hillview Park Pony Club distributed newsletter to all facility neighbours and local residents. **Issue***: Invitation to be sent to Hanson blasting consultant, Terrock, attend next meeting*. Terrock presenting that this meeting. **Issue***: Invitation to be sent to Boral to attend a future meeting*. LH advised invitation would be extended to Boral after next meeting.		

7	It was agreed to present Item 7a Operational Information prior to Terrock presentation.
	
	a. Operational Information
	BW provided presentation noting:
	· The 50,000L water cart is operating. Images of maintaining dust suppression on stockpiles and on haul roads were shown.
	· Community engagement included pruning of trees on property in Chatswood Court to remove fall risk.
	· Follow up discussion with resident of Ian Court. Blast monitoring results were passed on and feedback discussed.
	· GM reported that due to recognition from CRG Newsletter, she was approached by a resident in Montague Court with dust issue. Walked to property with resident and noted that property backs on to the paddock. GM to provide resident details to BW for follow up.
	· SL reported that dust is the worst it has ever been
	· Discussion regarding dust noted:
	  · There appears to be a lot more noise and dust from Boral and they don't appear to be doing anything
	  · It has been occurring consistently for the past five to six months
	  · Area is currently in drought conditions
	  · Hanson has implemented a stop work policy on days of excessive wind
	  · Water carts are running every day
	· AR advised that he will meet with Boral to discuss dust issues
	· Blasting was conducted on Friday 27 April.
	· BW provided environmental monitoring report which indicated ground vibration and airblast overpressure were below allowed limits.
	· The Monash Freeway asphalt aggregate production is now complete with a total of 175,000 tonnes supplied.
	· Production for Thompsons Road Cranbourne duplication project has commenced with 100,000 tonnes required
	· Rehabilitation has included:
	  · Backfilling of terminal benches with stripping campaign material
	  · Shaping of final batters on eastern wall
	  · Tree planting on north side for future visual amenity
	· Media article by Cr Darren Pearce, City of Knox, in April 2018 edition of Rowville Lysterfield Community News – very complimentary to CRG members.
		GM
		
		AR
			ASAP
			
			ASAP

3 **Presentation: Quarry Blasting and Blast Vibration**

Adrian Moore, Principal Engineer and James Richards, Technical Services, Terrock Consulting Pty Ltd, Hanson blasting consultants

Introduction to quarry blasting

Blasting at quarries permits large quantities of rock to be extracted for processing into various grades of aggregate to meet the growing needs of the construction industry.

Blasting at quarries is a controlled and regulated operation. Victorian quarries must comply with regulatory controls for ground vibration, airblast overpressure and ensure blasting does not compromise the safety of quarry personnel and the public.

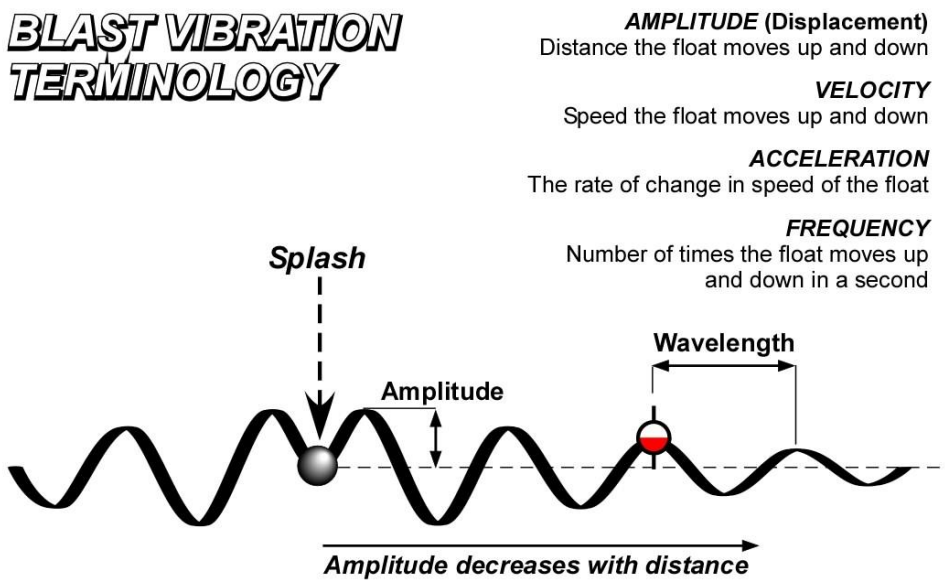
The nature of blasting

- When a blast hole is detonated, the explosives energy shatters the surrounding rock. The blast holes initiate in a sequence designed to heave the fragments forward, forming a pile of broken rock on the floor in front of the blast site.
- The energy of the explosives also produces **ground vibration** waves that radiate from each blast hole. Ground vibration waves travel along the surface at speeds of up to 2.2km per second. The ground surface is elastic, returning to its original position after the vibration wavefronts have passed.
- A proportion of a blast's energy is also released as **airblast** (overpressure). Airblast travels in waves through atmosphere at the speed of sound (340 metres per second).

The nature of ground vibration

Ground Vibration from blasting travels in waves which can be likened to those from a stone dropped in still water. The ripples (waves) radiate outward in all directions and the wave height reduces with increasing distance.

Some terms used in the study of ground vibration are shown below:

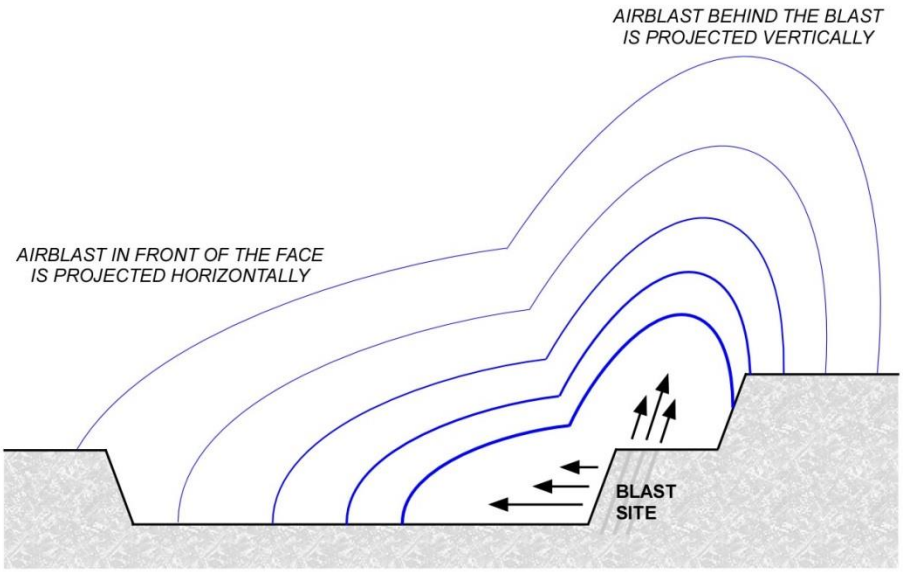


The peak **velocity** of the wave is the standard measure for assessing the effects of ground vibration on buildings. This is known as **PPV** (Peak Particle Velocity) and is measured as **mm/s** (millimetres per second).

- The human body is highly sensitive to vibration and can perceive PPV levels as low as 0.3mm/s. This velocity represents a displacement of around 0.005mm (around one-tenth the thickness of a human hair).
- Longer blast events (blasts with >100 holes or longer hole delays) are more likely to be perceptible than shorter events. In quarry blasting there is a brief time delay between the initiation of each blast hole (ranging from 9ms to 67ms), with all holes typically fired within a 0.5 to 2 second period.
- A standard quarry production blast may be 'felt' at distances up to 2 kilometres from a quarry. However, the transmission of vibration varies considerably depending on local ground conditions. At some locations, vibration levels may be relatively low. At another location, at the same distance from the blast, levels may be higher.
- "*Secondary movement*" may occur in houses, where loose items and hanging fixtures generate a visual or audible response to passing vibration waves (eg. a teaspoon briefly rattling in a teacup, wobbling of a sliding door, etc.). Secondary movement is a frequency-related response and can occur even when ground vibration levels are very low. Secondary movement may cause some people to believe ground vibration levels are very high or excessive.

<u>The nature of airblast (overpressure)</u>

- Airblast is a sudden change in air pressure. Airblast is sub-audible (ie. infrasound) and occurs at frequencies that are below the range of human hearing (<20Hz). Airblast is a separate measure to the audible emission (noise) from a blast and is measured in Decibels Linear (dBL).
- The audible noise of blasting can be likened to a brief, distant thunder clap and is sometimes followed by the sound of shattered rock tumbling forward. The perception of noise from a blast is influenced by the weather conditions at blast time. Blasts can be heard more clearly during still or light wind conditions. When winds are moderate or strong, blast noise is mostly perceptible to downwind receivers.



- The airblast and noise emission in front of a blast face than greater than behind the face.

- A rumble of ground-borne noise may accompany ground vibration. This can make it difficult to distinguish the airblast from the ground vibration.
- In some directions from a quarry, airblast levels are reduced by **Topographic Shielding**, where the landform between a blast site and a receiver acts as a barrier to the transmission of airblast.
- Airblast (and noise) travel at a slower speed than ground vibration waves, the latter travelling at speeds of up to 2.2km/second. Because of this, airblast arrives after the arrival of ground vibration. The delay in the arrival times increase with distance.

  Example:

  At 1km from a blast: Ground Vibration arrives @ 0.45 seconds
  Airblast arrives @ 2.9 seconds

  At 2.5km from a blast: Ground Vibration arrives @ 1.14 seconds
  Airblast arrives @ 7.35 seconds

<u>Blast vibration limits (ground vibration and airblast)</u>

Blast vibration is regulated by a branch of the Victorian State Government Department of Economic Development, Jobs, Transport and Resources (DEDJTR) named Earth **Resources Regulation** (**ERR**). ERR has developed "*Guidelines for Ground Vibration and Airblast Limits for Blasting in Mines and Quarries"*. These guidelines contain limits for blast vibration that apply at "sensitive sites" which are typically occupied residences.
All quarries must comply with the blast vibration limits specified by ERR as part of the quarry's approved Work Plan.
The current blast vibration limits of the Lysterfield Quarry's approved Work Plan are…

Ground Vibration	10 mm/s
Airblast	120 dBL

The Hanson Lysterfield Quarry has adopted an in-house policy for lower target limits of…

Ground Vibration	5 mm/s
Airblast	115 dBL

These lower limits are normally set by ERR for new quarries and extensions to existing operations. More information can be found at **earthresources.vic.gov.au.**

- All quarries must comply with the blast vibration limits specified by ERR in the quarry's Work Plan for all blasting.
- Exceedances of the limits may result in substantial fines for quarry operators and/or blasting operations being suspended pending an audit of blasting practice.
- Compliance with blast vibration limits is confirmed by routine blast vibration monitoring, ideally conducted by independent contractors.
- The ERR Ground Vibration and Airblast Limits are based on **human comfort** considerations and are designed to help minimise disturbance to people living near quarries. The limits are therefore lower than levels at which threshold/cosmetic damage to competent structures is known to occur in accordance with various standards and guidelines.
- Routine blast monitoring around Lysterfield Quarry began in 2010. There have been no recorded exceedances of the target limits (5 mm/s and 115 dBL) since monitoring began.

Blast vibration damage to buildings

- Over the past 40 years, numerous studies have been undertaken to investigate the effects of blasting on buildings and other structures. This research has led to the development of criteria with guideline limits that are used to prevent ground vibration and airblast damage to buildings.
- Modern guidelines adopt "*frequency-dependant*" criteria because ground vibration waves with low frequencies cause greater movement of buildings than vibration at high frequencies. Ground vibration frequencies from quarry blasting typically in the range between 10 and 20 Hz.

Damage guideline for ground vibration

Australian Standard AS2187.2 (2006) contains guideline damage criteria from overseas standards and research. One such guideline is sourced from British Standard BS7385.2 (1993). This criterion was developed from investigations of confirmed cases of damage to buildings from blasting and is approved for use in Australian conditions.

In accordance with the British criterion, the threshold at which there is an *increasing possibility* of cosmetic damage is **18 mm/s (**at 10 Hz vibration frequency).

Damage limits and thresholds for ground vibration

Damage classifications from British Standard BS7385.1 (1990) are shown below.

TABLE J4.4.2.2 BS 7385-1:1990 - DAMAGE CLASSIFICATION	
COSMETIC	The formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in the mortar joints of brick/concrete block construction.
MINOR	The formation of cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks.
MAJOR	Damage to structural elements of the building, cracks in support columns, loosening of joints, splaying of masonry cracks, etc.

The threshold for "minor" damage is at levels twice, and "major" damage 4 times above the cosmetic damage threshold…

So @ 10 Hz vibration…

- Cosmetic Damage >18 mm/s
- Minor Damage >36 mm/s
- Major Damage >72 mm/s

Damage limits and thresholds for airblast

- At very high levels, airblast can damage buildings. The building element most susceptible to airblast damage are glass window panes.
- Window panes may break when exposed to airblast levels above 133 dBL. Because the Decibels Linear scale is logarithmic, 133 dBL represents an 8 x increase of pressure from 115 dBL.
- Levels above 133 dBL are limited to within a few hundred metres of a blast face. Airblast levels reduce at a rate of 9 dBL with doubling of distance.
- Australian Standard AS2187.2 (2006) contains guideline airblast limits for preventing damage to buildings.

TABLE J5.4(B)

RECOMMENDED AIRBLAST LIMITS FOR DAMAGE CONTROL (see Note)

Category	Type of blasting operations	Peak sound pressure level (dBL)
Damage control limits		
Structures that include masonry, plaster and plasterboard in their construction and also unoccupied structures of reinforced concrete or steel construction	All blasting	133 dBL maximum unless agreement is reached with the owner that a higher limit may apply
Service structures, such as pipelines, powerlines and cables located above the ground	All blasting	Limit to be determined by structural design methodology

NOTE: Tables J5.4(A) and J5.4(B) are intended to be informative and do not override statutory requirements, particularly with respect to human comfort limits set by various authorities. They should be read in conjunction with any such statutory requirements and with regard to their respective jurisdictions.

Blast Vibration Monitoring

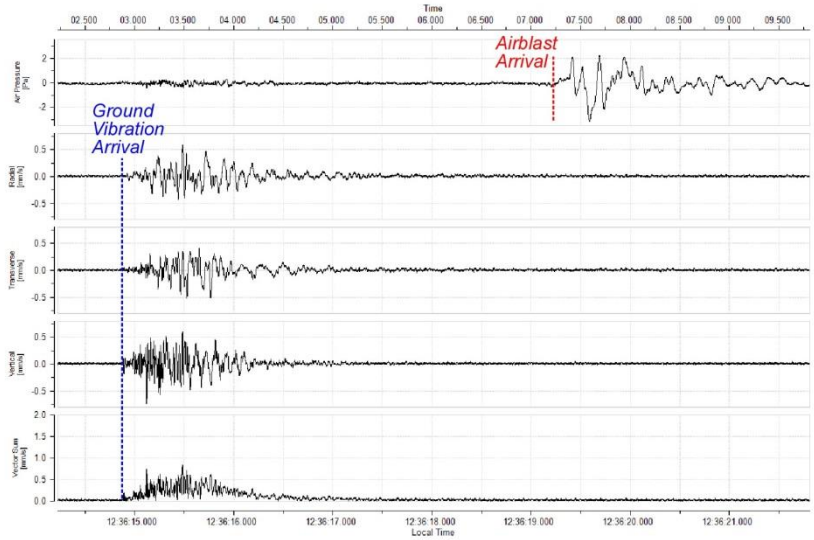
- Ground vibration and airblast is routinely monitored at sensitive sites near quarries.
- Measurements of blast vibration are recorded by a blast monitor. An attached geophone records the ground vibration and a microphone records airblast.
- The blast vibration results are detailed in a compliance report which is sent to the quarry after each blast event and forwarded to the relevant authority.

BAYVIA

Ground Vibration and
Airblast Overpressure Report

Site :	Hanson Lysterfield	Event ID :	Shot #1734
Location Name :	Station A (1,593m from blast)	Location Code :	
File Name:	STAC00120170906T123612E.fr3	Time:	2017-09-06T12:36:12.000+10:00
Coordinates:	S 37 12.345 E 145 12.345	CJ6 Serial No.:	C001

Event Notes



Vector Peak Particle Velocity (VPPV) :	0.84 mm/s	12:36:15.483
Peak Sound Pressure Level (PSPL) :	3.15 Pa	
	103.94dBL	12:36:19.589

Peak Component Particle Velocity (PCPV)

Radial :	0.58 mm/s	12:36:15.485
Transverse :	0.52 mm/s	12:36:15.528
Vertical :	0.74 mm/s	12:36:15.122

Typical Blast Monitoring Wavetrace Report

Causes of damage / defects in buildings

Defects are present in all houses. Most defects are cosmetic, such as a hairline crack at a cornice join, or surface cracks in a concrete slab. In some cases,

substantial settlement or movement of a buildings underlying soils may result in structural damage. Some of the common mechanisms and causes of damage/defects in houses are outlined below.

- **Clay soils**. Reactive clay soils are widespread in the Melbourne area. These soils expand during wet periods and contract in dry conditions. Reactive clay is a common cause of foundation movement that can result in the formation of cracks in buildings, sticking doors, etc. Houses built on sites with raised fill may experience similar problems.
- **Thermal expansion/contraction**. Building materials expand and contract with temperature changes. A lack of adequate expansion joints in brick walls and concrete slabs is a common cause of cracking.
- **Concrete shrinkage.** Some surface cracking will develop in most concrete slabs. This is often related to the curing process after the concrete is poured. More substantial cracking in concrete may result from foundation soil movement.
- **Drainage**. Inadequate drainage provisions and plumbing leaks around houses can affect the load bearing ability of foundation soils. Uncontrolled water runoff can cause subsidence and cracking or structural problems.
- **Tree roots**. Trees planted too close to houses can cause movement of house footings and cracking in walls, slabs etc. as the roots grow and draw moisture from the soil.
- **Building design and construction**. Not all houses are built to the highest possible standard. A house's design, quality of the construction materials used, foundation preparation and the quality of workmanship during construction all influence the degree and rate at which defects develop.

<u>Flyrock</u>

- 'Flyrock' is the throw of rock fragments during a blast. The term is typically used to describe rock that is thrown beyond the normal heave distance.
- If there is inadequate burden (blast confinement) provided by the blast face or the stemming material used to cap the blast holes, rock may be thrown beyond the normal distance.
- Occurrences of flyrock are uncommon and normally result from weak areas of face burden and/or human error during blast loading procedures.
- Flyrock poses the greatest risk to quarry equipment and personnel because throw greater in front of the face than behind the blast. Blasts typically face away from sensitive sites and towards the quarry pit.
- The risk of flyrock is mitigated by blast design, laser face profiling, rigorous blast loading procedures and record keeping and observing exclusion zones at blast time. The separation distances and buffers between blasting areas of quarries and adjoining properties typically provides adequate protection from flyrock.

<u>Blast vibration from Boral</u>

The levels of blast vibration around quarries depend on factors such as the location of the receiver, the in-hole charge mass, face direction, weather, local topography and ground conditions.

Terrock does not conduct routine blast monitoring for Boral, but from our experience it can be reasonably assumed that…

- Blast vibration levels are highest from at whichever quarry is closest to the receiver.
- Houses to the west and south of the quarries experience the highest levels from Hanson blasts.

	· Houses to the north and east of the quarries experience the highest levels from Boral blasts. · Blast vibration from blasting at both quarries may be perceptible depending on the location of the receiver. In recent years, Hanson Lysterfield Quarry has conducted around 50 blasts per year (approximately one blast per week).		
4	**Information Update: PAO** *Daniel Fyfe, Hanson* DF reiterated key points of presentation at last meeting, ie: · Seeking support from City of Knox to recommend that State Government lifts PAO · If lifted, Hanson will submit planning variation and revised Work Plan including updated regulations for expanded extraction limit. · Land at front of site will be available to City of Knox for sporting facilities · VB expressed her concern regarding impact on Hillview Equestrian Centre · GM queried if large structure infrastructure will be built. DF advised that it was unlikely. · LH advised that as planning and works plan variations are required, community engagement will be conducted. However, Hanson will collaborate with CRG and City of Knox Council prior to completion of any planning or works plan variation submissions. · DF advised that consultants had been briefed to prepare draft documentation. · Revised documents will ensure Hanson is compliant with current regulations. · DF advised that even if Council agrees to PAO, the State Government still has to lift the overlay. · PD advised that Council now has a good understanding of the concept and process. · PD has prepared and submitted his report and Council will discuss at their next meeting on Monday 28 May 2018 from 7:00pm. · Agenda and PD's report should be available online about a week prior at: http://www.knox.vic.gov.au/Page/Page.aspx?Page_Id=5016 · DP advised that Councillors attended a meeting four years ago with Department of Economic Development, Jobs, Training and Resources and were informed that the quarries [Hanson and Boral] are key state infrastructure requirements.		
5	**CRG Issue Updates** LH advised that two year anniversary of CRG was 6 April 2018. According to the Terms of Reference, (5.1 Appointment and Term) . . . . *"The term of appointment for membership of the CRG is twenty-four (24) months. It may be necessary to reduce or extend this appointment period and any such variations will be reasonably determined by Hanson in agreement with CRG."* LH suggested that, in light of PAO and other future planning issues, the current membership of the CRG be rolled over for a further two years. She also suggested that Hanson could conduct a promotion program to seek a further five (5) members to take membership to the recommended maximum of 18.		

LH advised she had discussed with Hanson and they had agreed with the suggestion.

Following discussion, members unanimously agreed to rollover the current membership for a further two years and have Hanson conduct a promotional program to expand membership to 18.

It was agreed that the best source of promotion was an advertisement in the Rowville Lysterfield Community News and a local letterbox drop.

VB advised she would propose the letterbox drop to the Hillview Park Pony Club.

6 Communication and consultation

LH advised that Hanson had requested that she submit the CRG Newsletter in the 2018 CCAA Innovation Awards.

All members supported and DP approved use of his recent article in Rowville Lysterfield Community News to be utilised.

7 Other Business

a. **Operational Information**

- 50,000 litre water cart is maintaining suppression on stockpiles and dust suppression on haulage roads
- Tree branches overhanging a residence in Chatswood Court were pruned to remove fall risk
- Follow-up discussions to previous feedback: provided blast monitor results passed on to resident in Ian Court, and feedback discussed
- Blasting was conducted on Friday 27 April 2018 – different to the usual blasting day of Wednesday
- Terrock were requested to monitor ground vibration and airblast overpressure from the blast. CJ6 monitors were used to record the blast vibration

The vibration measurements recorded from the blast were:

Monitoring Location	PPV (mm/s)	Peak Air Vibration (dBL)	Distance to Blast (m)	Monitor Serial No
15 Sandford Close	2.51	103.35	827	CJ6-B002
6 Parkview Terrace	90.98	0.33	2042	CJ6-C010
40 Pitfield Crescent	97.99	0.22	1940	CJ6-C028

- Monash FWY Asphalt Aggregate production is complete with 175,000 tonnes supplied
- Production for Thompsons Road Cranbourne duplication project requires 100kt product
- Rehabilitation: backfilling of terminal benches with stripping campaign material has been undertaken
- Rehabilitation shaping of final batters on eastern wall has commenced
- Tree planting on north side for future visual amenity has been undertaken
- Cr Darren Pearce's article in the Rowville Lysterfield Community News was noted and the Councillor thanked for his fair and reasonable comments.

	b. Following discussion, it was agreed that a letter be sent to the Minister for Roads to attend the next meeting.		

Meeting Closed:	8:20pm
2018 Meeting/s :	Wednesday **1 August 2018** at **6:00pm** Wednesday **14 November 2018** at **6:00pm** **Venue:** The Anderson Room, Waverley Golf Club, 82 Bergins Road, Rowville

ACTION SUMMARY

Item	Issue	Action	By
7a	Details of resident in Montague Court to be provided to BW for follow up.	WB	ASAP
7a	Andrew Ritchie to meet with Boral to discuss dust issues	AR	ASAP
7b	Letter to be sent to Minister for Roads to attend the next meeting.	LH	ASAP