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REPORT 10768.92023

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Addendum 1 to Arboricultural Inspection Report Buchan Caves Reserve, North Arm Tree Inspection Survey, 2023 Impact Analysis of Proposed Buildings on Trees

Brief

Parks Victoria have requested that Arboriculture Pty Ltd carry out an impact analysis of proposed accommodation buildings and a kitchen and amenities building on existing trees included in the 2023 tree survey within the North Arm area of Buchan Caves reserve.

Analysis and report

A desktop analysis of probable impacts of proposed buildings was carried out using guidance provided in AS4970-2009 *Protection of Trees on Development Sites*.

Plans provided by Plico Design Studio (14/5/2024, Drawing A101, Proposed Site Plan), show the proposed building footprints with trees and elevation contours. The plans were provided in CAD (dwg) and pdf formats without geospatial coordinate systems. The plans show only the footprints and dimensions of the buildings and not any services or excavations required and as such only the footprints of the buildings is taken into account in the analysis.

The plans were imported into a GIS (geographical information system) system and aligned with known features from accurate geospatial surveys provided by Parks Victoria previously. The final building footprint alignments were matched to the contours in the plans provided as the tree symbols appeared to be representative only and not accurately placed. To aid future spatial alignment accuracy two survey station marks with MGA20 zone 55 coordinates from a previously supplied feature survey[1] were included in the plans prepared for this report. The station marks were transformed from GDA94 55 marks shown in the original drawings. The marks presumably align with survey nails placed in concrete paths near the current amenities block although the existence of these has not been checked.

[1] SMEC Urban North Arm Detail Survey Feature Plan Drawing 34210068-00-001 Rev. A. Aug. 2011

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Under Australian Standard AS4970-2009 TPZ encroachments with an area of up to 10% of a tree's TPZ (tree protection zone) are considered *minor* encroachments provided they are outside the SRZ (structural root zone). TPZ encroachments of 10% or more are considered *major* encroachments.

For the impact analysis, the consultant arborist determines if the impact within the encroached area (e.g. depth of cut or fill, permeable or non-permeable surface, etc.) is likely to affect the tree's health or stability and to what degree. Desktop impact analysis can be further supported by fieldwork (e.g. non-destructive digging) to discover actual roots within the encroached TPZ area that would be damaged or destroyed.

In considering the impacts of proposed TPZ encroachments the arborist may take into account the presence of existing or past structures or obstacles affecting root growth. Tree roots are opportunistic and grow where conditions are conducive: roots do not proliferate in dry soils or soils with high bulk density which may be considered obstacles to root growth.

Summary of Impact Analysis

Two areas of interest were defined using 50m radius buffer zones from the buildings (one area surrounding 5 proposed accommodation units and another area at the southeast end of the North Arm surrounding the proposed kitchen and amenities building (See Plan 1 and Plan 2 below). The 50m buffer areas coincide with recommendations made in Clause 53.02 Bushfire Planning (Victorian Planning Scheme) and were chosen to assist in vegetation management decisions regarding bushfire management.

Trees from the 2023 tree inspection survey falling within the two project areas were included in this report addendum. Please see the Method section of the parent report for further information regarding the tree survey method.

Fifty-three (53) trees were included in the impact analysis: 33 exotic (non-Australian origin) trees, 19 Victorian native trees and 1 Australian native tree (originating from outside of Victoria).

Six (6) trees will have major encroachments and significant impacts to their root systems: 1 low retention, 4 medium retention and 1 high retention tree. None of these trees have been previously assessed as being impacted by the landscape works for the proposed swale or indicated for tree removal for arboricultural reasons independent of constructions (e.g. removal due to poor health or structure). The trees are: 2333, 2334, **2336**, 2337, 2338, 2339 (high retention value tree reference numbers underlined, Victorian native species in bold). See Table 1 below for tree details.

All other trees apart from tree 602, *Brachychiton populneus* (Kurrajong) will suffer minor or not encroachments or impacts from the buildings.

Tree 602 is a medium retention value Victorian native tree existing approximately 1m to the east of one of the proposed units. While the tree will most likely sustain major TPZ encroachment it could be protected and retained if desired if pruned back to allow clearance to the building but may possibly be too close to the building to meet the Clause 53.02 defendable space requirements.

Table 1 Trees within 50m buffer areas of proposed buildings, Buchan Caves Reserve, North Arm.

Tree #	*Species*	Origin	Retention	Arb Removal Recommed?	Impact Summary Swale	Impact Summary Buildings	Photo Reference
2304	*Quercus sp.*	Exotic	Medium	No	No impact	No impact	Photo 1
2305	*Juglans regia*	Exotic	Medium	No	Lost	No impact	Photo 2
2306	*Juglans regia*	Exotic	Medium	No	No impact	No impact	
2310	*Pinus halepensis*	Exotic	Medium	No	No impact	No impact	Photo 6
2314	*Liquidambar styraciflua*	Exotic	Medium	No	Lost	No impact	Photo 7
2315	*Fraxinus excelsior 'Aurea'*	Exotic	Medium	No	Lost	No impact	Photo 8
2316	*Acer sp. cv*	Exotic	Medium	No	Minor impact	No impact	Photo 9
2317	*Eucalyptus melliodora*	Vic Native	Medium	No	Lost	No impact	
2318	*Melicytus dentatus*	Vic Native	High	No	Minor impact	No impact	Photo 10
2319	*Hakea laurina*	Aus Native	Medium	No	Lost	No impact	
2320	*Eucalyptus melliodora*	Vic Native	Medium	No	Lost	No impact	Photo 11
2321	*Acer rubrum*	Exotic	Medium	No	No impact	No impact	Photo 12
2322	*Eucalyptus melliodora*	Vic Native	High	No	Moderate impact	No impact	Photo 13
2323	*Corymbia maculata*	Vic Native	Low	No	No impact	No impact	Photo 14
2324	*Callitris glaucophylla*	Vic Native	Medium	No	No impact	No impact	Photo 15
2325	*Chamaecyparis lawsoniana*	Exotic	Medium	No	No impact	No impact	Photo 16
2333	*Pinus sp.*	Exotic	Medium	No	No impact	Lost	Photo 17
2334	*Picea sitchensis*	Exotic	Medium	No	No impact	Lost	Photo 18
2335	*Eucalyptus melliodora*	Vic Native	Low	No	No impact	Minor impact	Photo 19
2336	*Eucalyptus melliodora*	Vic Native	Low	No	No impact	Lost	
2337	*Fraxinus 'Raywood'*	Exotic	High	No	No impact	Lost	Photo 20
2338	*Abies sp.*	Exotic	Medium	No	No impact	Lost	Photo 21
2339	*Brachychiton populneus*	Vic Native	Medium	No	No impact	Lost	Photo 22
2340	*Acacia caerulescens*	Vic Native	High	No	No impact	No impact	Photo 23
167	*Ulmus glabra 'Lutescens'*	Exotic	Very High	No	Minor impact	No impact	Photo 24
539	*Juglans regia*	Exotic	Medium	No	Lost	No impact	Photo 26
540	*Juglans regia*	Exotic	High	No	Moderate to high impact	No impact	
541	*Juglans regia*	Exotic	High	No	Lost	No impact	Photo 27

Tree #	*Species*	Origin	Retention	Arb Removal Recommed?	Impact Summary Swale	Impact Summary Buildings	Photo Reference
543	*Betula pendula*	Exotic	Medium	No	Lost	No impact	
544	*Betula pendula*	Exotic	Medium	No	Lost	No impact	
545	*Betula pendula*	Exotic	Medium	No	Lost	No impact	Photo 28
561	*Fraxinus angustifolia*	Exotic	Low	No	Lost	No impact	Photo 29
562	*Tilia x europea*	Exotic	High	No	Lost	No impact	
563	*Fraxinus 'Raywood'*	Exotic	High	No	Lost	No impact	Photo 30
565	*Fraxinus angustifolia*	Exotic	Medium	No	Lost	No impact	Photo 31
574	*Tilia x europea*	Exotic	High	No	Lost	No impact	Photo 32
575	*Tilia x europea*	Exotic	High	No	Lost	No impact	Photo 33
580	*Eucalyptus rubida*	Vic Native	Very High	No	No impact	Minor impact	Photo 34
581	*Brachychiton populneus*	Vic Native	Medium	No	No impact	Minor impact	Photo 35
594	*Eucalyptus viminalis*	Vic Native	Very High	No	Minor impact	No impact	Photo 36
595	*Quercus rubra*	Exotic	Medium	No	Lost	No impact	Photo 37
598	*Eucalyptus melliodora*	Vic Native	Medium	No	No impact	No impact	
599	*Eucalyptus melliodora*	Vic Native	Medium	No	No impact	No impact	
600	*Eucalyptus melliodora*	Vic Native	Medium	No	No impact	No impact	
601	*Allocasuarina littoralis*	Vic Native	Medium	No	No impact	Minor impact	
602	*Brachychiton populneus*	Vic Native	Medium	No	No impact	Impact tolerable	Photo 38
623	*Eucalyptus viminalis*	Vic Native	Very High	No	Minor impact	No impact	Photo 39
624	*Fraxinus angustifolia*	Exotic	Low	No	Lost	No impact	Photo 40
2307	*Fraxinus excelsior 'Aurea'*	Exotic	Low	Yes	No impact	No impact	Photo 3
2308	*Pinus halepensis*	Exotic	Low	Yes	No impact	No impact	Photo 4
2309	*Pinus halepensis*	Exotic	Low	Yes	No impact	No impact	Photo 5
538	*Gleditsia triacanthos* 'Sunburst'	Exotic	Low	Yes	Lost	No impact	Photo 25
564	*Populus nigra var. italica*	Exotic	Low	Yes	Lost	No impact	

Use of this report to aid identification of Clause 53.02 defendable space requirements

Clause 53.02 details the defendable space requirements required under the Bushfire Management Overlay. Some of these requirements are not feasible within the north arm but some can be utilised to provide bushfire protection on the adjacent slopes (subject to DELWP approval). These points are:

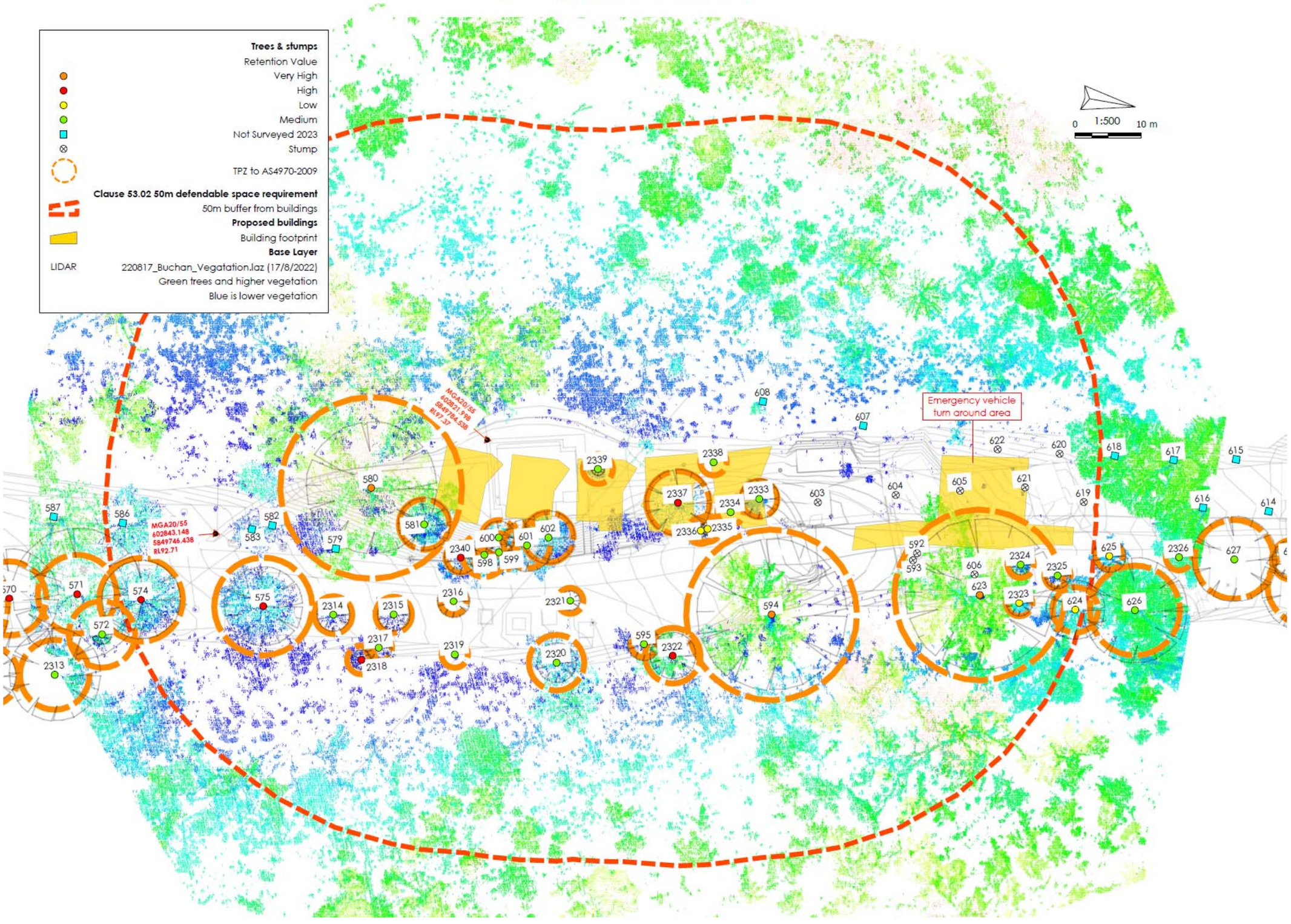
- Shrubs must not be located under the canopy of trees;
- Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres;
- Trees must not overhang or touch any elements of the building;
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

The above general requirements may change subject to review by the relevant authorities.

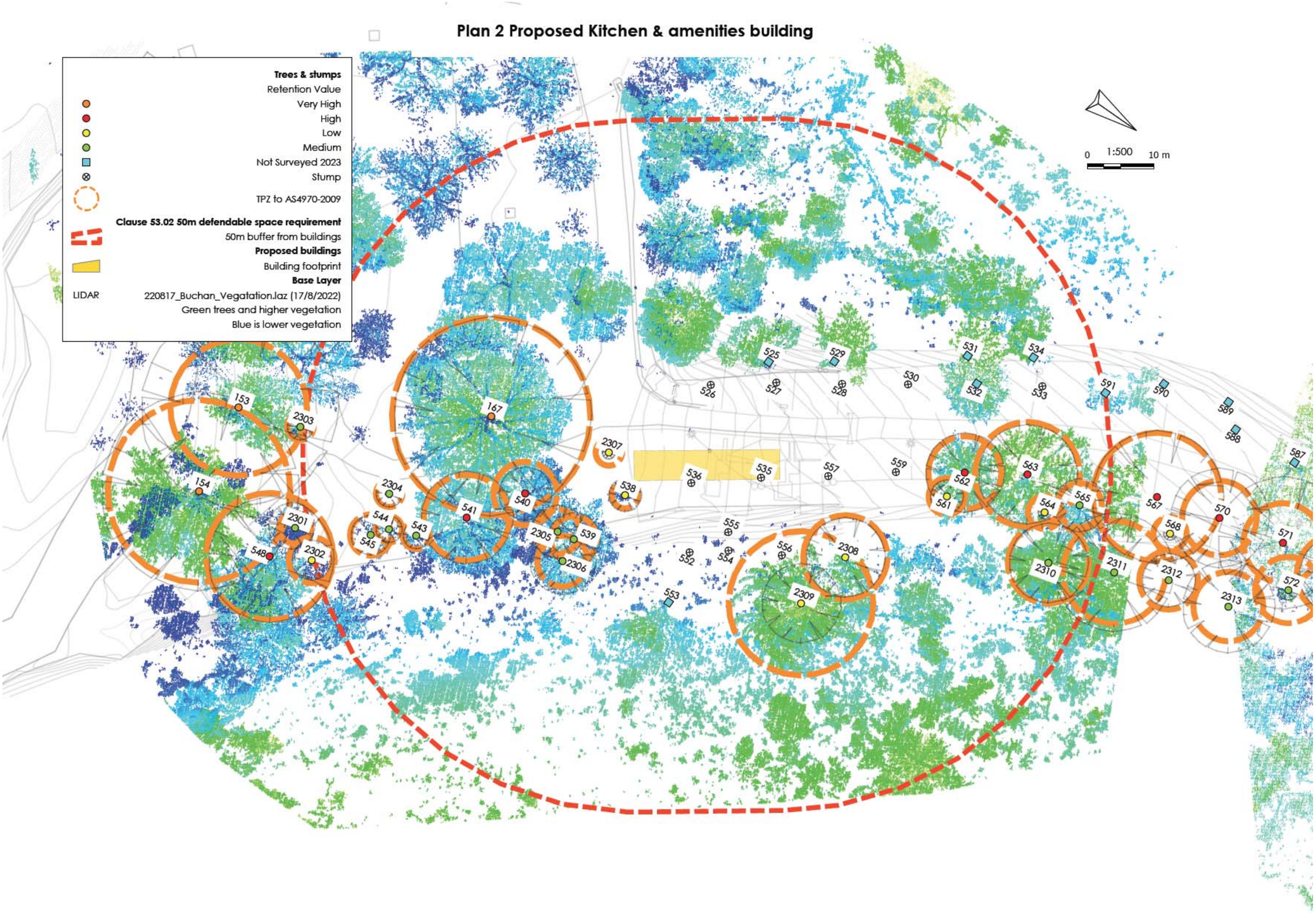
Plan 1 and 2 below includes a coloured point cloud overlay for vegetation based on a 2022 survey provided by Parks Victoria (220817_Buchan_Vegatation.laz). The coloured areas represent tree canopies and lower vegetation canopies surrounding and below the trees. The point cloud layer does not show ground layer vegetation (grasses, etc.) which were omitted for clarity of the tree and shrub vegetation layers.

The coloured point cloud layer can be used with the tree canopy layer and tree photos to help plan the extent of vegetation removal that may be required at least within the flatter valley area of the north arm. It is suggested that any final bushfire management plan use this information augmented by an on-site vegetation assessment.

Plan 1 Proposed Accomodation Units



Plan 2 Proposed Kitchen & amenities building



Tree Photos

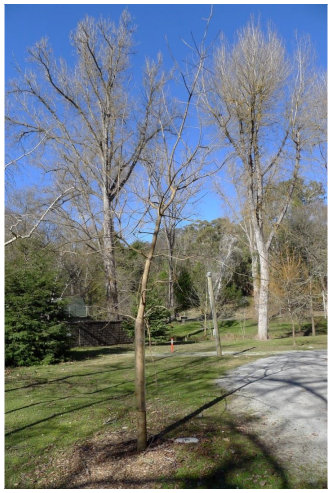


Photo 1 from north-west: Tree 2304

Photo 2 from west: Tree 2305 and 2306

Photo 3 from north-west: Tree 2307

Photo 4 from south-west: Tree 2308

Photo 5 from south-west: Tree 2309

Photo 6 from south-west: Tree 2310

Photo 7 from north-west: Tree 2314

Photo 8 from south-west: Tree 2315

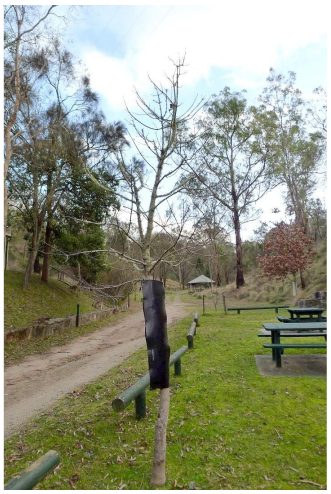


Photo 9 from south-east: Tree 2316

Photo 10 from south-west: Tree 2318

Photo 11 from south-west: Tree 2320

Photo 12 from south-east: Tree 2321

Photo 13 from west: Tree 2322

Photo 14 from west: Tree 2323 50 and 51, right to left

Photo 15 from north: Tree 2324

Photo 16 from west: Tree 2325

Photo 17 from north: Tree 2333

Photo 18 from north: Tree 2334

Photo 19 from north: Tree 2335 and 2336

Photo 20 from north-west: Tree 2337

Photo 21 from east: Tree 2338

Photo 22 from north: Tree 2339

Photo 23 from east: Tree 2340

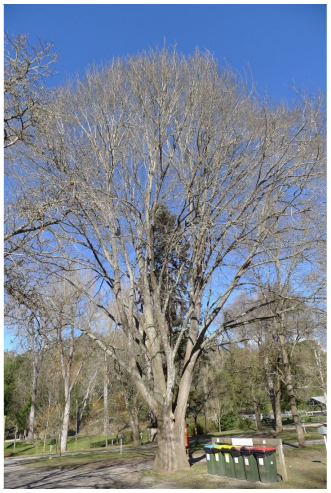


Photo 24 from north: Tree 167

Photo 25 from north-west: Tree 538

Photo 26 from north: Tree 539

Photo 27 from west: Tree 541 Background and 540 foreground

Photo 28 from north-west: Tree 545 Background, and 9 & 10

Photo 29 from south-west: Tree 561 Right and 562 left

Photo 30 from south-west: Tree 563 Left

Photo 31 from south-west: Tree 565

Photo 32 from south-west: Tree 574

Photo 33 from south-west: Tree 575

Photo 34 from north-west: Tree 580

Photo 35 from east: Tree 581

Photo 36 from south: Tree 594

Photo 37 from south-west: Tree 595

Photo 38 from north-east: Tree 602 to 598

Photo 39 from north-west: Tree 623

Photo 40 from south-west: Tree 624 left, 2323 taller tree right