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Version Title	Action	Staff	Date
20 Wattle Valley Rd – AIA and Amendment – V1	Prepared	PD	21/09/2023
20 Wattle Valley Rd – AIA and Amendment – V2	Reviewed	GH	21/09/2022
20 Wattle Valley Rd – AIA and Amendment - FINAL	Proofed	IF	22/09/2023
20 Wattle Valley Rd – AIA and Amendment - FINAL- REVB	Amended	IF	28/11/2023



Millar Merrigan has commissioned Ironbark Environmental Arboriculture (IEA) to provide an arboricultural impact assessment in response to a Request for Further Information (RFI) from Yarra Ranges Council.

This report references the following documents:

- Arboricultural impact assessment, prepared by Ironbark Environmental Arboriculture, 10th November 2022
- RFI, Application for Planning Permit PA 2302062, 20 Wattle Valley Road BELGRAVE 3160, 27/02/2023

The RFI requested assessment of all trees on neighbouring properties within four (4) meters of the boundary fence line, and greater detail around the arboricultural impacts proposed upon tree #3.

Methods

On the 4th August, 2023, Patrick Dyson of IEA collected data for fourteen (14) additional trees at 20 Wattle Valley Road in Belgrave Heights. Additional trees have been numbered as a continuation of the trees initially assessed at the site.

There were two hundred and forty-six (246) trees previously assessed and included in the Arboricultural Impact Assessment referred to in this report.

Summary

This report contains the following information:

- Arboricultural impact assessment of tree #3, prepared with reference to AS 4970-2009 Protection of Trees on Development Sites.
- Amendment for additional 3rd-party trees.

The findings of this report were as follows:

- Six (6) trees have *high* retention values.
- Six (6) trees have *medium* retention values.
- Two (2) trees have *low* retention values.
- There were no encroachments from the proposed design

Arboricultural impacts are assessed with reference to the following documents:

• Final plans - 20054_Belgrave Heights CS_VCE Prelim DA - 2022.09.07

Planning Context

The site is within the Yarra Ranges Shire and is zoned as *Low-Density Residential Zone* (LDRZ); and is covered by the *Significant Landscape Overlay* – *Schedule 22* (*SLO22*).

The site is greater than 4,000m2, therefore vegetation removal is subject to assessment against Clause 52.17 *Native Vegetation*.

DELWP mapping (NatureKit 2.0) shows patches of *Herb Rich Foothill Forest* (EVC 23) present on site with *Eucalyptus radiata, obliqua* and *cypellocarpa* as being characteristic of the site.







Arboricultural Impact Assessment – Major encroachments

The proposed design requires a *major* encroachment (>10%) into the TPZ of tree #3, but outside of the SRZ.

Major encroachment into TPZ is subject to tree species, health and structure before determining viability with the proposed design.

ID	Common Name	Species	Height (m)	Widt	DBH (cm)	DAB (cm)	Health	Structure	ULE	Visual Amenity Value	Retention Value	TPZ (m)	SR Z (m)	Recommendation
	Radiata	Pinus	(/		(0007)	()						11.	()	Major encroachment
3	Pine	radiata	28	8	98	106	Good	Good	>10 years	High	High	8	3.4	24.5%





Arboricultural Impact Assessment – No encroachment

The following trees have no encroachment into their TPZ with the proposed design and can be retained with suitable tree protection measures in place for the duration of the development.

		Common		Height	Width	DBH	DAB				Visual Amenity	Retention			
	ID	Name	Species	(m)	(m)	(cm)	(cm)	Health	Structure	ULE	Value	Value	Comments	TPZ	SRZ
			Corymbia					.		10		High –			
	247	Spotted Gum	maculata	20	8	45	55	Good	Good	>10 years	Medium	3 rd Party		5.4	2.6
			Acacia					_		-		High –			
	248	Blackwood	melanoxylon	13	6	30	40	Poor	Fair	<3 years	Low	3 rd Party		3.6	2.3
			Pittosporum					<u> </u>		10		High –	Hedgerow		
	249	James Stirling	tennuifolium	6	15	8	20	Good	Good	>10 years	Medium	3 rd Party	of 12 trees	2.0	1./
	0.50	D I I I	Acacia		-		0.5		_ ·	>3 - <10		High –		.	0 4
	250	Blackwood	melanoxylon	8	5	20	35	Good	Fair	years	Medium	3 rd Party		2.4	2.1
	054	Black	Allocasuraina	47	0	05	40					High –		0.0	0.0
	251	Sheoak	littoralis	17	6	25	40	Good	Good	>10 years	Hign	3 rd Party		3.0	2.3
	252		Syzygium	4	20	6	45	Cood	Cood	> 10	Law	High –	Hedgerow	2.0	4 5
	252		Smithi	4	20	0	15	Good	Good	>10 years	LOW	3 rd Party	of 17 trees	2.0	1.5
	252	Depart Ash	Fraxinus	10	0	22	10	Cood	Cood	>10 vooro	Madium	Hign –		2.0	2.4
	255	Desen Ash	Dittoonorum	12	9	32	40	Good	Good	>10 years	Medium	J rd Party	Hodgorow	J.O	2.4
	254	Jamas Stiroling	rillosporum	7	15	Q	16	Good	Eoir	>10 years	Modium	⊓ign – 3rd Portv	of 8 troop	2.0	15
	234		Erovinus	1	15	0	10	Guu	Fall	>10 years	Medium	J ^{ar} Faity Lliab	01011665	2.0	1.5
	255	Decert Ach	angustifolia	13	10	45	60	Good	Good	>10 years	High	3rd Darty		51	27
	200	Southern	Eucalyntus	15	10	43	00	Guu	900u	> 10 years	riigii	Jiah		J.4	2.1
	256	Mahogany	botrvoides	24	14	65	85	Good	Good	>10 years	High	3 rd Party		78	31
	200	Manogariy	Prunus	<u> </u>	17	00	00	0000	0000	>3 - <10	riigii	High _		7.0	0.1
	257	Wild Cherry	americana	4	3	8	15	Good	Good	vears	Low	3 rd Party		20	15
	201	Wild Oriony	Fucalvotus			Ŭ	10	0000	0000	>3 - <10	2011	High –		2.0	1.0
	258	Yellow Box	meiliodora	14	8	35	50	Fair	Fair	vears	Medium	3 rd Party		4.2	2.5
			Eucalvotus							j		Hiah –			
This copied do	cume	nt to be made an Dead Gum		10	5	30	40	Dead	Fair	<3 years	Low	3 rd Party		3.6	2.3
for the s	ole pu	rpose of enablin	^g Eucalyptus							>3 - <10	1	High –			
its consi	decati	owand review a	^s melliodora	14	6	35	50	Fair	Fair	years	Medium	3 rd Party		4.2	2.5
part of a p	lannin	g process under	the			•	•		•		•		•		
Planning a	nd Env	vironment Act 1	987.												

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Adapted from IEA GPS data, Nearmaps image dated 4/02/2022 and 20054_Belgrave Heights CS_VCE Prelim DA -2022.09.07

Arboricultural Impact Assessment Summary

Retention Value	Recommendation	Total
High	Major encroachment 24.5%	1
	No Encroachment	6
High Total		7
Low	No Encroachment	2
Low Total		2
Medium	No Encroachment	6
Medium Total		6
Grand Total		15

Count of Recommendation	Total
Major encroachment 24.5%	1
No Encroachment	14
Grand Total	15

In summary of the above tables:

- There is one (1) *High* retention value trees with a *major* TPZ encroachment, tree #3.
- There are fourteen (14) trees with no TPZ encroachments, trees #247 260.





There are no encroachments for trees #247 - 260, they will remain viable with tree protection measures in place throughout the development.

Tree #3 has a *major encroachment* into 24.5% of the TPZ. This is a significant and irregularly shaped encroachment over a significant portion of the TPZ. The existing *major* encroachment is in the form of a gravel driveway. This will significantly compact the soil within the TPZ and inhibit root growth.

Soil bulk density (SBD) is the mass of soil per unit volume and is often used as a measure of compaction (ISA 2014, p.149). At bulk densities of approximately 1.6g/cm3 soils are regarded as limiting to root penetration (Roberts et al.2006, p.19).

The repeated transit of vehicles in the informal car parks is likely to have compacted the soil to a bulk density that is limiting to root penetration.

With reference to AS 4970-2009 - *Protection of Trees on Development Sites, 3.3.4 TPZ encroachment considerations, (g) The presence of existing or past structures or obstacles affecting root growth*; the level of compaction of the existing gravel driveway is considered to be an obstacle to root growth.

The encroachment, whilst *major*, does not extend into the SRZ. It is not expected that there will be a high density of water-absorbing, or structural roots within the encroachment area.

However, given the extent of the encroachment and that *Pinus radiata* can have shallow root systems, a Non-Destructive Dig (NDD) should be conducted to investigate the extent of the root system present in the encroachment area.

The results of the NDD should determine the viability of tree #3 to withstand the encroachment from the proposed design.

Recommendations

- Undertake an NDD and root mapping for tree #3 to assess the extent of the roots within the encroachment area.
- Commission a *tree protection management plan* for trees to be retained prior to commencement of works, inclusive of additional tree #247 260.
- Fauna impact mitigation services will be required for trees requiring removal.



Appendices

Arboricultural Impact Assessment Reporting Guidelines Flowchart





Tree Assessment Descriptors

Origin	
Indigenous	The species is characteristic of the current extent or pre-1750 ecological vegetation class (EVC) mapping for the assessment area. The species is native to Victoria and occurs naturally in this location.
Native	The species is native to the state of Victoria.
Australian	The species is native to Australia but does not occur naturally within Victoria.
Exotic	The species does not naturally occur within Australia.

Health	
Good	The tree displays 71-100% live canopy mass and has near-optimal foliage characteristics in size, colour and density.
	The tree may have deadwood in the interior canopy.
	The tree may exhibit a low level of pest/pathogen infestation.
	It is expected that the tree will maintain its condition of health without intervention.
Fair	The tree displays 51-70% live canopy mass, and the foliage may be stunted or partly discoloured.
	The tree may display some dieback of the peripheral canopy.
	The tree may exhibit a medium-level pest/pathogen infestation.
	With intervention, it is expected that the tree will improve its condition of health
Poor	The tree displays < 50% live canopy mass and the foliage is completely discoloured, dying or both.
	The tree has extensive dieback of the peripheral canopy.
	The tree has extensive pest/pathogen infestation.
	The tree is unlikely to improve its condition of health even with intervention.
Dead	The tree has no live vascular tissue.



Structure	
Good	Tree has well-formed unions.
	there are no signs of decay in either the trunk and/or 1 st order branches.
	The tree has good trunk and 1 st order branch taper and is displaying pronounced reactive wood growth, indicating it has adapted to its location
	tree may exhibit structural defects on either the 2 nd or 3 rd order branches or both.
	Structural defects can be remediated by pruning as per AS 4373-2007 Pruning of Amenity Trees
Fair	The tree may have included bark between unions but is not showing signs of cracking or splitting.
	The tree may have signs of decay in either the trunk, the 1 st order branches or both
	The tree may have a suboptimal taper in either the trunk, 1 st order branches or both and is displaying some reactive wood growth, indicating it has not fully adapted to its location.
	Structural defects can be mitigated but not remediated by pruning as per AS 4373-2007 Pruning of Amenity Trees.
Poor	The tree may have extensive included bark, is showing signs of splitting and/or there is decay in the unions
	There is evidence of extensive decay in either the trunk, the 1 st order branches or both
	The tree has a poor taper in the trunk, and 1 st order branches or both, indicating either exposure to new conditions or a poor condition of health and that the tree does not have the resources to allocate to reactive wood growth
	Structural defects cannot be mitigated by pruning as per <i>AS 4373- 2007</i> <i>Pruning of Amenity Trees</i>



Visual Amenity Val	ue
High	The tree is large (more than 12 m in height).
	The tree is easily visible from the outside of the subject site.
	The tree makes a significant aesthetic contribution to the subject site as well as the broader landscape.
Medium	The tree is medium-sized (8m to 12 m in height)
	The tree is partly visible from the outside of the subject site.
	The tree makes some aesthetic contribution to the subject site as well as the broader landscape.
Low	The tree is small (Less than 8m in height)
	The tree makes a minimal aesthetic contribution to the subject or the broader landscape.

Useful Life Expecta	ancy
>10 years	The tree has <i>good</i> health and <i>good</i> structure and is expected to maintain its condition of health and structure without intervention for greater than ten (10) years.
>3 and <10 years	The tree has <i>fair</i> to <i>good</i> health and <i>fair</i> to <i>good</i> structure and is expected to maintain its condition of health and structure without intervention for more than three (3) years. Without intervention, the tree is expected to decline in health, structure or both within ten (10) years.
<3 years	Tree has either <i>poor</i> health or <i>poor</i> structure, or both Without intervention, the tree is expected to decline in health, structure or both within three (3) years.



Arboricultural Retention Value

Arboricultural retention values are based on the trees' health, structure and visual amenity value (matrix below). Biodiversity, habitat and heritage values are not included in determining the arboricultural retention value, where relevant these are addressed in the *Preliminary Tree Assessment Discussion*.

Arboricultural Retention Value Matrix

Health	Good +2	Good +2	Good +2	Fair +1	Fair +1	Fair +1	Poor -1	Poor -1	Poor -1
Structure	Good +2	Fair +1	Poor -1	Good +2	Fair +1	Poor -1	Good +2	Fair +1	Poor -1

Combined									
Health and	4	3	1	3	2	0	1	0	0
Structure Score									

Visual Amenity Value Score High +2	Medium +1	Low +0
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Total Score	Arboricultural Retention Value	
5 to 6	High	
3 to 4	Medium	
0 to 2	Low	









Tree protection zone (TPZ)	In accordance with AS 4970-2009 Protection of Trees on Development Sites, the trunk diameter measured at 1.4 m above ground level is used to calculate the tree protection zone (TPZ).
	The TPZ is a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's root and crown.

Structural root zone (SRZ)	In accordance with AS 4970-2009 Protection of Trees on Development Sites, the SRZ is calculated from the diameter of the trunk above the root buttress. The SRZ is the area required for tree stability. This is the area where structural woody roots are likely to occur.

Major encroachment	The proposed encroachment is more than 10% of the TPZ area, inside SRZ or both.

Minor encroachment	The proposed encroachment is less than 10% of the TPZ area and outside the SRZ.
Epicormic shoot	Regrowth shoots which are produced from latent buds and are commonly less strongly attached than original branches.
Bark inclusion	Inwardly turned bark within the union of branches or codominant (twin) trunks. In some circumstances, included bark can reduce the structural integrity of a branch or trunk union.



Expertise to Provide Consultancy Services

I have over twenty (20) years of experience in arboricultural and ecological industries, including over sixteen (16) years of consultancy.

I have training and experience in the collection of biological samples and data for scientific research. I have co-authored papers published in peer-reviewed scientific journals.

My qualifications, experience and expertise are in the fields of arboriculture, planning and wildlife biology, which ensures that I am qualified to make informed independent assessments of issues pertaining to the management of vegetation and associated fauna.

Yours Sincerely



Director and Principal Consultant

References

Standards Australia, AS 4970-2009 Protection of Trees on Development Sites, SAI Global.

Roberts, J., Jackson, N. & Smith, M. (2006) Tree Roots in the Built Environment, The Stationery Office, Department of Communities and Local Government, UK.

International Society of Arboriculture (2015) Glossary of Arboricultural Terms.

Standards Australia, AS 4970-2009 Protection of Trees on Development Sites, SAI Global.



Tree ID:	247
Botanical Name:	Corymbia maculata
Common Name:	Spotted Gum
Origin:	Australian
Height (m):	20
Width (m):	8
DBH (cm)	45
Diameter at base (cm):	55
Health:	Good
Structure:	Good
ULE:	>10 years
Visual Amenity Value:	Medium
Retention Value:	High - 3rd Party
TPZ Radius (m):	5.40
SRZ Radius (m):	2.57
Comments:	





Tree ID:	248	
Botanical Name:	Acacia melanoxylon	
Common Name:	Blackwood	
Origin:	Indigenous	
Height (m):	13	New Street
Width (m):	6	
DBH (cm)	30	
Diameter at base (cm):	40	
Health:	Poor	
Structure:	Fair	Carlin .
ULE:	<3 years	1 - (3)
Visual Amenity Value:	Low	
Retention Value:	High - 3rd Party	and the second sec
TPZ Radius (m):	3.60	
SRZ Radius (m):	2.25	
Comments:		

Tree ID:	249
Botanical Name:	Pittosporum tennuifolium
Common Name:	James Stirling
Origin:	Exotic
Height (m):	6
Width (m):	15
DBH (cm)	8
Diameter at base (cm):	20
Health:	Good
Structure:	Good
ULE:	>10 years
Visual Amenity Value:	Medium
Retention Value:	High - 3rd Party
TPZ Radius (m):	2.00
SRZ Radius (m):	1.68
Comments:	Hedgerow of 12 trees



Tree ID:	250
Botanical Name:	Acacia melanoxylon
Common Name:	Blackwood
Origin:	Indigenous
Height (m):	8
Width (m):	5
DBH (cm)	20
Diameter at base (cm):	35
Health:	Good
Structure:	Fair
ULE:	>3 - <10 years
Visual Amenity Value:	Medium
Retention Value:	High - 3rd Party
TPZ Radius (m):	2.40
SRZ Radius (m):	2.13
Comments:	





Tree ID:	251	
Botanical Name:	Allocasuraina littoralis	
Common Name:	Black Sheoak	
Origin:	Victorian	
Height (m):	17	
Width (m):	6	
DBH (cm)	25	
Diameter at base (cm):	40	
Health:	Good	
Structure:	Good	Rept (2) III IN MARKANNE CONTRACTOR
ULE:	>10 years	
Visual Amenity Value:	High	
Retention Value:	High - 3rd Party	
TPZ Radius (m):	3.00	
SRZ Radius (m):	2.25	
Comments:		

Tree ID:	252
Botanical Name:	Syzygium smithii
Common Name:	Lilly Pilly
Origin:	Australian
Height (m):	4
Width (m):	20
DBH (cm)	6
Diameter at base (cm):	15
Health:	Good
Structure:	Good
ULE:	>10 years
Visual Amenity Value:	Low
Retention Value:	High - 3rd Party
TPZ Radius (m):	2.00
SRZ Radius (m):	1.49
Comments:	Hedgerow of 17 trees



Tree ID:	253
Botanical Name:	Fraxinus angustifolia
Common Name:	Desert Ash
Origin:	Exotic
Height (m):	12
Width (m):	9
DBH (cm)	32
Diameter at base (cm):	48
Health:	Good
Structure:	Good
ULE:	>10 years
Visual Amenity Value:	Medium
Retention Value:	High - 3rd Party
TPZ Radius (m):	3.84
SRZ Radius (m):	2.43
Comments:	





Tree ID:	254	
Botanical Name:	Pittosporum tennuifolium	
Common Name:	James Stirling	
Origin:	Exotic	
Height (m):	7	
Width (m):	15	
DBH (cm)	8	The second s
Diameter at base (cm):	16	
Health:	Good	Later the second
Structure:	Fair	
ULE:	>10 years	
Visual Amenity Value:	Medium	
Retention Value:	High - 3rd Party	
TPZ Radius (m):	2.00	
SRZ Radius (m):	1.53	
Comments:	Hedgerow of 8 trees	

Tree ID:	255
Botanical Name:	Fraxinus angustifolia
Common Name:	Desert Ash
Origin:	Exotic
Height (m):	13
Width (m):	10
DBH (cm)	45
Diameter at base (cm):	60
Health:	Good
Structure:	Fair
ULE:	>10 years
Visual Amenity Value:	High
Retention Value:	High - 3rd Party
TPZ Radius (m):	5.40
SRZ Radius (m):	2.67
Comments:	



Tree ID:	256
Botanical Name:	Eucalyptus botryoides
Common Name:	Southern Mahogany
Origin:	Victorian
Height (m):	24
Width (m):	14
DBH (cm)	65
Diameter at base (cm):	85
Health:	Good
Structure:	Good
ULE:	>10 years
Visual Amenity Value:	High
Retention Value:	High - 3rd Party
TPZ Radius (m):	7.80
SRZ Radius (m):	3.09
Comments:	





Tree ID:	257	
Botanical Name:	Prunus americana	
Common Name:	Wild Plum	
Origin:	Exotic	
Height (m):	4	
Width (m):	3	And the second
DBH (cm)	8	
Diameter at base (cm):	15	
Health:	Good	
Structure:	Good	
ULE:	>3 - <10 years	and the second second
Visual Amenity Value:	Low	
Retention Value:	High - 3rd Party	
TPZ Radius (m):	2.00	
SRZ Radius (m):	1.49	
Comments:		

Tree ID:	258
Botanical Name:	Eucalyptus melliodora
Common Name:	Yellow Box
Origin:	Victorian
Height (m):	14
Width (m):	8
DBH (cm)	35
Diameter at base (cm):	50
Health:	Fair
Structure:	Fair
ULE:	>3 - <10 years
Visual Amenity Value:	Medium
Retention Value:	High - 3rd Party
TPZ Radius (m):	4.20
SRZ Radius (m):	2.47
Comments:	









Tree ID:	260	
Botanical Name:	Eucalyptus melliodora	
Common Name:	Yellow Box	
Origin:	Victorian	
Height (m):	14	
Width (m):	6	
DBH (cm)	35	Mar King Val
Diameter at base (cm):	50	
Health:	Fair	
Structure:	Fair	
ULE:	>3 - <10 years	A JUNEAU A
Visual Amenity Value:	Medium	
Retention Value:	High - 3rd Party	
TPZ Radius (m):	4.20	
SRZ Radius (m):	2.47	
Comments:		