GALBRAITH & Associates

Tree Consultants & Contractors

25/Oct/19

United Asia Group
C/o SJB Planning
Attn. Kate Foldi

Dear Kate,

re: 346-350 Macaulay Road, Kensington

Introduction
It is proposed to demolish the existing facility at 346-350 Macaulay Road, Kensington and construct an eight level multi apartment building. Eight Council street trees exist in the Macaulay Road and Stubbs Street footpaths opposite the site. Galbraith and Associates has been requested by SJB Planning to inspect and report on these trees and discuss the likely impact of the proposal on them.

The information provided includes a species description, data on trunk diameters at breast height, heights by spreads, condition, origin of the trees (whether exotic, Australian, Victorian, indigenous or weed) and tree protection zones (TPZs) and indicative structural root zones (SRZs), as per the relevant Australian Standard 4970:2009 'Protection of trees on development sites' approach.

Each tree is located and numbered on the accompanying extract of the existing site conditions survey on page 2 and described on page 3.

Methodology
All trees were visited on foot and assessed using Visual Tree Assessment (Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees* 'HMSO Publications'. Stem diameters were measured with a diameter tape. Heights were estimated by eye. Crown spread figures were obtained by pacing out the relevant distances. Photographs were taken with a digital camera. Tree Protection Zones (TPZs) and Indicative Structural Root Zones (SRZs) were calculated according to the Australian Standard 4970:2009 'Protection of trees on development sites'.

The following sources of information were used in the preparation of the report: TP00.02 Rev 2, TP00.03 Rev 1, TP01.01 Rev 14 – TP1.03 Rev 14, TP01.04 Rev 17, TP06.01 Rev 5, TP06.02 Rev 5 TP06.03 Rev 5 and TP07.01 by Hayball.

The inspection was undertaken on the 22/Oct/19.

TREE SURVEY

Tree No.	Species Indigenous (I) Victorian (V) Australian (A) Exotic (E) Weed (W)	DBH (cm)	HxS (m)	Comments, WOR, TPZ(m), SRZ(m)
1	Ulmus minor E Smooth –leaved Elm	72	20x20	Young mature vigorous healthy specimen. It is outgrowing its location as is evident by the damage the roots are causing to the kerb and channel, and the fact that the trunk is leaning over the kerb at beyond 2m height. The safe useful life expectancy is < 10 years, despite the good condition of the tree. TPZ 8.7m SRZ 3
2	Melaleuca linariifolia A Snow in Summer	41	7x6	Mature small tree in fair health. As is typical of the species, the trunk is very thick relative to the crown height and volume. The kerb is being damaged. The tree has little streetscape significance. TPZ 4.9 SRZ 2.3
3	Melia azedarach A White Cedar	14	5x5	Young small street tree in fair-good condition. Long SULE. TPZ 2 SRZ 1.5
4	Corymbia maculata V Spotted Gum	55	18x10	The tree has a prominent lean over Stubbs Street. Although healthy, it has become a traffic hazard, particularly trucks turning left into Stubbs Street from Macaulay Road. The trunk is being repeatedly bashed by trucks. SULE 0. TPZ 6.6 SRZ 2.7
5	Corymbia maculata V	60	18x13	Healthy young mature tree in good condition with a SULE of > 15 years. TPZ 7.2 SRZ 2.8
6	Melia azedarach A	24	6x6	Semi mature small tree in good condition. TPZ 2.9 SRZ 2
7	Melia azedarach A	29	6x6	As above. TPZ 3.5 SRZ 2.2
8	Melia azedarach A	7	3x2	Small misshapen stunted tree of little note. TPZ 2 SRZ 1.5

Impact of the Proposal

With respect to tree 1, it cannot be retained under the current plans. Although the basement is set back sufficiently to the existing building line, beneath which there will be little or no root development, the protruding slab of the ground floor demands at least 600mm excavation. Given that the trunk centre is 3.8m from the edge of the building, the excavation for the slab will be well inside the SRZ. As discussed, the tree`s SULE < 10 years, due to the very severe damage it will be causing to the kerb and channel by then, and the impedance over the road of the trafficable area, due to a combination of trunk girth increase and lean.

Tree 2 is at risk from the proposal. It is probable that significant root development is in the slightly elevated garden bed between the existing building and footpath opposite the tree. Roots in the garden bed will be lost for the protruding slab. Furthermore the location of the main pedestrian entry for the new building is likely to cause the tree to be regarded as being a nuisance, should it survive. I recommend that the tree be removed, given these plans. The tree is of relatively low significance and can be readily replaced.

Tree 3 can be readily retained.

Tree 4 cannot be retained, irrespective of whether there is any re-development of the site. It is a traffic hazard.

With respect to tree 5, it is highly likely the tree can be successfully retained under this proposal. Its successful retention depends on whether there is any significant root development beneath the existing retaining walls making up the planter on the street frontage. My expectation is that there is not because of the height and solid nature of the walls of the planter, suggesting deep robust footings acting as root barriers. Furthermore conditions for root development west of the planter look poor – consisting of concrete and further retaining walls. The existing footings of the planter could be retained under this proposal so as to minimise disturbance of the root zone. Substantial pruning back of the west side of the crown will be required for the proposed building, however although this will affect the aesthetics of the tree, it is unlikely to impact on the SULE.

In relation to tree 6, the main crossover from Stubbs Street into the building is proposed to be constructed close to it, with the point of the splay where it intersects with the kerb being only 1.2m from the trunk centre. The ability to successfully retain the tree under this proposal depends on whether there are major roots in the upper 30cm in this area where the splay is to be constructed. Thus one would have to say that this tree is at risk. If significant root loss does indeed occur during the construction of the crossover, an advanced replacement tree, whether a Spotted Gum or Melia as per the current species mix along Stubbs Street, could replace it. The change imparted with the removal of this tree relative to a new one should be imperceptible within 3 years.

Trees 7 and 8 can be readily retained under this proposal.

Tree 1

Damage to kerb and channel of tree 1 and encroachment of the trunk over the kerb, both problems which are likely to cause this tree to be untenable to be retained within 10 years as it keeps vigorously growing.

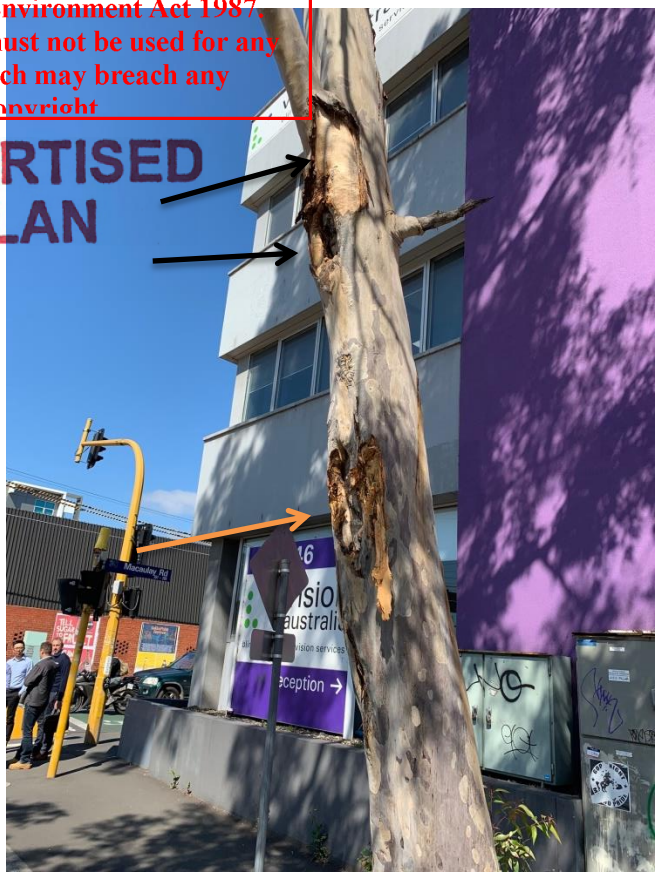
Tree 1, looking west – lean over the road is obvious.

View of structural damage and encroachment of the trunk over the kerb.

Tree 2

Trees 3-1 looking east to west.

Tree 4 has a prominent lean over Stubbs Street.



The arrows indicate where the trunk is repeatedly being impacted by passing trucks – untenable

Close up of the repeated trunk vehicular impact wounds on tree 4.

Tree 5

Trunk of tree 5

Significant root development is highly unlikely beneath the pedestrian concrete ramp opposite tree 5. Excavation to the left of the planter can take place without harming the tree.

Tree 6

Tree 7 Tree 8

Summary
It is probable that trees 3 and 5-8 can be successfully retained under this proposal.

Tree 6 is however at some risk due to excessive root loss from the construction of the proposed crossover.

Tree 5 is at low risk from significant root loss however some substantial pruning of the west side of the crown will be required. This will not impact on its SULE.

Trees 1, 2 and 4 will have to be removed. All three trees have limited SULEs, with tree 4 having an SULE of zero in my opinion.

Notes on terminology
In order to understand the column headings of the table of data, I have provided the following explanations:

DBH diameter of trunk over bark at breast height In a number of cases where the tree has forked into multiple trunks below breast height (1.3-1.5m) the diameter is measured below the fork and an estimate is made for the single trunk equivalent at breast height, or else figures for each of the individual stems can be given.

HxS This is the estimated height (H) of the tree and its average crown spread (S).

SULE Safe useful life expectancy in years. Taken in the context that the area is to be developed for residential use, and that sensible distances are maintained between the buildings and the trees, this is

the estimate of time that the tree will continue to provide useful amenity without imposing an onerous financial burden in order to maintain relative safety, and avoid excessive nuisance.

Condition This descriptor can be encapsulated by three terms, namely **Health (H), Structure (S) and Form (F).**

Health is largely governed by the ease in which the metabolic functions are occurring throughout the tree. Symptoms of health include the amount, distribution, density, size and colour of the foliage.

Structure refers to the structural stability of the tree and its branches. A well structured tree is not likely to shed branches or stems, or snap in the trunk or blow over, whereas a poorly structured tree is more likely to.

Form basically refers to the symmetry of the tree. A tree with a straight trunk and symmetrical crown and evenly distributed branches is referred to as having good form, whilst a lopsided leaning tree may have fair – poor form.

Tree Protection Zone (TPZ) According to the Australian Standard AS 4970-2009 'Protection of Trees on Building Sites', the TPZ is the principal means of protecting trees on development sites. It is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable.' The radius of the TPZ is calculated by multiplying the DBH by 12. The radius is measured from the centre of the stem at ground level. An area of 10% of the TPZ is deemed acceptable to violate if 10% of the *area* of the TPZ is made up in other directions. *Thus if encroachment is from one side only, encroachment to as close as approximately 8 times the DBH (2/3 the listed TPZ radius) is permissible according to the Standard.*

Where the tree has more than one trunk, the TPZ is deduced by taking the square root of the sum of the squares of each of the DBHs, and multiplying this figure by 12

The tree protection zones as calculated according to the AS 4970-2009 should be construed as a rough guide. They are only used in this statement because various local authorities now demand it in their assessments of development applications. Many factors such as the type of encroachment on the TPZ, species tolerance, age, tree height, presence of spiral grain, soil type, soil depth, tree lean, the existence of onsite structures or root directional impediments, level of wind exposure, irrigation and ongoing tree care and maintenance are each highly influential on the size and success of the TPZ estimation, therefore the figures derived from the Standard and provided in this report must be treated as rough guides only.

Structural Root Zone

According to the Aus Std. AS 4970:2009, this is the area of the root plate required for a tree`s stability. In order to calculate the indicative radius of such a zone from the trunk centre, according to the Aus Std., one uses the following formula: SRZ radius is $(D \times 50)^{0.42} \times 0.64$, where D is the trunk diameter in metres taken from just above the root buttress. The minimum indicative SRZ radius according to the Std. is 1.5m for any tree, irrespective of how small. A graph is also provided in the Aust Std, with a curve depicted relating the SRZ to trunk diameter. Unfortunately, the calculated figures do not match those derived from the graph. The Aust Std. does not mention from where this formula is taken although acknowledges the publication 'Mattheck, C. & Breloer, H. (1994) *The Body Language of Trees* HMSO Publications' in the preface and bibliography. The figures derived from the graph for the SRZs are far greater than those implied from the curve of 95% fit for the results from studies of upturned root plates of windblown and winched over trees (see Mattheck, C. & Breloer, H. (1994). Furthermore the figures derived from the graph for the SRZs are far greater than what one calculates them to be, using the formula provided by the Standard i.e. $(D \times 50)^{0.42} \times 0.64$. The calculated figures according to the Aust Std. are considerably greater for small and large trunks than those of Mattheck & Breloer.

In reality, the radii calculated for indicative SRZs are usually much larger than necessary, except in cases such as where the soils are very shallow or where the structural root development is unidirectional or highly asymmetric for some reason, and the excavation is to be within the zone of the roots. The structural stability generally depends far more on what proportion of the circumference of

the tree is to be excavated than the actual distance of excavation from a tree, and this is not taken into account quite often when using the SRZ.

Tree Origin Categories

Each tree has been classified as to whether it is indigenous (**I**), native to Victoria (**V**), native to Australia (**A**), exotic (**E**) or an environmental weed (**W**).

An indigenous species (**I**) is one that is known to grow naturally in the local area, even if the individual tree has been planted and is from a seed source or provenance foreign to the area.

A species classified **V** is one which has a part or all, even if very small, of its natural range within Victoria, although it may occur outside the state as well. It does not however occur naturally in the local area.

A species classified **A** is native elsewhere in Australia than Victoria. It does not occur naturally in the local area.

A species classified **E** has its natural range occurring outside Australia.

A species classified **W** is a seriously invasive environmental weed.

GALBRAITH & ASSOCIATES

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