ARBORICULTURAL IMPACT ASSESSMENT REPORT

Vines Drive Upgrade: Centre of Excellence

Address: Vines Drive, Richmond

Prepared for: Richard Crookes Constructions

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1.0 INTRODUCTION

1.1 Purpose of this Report

Sturt Noble Arboriculture was engaged by Richard Crookes Constructions to assess existing trees, prepare an Arboricultural Impact Assessment Report and Tree Protection Recommendations in relation to the proposed upgrade of Vines Drive at UWS Richmond.

The purpose of this report is to address the Secretary's Educational Assessment Requirements (SEARs) for the project, dated 19th March 2021. Specifically, to:

- Identify the number and location of existing trees on site
- Detail the size and percentage canopy density of each tree
- To assess and review the condition of existing trees by undertaking a Visual Tree Assessment
- Assess each individual tree's suitability to be retained as a sustainable part of the proposed landscape in the long term, considering the likely impacts of works proposed.
- Provide recommendations for tree removal, retention and protection
- Provide detailed justification for each tree to be removed or retained and protected
- Provide recommendations where appropriate to enable trees to be retained or have better long term health outcomes and minimize potentials for hazard.
- To provide information on appropriate tree protection measures, appropriate setbacks, constraints and tree management procedures during site works.

This report has been carried out as per the Methodology outlined in **Appendix 1**

1.2 Background

The preparation of this report has been prepared in awareness and consideration of the following standards, controls and guidelines:

- Hawkesbury City Council DCP 2013
- Australian Standard AS4970-2009 *Protection of Trees on Development Sites*
- Australian Standard AS4373-2007 *Pruning of Amenity Trees*
- Australian Standard AS2303-2015 *Tree Stock for Landscape Use*

It has also taken into consideration advice from the following reports:

- Arboricultural Impact Assessment Report prepared by Sturt Noble Revision E. 20/07/2021

1.3 The Proposal

This impact assessment has been prepared based on the following plans:

- Civil Road plans C10-P1, C31-P5, C32-P1, C33-P1 & C41-P1 prepared by TTW Engineers.

Refer to plans in **Appendix 2**

The proposed works to the site include:

- Demolition of existing roadway
- Construction of new roadway pavements, flush kerbs, subsoil drainage, roundabouts and associated batters.
- Installation of associated landscape.
- Nominated planting areas
- Associated works/ services.

1.4 Foreseeable Construction Impacts

Foreseeable impacts noted from the proposed development, construction type and anticipated methodology include:

- Excavations for new roadway pavements, flush kerbs, subsoil drainage, roundabouts and associated batters.
- Soil level changes including the placement of fill material for the roadways and batters to make up grades
- Laying impermeable paving to roadway pavements.
- Ripping or cultivation of soil for landscaped areas.
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Storage of site fill, building materials, waste and waste receptacles.

2.0 PLANNING CONTROLS

2.1 Council Consent

Hawkesbury City Council's DCP notes the following trees and vegetation are prescribed (protected):

- Any tree with a height greater than 4 metres, or a branch spread greater than 3m, or a trunk circumference greater than 500mm at 1m above ground level
- Native trees or vegetation on land zoned SP1 Special Activities
- Trees within 40m of a watercourse

Hawkesbury City Council's DCP notes the following matters for consideration. Is the tree or vegetation:

- Significant as a single specimen or as part of a group
- Of historic or cultural significance
- Registered on Council's Significant Tree Register
- Prominent due to its height, size, position or age
- Endemic, rare or threatened

Hawkesbury City Council's DCP notes the following shall not generally be considered as valid reasons to ringbark, cut down, top, lop, remove, injure, slash poison or wilfully destroy trees or vegetation:

- To construct a building when the structure could be relocated away from the tree or vegetation

Under these planning controls, the following should be noted:

- Crepe Myrtle Trees 25 – 27 & 39 (*Lagerstroemia indica*) are exempt from the TPO due to their low height and small DBH
- Both *Cinnamomum camphora* (Camphor Laurel) and *Acer Negundo* (Box Elder) are exempt species. However; we note these species form a large percentage of the Vine Drive entry road plantings and have a High landscape value and are Prominent due to their height, size, position or age

3.0 THE EXISTING SITE

3.1 The Site

The site is a large part of Vines Drive, at UWS Richmond between Londonerry Road and Resources Road where it meets Clydesdale Road. The road is currently sealed with no kerbs with Western Sydney University to all sides.

The road is flat with a fall to either side as a shallow grass embankment. The road is lined in a mix of well established, mature endemic and exotic trees.

3.2 Soils

The site soil is made up of heavy clays and clayey sands with some large boulders throughout. This type of soil is covers a wide area between the lower terraces of the Hawkesbury/Nepean River system and west of South Creek. The soil lies overs the Londonderry Clay formation and the landscape is generally flat terraces with some gently undulating low rises.

Most of the remnant natural vegetation that can be found on this soil type is located in the Castlereagh State Forest. There are some small areas of uncleared scrub located between small farms and quarries. This soil type has high erodibility and generally low fertility. It can be a flood hazard, become seasonally waterlogged or be a water erosion hazard.

3.3 The Trees

Forty -six (46) trees located within the area of investigation have been assessed for this Report. The trees consist of a mix of twenty (20) Australian native trees and twenty six (26) exotic trees. Refer to **Appendix 2** for tree locations

Each of the trees assessed has been allocated a Sustainable Retention Index Value (SRIV) that is based on their health, vigour, structure and age class. The SRIV does not take into account the impact of the proposed development.

Of the 46 trees; twenty five (25) are exempt from Hawkesbury City Council's Tree preservation order.

Five (5) Crepe Myrtle Trees 25 – 27 & 39 (*Lagerstroemia indica*) are exempt from the due to their low height and small DBH.

Eighteen (18) Camphor Laurel (*Cinnamomum camphora*) and two (2) Box Elder *(Acer Negundo)* are also exempt species.

However; as previously noted these species form a large percentage of the Vine Drive entry road plantings and have a High Landscape value.

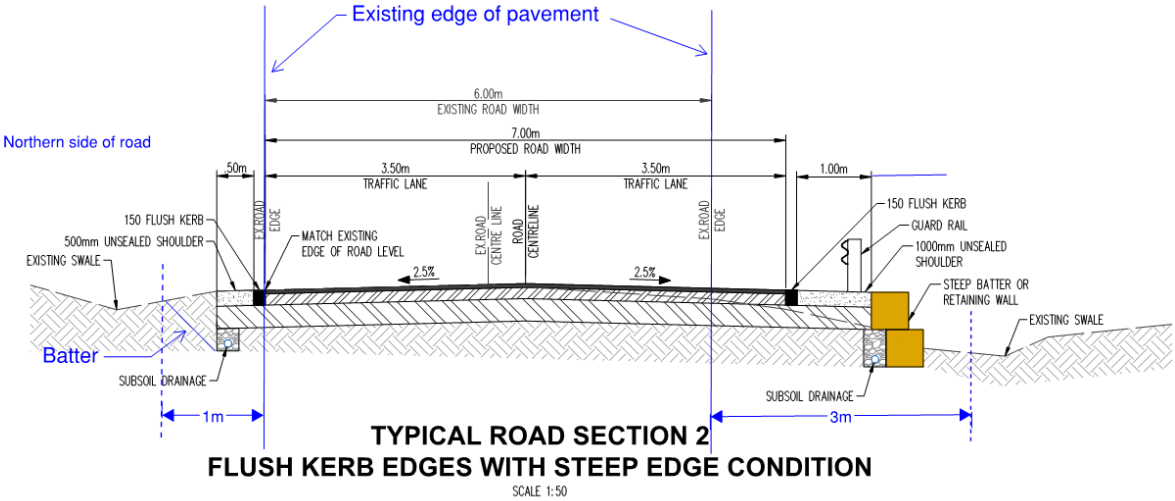
A complete and detailed tree assessment schedule was prepared and is included in **Appendix 3**.

4.0 ABORICULTURE IMPACT ASSESSMENT

4.1 Construction Assumptions

It is assumed for this report that excavation for the roadway will not extend greater than 1m from the northern side of the new road pavement and 3m from the south. For the purposed of the impact assessment this limit will be considered to be the extent of disturbance to the root zones including any service lines.

Further detail of site works are required particularly details of excavation extent of any proposed services (water, telecoms and electrical) and level changes particularly within the TPZ of any trees proposed for retention. This should be provided prior to construction so any additional impacts can be assessed.



4.2 Trees to be removed

The plans show that three trees (3) will need to be removed to accommodate the proposed road works. A further five (5) juvenile street trees can either be removed or transplanted.

Table 1: Trees to be removed or transplanted

Construction footprint critical to the following trees	Other (poor condition, other studies, etc)	Exempt species to be removed (exempt and can be removed/transplanted without consent)
36, 35,37 & 40		25,26,26A,27 & 39

Trees 36, 35,37 are endemic trees of High landscape significance. Trees 36, 37 are in fair condition with medium term retention potential. Tree 35 has a large wound and is in poor condition with short-term retention potential. All three trees are required to be removed to allow for the proposed development footprint as they have major encroachments to their TPZs (T35 -37.9%/ T37 - 44.3%, T36 over 60%) and encroachments on their SRZs.

The SSD should seek approval for the removal of Tree Nos. 35, 36, 37 & 40.

4.3 Trees to be retained

With implementation of the tree protection measures it should be possible to retain all other trees on the developed site. The plans show that thirty-eight (38) trees are proposed to be retained.

Table 2: Trees to be retained

Clear of all works	Minor Encroachment	Major Encroachment
43, 44 & 45	41 & 46	1-24,28-34, 42 & 47

It is evident that there are potentially major impacts to all trees to be retained. Although of these 47 trees; twenty trees (25) are exempt from Hawkesbury City Council's Tree preservation order; they all have high landscape value and contribute much to this major entry to the campus. For this assessment we have made the assumption that the UWS would assume retention and protection of these significant trees.

These exempt species are eighteen (18) Camphor Laurel (*Cinnamomum camphora*) and two (2) Box Elder *(Acer Negundo)*. We note that these are both species tolerant to encroachment and disturbance.

We also note that although the encroachments are major it is likely that the majority of these tree's roots will be situated in the lower ground which is permeable lawn areas and not under the raised asphalt roadway.

However; the degree of encroachment will also depend on the relative time frames of when the trees were established and the current roadway was constructed. Plus; the depth of the existing construction and whether the new road will involve significant deeper excavation to construct the new pavements, kerbs and most critically subsoil drainage.

Proposed road design and Construction of the roadway and associated infrastructure should consider the Tree Protection Zones as discussed in the following sections to minimise any adverse impact.

4.4 Works within Tree Protection Zones

With regard to encroachments on the 38 trees to be retained.

- Any disturbance to soils within TPZ's could destabilise the trees or impact on long term health.
- It is proposed non invasive exploratory trenching (Refer 5.10 Root investigation) is carried out as indicated on the plan to all significant native trees. These species are much less tolerant than the other exotic species and the Site arborist shall review any large roots uncovered (above 50mm in diameter) and provide advise on removal or mitigation by design changes. Where possible large roots should be retained.

The plan in **Appendix 2** indicates trees TPZ's and SRZ's and should be used to inform later design decisions and temporary tree protection fences.

4.5 Pruning works

In addition to Tree Protection Zones, the extent of the canopy (canopy dripline) should also be considered, particularly in relation to construction activities and along access points.

Significant pruning of trees to accommodate digging machinery is generally not acceptable. Trees may not be pruned by more than 10% without consent.

Branches should be temporarily pushed or tied where possible to minimise the amount of pruning works.

4.6 Ongoing management of trees to be retained

Ongoing monitoring and maintenance should be undertaken for the thirty-eight (38) trees identified to be retained and irrigation of impacted trees should be considered depending on rainfall patterns and time of year.

5.0 MITIGATION MEASURES

5.1 Tree Protection Measures

It is recommended that a site specific Tree Protection Plan (TPP) is prepared to guide the construction process to ensure all trees designated for retention remain as a sustainable part of the landscape in the long term.

The plan shall be prepared by a consulting arborist (AQF Level 5) and should at a minimum include a detailed plan of the locations of, and specifications for, tree protection measures.

The TPP shall include a monitoring schedule relating to critical points during the works (hold points) where the Project Arborist is required to visit the site and confirm that works are being undertaken as conditioned by Council/as required.

The following tree protection measures shall be implemented prior to the commencement of any site works, and shall remain in place for the duration of the development.

5.2 Tree Protection Zones

The Tree Protection Zones recommended for all trees within the site are to be retained and shall be equivalent to the Tree Protection Zone as specified in this report. This is a radial distance measured from the centre of the trunk of the subject trees.

The following activities are prohibited within the specified Tree Protection Zones without sign off by the Project Arborist:-

- Excavations, grading and trenching
- Ripping or cultivation of soil;
- Mechanical removal of vegetation;
- Soil disturbance or movement of natural rock;
- Soil level changes including the placement of fill.
- Movement and storage of plant, equipment & vehicles;
- Erection of site sheds;
- Affixing of signage or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

Where existing lawn will be disturbed by construction activities; place a 50-75mm layer of coarse organic mulch over the entire surface of the TPZ. Where the TPZ is adjacent to construction activities first lay down geotextile fabric beneath the mulch to facilitate easy removal of the mulch at completion and any accidental spillage of construction materials.

Install drip irrigation around the root zones if required by the Project Arborist.

5.3 Tree Protection Fencing

All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the full extent of the Tree Protection Zone (excluding the footprint of the proposed works and areas within adjoining properties).

As a minimum the fence should consist of temporary chain wire panels 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate.

Appropriate signage shall be installed on the fencing to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone.

Refer to **Appendix 4** for examples of protective fencing and signage.

5.4 Trunk, Branch & Ground Protection

Where provision of tree protection fencing is in impractical due to its proximity to the works zone, trunk protection shall be erected around the tree to avoid accidental damage. As a minimum, the trunk protection shall consist of two metre (2m) lengths of hardwood timbers (100 x 50mm) spaced at 100-150mm centres secured together with 2mm galvanised wire. These shall be strapped around the trunk (not fixed in any way) to avoid mechanical injury or damage. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period.

Proposed paved areas to the roadway within the Tree Protection Zone of trees to be retained ideally should be placed above grade to minimise excavations within the root zone and avoid root severance and damage.

Placement of fill material within the Tree Protection Zone of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent to provide some aeration to the root zone. Note that Roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

Refer to **Appendix 4** for examples of trunk, branch and ground protection.

5.5 Demolition Works within Tree Protection Zones

Where demolition of pavements is required within the Tree Protection Zones of trees to be retained it is to be carried out to avoid disturbance to existing soils, damage to existing roots or potential root growth.

Machinery shall work within the footprint of existing pavements where possible to avoid compaction of the adjacent soil and Tree Protection Zones.

When removing hard surfaces it shall be stripped-off in thick layers using a small rubber tracked excavator or alternative approved method to avoid damage to underlying roots and minimise soil disturbance. The final layer of sub-base material shall be removed using hand tools where required to avoid compaction of the underlying soil profile and damage to woody roots.

If any concentrations of roots or roots with diameters equal to or greater than 50mm are encountered they must be retained in an undamaged condition for assessment by the Project Arborist. If the Project Arborist deems surrounding underground elements such as footing and pipes are providing support, these elements shall be left in-situ.

5.6 Excavations within Tree Protection Zones

The excavator shall work within the footprint of existing pavements where possible to avoid compaction of the adjacent soil and Tree Protection Zones.

5.7 Underground Services

All proposed underground services should be located as far away as practicable from existing trees to be retained to avoid excavation within the Tree Protection Zone.

For underground services, where the incursion to the Root Zone is less than 10% of the total TPZ (i.e. beyond the Minimum Setback Distance), a chain trenching device may be used. A backhoe or skid steer loader (bobcat) is unacceptable due to the potential for excessive compaction and root damage. Where large woody roots (greater than 50mm in diameter) are encountered during excavation or trenching, these shall be retained intact wherever possible (eg by sub-surface boring beneath roots or re-routing the service etc).

Excavations required for underground services within the Structural Root Zone of any tree to be retained should only be undertaken by sub-surface boring. The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified at a minimum depth of 600mm. This will depend on the soil conditions at the site. Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by the Project Arborist to determine continued health and stability of the subject tree.

Further detail of site services is required prior to construction so any additional impacts can be assessed.

5.8 Grading and Level Changes

Further detail of level changes, particularly within the TPZ of any trees proposed for retention is required prior to construction so any additional impacts can be assessed.

5.9 Canopy pruning

Care shall be taken when operating backhoes, excavators and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Project Arborist must be sought.

All pruning works shall be directed by the Project Arborist and shall be carried out by an AQF Level 3 Arborist. All pruning works shall be in accordance with the Australian Standard *(AS) 4373:2007 Pruning of amenity trees.* This standard outlines appropriate pruning practices and procedures that reduce the risk of damage and injury to trees. Correct pruning practices respect the natural form and branching habit of a tree and work with the trees natural defence mechanisms against disease to avoid damage and injury to trees.

Pruning should always be limited to the minimum amount necessary to achieve the desired aim. Significant loss of foliage created by excessive pruning may weaken the tree, leading to premature decline or predisposition to branch failure or disease, creating potential hazards.

Council consent will be required prior to commencement of the work. Pruning must be performed in accordance with *Australian Standard (AS) 4373:2007 Pruning of amenity trees* (Standards Australia 2007).

5.10 Root Investigation

Exploratory excavation may be required where the proposed excavation created by the development works exceeds 10% of the Tree Protection Zone of any Prescribed Tree; or service trenches are required within the TPZ; to determine the impact of the development on the tree. The purpose of the investigation is to verify the quantity, size, type, depth and orientation of tree roots along the perimeter of the proposed encroachment in order to make an informed judgement in relation to the potential impact on the tree.

Exploratory excavation shall only be carried out using non-destructive or non-injurious techniques, such as careful digging using hand held implements, using compressed air (Airspade®), water pressure, or suction (vacuum device) or a combination of these techniques, to carefully remove soil without damaging roots. The work shall be undertaken by an arborist with a minimum qualification of AQF Level 3. Once roots are exposed, a visual examination can be carried out with the Project Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree.

The results of the root investigation together with the Development Impact Assessment must be documented in the report and submitted together with the DA. The report shall contain information that demonstrates that the trees will remain viable in conjunction with the works.

5.11 Root Pruning

Where root pruning is required, roots shall be severed with sterile, clean, sharp pruning implements resulting in a clean cut. Any excavated root zones shall be retained in a moist condition during the construction phase using Hessian material or mulch where

practical. Trees that have roots removed shall have drip irrigation installed around the root zone to ensure they receive an adequate supply of water.

5.12 Tree Damage/ Decline

If trees show signs of stress or deterioration, remedial action shall be taken to improve the health and vigour of the subject tree(s) in accordance with best practice arboricultural principles. Advice must be sought from the Project Arborist.

In the event of any tree becoming damaged for any reason during the construction period the Project Arborist must be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

6.0 CONCLUSION

Forty-seven (47) trees have been considered on the site as part of this assessment and their locations are shown in **Appendix 1**. The trees consist of a mix of twelve (21) Australian native trees and twenty six (26) exotic trees. Refer to **Appendix 2** for tree locations.

Of the 47 trees; twenty five (25) are exempt from Hawkesbury City Council's Tree preservation order. Five (5) Crepe Myrtle Trees 25 – 27 & 39 (Lagerstroemia indica) are exempt from the due to their low height and small DBH. Eighteen (18) Camphor Laurel (*Cinnamomum camphora*) and two (2) Box Elder (*Acer Negundo*) are also exempt species.

However; these exempt species form a large percentage of the Vine Drive entry road plantings and have a High landscape value.

The proposed works to the site include demolition of the existing roadway and construction of new roadway pavements, flush kerbs, subsoil drainage, roundabouts and associated batters along Vines Drive, at UWS Richmond. This upgraded section is between Londonerry Road and Resources Road where it meets Clydesdale Road. The road is currently sealed with no kerbs with Western Sydney University to all sides.

The plans show that four trees (4) will need to be removed to accommodate the proposed development. A further five (5) juvenile street trees can either be removed or transplanted.

Table 1: Trees to be removed

Construction footprint critical to the following trees	Other (poor condition, other studies, etc)	Exempt species to be removed (exempt and can be removed/transplanted without consent)
36, 35, 37, 40		25, 26, 26A, 27 & 39

Trees 36, 35, 37 & 40 are endemic trees of High landscape significance. Trees 36, 37 are in fair condition with medium term retention potential. Tree 35 has a large wound and is in poor condition with short-term retention potential. All three trees are required to be removed to allow for the proposed development footprint as they have major encroachments to their TPZs (T35 -37.9%/ T37 - 44.3%, T36 over 60%, T40 – 22%) and encroachments on their SRZ.

With implementation of the tree protection/mitigation measures set out in Section 5 of this report, it should be possible to retain all other trees on the developed site. The plans show that forty-seven (47) trees are proposed to be retained.

Trees on site that are to be retained as part of the approved development must be protected from potential damage caused by construction activities. Refer to Section 5.0 for tree protection recommendations/mitigation measures.

It is evident that there are potentially major impacts to all trees to be retained. Although of these 47 trees; twenty trees (25) are exempt from Hawkesbury City Council's Tree preservation order; they all have high landscape value and we contribute much to this

major entry to the campus. For this assessment we have made the assumption that the UWS would assume retention and protection of these significant trees.

It is proposed non invasive exploratory trenching (Refer 5.10 Root investigation) is carried out as indicated on the plan to all significant native trees. These species are much less tolerant than the other exotic species and the Site arborist shall review any large roots uncovered (above 50mm in diameter) and provide advise on removal or mitigation by design changes. Where possible large roots should be retained.

Ongoing monitoring and maintenance should be undertaken especially for native trees and irrigation of impacted trees should be considered depending on rainfall patterns and time of year.

Where recommended work processes and tree protection measures cannot be adhered to further advice should be sought from the Project Arborist.

7.0 DISCLAIMER

The author and Sturt Noble Arboricultural Consulting take no responsibility for actions taken and their consequences, contrary to those expert and professional instructions given as recommendations.

This is not a hazard assessment report and it should be noted that trees are always inherently dangerous. This assessment was carried out from the ground, and covers what was reasonably able to be assessed and available to the assessor at the time of inspection. No aerial or subterranean inspections were carried out and structural weakness may exist within roots, trunk or branches.

Any protection or preservation methods recommended are not a guarantee of tree survival or safety but are designed to improve vigour and reduce risk. Timely inspections and reports are necessary to monitor the trees' condition. No responsibility is accepted for damage or injury caused by the trees and no responsibility is accepted if the recommendations in this report are not followed.

Limitations on the use of this report: Trees are dynamic living structures, growing and adapting to conditions around them. Tree condition will change and vary over time depending on weather, environmental factors and mechanical or human interaction.

This report is to be utilised in its entirety only. Any written or verbal submission, report or presentation that includes statements taken from the findings, discussions, conclusions or recommendations made in this report, may only be used where the whole of the original report (or a copy) is referenced in, and directly attached to that submission, report or presentation.

Assumptions: Care has been taken to obtain information from reliable resources. All data have been verified insofar as possible; however, Sturt Noble Arboricultural Consulting can neither guarantee nor be responsible for the accuracy of information provided by others.

Unless stated otherwise: Information contained in this report covers only the trees that were examined and reflects the condition of the trees at the time of inspection.

Assessment is limited to the conditions at the time of the inspection and only trees discussed in the report have been assessed.

Where access to the base of the tree is limited, such as difficult site access due to site conditions, only general comments can be made. Assessment of tree health and structure is limited to that visible from the site of proposed works and may not reflect the true condition of the tree. Assessment of tree health and structure is limited to that visible from the site of proposed works and may not reflect the true condition of the tree.

Plans used to assess likely impact are those appended/ referenced.

Ongoing monitoring of all trees is advised and where significant changes are observed, further advice should be requested. Unusual developments or sudden changes in a tree's condition should be addressed immediately.

8.0 REFERENCES

Chapman, G. A & Murphy, C. L, 1989 Soil landscapes of the Sydney 1:100,000 sheet (9130) Pub. NSW Govt.

Draper, D.B and Richards, P.A (2009) Dictionary for managing Trees in Urban Environments, (IACA) Institute of Australian Consulting Arboriculturists ©. Pub. CSIRO Publishing, Melbourne.

IACA, 2010, Sustainable Retention Index Value Matrix (SRIV) Version 4, A visual method of objectively rating the viability of urban trees for development sites and management, based on general tree and landscape assessment criteria, Institute of Australian Consulting Arborculturists, Australia, www.iaca.org.au.

Googlemaps ©. Viewed 15th October 2021

Standards Australia (2007) Australian Standard AS4373-2007 *Pruning of Amenity Trees,* Pub. Standards Australia, Sydney.

Standards Australia (2009) Australian Standard AS4970-2009 *Protection of Trees on Development Sites*, Pub. Standards Australia, Sydney.

Sturt Noble Arboriculture (2021) Arboricultural Impact Assessment Report. Revision E.

APPENDIX 1: METHODOLOGY

A1.1 Site Inspection

This report, its comments and recommendations have been prepared based on the information gathered during a detailed site inspection carried out on the on the 10th March 2021. This assessment is summarised in **Appendix 1**.

A1.2 Tree Locations

The location of the subject trees are based on the site survey, 79528_REV-A, 11/02/2021. Additional trees found on site that are not represented on the survey, have been shown in approximate locations only.

A1.3 Visual Tree Assessment

The trees were assessed from the ground by the Visual Tree Assessment (VTA) method as described in Mattheck & Breloer (1994), using non-invasive tools such as binoculars and acoustic mallet. No digging or exposing of the root zones occurred in this inspection and no aerial inspection by climbing was performed. No aerial inspection or diagnostic testing was undertaken as part of this assessment.

The following data was collected for each tree:

- Botanical and common name.
- Tree dimensions (approximate only).
- Canopy density (approximate only).
- Overall health and vitality, including epicormic growth, deadwood and predation by pests and diseases.
- Structural condition including evident faults such as Bark Inclusions or poor branch attachments, decay, cavities and mechanical or biological damage.
- Stability of the tree including excessive trunk lean, stability of the soil, soil cracking, soil heaving, exposed roots and root damage.

A1.4 Retention Value

Each tree has been given a Sustainable Retention Index Value (SRIV) according to the rating system set out in the Sustainable Retention Index Value Matrix (refer to the table in section A1.8). The SRIV for each tree is based on its health, vigour, structure and age class as established in the Visual Tree Assessment. The SRIV does not take into account the impact of the proposed development.

A1.5 Landscape Significance Assessment

Landscape Significance is an essential criterion to establish the importance that a particular tree may have on a site. Each tree has been given a Tree Significance in landscape rating based on the 'IACA Significance of a Tree, Assessment Rating

System'. A tree is to have a minimum of three criteria in a category to be applicable for that rating.

Tree Significance in the landscape ratings:

High	**Medium**	**Low**
▪ The tree is in good condition and good vigour; ▪ The tree has a form typical for the species; ▪ The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age; ▪ The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register; ▪ The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity; ▪ The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values; ▪ The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - tree is appropriate to the site conditions.	▪ The tree is in fair-good condition and good or low vigour; ▪ The tree has form typical or atypical of the species; ▪ The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area ▪ The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street, ▪ The tree provides a fair contribution to the visual character and amenity of the local area, ▪ The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.	▪ The tree is in fair-poor condition and good or low vigour; ▪ The tree has form atypical of the species; ▪ The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings, ▪ The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area, ▪ The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen, ▪ The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - tree is inappropriate to the site conditions, ▪ The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms, ▪ The tree has a wound or defect that has potential to become structurally unsound. ▪ Environmental Pest / Noxious Weed Species ▪ The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties, ▪ The tree is a declared noxious weed by legislation. ▪ Hazardous/Irreversible Decline ▪ The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

A1.6 Tree Protection Zones (TPZ) and Structural Root Zones (SRZ)

The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained.

The Structural Root Zone (SRZ) is located within the TPZ around the base of a tree and provides the bulk of mechanical support and anchorage for a tree.

The Tree Protection Zones (TPZ) and Structural Root Zones (SRZ) have been arrived at using methods as detailed in Australian Standard AS 4970– 2009. Specific site factors are also considered that may influence the location of the TPZ and/or structural tree roots.

A1.7 Encroachment and Development Impacts

Encroachments and development impacts to tree TPZ's and SRZ's include;

- Excavation
- Filling
- Changes to existing soil levels
- Placing items and elements within the zones even if only temporarily
- Soil disturbance
- Any other physical damage to the trunk or root system or any other activity likely to cause damage to the tree.

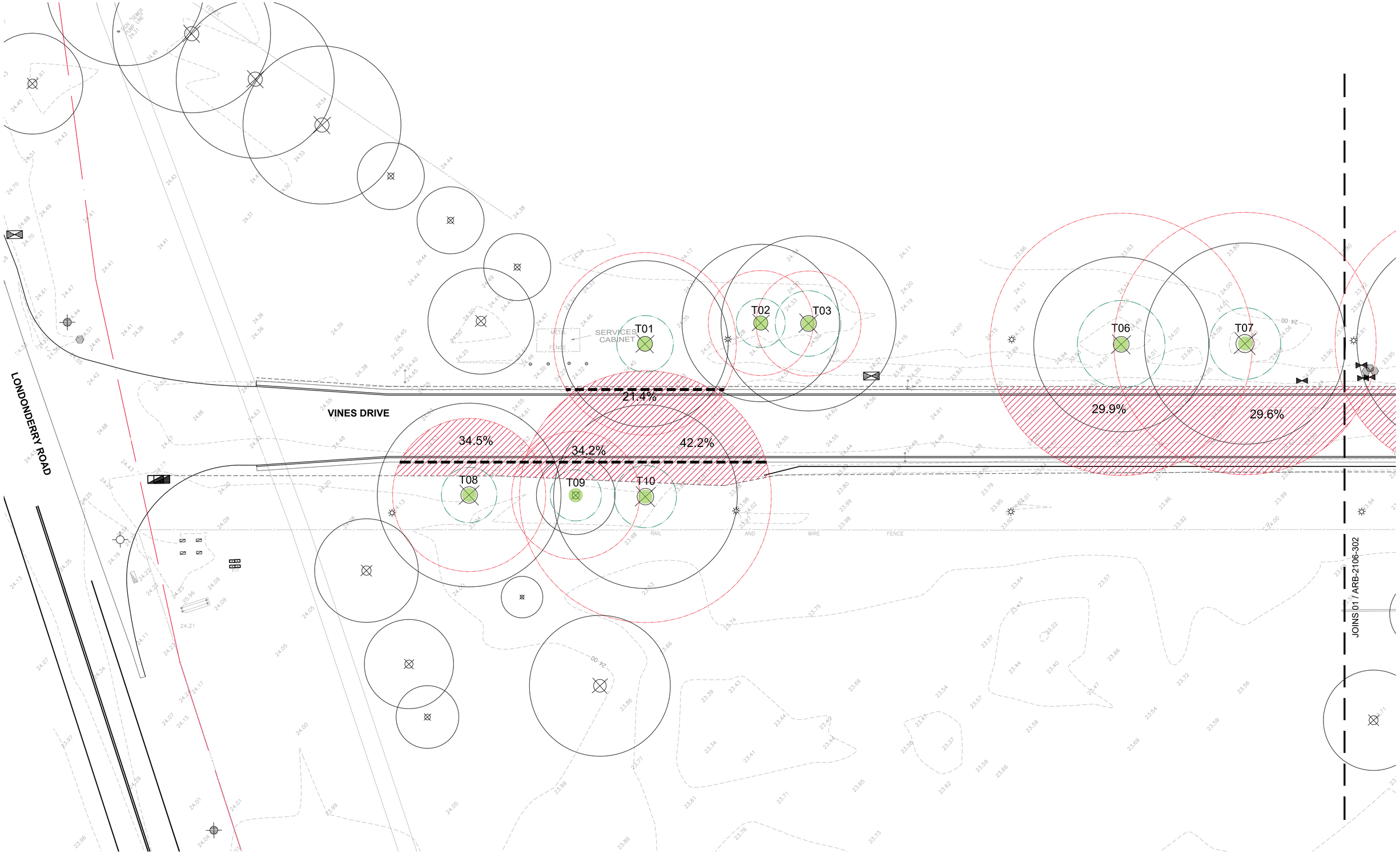
Under *AS 4970:2009 Protection of trees on development sites*, a major encroachment is greater than 10% of the area of the TPZ and the Project Arborist must determine and demonstrate that the tree would remain viable. More detailed investigations, such as exploratory excavations and root investigation to enable an informed evaluation of the potential impact of the proposed works may be required.

Encroachments into the SRZ are not likely to be supported unless the Project Arborist has undertaken exploratory investigation and can demonstrate that there will be minimal impact to the tree.

A1.8 SRIV Table

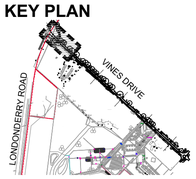
	Vigour Class and Condition Class					
Age Class	Good Vigour & Good Condition (GVG)	Good Vigour & Fair Condition (GVF)	Good Vigour & Poor Condition (GVP)	Low Vigour & Good Condition (LVG)	Low Vigour & Fair Condition (LVF)	Low Vigour & Poor Condition (LVP)
	Able to be retained if sufficient space available above and below ground for future growth. No remedial work or improvement to growing environment required. May be subject to high vigour. Retention potential - Medium - Long Term.	Able to be retained if sufficient space available above and below ground for future growth. Remedial work may be required or improvement to growing environment may assist. Retention potential - Medium Term. Potential for longer with remediation or favourable environmental conditions	Able to be retained if sufficient space available above and below ground for future growth. Remedial work unlikely to assist condition, improvement to growing environment may assist. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. No remedial work required, but improvement to growing environment may assist vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	May be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment may assist condition and vigour. Retention potential - Short Term. Potential for longer with remediation or favourable environmental conditions.	Unlikely to be able to be retained if sufficient space available above and below ground for future growth. Remedial work or improvement to growing environment unlikely to assist condition or vigour. Retention potential - Likely to be removed immediately or retained for Short Term. Potential for longer with remediation or favourable environmental conditions
Young (Y)	**YGVG - 9** Index Value 9 Retention potential - Long Term. Likely to provide minimal contribution to local amenity if height Retain, move or replace	**YGVF - 8** Index Value 8 Retention potential - Short - Medium Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Medium-high potential for future growth and adaptability. Retain, move or replace.	**YGVP - 5** Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Low-medium potential for future growth and adaptability. Retain, move or replace	**YLVG - 4** Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height Medium potential for future growth and adaptability. Retain, move or replace	**YLVF - 3** Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions. Likely to provide minimal contribution to local amenity if height <5m. Low-medium potential for future growth and adaptability. Retain, move or replace	**YLVP - 1** Index Value 1 Retention potential - Likely to be removed immediately or retained for Short Term. Likely to provide minimal contribution to local amenity if height
Mature (M)	**MGVG - 10** Index Value 10 Retention potential - Medium - Long Term	**MGVF - 9** Index Value 9 Retention potential - Medium Term. Potential for longer with improved growing conditions.	**MGVP - 6** Index Value 6 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVG - 5** Index Value 5 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVF - 4** Index Value 4 Retention potential - Short Term. Potential for longer with improved growing conditions	**MLVP - 2** Index Value 2 Retention potential - Likely to be removed immediately or retained for Short Term.
Over-mature (O)	**OGVG - 6** Index Value 6 Retention potential - Medium - Long Term.	**OGVF - 5** Index Value 5 Retention potential - Medium Term.	**OGVP - 4** Index Value 4 Retention potential - Short Term.	**OLVG - 3** Index Value 3 Retention potential - Short Term. Potential for longer with improved growing conditions.	**OLVF - 2** Index Value 2 Retention potential - Short Term.	**OLVP - 0** Index Value 0 Retention potential - Likely to be removed immediately or retained for Short Term

APPENDIX 2: PLANS



ISSUE	DESCRIPTION	DATE
A	IMPACT ASSESSMENT REPORT	25.10.2021

KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- EXISTING SURVEY
- EXTENT OF DISTURBANCE
- EXISTING TREE. TREE NUMBERS RELATE TO ASSESSED TREES
- TREES TO BE RETAINED
- TREES TO BE REMOVED
- TREES TO BE TRANSPLANTED
- STRUCTURAL ROOT ZONE (SRZ)
- TREE PROTECTION ZONE (TPZ)
- TPZ INCURSION
- EXPLORATORY TRENCHING. REFER TO ARBORIST REPORT FOR DETAILS
- REFER TO THE TREE IMPACT ASSESSMENT SCHEDULE FOR DETAILS ON ASSESSED TREES

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PROJECT
CENTRE OF EXCELLENCE

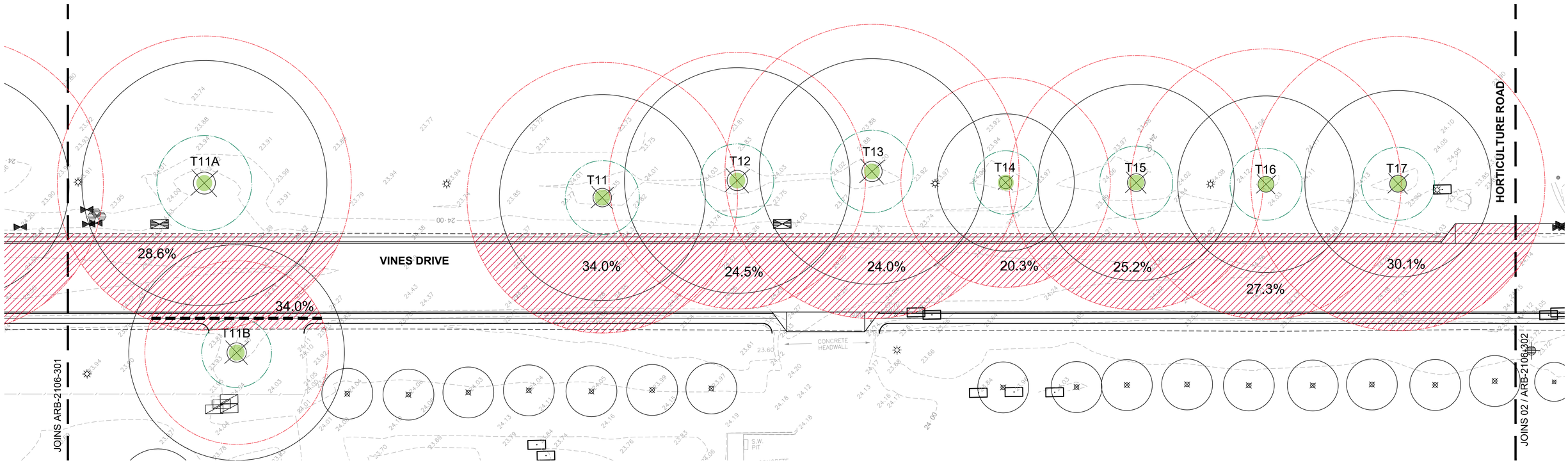
CLIENT
NBRS ARCHITECTURE

0 2 4 10 m

DRAWING
VINES DRIVE IMPACT ASSESSMENT PLAN 01

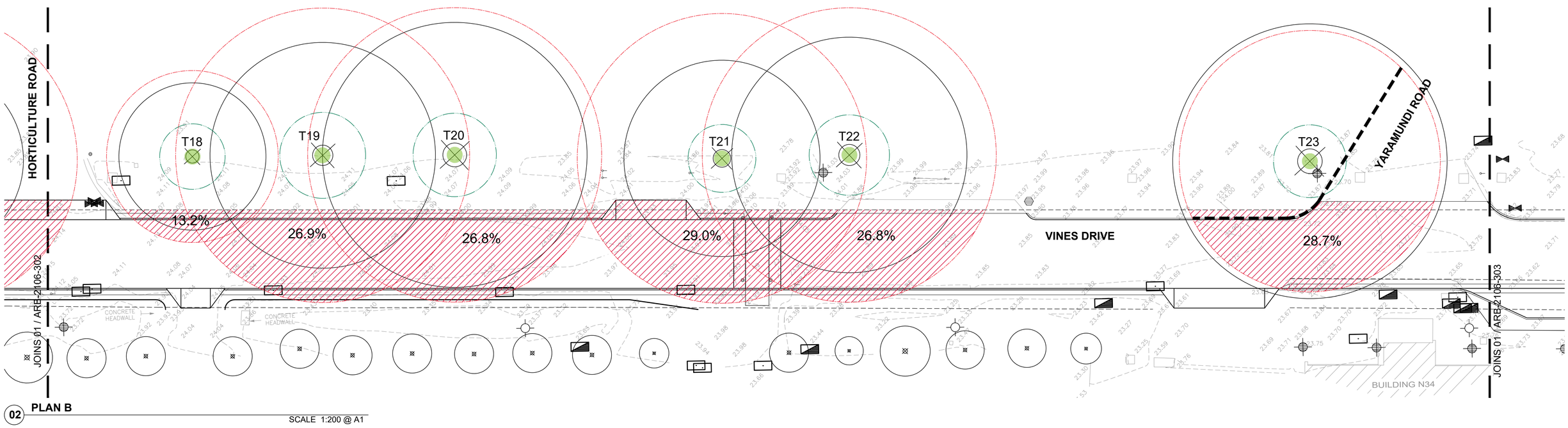
DRAWING NUMBER: ARB-2106-301
ISSUE: A

SCALE: 1:200 @ A1, 1:400 @ A3
DRAWN: jw
CHECKED: gs
DIRECTOR: gs



01 **PLAN A**

SCALE 1:200 @ A1

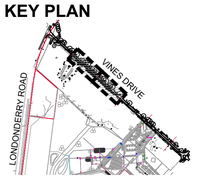


02 **PLAN B**

SCALE 1:200 @ A1

ISSUE	DESCRIPTION	DATE
A	IMPACT ASSESSMENT REPORT	25.10.2021

KEY PLAN



LEGEND

- PROPERTY BOUNDARY
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PROJECT
CENTRE OF EXCELLENCE

CLIENT
NBRS ARCHITECTURE

0 2 4 10 m

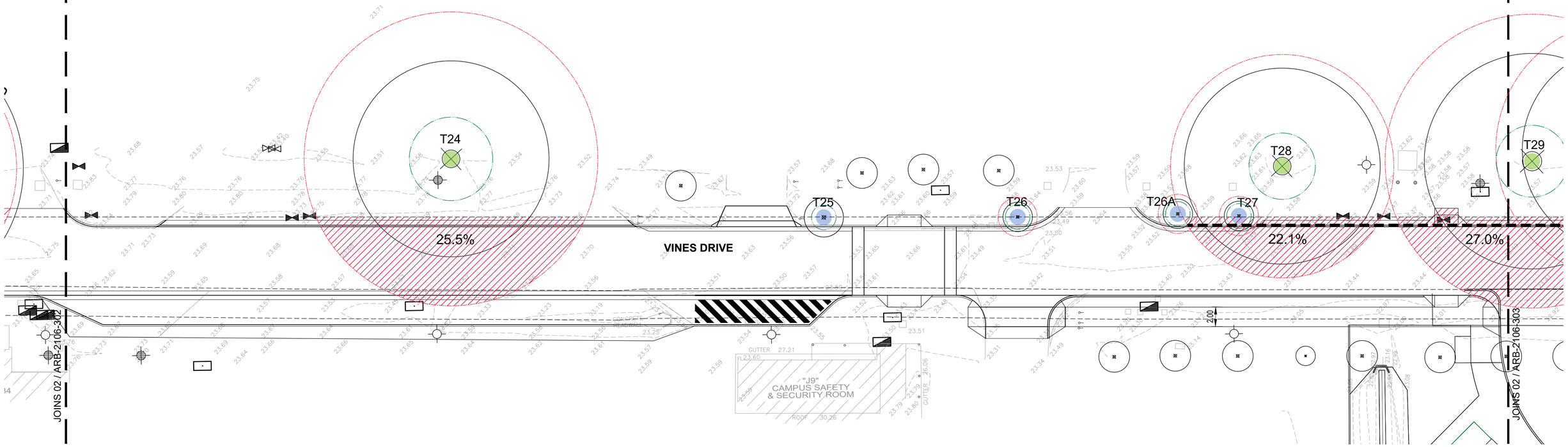
DRAWING
VINES DRIVE IMPACT ASSESSMENT PLAN 02

DRAWING NUMBER
ARB-2106-302

ISSUE
A

SCALE
1:200 @ A1
1:400 @ A3

DRAWN	CHECKED	DIRECTOR
jw	gs	gs



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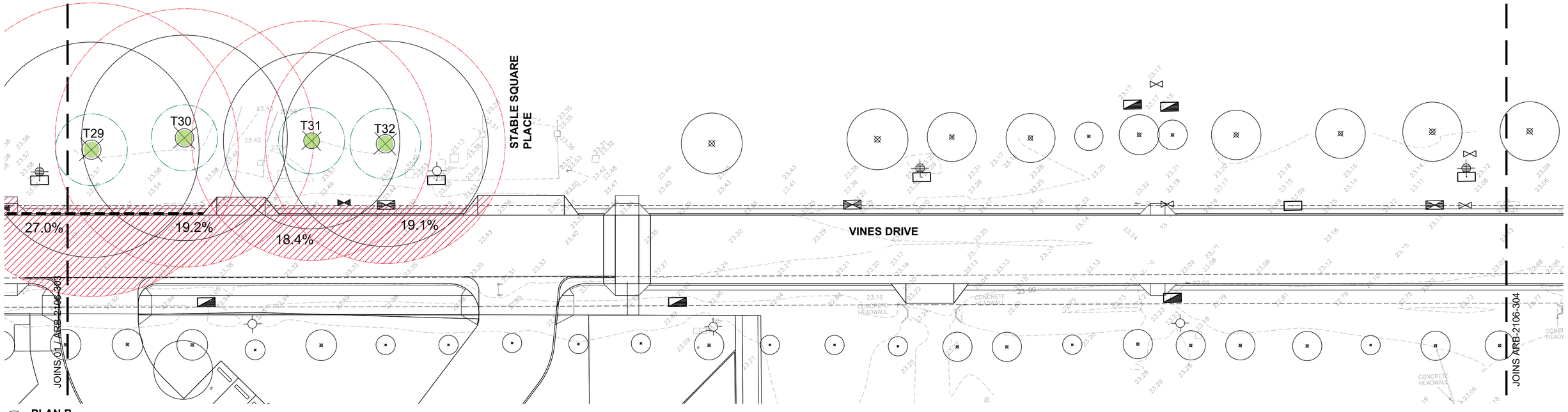
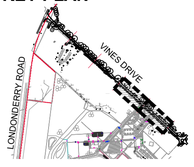


02 **PLAN B**

SCALE 1:200 @ A1

ISSUE	DESCRIPTION	DATE
A	IMPACT ASSESSMENT REPORT	25.10.2021

KEY PLAN



LEGEND

- PROPERTY BOUNDARY
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- REFER TO THE TREE IMPACT ASSESSMENT SCHEDULE FOR DETAILS ON ASSESSED TREES

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PROJECT
CENTRE OF EXCELLENCE

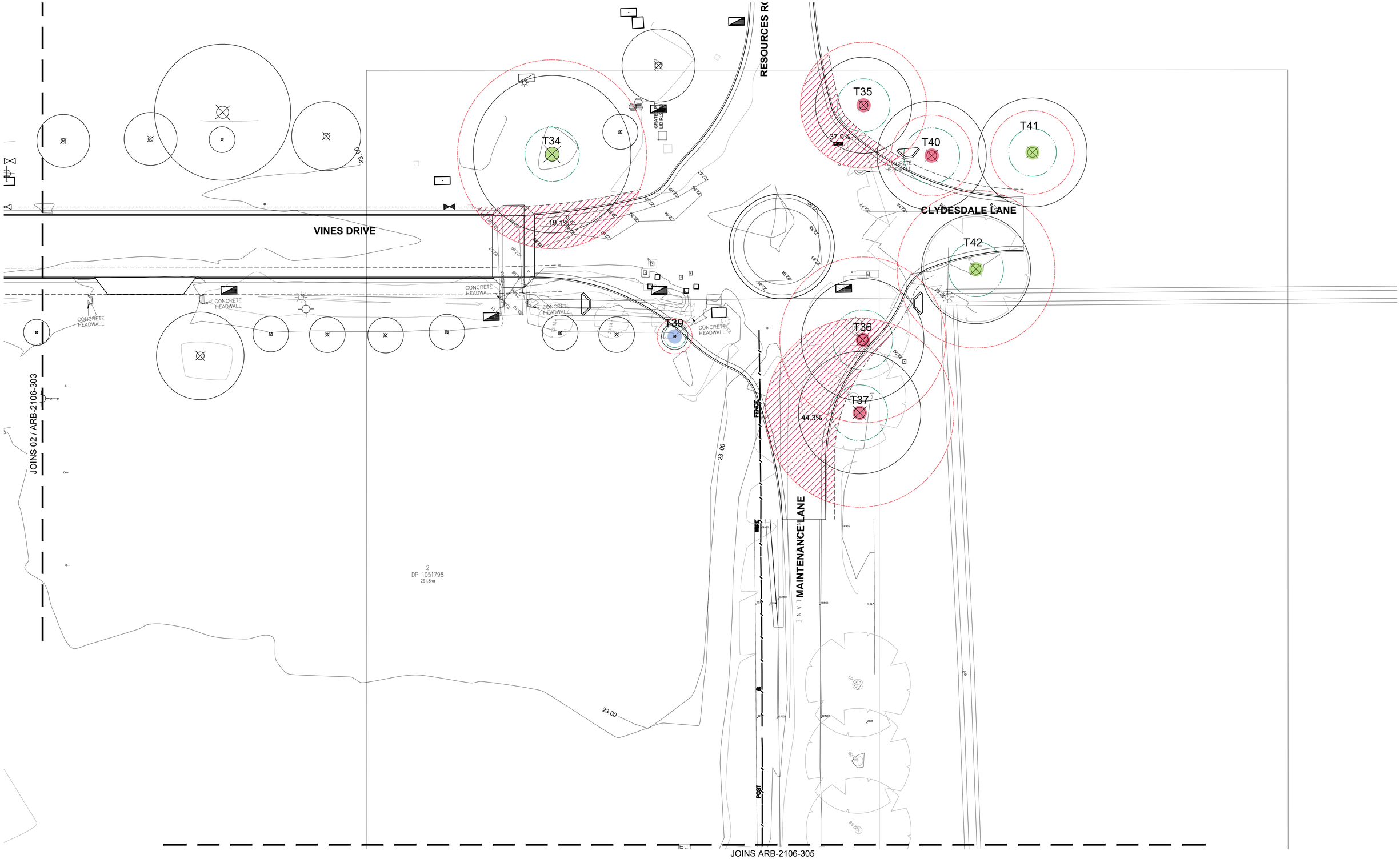
CLIENT
NBRS ARCHITECTURE

0 2 4 10 m

DRAWING
VINES DRIVE IMPACT ASSESSMENT PLAN 03

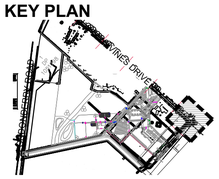
DRAWING NUMBER	ISSUE
ARB-2106-303	A

SCALE	DRAWN	CHECKED	DIRECTOR
1:200 @ A1 1:400 @ A3	jw	gs	gs



ISSUE	DESCRIPTION	DATE
A	IMPACT ASSESSMENT REPORT	25.10.2021
B	IMPACT ASSESSMENT REPORT	13.10.2021

KEY PLAN



LEGEND

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PROJECT
CENTRE OF EXCELLENCE

CLIENT
NBRS ARCHITECTURE

0 2 4 10 m

DRAWING
VINES DRIVE IMPACT ASSESSMENT PLAN 04

DRAWING NUMBER
ARB-2106-304

ISSUE
B

SCALE
1:200 @ A1
1:400 @ A3

DRAWN	CHECKED	DIRECTOR
jw	gs	gs

JOINS ARB-2106-304

TIMBER POST WIRE FENCE

TIMBER

GRATED PIT LID RL22.24

ERVATION
ON

T43

T44

T45

T46

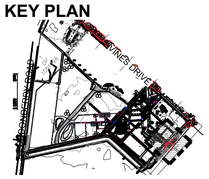
T47

4.4%

22.2%

ISSUE	DESCRIPTION	DATE
A	IMPACT ASSESSMENT REPORT	13.10.2021

KEY PLAN



LEGEND

- PROPERTY BOUNDARY
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ACN: 164 245 514 ABN: 99 164 245 514

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PROJECT
CENTRE OF EXCELLENCE

CLIENT
NBRS ARCHITECTURE

0 2 4 10 m

DRAWING
VINES DRIVE IMPACT ASSESSMENT PLAN 05

DRAWING NUMBER
ARB-2106-305

ISSUE
A

SCALE
1:200 @ A1
1:400 @ A3

DRAWN	CHECKED	DIRECTOR
jw	gs	gs

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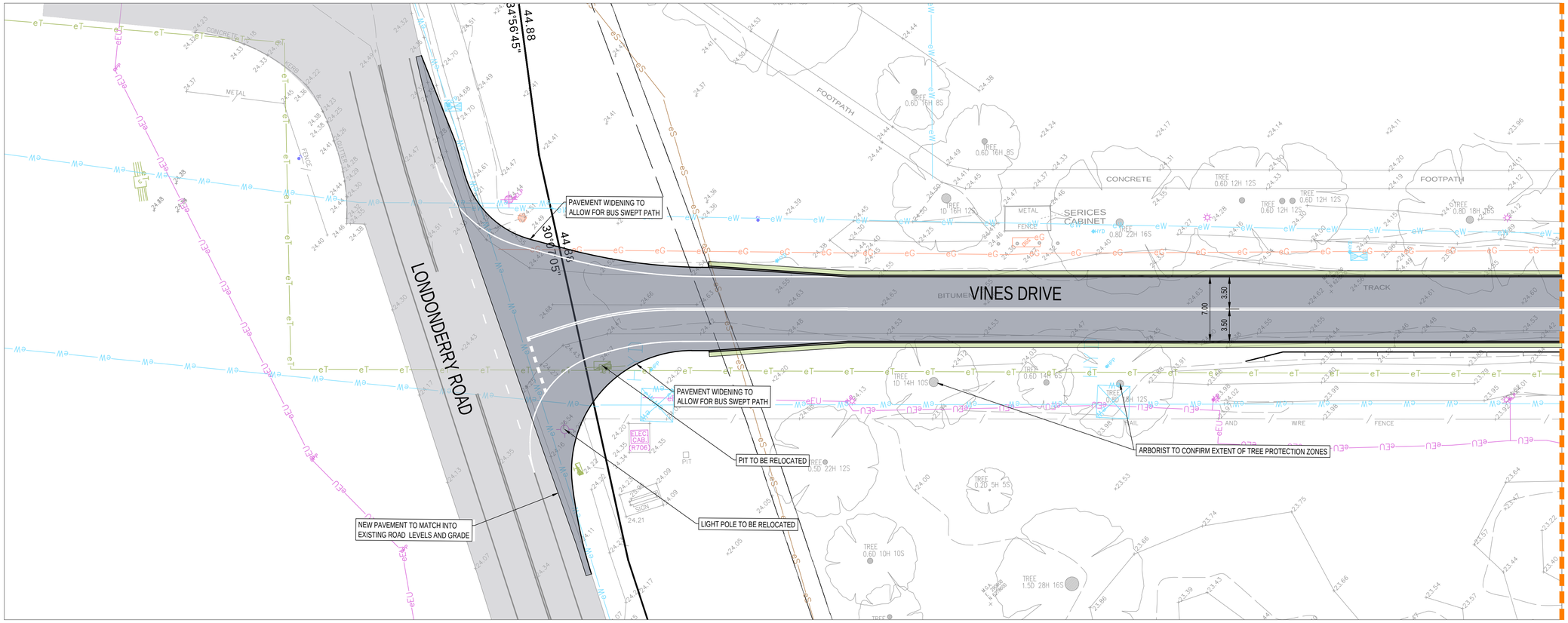

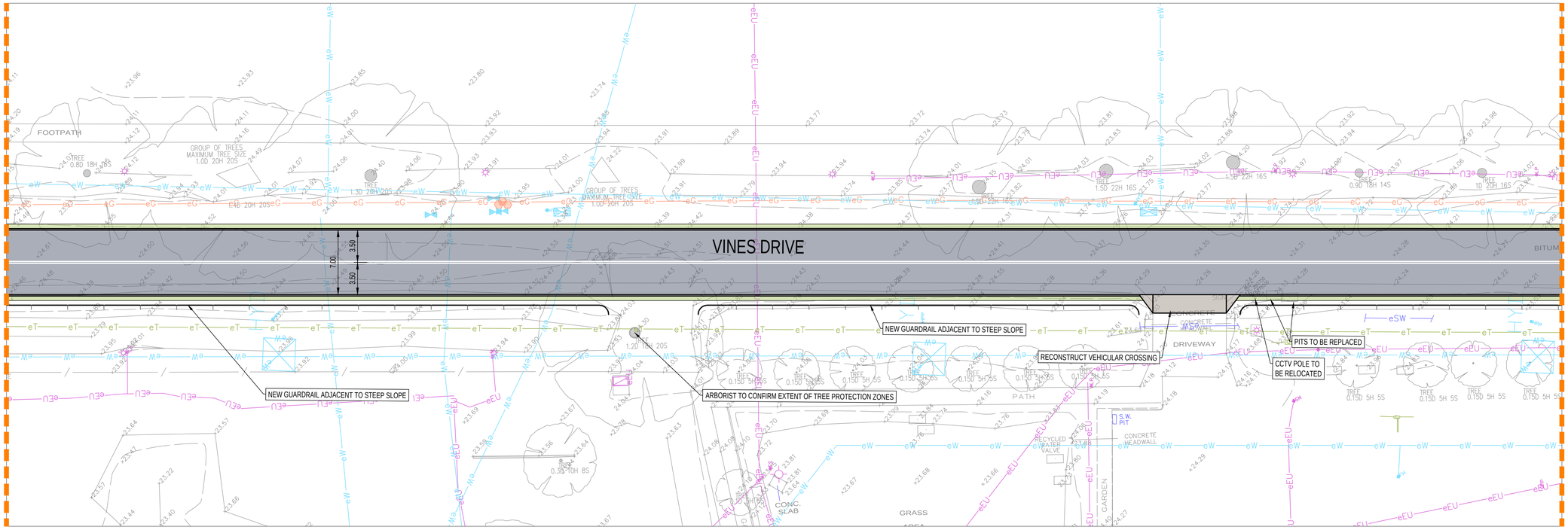

FileName: C31.dwg – USER: duncanm – Plot File Created: Oct 08, 2021 - 5:30pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	DM	DM	08.10.21

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Architect
NBRS ARCHITECTURE
4 GLEN STREET, MILSONS POINT NSW
PH: (02) 9922 2344

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
SINSW CENTRE OF EXCELLENCE (RICHMOND)

Sheet Subject
GENERAL ARRANGEMENT PLAN SHEET 1

Scale : A1	Drawn	Authorised
AS SHOWN	JH	SB

Job No	Drawing No	Revision
211091	C31	P1

Plot File Created: Oct 08, 2021 - 5:30pm

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FOR CONTINUATION REFER PREVIOUS SHEET

FOR CONTINUATION REFER BELOW

HORTICULTURE ROAD

VINES DRIVE

RECONSTRUCT VEHICULAR CROSSING

NEW GUARDRAIL ADJACENT TO STEEP SLOPE

CCTV POLE TO BE RELOCATED

PITS TO BE REPLACED

NEW KERB RAMP

PIT TO BE REPLACED

PIT TO BE REPLACED

NEW GUARDRAIL ADJACENT TO STEEP SLOPE

CONSTRUCT NEW 75mm HIGH RAISED PEDESTRAIN CROSSING

RECONSTRUCT VEHICULAR CROSSING

PIT TO BE REPLACED

RECONSTRUCT VEHICULAR CROSSING

PIT TO BE REPLACED

BITUMEN

7.00

3.50

3.50

FOR CONTINUATION REFER ABOVE

FOR CONTINUATION REFER NEXT SHEET

YARRAMUNDI ROAD

VINES DRIVE

PIT TO BE REPLACED

RECONSTRUCT VEHICULAR CROSSING

PIT TO BE RETAINED

NEW BUS BAY TO BE CONSTRUCTED

ELECTRICAL POLE TO BE RETAINED

NEW CONCRETE PAVEMENT TO MATCH INTO EXISTING

ELECTRICAL POLE TO BE RETAINED

HEADWALL TO BE REPLACED

ELECTRICAL POLE TO BE RETAINED

RECONSTRUCT VEHICULAR CROSSING

CONSTRUCT NEW 75mm HIGH RAISED PEDESTRAIN CROSSING

PIT TO BE REPLACED

CONSTRUCT NEW 100mm HIGH RAISED PEDESTRAIN CROSSING

PIT TO BE REPLACED

NEW CONCRETE FOOTPATH

BUILDING N34

CAMPUS SAFETY & SECURITY ROOM

BITUMEN

7.00

3.50

3.50

3.00

2.40

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

FileName: C32.dwg - USER: dunnorm - Plot File Created: Oct 08, 2021 - 5:30pm

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Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	DM	DM	08.10.21

Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date

Architect
NBRS ARCHITECTURE
4 GLEN STREET, MILSONS POINT NSW
PH: (02) 9922 2344

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
SINSW CENTRE OF EXCELLENCE (RICHMOND)

Sheet Subject
GENERAL ARRANGEMENT PLAN SHEET 2

Scale : A1	Drawn	Authorised
AS SHOWN	JH	SB

Job No	Drawing No	Revision
211091	C32	P1

Plot File Created: Oct 08, 2021 - 5:30pm

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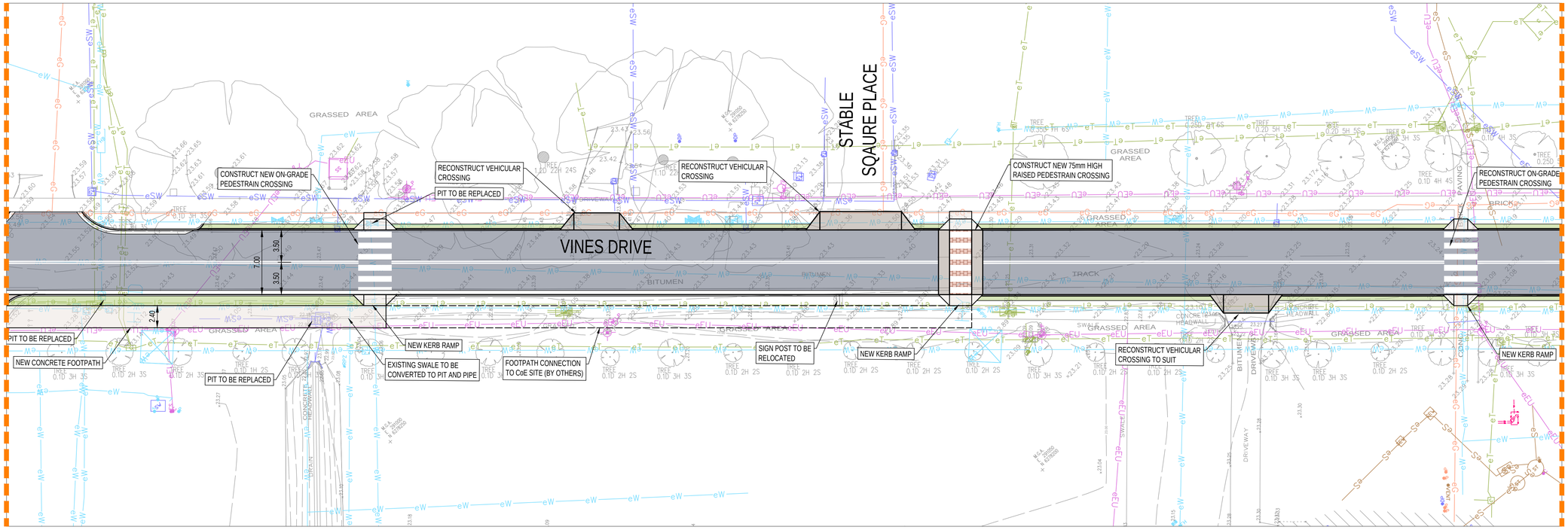
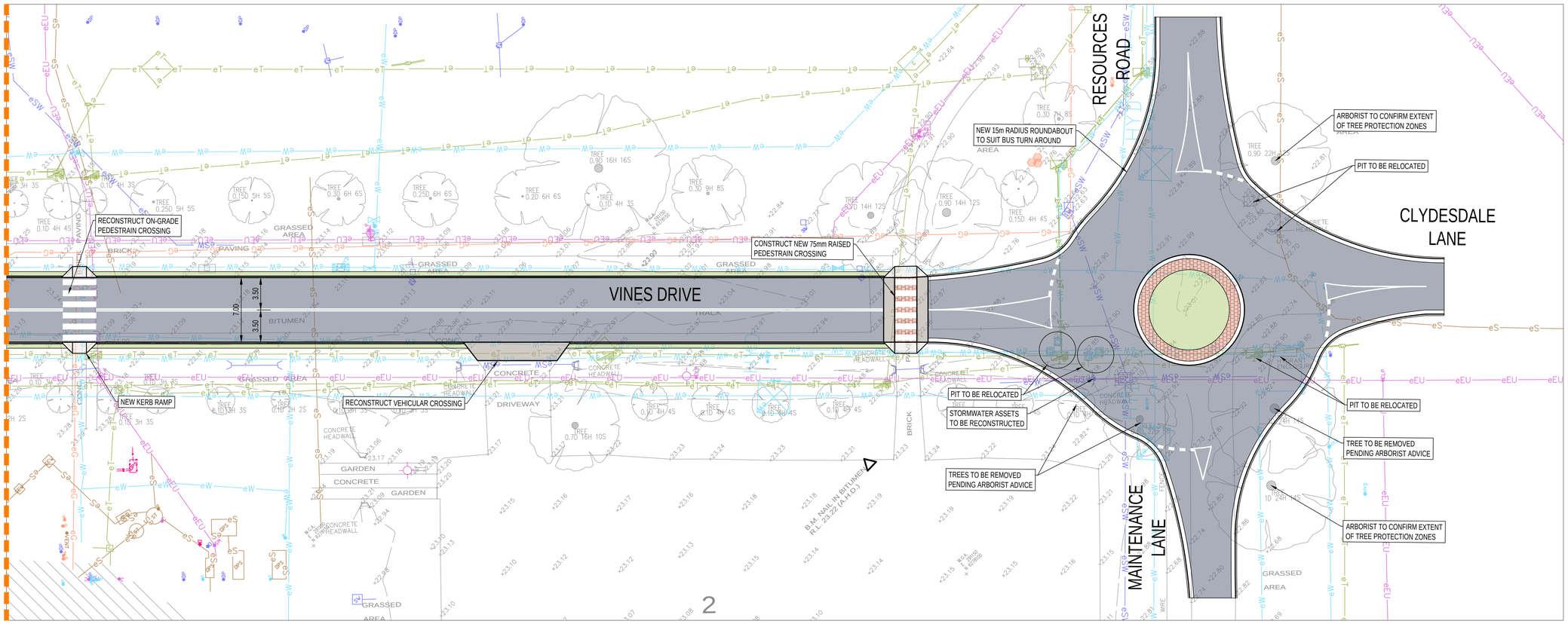
FOR CONTINUATION REFER PREVIOUS SHEET

FOR CONTINUATION REFER BELOW





FOR CONTINUATION REFER ABOVE

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Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	DM	DM	08.10.21

Architect
NBRS ARCHITECTURE
4 GLEN STREET, MILSONS POINT NSW
PH: (02) 9922 2344

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
SINSW CENTRE OF EXCELLENCE (RICHMOND)

Sheet Subject
GENERAL ARRANGEMENT PLAN SHEET 3

Scale : A1	Drawn	Authorised
AS SHOWN	JH	SB

Job No	Drawing No	Revision
211091	C33	P1

Plot File Created: Oct 08, 2021 - 5:33pm

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

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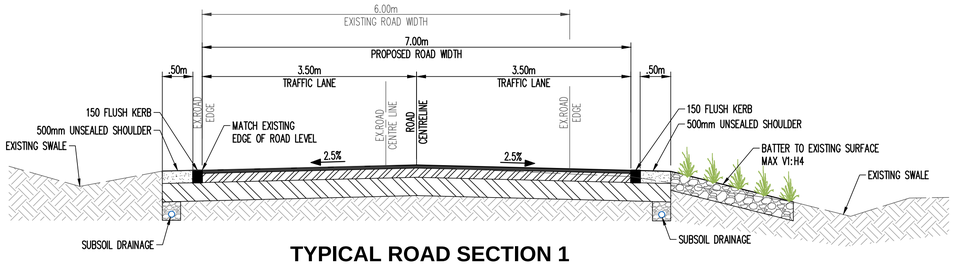
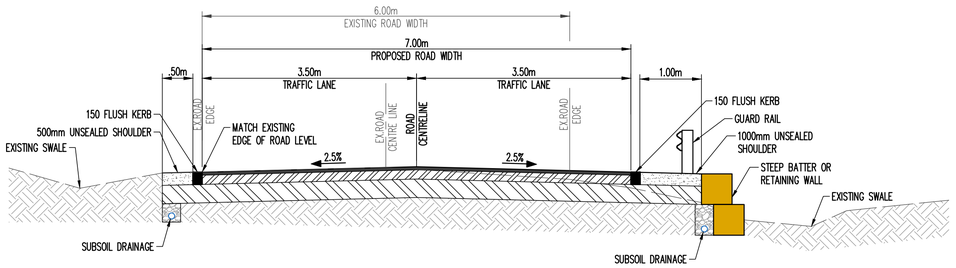


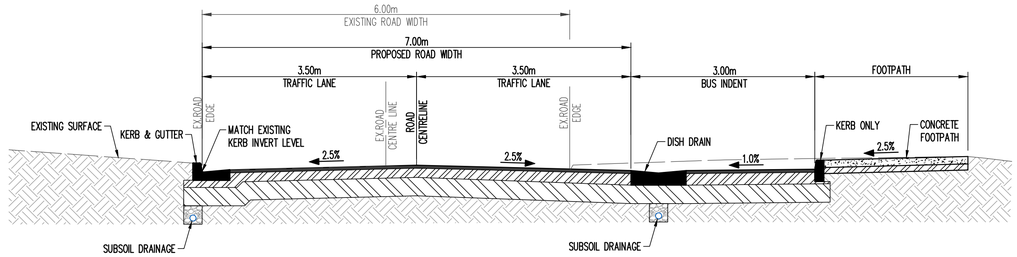
TYPICAL ROAD SECTION 1
FLUSH KERB EDGES

SCALE 1:50



TYPICAL ROAD SECTION 2
FLUSH KERB EDGES WITH STEEP EDGE CONDITION

SCALE 1:50



TYPICAL ROAD SECTION 3
BUS INDENT

SCALE 1:50

FileName: C10.dwg – USER: duncanm – Plot File Created: Oct 08, 2021 - 5:30pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	DM	DM	08.10.21

Rev	Description	Eng	Draft	Date

Rev	Description	Eng	Draft	Date

Architect
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TTW Structural Civil Traffic Façade
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Project
SINSW CENTRE OF EXCELLENCE (RICHMOND)

Sheet Subject
TYPICAL SECTIONS

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Scale : A1	Drawn	Authorised
AS SHOWN	JH	SB

Job No	Drawing No	Revision
211091	C10	P1

Plot File Created: Oct 08, 2021 - 5:30pm

APPENDIX 3: TREE ASSESSMENT SCHEDULE

Tree Assessment Sheet	
Location:	Richmond Centre of Excellence: Vines Drive Upgrade
Client:	Richard Crookes constructions
Date:	18.10.2021

Tree No.	Botanical Name / **Common Name**	Dimensions							Health				Vigour				Structure					Age Class					**Landscape Significance**	**Retention Value SRIV**	Comments
		TPZ radius (m)	**SRZ** radius (m)	DBH (mm)	DAB (mm)	Height (m)	Spread EW (m)	Spread NS (m)	Deadwood	Dieback	Pests	Diseases	Canopy density %	Foliage size	Foliage colour	Extension growth	Inclusions	Fractures	Wounds	Cavities	Decay	Senescent	Mature	Semi Mature	Young	New planting			
1	*Eucalyptus melliodora* **Yellow Box**	10.44	3.24	870	950	19	19	18	MIN	-	-	-	50	Small	Poor	No	-	-	-	-	-	S					H	**OLVP0**	
2	*Acer Negundo* **Box Elder**	6.00	2.80	530	670	16	11W	18					90	G	G	Y							M				H	**MGVF9**	Multi Trunk
3	*Acer Negundo* **Box Elder**	6.00	3.75	820	1350	16	16	20					90	G	G	Y							M				H	**MGVF9**	Multi Trunk
6	*Cinnamomum camphora* **Camphor Laurel**	19.44	5.01	1620	2690	18	21	20					100	G	G	Y							M				H	**MGVF9**	Multi Trunk
7	*Cinnamomum camphora* **Camphor Laurel**	17.04	4.09	1420	1660	20	20	23	Y	-	-	-	100	G	G	Y							M				H	**MGVF9**	Multi Trunk
8	*Eucalyptus resinifera* **Red mahogany**	8.76	3.17	730	900	20	21	18	Y				70	G	G	Y							M				H	**MLVF4**	
9	*Eucalyptus resinifera* **Red mahogany**	7.32	2.93	610	750	19	9	9	Y	Y			60						Y				M				H	**MLVP2**	Dead limb
10	*Eucalyptus resinifera* **Red mahogany**	14.40	3.56	1200	1190	22	20	21	Y	Y			50						Y			S					H	**OLVP0**	Large wound from central leader removal
11	*Cinnamomum camphora* **Camphor Laurel**	13.80	3.78	1150	1370	20	19	21	Y				60	G	G	Y							M				H	**MGVP6**	Qty. of deadwood/dieback. Sparse canopy. Co-dominant trunks.
11A	*Cinnamomum camphora* **Camphor Laurel**	21.24	4.85	1770	2480	22	23	25	Y				100	G	G	Y							M				H	**MGVG10**	Minor deadwood. Multitrunk
11B	*Eucalyptus crebra* **Narrow leaved Ironbark**	9.36	3.56	780	1190	22	20	22	Y				90	G	G	Y			Y				M				H	**MGVG10**	Pruning wounds-well occluded.
12	*Cinnamomum camphora* **Camphor Laurel**	13.08	3.74	1090	1340	17	18	23	Y	Y			60						Y				M				H	**MGVP6**	Qty. of deadwood/dieback. Sparse canopy. Co-dominant trunks.
13	*Cinnamomum camphora* **Camphor Laurel**	15.60	4.21	1300	1770	18	23	18	Y	Y			70						Y				M				H	**MGVP6**	Qty. of deadwood/dieback. Sparse canopy. Multitrunk
14	*Cinnamomum camphora* **Camphor Laurel**	10.68	3.24	890	950	18	14	14	Y				100	G	G	Y							M				H	**MGVP6**	Qty. of deadwood/dieback.
15	*Cinnamomum camphora* **Camphor Laurel**	12.96	3.73	1080	1330	20	20	20	Y				90	G	G	Y							M				H	**MGVF9**	Multitrunk
16	*Cinnamomum camphora* **Camphor Laurel**	13.80	3.67	1150	1280	23	18	16	Y	Y			80						Y				M				H	**MGVP6**	Qty. of deadwood/dieback. Pruning wounds-well occluded. Multitrunk
17	*Cinnamomum camphora* **Camphor Laurel**	16.20	3.72	1350	1320	24	19	19	Y				90	G	G	Y							M				H	**MGVF9**	Minor deadwood. Multitrunk
18	*Cinnamomum camphora* **Camphor Laurel**	8.76	3.34	730	1020	15	10	11	Y				80	G	G	Y							M				H	**MGVF9**	Minor deadwood. Multitrunk
19	*Cinnamomum camphora* **Camphor Laurel**	17.16	4.38	1430	1950	18	18	23	Y				80	G	G	Y							M				H	**MGVP6**	Qty. of deadwood/dieback.epicormic growth. Multitrunk

Tree Assessment Sheet	
Location:	Richmond Centre of Excellence: Vines Drive Upgrade
Client:	Richard Crookes constructions
Date:	18.10.2021

Tree No.	Botanical Name / **Common Name**	Dimensions							Health				Vigour				Structure					Age Class					**Landscape Significance**	**Retention Value SRIV**	Comments
		TPZ radius (m)	**SRZ** radius (m)	DBH (mm)	DAB (mm)	Height (m)	Spread EW (m)	Spread NS (m)	Deadwood	Dieback	Pests	Diseases	Canopy density %	Foliage size	Foliage colour	Extension growth	Inclusions	Fractures	Wounds	Cavities	Decay	Senescent	Mature	Semi Mature	Young	New planting			
20	*Cinnamomum camphora* **Camphor Laurel**	23.28	4.25	1940	1810	18	20	27	Y				100	G	G	Y							M				H	**MGVG10**	Minor deadwood. Multitrunk
21	*Cinnamomum camphora* **Camphor Laurel**	14.76	3.46	1230	1110	17	20	18	Y				100	G	G	Y							M				H	**MGVG10**	Minor deadwood/dieback. Pruning wounds-well occluded. Multitrunk
22	*Cinnamomum camphora* **Camphor Laurel**	19.20	4.10	1600	1670	18	22	24	Y				100	G	G	Y							M				H	**MGVG10**	Minor deadwood/dieback. Pruning wounds-well occluded. Multitrunk
23	*Eucalyptus robusta* **Swamp Mahogany**	13.32	3.71	1110	1310	27	20	28	Y				90	G	G	Y			Y				M				H	**MGVG10**	Minor wounds-well occluded.
24	*Schinus molle var. areira* **Pepper Tree**	20.16	4.26	1680	1820	18	20	20	Y	Y			40	Small	Poor	No			Y	Y	Y	S					M	**OLVP0**	Large wound from central leader removaldecay. Large secondary leader.Hollow trunk.
25	*Lagerstroemia indica* **Crepe Myrtle**	0.90	1.26	100	100	5	4	4					90												Y		L	**YGVG9**	Remove or transplant
26	*Lagerstroemia indica* **Crepe Myrtle**	0.90	1.26	100	100	4	3	3					90												Y		L	**YGVG9**	Remove or transplant
26A	*Lagerstroemia indica* **Crepe Myrtle**	0.90	1.26	75	100	4	3	3					90												Y		L	**YGVG9**	Remove or transplant
27	*Lagerstroemia indica* **Crepe Myrtle**	0.90	1.26	95	100	4	3	3					90												Y		L	**YGVG9**	Remove or transplant
28	*Eucalyptus botryoides* **Southern Mahogany**	11.40	3.39	950	1060	20	20	19	Y				80	G	G	Y			Y				M				H	**MGVF9**	Pruning wounds-well occluded.
29	*Eucalyptus botryoides* **Southern Mahogany**	18.60	3.67	1550	1280	25	22	20	Y				90	G	G	Y							M				H	**MGVG10**	
30	*Cinnamomum camphora* **Camphor Laurel**	13.20	3.38	1100	1050	16	21	15	Y				100	G	G	Y							M				H	**MGVF9**	Multitrunk
31	*Cinnamomum camphora* **Camphor Laurel**	12.24	3.38	1020	1050	16	18	17	Y				100	G	G	Y							M				H	**MGVF9**	Multitrunk.Pruning wounds-well occluded.
32	*Cinnamomum camphora* **Camphor Laurel**	12.24	3.62	1020	1240	17	21	16	Y				100	G	G	Y							M				H	**MGVF9**	Multitrunk
34	*Eucalyptus botryoides* **Southern Mahogany**	10.80	3.11	900	860	20	18	18					70	G	G	Y	minor		Y				M				H	**MGVF9**	Co-Dominant t 1.8m.Pruning wounds-well occluded.
35	*Casuarina glauca* **Swamp Sheoak**	7.20	3.03	600	810	18	11	11					90	G	G	Y			Large				M				H	**MGVP6**	Large wound from failure at inclusion.Remove
36	*Casuarina glauca* **Swamp Sheoak**	9.48	3.43	790	1090	20	13	14	Y				90	G	G	Y							M				H	**MGVF9**	Pruning wounds-well occluded. Remove
37	*Casuarina glauca* **Swamp Sheoak**	10.80	3.20	900	920	14	14	14					90	G	G	Y							M				H	**MGVF9**	Pruning wounds-well occluded. Remove

Tree Assessment Sheet																																
Location:		Richmond Centre of Excellence: Vines Drive Upgrade																														
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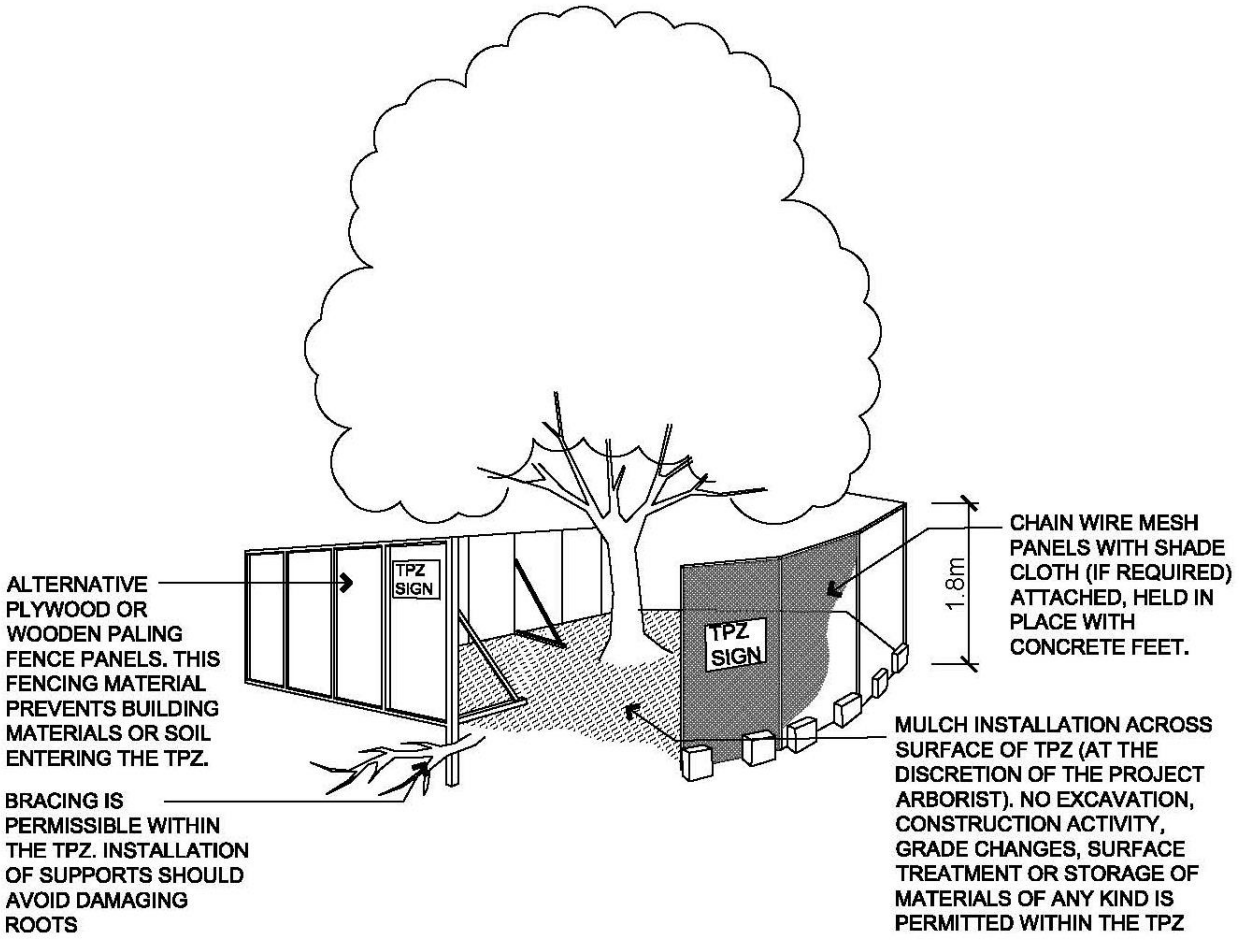
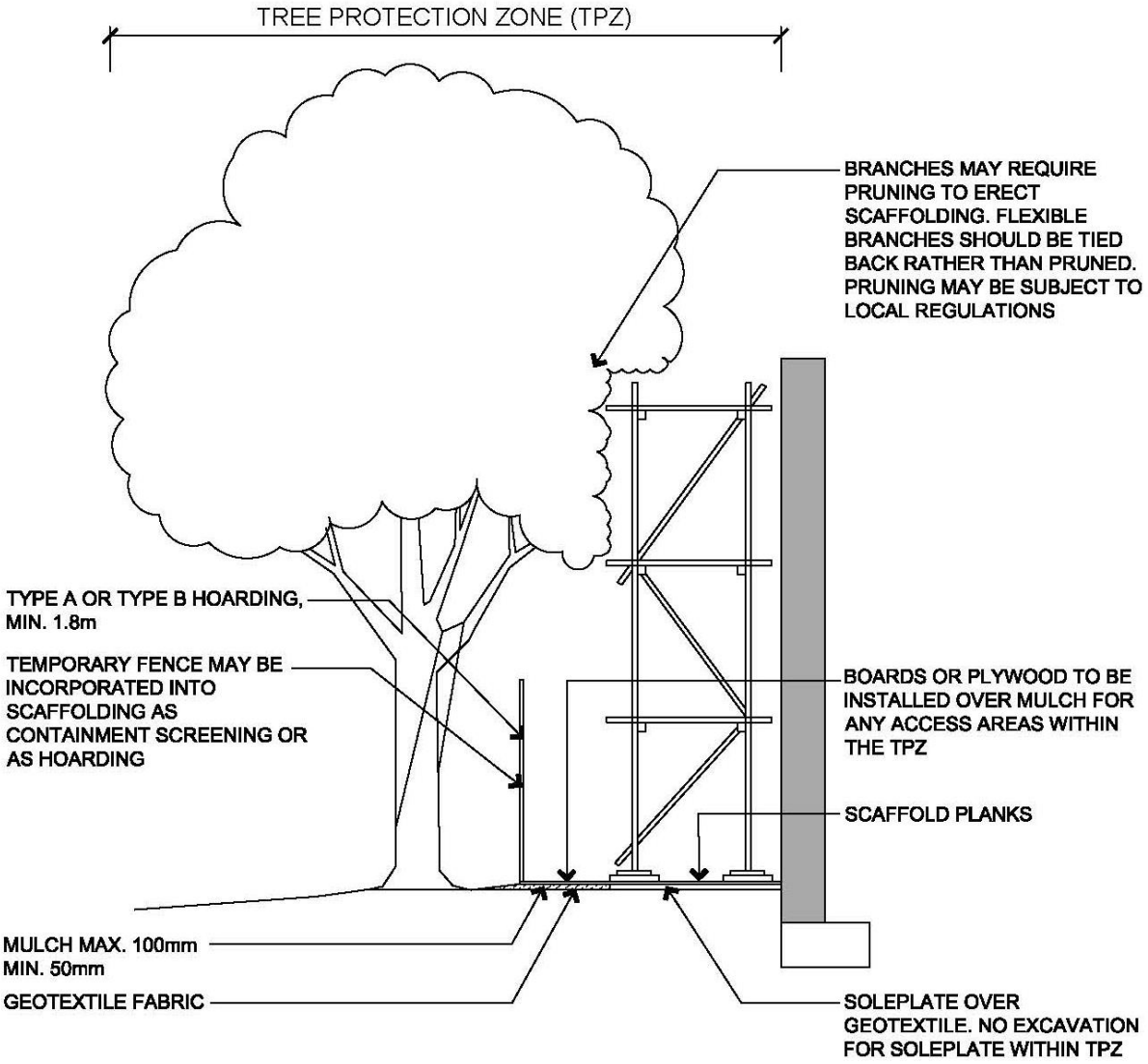
Tree No.	Botanical Name / **Common Name**	**TPZ** radius (m)	**SRZ** radius (m)	DBH (mm)	DAB (mm)	Height (m)	Spread EW (m)	Spread NS (m)	Deadwood	Dieback	Pests	Diseases	Canopy density %	Foliage size	Foliage colour	Extension growth	Inclusions	Fractures	Wounds	Cavities	Decay	Senescent	Mature	Semi Mature	Young	New planting	**Landscape Significance**	**Retention Value SRIV**	Comments				
39	*Lagerstroemia indica* **Crepe Myrtle**	0.90	1.26	95	100	4	3	3					90												Y		L	**YGVG9**	Remove or transplant				

APPENDIX 4: TYPICAL TREE PROTECTION DETAILS



PROTECTIVE FENCING

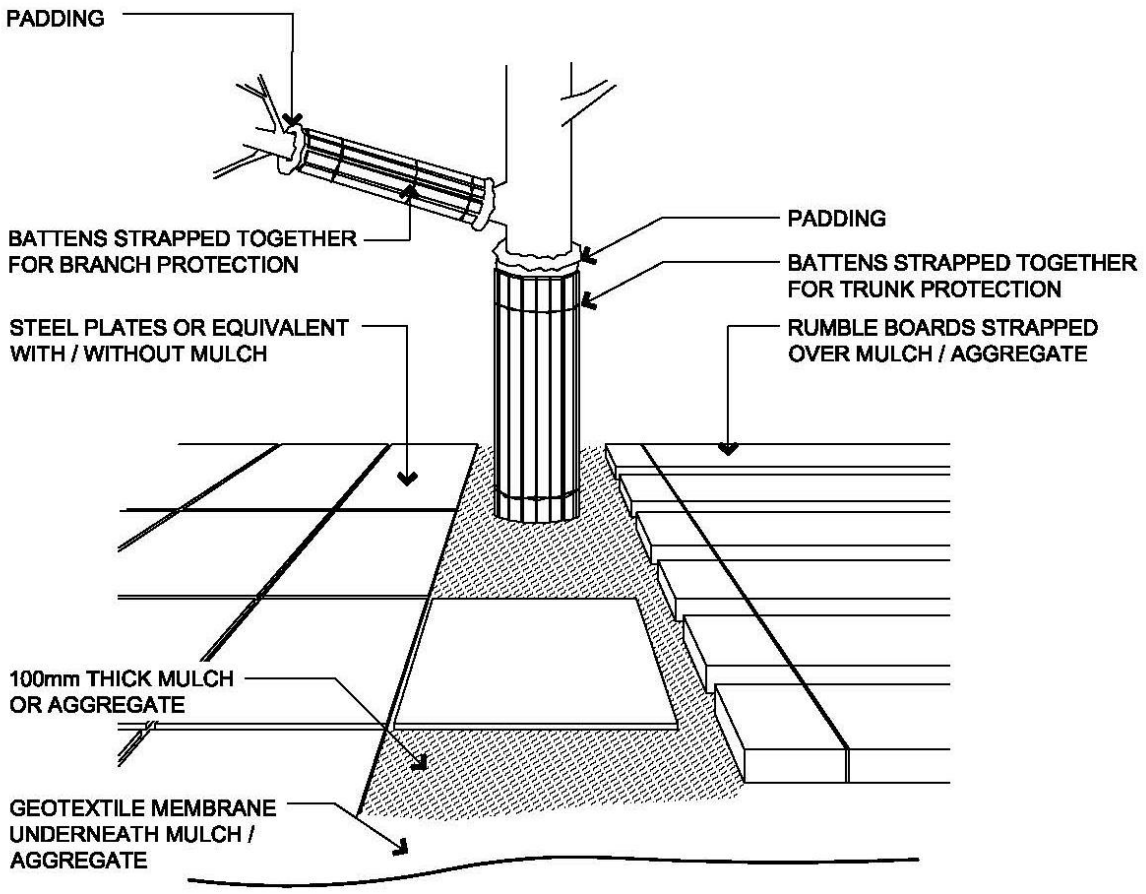
Based on AS4970-2009 NOT TO SCALE



NOTE: Excavation required for the insertion of support posts for tree protection fencing should not involve the severance of any roots greater than 20mm in diameter, without the prior approval of the project arborist.

INDICATIVE SCAFFOLDING WITHIN A TPZ

Based on AS4970-2009 NOT TO SCALE



NOTE:
1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

Based on AS4970-2009 NOT TO SCALE

TREE PROTECTION ZONE SIGN

Based on AS4970-2009 NOT TO SCALE