ENSPEC®
ENVIRONMENT AND RISK

WWW.ENSPEC.COM

ABN 92062909255

VISUAL TREE ASSESSMENT (VTA) AND WRITTEN REPORT

LOCATION: DALLEY STREET JUNEE

COMPLETED FOR: JUNEE SHIRE COUNCIL

DATE: MAY 2014

☎+613 9755-6799
+613 9755-6788
ADMIN@ENSPEC.COM

HEAD OFFICE & LABORATORY
UNIT 2 - 13 VIEWTECH PLACE
ROWVILLE. 3178

STATE OPERATIONAL OFFICES

QUEENSLAND
39 VERNON TERRACE
TENERIFFE.

SOUTH AUSTRALIA
24 SOUTH ROAD
WEST HINDMARSH

VICTORIA
22-24 MCCALLUM STREET
SWAN HILL

TASMANIA
53 BRISBANE STREET
LAUNCESTON

TABLE OF CONTENTS

1) EXECUTIVE SUMMARY

ENSPEC was engaged by Junee Shire Council to conduct ground based Visual Tree Assessments, Ground Penetrating Radar tests, and provide a written summary report and management plan, regarding sixteen *Brachychiton populneus* (Kurrajong) located within the road reserves along Dalley Street Junee.

The majority of *Brachychiton populneus* within Dalley Street were assessed to have no significant health or structural issues; with the majority of their conditions typical for the species and indicative of good health and structure. The upper canopy of most trees has been significantly reduced to maintain compliance for power line clearance. The resultant canopy habit of these trees has been degraded, but no significant structural issues were evident. The most significant structural issues pertained to bifurcated unions, to which all were assessed to be structurally stable; and soil heave, pertaining to a previous primary root plate failure for one tree which has since stabilised.

The ground penetrating radar tests identified that all trees have extensive root plates within the road reserve, and that numerous roots are present in close proximity to private property. No obvious or significant issues pertaining to root growth and their interaction with private assets (i.e. fences or houses) were observed during the testing and assessments. Minor deformation of some brick and concrete fencing was observed, but the cause could not be solely attributable to the presence of roots given the age of the structures, the methods of their construction (i.e. absence of expansion joints) and the geology of the area.

Brachychiton populneus is a long lived species, known to survive in cultivation for greater than 100 years. The assessed trees displayed no signs or symptoms to indicate that they have reached over-maturity. If management of their landscape and environment is maintained they are estimated to have significant life expectancies (>50 years), and if site conditions are improved, then their life expectancies and character could be further enhanced.

All trees were assessed to be a low risk and recommended for reinspection in 36 months.

Four trees have been recommended for routine intervention works - canopy lifting and dead limb removal.

All pruning works should be conducted in accordance with Australian Standard 4373-2007: Pruning Amenity Trees.

To facilitate the longevity of the trees ENSPEC recommends the following:

a) Mulch all tree root plates
b) Realign kerb and channel
c) Reengineer low voltage power lines or amend pruning cycles

2) BRIEF & INSPECTION METHODOLOGY

ENSPEC was engaged by Junee Shire Council to conduct ground based Visual Tree Assessments (VTA), Ground Penetrating Radar (GPR) tests, and provide a written summary report and management plan, regarding sixteen *Brachychiton populneus* (Kurrajong) located within the road reserves along Dalley Street Junee.

Dalley Street is identified in the Junee Local Environment Plan 2012 as a Heritage Conservation Area and the Junee Shire Council Urban Tree Management Plan requires the Council to address conflicts that arise from tree species that are on its prohibited species list. *Brachychiton populneus* is on the prohibited species list; however due to its presence within the Dalley Street Heritage Conservation Area its value, contribution and effects must be established to facilitate long-term management decisions for the trees.

Site methodology involved a detailed visual inspection of all parameters pertaining to each trees' present health, including root investigation using GPR. The influence of previous activities on each tree's current condition was considered during the assessment.

3) DATE OF INSPECTION

The Visual Tree Assessments (VTA) and Ground Penetrating Radar (GPR) tests were conducted on the 1st and 2nd of May 2014; the weather conditions while conducting the assessments and test were clear and sunny.

4) ARBORICULTURALISTS CONDUCTING ASSESSMENT

Name of Arboriculturalist	Chris Spencer	Ian Miller
Qualifications	Bachelor of Science (Honours) Diploma in Arboriculture	Diploma in Arboriculture
Contact phone number	0417 702 190	0417 027 165
E-mail Address	chris.spencer@enspec.com	ian.miller@enspec.com
Website Address	**www.enspec.com**	

5) SITE ADDRESS OF TREES

The trees are located within road reserve areas along Dalley Street Junee.

6) MAP OF TREE LOCATIONS

Plate 1 provides an overview of the assessed tree locations.

7) DESCRIPTION OF TREE SPECIES & TREE INFORMATION

All trees assessed are *Brachychiton populneus* (Kurrajong). *Brachychiton populneus* is native to the region, naturally distributed from north-eastern Victoria to northern Queensland. It has a wide environmental distribution, from coastal to semi-arid environs, and thus has high environmental tolerances to issues such as fire and drought. It is a relatively slow growing tree that sometimes becomes semi-deciduous during early summer, and can develop extensive and deep root systems dependant on local soil conditions and geology. Currently, the species is listed on the Junee Shire Council prohibited species list within its Urban Tree Management Plan. Council states that its inclusion on this list is due to its propensity for extensive fruit fall and potential for root invasiveness.

Table 1 provides a summary of the general characteristics of the trees assessed. Detailed tree assessment data has been provided as a separate Appendix - 2014 May Dalley St Junee Tree Data.

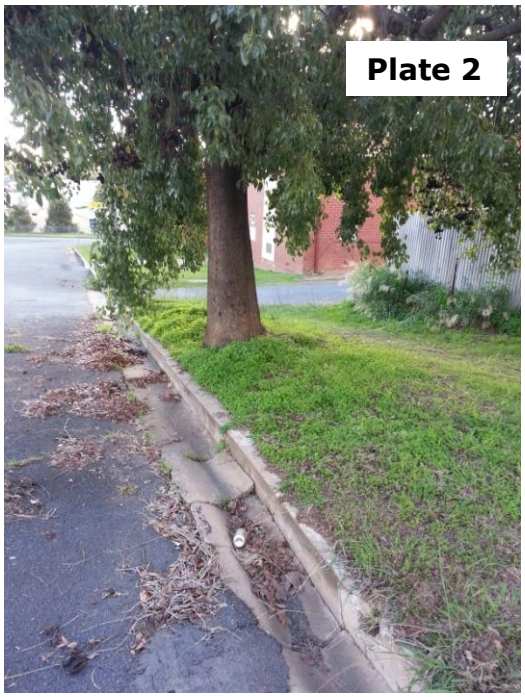
Table 1					
Tree ID	**DBH (cm)**	**Height (m)**	**Canopy E-W (m)**	**Canopy N-S (m)**	**Age (est.)**
1	51	5	10	9	> 80 years
2	42	5	7	9	> 80 years
3	32	5	7	6	> 80 years
4	34	5	6	7	> 80 years
5	41	5	8	7	> 80 years
6	38	5	5.5	5	> 80 years
7	52	5	9	9	> 80 years
8	37	5	7	7	> 80 years
9	36	5	7	5	> 80 years
10	43	5	9	6	> 80 years
11	21	5	7.5	7	> 80 years
12	53	5	8	9	> 80 years
13	40	5	7	6.5	> 80 years
14	38	5	6.5	6.5	> 80 years
15	47	8	9	9	> 80 years
16	65	8	7	6.5	> 80 years

8) TOPOGRAPHY STATEMENT

Dalley Street consists of a wide road, with porphyry kerb and guttering. The road reserve areas were observed to be wide and generally consisted of gravel, grass and exposed soil. The street raises to a crest approximately in the middle, with obvious slopes east and west either side. The site is acknowledged to have a long history within the community, with the St. Pauls Uniting Church, located on the corner of Stewart Street and Dalley Street, built in 1904. It was interpreted that some of the houses within the street were constructed within the early 1900s, as several were observed to have dated foundation stones inscribed with dates prior to 1920.

9) OBSERVATIONS OF TREE CONDITION

a) Root Plate Statement



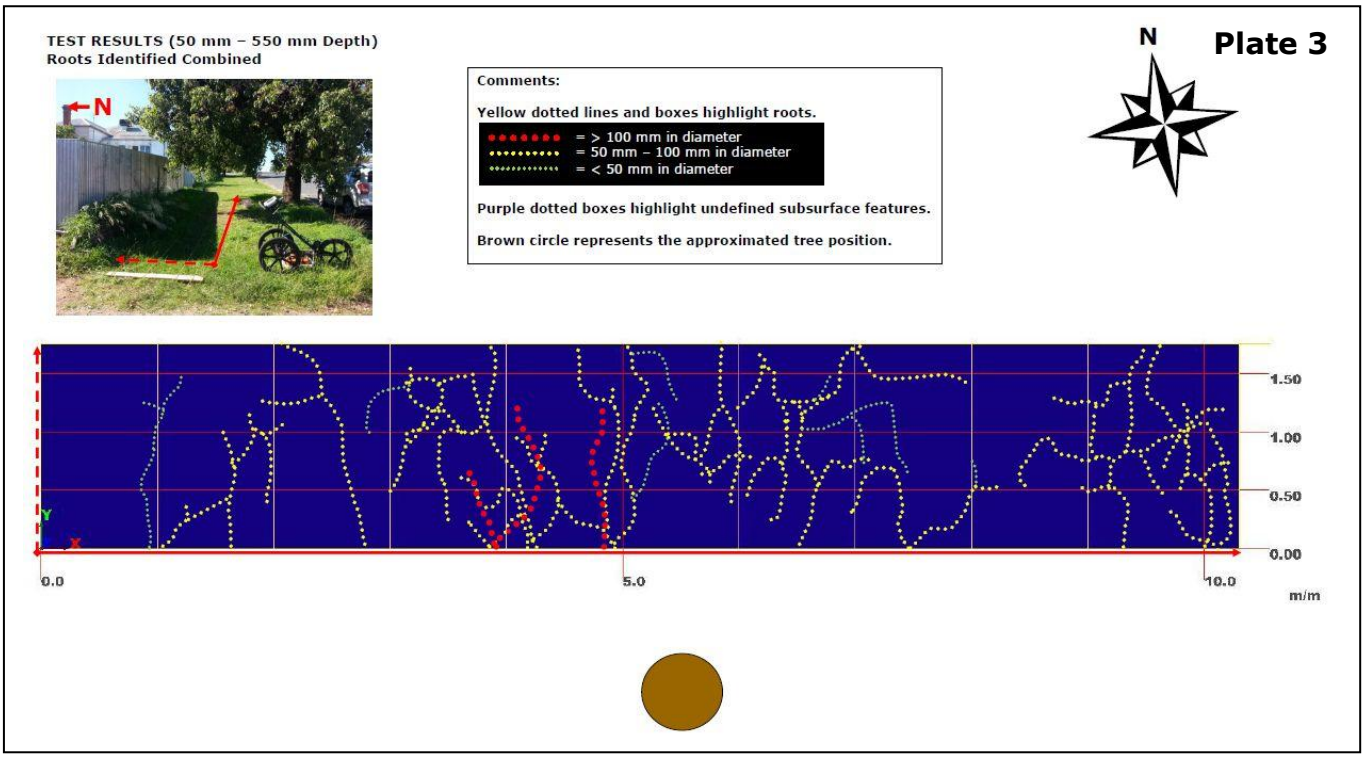
All trees were located approximately 200-700 mm north of the kerb and bitumen road (e.g. Plate 2 – Tree 1). Given the estimated age of the trees in relation to these assets it was assumed that roots may have been damaged and disturbed during their construction; however, no obvious signs or symptoms of damage were evident at the time of assessment.

Deformation of the kerb and bitumen road was observed directly adjacent to most trees, and was interpreted to have been caused by root growth. No significant hazards were observed, associated with the extent of deformation.

On the northern side of the trees is a wide footpath that commonly consisted of lawn; however footpath areas located on the crest of Dalley Street generally consisted of gravel and exposed soil. Several footpath areas adjacent to assessed trees displayed signs of compaction, but the extent was not assessed to be significantly affecting tree health.

Due to the species, and history of the site, GPR tests were conducted on the northern side of each tree, close to private property fence lines. The purpose of the tests was to identify roots in close proximity to private property and assets.

Plate 3 provides an example of the summary test findings within the upper soil profile north of Tree 1. All summary details of test findings within the upper soil profile for each tree have been provided in Appendix 1. All GPR test results have been provided as separate report Appendices.



Generally, the GPR tests indentified numerous root masses within each test area, with many roots identified to extend across the entire width of each test area toward private properties. Trees within private property were adjacent to four if the test areas, and roots from these private trees were identified by the GPR tests within those test areas.

Most commonly, roots were identified at all depth ranges from 50 mm – 1550 mm depth; with major roots interpreted to vary in size from 50 mm – 150 mm in diameter.

Several subsurface utilities were identified within the GPR tests; adjacent to Tree 5, 8, 9, 15, and 16. It was interpreted that roots would have been damaged and disturbed during the construction and maintenance of these subsurface utilities. No obvious signs of damage were evident for most trees, but symptoms of root damage or disturbance were observed within the canopy of Tree 9. Additionally, two small excavations pits were observed adjacent to Tree 15 and 16 (Plate 4). Within the two small excavations pits, roots less than 75 mm in diameter had been severed (Plate 5).

Plate 4

Plate 5

The majority of tree root plates were observed to be relatively undisturbed and interpreted to represent stable conditions. However, Tree 7 was observed to have an obvious trunk lean towards the east, and its root plate displayed signs of soil heave and root displacement (Plate 6). It was interpreted that the tree has likely experienced a primary root plate failure in the past, whereby roots on its western side have failed, but the remaining root system has been sufficient to maintain support for the tree. The tree was assessed to be structurally stable at the time of assessment, indicating that the tree's root system has responded to the primary failure with the formation of new roots to provide support.

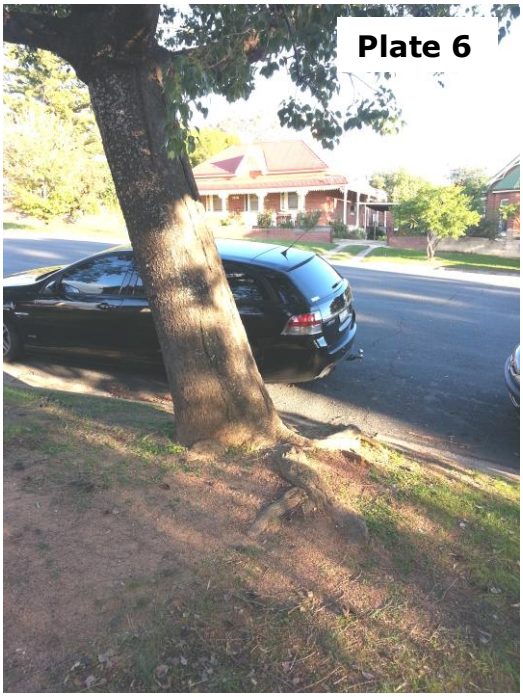


Plate 6

b) Root and Trunk Buttress Statement

All trees displayed prominent root/trunk buttressing that has developed in response to prevailing climatic and environmental conditions, which would generally be indicative of extensive root development providing sound structural support. Due to the prevailing soil conditions, several trees displayed extensive buttressing (e.g. Plate 7 – Tree 2) and surface root development (e.g. Plate 8 – Tree 9). Minor mechanical damage was observed to some buttressing and surface roots but no significant issues were identified.


Plate 7


Plate 8

c) Tree Trunk Structure Statement

The majority of trees were observed to have single trunks that displayed excellent taper to their first major scaffold limbs, and displayed no significant structural issues or obvious signs of damage or decay.

Three trees were observed to have bifurcated trunk unions – Tree 11, 13 and 16.


Plate 9 - Tree 11


Plate 10 - Tree 13


Plate 11 - Tree 16

The bifurcated unions of Tree 13 and 16 were observed to be structurally stable, with only minor bark inclusion and swelling evident. The bifurcated union of Tree 11 was observed to be tight, with obvious trunk deformation occurring. The trunk structure of Tree 11 was assessed to be structurally stable at the time of assessment; however it is acknowledged that issues with its structure may develop in the future that may necessitate intervention works (e.g. cabling or bracing).

d) Tree Branches and Limb Statement


Plate 12

Tree 1 – 14 are located directly beneath low voltage power lines. Consequently, their canopies have been significantly pruned to ensure that appropriate clearance is maintained to these electrical assets (e.g. Plate 12 – Tree 2). The resultant canopy structure of these trees has been degraded, but all were assessed to be structurally stable.

All major scaffold limbs were observed to have excellent taper and sound unions, and several trees were observed to have extended lateral limbs. All major scaffold limbs were assessed to be structurally stable and have a low likelihood for failure.

Recent canopy pruning was observed to have occurred on several of the assessed trees. It was identified that much of the pruning did not adhere to the current Australian Standard 4373-2007: Pruning Amenity Trees. Issues of poor pruning pertained to branch tears (Plate 13), flush cuts (Plate 14) and retention of stubs. While not a significant issue for the current structure of the trees, these observations highlight that pruning standards for Council and contractors should be improved and maintained.


Plate 13


Plate 14

e) Canopy/Foliage Statement

Given their landscape setting, all trees, except for Tree 9, displayed leaf size, colour, density and new season (internodal) growth typical for the species; generally indicative of good health (Plate 15). Tree 11 displayed obvious signs of tip dieback, leaf chlorosis (i.e. yellowing) and reduced canopy density (Plate 16). These observations are typical for trees that have been affected by root plate issues such as compaction and damage; both of which were identified as affecting this tree. The extent of canopy decline was assessed to be affecting the long term viability of the tree; but with favourable climatic conditions, and avoidance/minimisation of further root damage the tree has potential to recover.

Plate 15

Plate 16

f) Size of Dead Wood Statement

Dead limbs within the canopies of the assessed trees were most commonly less than 50 mm in diameter. Four trees (Tree 9, 12, 13, and 14) were observed to have larger dead limbs (<75 mm in diameter) that require routine intervention works.

g) Pest and Disease Statement

No obvious signs or symptoms of significant pests or diseases were evident within the canopies of the assessed trees. The presence of *Mictis profana* (Crusader Beetles) was observed on a few trees. This insect species feeds on young plant growth, which results in the wilting of shoots, but is identified as a minor pest with low potential for significant damage to trees.

10) IMPACT STATEMENT OF TREE IN LOCATION

The trees are located within a Heritage Conservation Area as defined within the Junee Local Environment Plan 2012. As such, they are acknowledged to have historical significance for the local community. Additionally, they are mature native specimens that are providing shade for residents and pedestrians, habitat for local fauna, and due to their prominence within the street as an avenue planting, they are acknowledged to have local landscape value.

Trees in urban areas contribute significantly to human health and environmental quality by providing various ecosystem services (i.e. the conditions and processes through which ecosystems sustain and enhance human life). To better understand the ecosystem services and values provided by trees, the U.S. Forest Service developed i-Tree Eco. The results from i-Tree models are used to advance the understanding of tree and forest resources; improve urban forest policies, planning and management; provide data to support the potential inclusion of trees within environmental regulations; and determine how trees affect the environment and consequently enhance human health and environmental quality in urban and rural areas. Further details about the methodology, calculations and values can be sourced at: http://www.itreetools.org.

The sixteen trees within the assessment area are calculated to be providing the following environmental and functional benefits.

Table 2	
Current Carbon Storage	7.2 tonnes ($174)
Annual Carbon Sequestered	0.5 tonnes ($12)
Leaf Area	2040 m²
Annual Pollution Removal	3.7 kg
Annual Rainfall Interception	5 m³ ($12)
Annual Heating Benefits	31 kWh ($1.2)
Annual Cooling Benefits	205 kWh ($7.7)
Amenity Value	$85,649

11) RISK ASSESSMENT MATRIX OF THE TREE

While inspecting and assessing the trees, a risk assessment was completed. The risk rating is allocated to help assess the consequences the tree or group of trees pose to a target.

The formula is (Likelihood of Failure * Likelihood of Impact)/2*Consequences.

When conducting the assessment the part of the tree that is most likely to fail within the inspection period is assessed and rated. The inspection period for this assessment has been deemed at **36** months.

Tree ID	Likelihood Failure	Likelihood value	Likelihood of Impact	Impact value	Consequences	Consequence value	Risk Rating	Risk
1	Rare	2	Occasional Use	6	Insignificant	1	6	**Very Low**
2	Rare	2	Occasional Use	6	Insignificant	1	6	**Very Low**
3	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
4	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
5	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
6	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
7	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
8	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
9	Moderate	6	Frequent Use	8	Minor	4	96	**Very Low**
10	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
11	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
12	Moderate	6	Frequent Use	8	Minor	4	96	**Very Low**
13	Moderate	6	Frequent Use	8	Minor	4	96	**Very Low**
14	Moderate	6	Frequent Use	8	Minor	4	96	**Very Low**
15	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**
16	Rare	2	Frequent Use	8	Insignificant	1	8	**Very Low**

The Likelihood of failure was most commonly based upon a limb less than 75 mm in diameter failing.
The Likelihood of impact was most commonly based upon the limb failing over the road.
The Consequence was most commonly based upon the limb impacting with a vehicle or pedestrian.

12) LIFE EXPECTANCY OF TREE

All trees have an estimated life expectancy of greater than 50 years. This estimation was based upon the tree species and the current conditions in their given locations.

13) DISCUSSION

The majority of *Brachychiton populneus* within Dalley Street were assessed to have no significant health or structural issues; with the majority of their conditions typical for the species and indicative of good health and structure. The most significant structural issues pertained to bifurcated unions, to which all were assessed to be structurally stable; and soil heave, pertaining to a previous primary root plate failure for one tree which has since stabilised. The most common issue pertained to the extent of canopy pruning conducted to maintain power line clearance compliance. None of the health or structure issues observed was assessed to be significantly affecting the longevity or level of risk of the trees.

The ground penetrating radar tests identified that all trees have extensive root plates within the road reserve, and that numerous roots are present in close proximity to private property. No obvious or significant issues pertaining to root growth and their interaction with private assets (i.e. fences or houses) were observed during the testing and assessments. Minor deformation of some brick and concrete fencing was observed, but the cause could not be solely attributable to the presence of roots given the age of the structures, the methods of their construction (i.e. absence of expansion joints) and the geology of the area.

Brachychiton populneus is a long lived species, known to survive in cultivation for greater than 100 years. The assessed trees displayed no signs or symptoms to indicate that they have reached over-maturity. If management of their landscape and environment is maintained they are estimated to have significant life expectancies (>50 years), and if site conditions are improved, then their life expectancies and character could be further enhanced. Due to the good health and extended estimated life expectancies of the trees ENSPEC does not deem it necessary to address requirements for a replacement species as defined in the consultant brief.

14) RECOMMENDATIONS & REMEDIAL WORKS

The following table provides a summary of the routine intervention works recommended.

Table 3

Tree ID	Remedial Works	Priority for Maintenance	Equipment
1	Crown lift	Routine	Chipper
9	Deadwood Removal	Routine	Chipper
12	Deadwood Removal	Routine	Chipper
13	Deadwood Removal	Routine	Chipper
14	Deadwood Removal	Routine	Chipper

All pruning works should be conducted in accordance with Australian Standard 4373-2007: Pruning Amenity Trees.

In addition to the routine intervention works ENSPEC recommends the following to facilitate the longevity of the trees and maintenance of their health and structure.

a) Mulch all tree root plates.
b) Realignment of kerb and channel.
c) Reengineering of low voltage power lines or amend pruning cycles.

a) Forest mulch, containing a combination of woody materials, bark, and leaves, should be applied directly onto the root plate of each tree. Mulch should be composted (minimum of 3 months) and sourced from a reputable supplier to ensure it is free of foreign pests and diseases. Mulch should be manually spread (i.e. no machinery) to an approximate depth of 100 mm directly beneath the canopy of each tree. The addition of mulch to the root plates of these trees should be conducted to improve and replenish nutrient cycling within the soil, which will improve soil structure, gaseous exchange and infiltration, which will facilitate improved tree health.

b) Deformation of the existing kerb and channel was observed during the assessments. It is acknowledged that this infrastructure will likely be replaced in the future. To ensure the longevity of the trees, ENSPEC recommends that all construction works be conducted in accordance with Australian Standard 4970-2009: Protection of trees on development sites as far as practicable. To achieve compliance with this standard it is recognised that the kerb and channel will need to be realigned away from the trees. The optimum distance for this realignment would be defined by the Australian Standard (AS4970-2009), but it is acknowledged that the full extent of this may not be achieved due to traffic management requirements. All Tree Protection Zones and Structural Root Zones have been provided within the separate Appendix - 2014 May Dalley St Junee Tree Data.

c) The trees are recognised to have heritage significance and as such their management should reflect their value. The presence of the low voltage power line is significantly affecting the canopy habit of most of the trees as their canopies are cyclically pruned to ensure that appropriate clearances to these electrical assets are maintained. Cyclic pruning requires removal of canopy within the legislated clearance zones, and additional clearance to accommodate growth that will occur between pruning cycles.

   ENSPEC identifies that the best way to improve the canopy structure of these trees is to minimise their requirements for pruning. This can best be achieved by reengineered to aerial bundle cable. However, it is acknowledged that reengineered to aerial bundle cable is likely to be cost prohibitive to Council. Therefore an alternative action would be to instigate an annual pruning cycle so as to reduce clearance requirements for these trees.

15) DISCLOSURE STATEMENT

ENSPEC Pty Ltd and their employees are specialists who use their knowledge, training and education (qualifications), infield learning experiences, personal experiences research, diagnostic tools, scientific equipment to examine trees, recommend measures to enhance the beauty, health and preservation of trees, to reduce the risk of living near trees.

Trees are living organisms that can be affected by pests, diseases and natural events outside of ENSPEC control. ENSPEC and their employees cannot detect every condition that affects a trees health, condition and structural integrity. Conditions are often hidden within trees and below ground where humans cannot naturally see. Unless otherwise stated, ENSPEC's employee's observations have been visually made from ground level.

In the event that ENSPEC recommends retesting or inspection of trees at stated intervals, or ENSPEC recommends the installation engineering solutions, ENSPEC must inspect the engineering solution at intervals of not greater than 12 months, unless otherwise specified in writing. It is the client's responsibility to make arrangements with ENSPEC to conduct re-inspections.

Intervention treatments of trees may involve considerations beyond the scope of ENSPEC's service, such as property boundaries and ownership, disputes between neighbours, sight lines, landlord-tenant matters and other related incidents. ENSPEC cannot take such issues into account unless complete and accurate information is given prior or at the time of the site inspection. Likewise ENSPEC Pty Ltd cannot accept responsibility for the authorisation or non-authorisation of any recommended treatment or remedial measures undertaken.

ENSPEC Pty Ltd cannot guarantee that a tree will be healthy or safe under all circumstances or for a specified period of time after our initial inspection and recommendations.

If this written report is to be used in a court of law, or any other legal situation, or by other parties ENSPEC must be advised in writing prior to the written report being presented in any form to any other party. All written reports must be read in their entirety. At no time shall part of the written assessment be referred to unless taken in full context with the whole written report.

Clients may choose to accept or disregard the recommendations of the assessment and written report.

Notwithstanding anything in the report, express or implied, the client is not entitled to recover from ENSPEC Pty Ltd, its employees, agents and/or subcontractors any damages for business interruption or loss of actual or anticipated revenue, income or profits or any consequential, special, contingent or penal damage, whatsoever, and the client releases ENSPEC Pty Ltd from any such liability. Without limitation of the foregoing, a party shall at all times be limited (to the extent permitted by law) damages in the amount paid by the Client to ENSPEC Pty Ltd for ENSPEC Pty Ltd services. The limitation applies whether the claim is based on warranty, contract, statute, tort (including negligence) or otherwise.

APPENDIX 1 SUMMARY GPR TEST RESULTS

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circle represents the approximated tree position.

Tree 1 – Side of 33 Denison Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

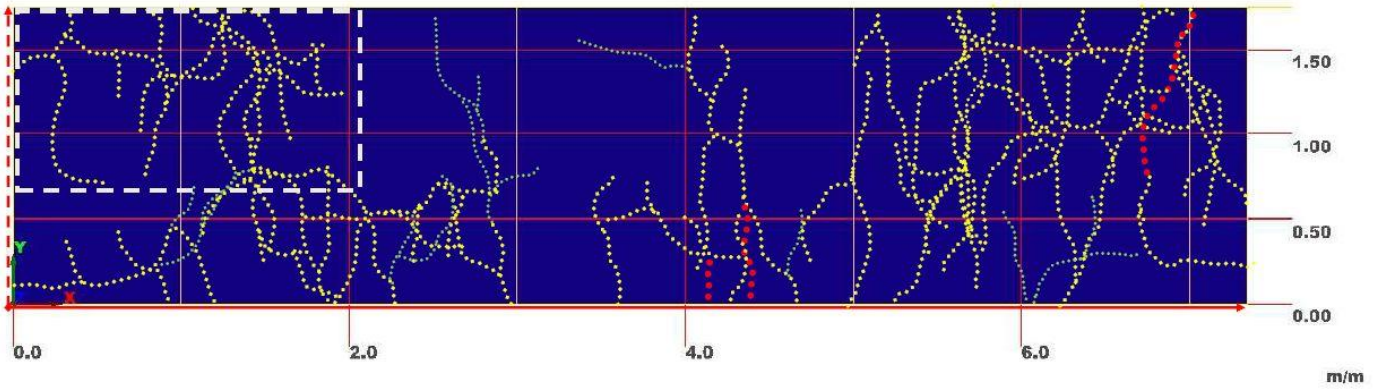
Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

White dotted boxes highlight roots from private trees.

Brown circles represent the approximated tree positions.



ENSPEC
ENVIRONMENT AND RISK

Tree 2 – Corner of Dalley & Denison Streets

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

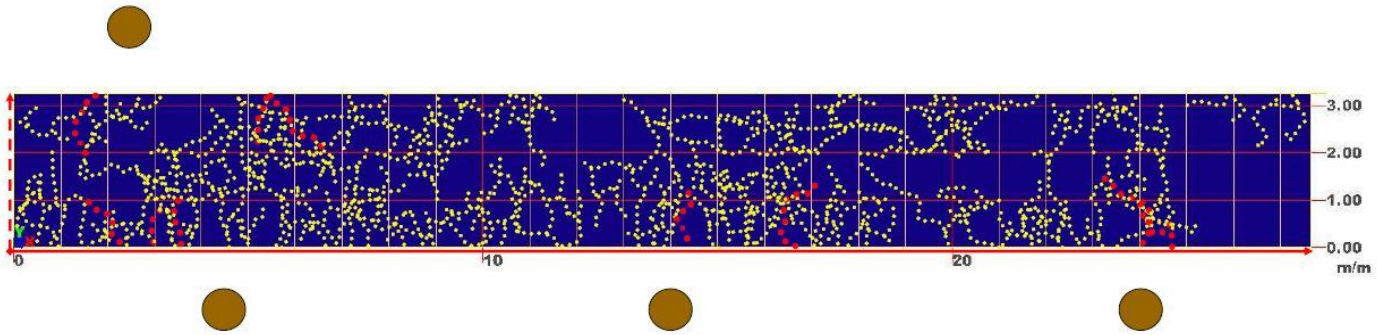
Comments:

Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.



Tree 3, 4 and 5 - Side of 28 Denison Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

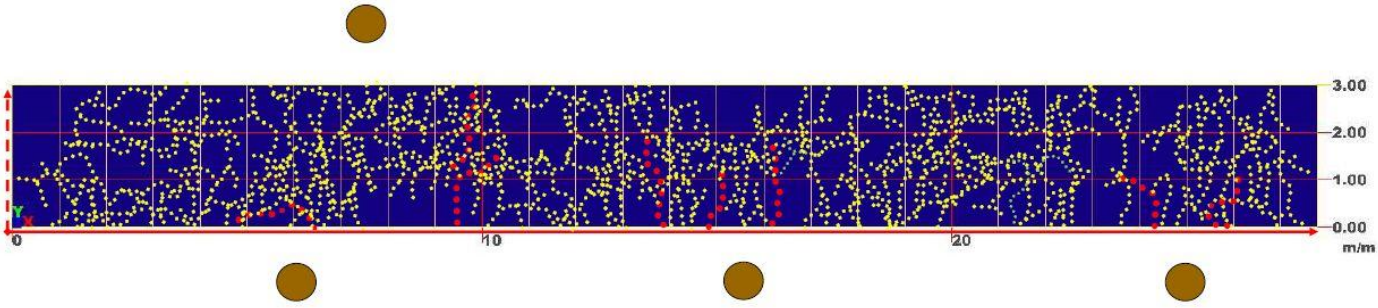
Comments:

Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.



Tree 6, 7 and 8 – 16 Dalley Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

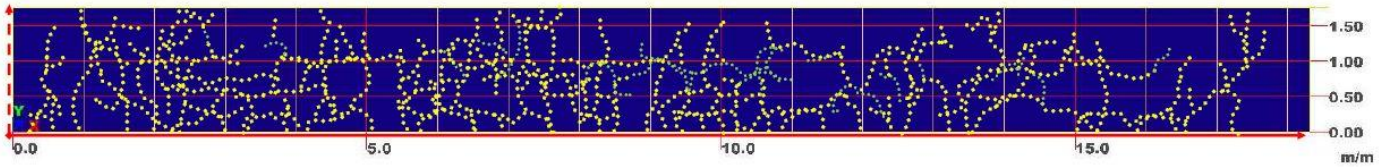
Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.

N



Tree 9 and 10 – 18 Dalley Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

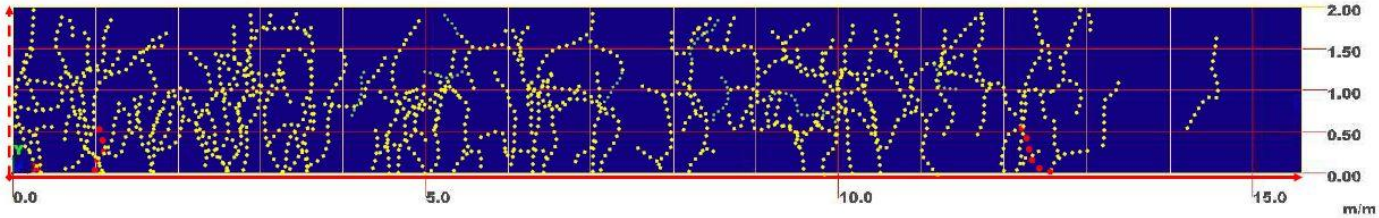
Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.

N



Tree 11 and 12 – 28 Dalley Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

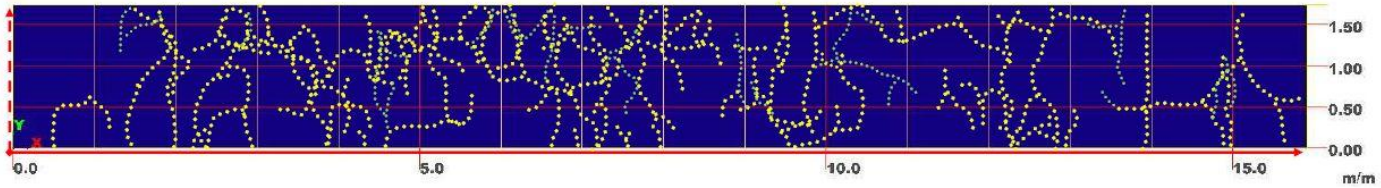
Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.

N



Tree 13 and 14 – 30 Dalley Street Junee

TEST RESULTS (50 mm – 550 mm Depth)
Roots Identified Combined

Comments:

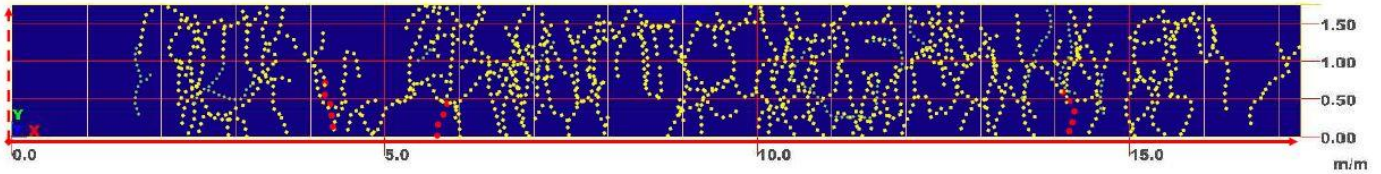
Yellow dotted lines and boxes highlight roots.

= > 100 mm in diameter
= 50 mm – 100 mm in diameter
= < 50 mm in diameter

Purple dotted boxes highlight undefined subsurface features.

Brown circles represent the approximated tree positions.

N



Tree 15 and 16 – 32 Dalley Street Junee

APPENDIX 2 TREE ASSESSMENT MATRIX

The following table shows the ratings for the Likelihood of Failure, Likelihood of Impact and the Consequences. We have developed a simple formula to categorise the risk posed by the tree. The formula is:

(Likelihood of Failure X Likelihood of Impact) divided by 2, & multiplied by the Consequences.

At the completion of this assessment a more detailed analysis may be required to document the risk. The maximum total score that can be allocated to a tree or area using this matrix is **500 points**.

At the completion of the assessment, and to help categorise the final quantified risk of the tree, we have applied the following points table; these categories are not set and may be amended to meet specific local requirements for special needs. It is important that the assessor uses common sense when providing recommendations. Mitigation of risk should not always involve only the tree; simple options such as the relocation or realignment of the target can be a workable, cost effective outcome (eg. shifting a footpath). Alternative options can be clearly documented in a management plan.

1 -125 points = Very Low Risk Tree. For example, the tree will have no failures prior to the next inspection period and in most cases no remedial arboriculture works will be required.

125 – 250 points = Low Risk Tree. For example, remedial arboriculture works or tree removal **may** be required to mitigate the risk of this tree. A management plan defining the outcomes of the assessment **may be** required. Engineering solutions may also be considered in order to mitigate the risk.

250 – 375 points = Medium Risk Tree. For example, remedial arboriculture works or a management plan **will be** required to manage the tree. Engineering solutions may need to be implemented to mitigate the risk. Total removal may be the only option.

375 – 500 points = High Risk Tree. For example, extensive remedial arboriculture works and an extensive management plan **are** required to manage the tree (if retained). Engineering solutions may need to be implemented to mitigate the risk. Total removal of the tree may be the only option.

Likelihood of Failure
The Likelihood of Failure (e.g. the branch or tree failing) is assessed up to the next designated inspection date. If the tree is on an annual inspection regime the assessor must only assess that part of the tree he believes could, or will, fail within the inspection period. If there are other defects in the tree that could fail outside of the inspection period their Likelihood of Failure should not be considered, as they have not been identified as the 'immediate risk'. Such defects should be documented in some form, such as in a comment section or a more detailed written report - the client should define these requirements.

Likelihood of Impact
The Likelihood of Impact is assessed by estimating the period of time the target is occupied by a human. A tree could have several different Likelihood of Impact ratings under the tree's own canopy; for example, the tree may overhang a footpath, as well as an area that cannot be accessed by humans or vehicles. If the defect is located above a footpath that is used for 4-8 hours per day the assessor would categorise the Likelihood of Impact as 'Frequent Use', whereas, if the defect is located above an area that is not used (e.g. grass or garden bed) the Likelihood of Impact would be assessed as 'Low Use'.

Consequences
When assessing the Consequences, the section of tree that must be assessed (e.g. branch, trunk) is that which the arborist believes could fail within the defined inspection time frame and hit the designated Likelihood of Impact (target). The specific section being assessed for Likelihood of Failure could be any part of the tree, from a small piece of dead wood of <25 mm through to the whole tree. The rating for Consequences is calculated by estimating the extent, severity and value of damage caused by a tree failure resulting in an impact.

The re-inspection date plays a critical role in determining the Likelihood of Failure and it is critical that the future inspection regime is determined prior to or at the completion of the tree inspection. Full inspection cycles are generally categorised as 1, 3 or 5 years.

Additional Assessment
At all times the assessor should complete a second risk assessment while on site if remedial works or engineering solutions are to be recommended in the final report; this allows the client to understand the risk the tree poses **after** the recommendations have been implemented.

Likelihood of Failure

10	**Almost certain**	Obvious fault that indicates a failure is almost certain under normal conditions within the re-inspection period (better than 1:2 - 50% chance)
8	**Likely**	Obvious fault that indicates a failure is highly likely under normal conditions within re-inspection period (better than 1:4 - 25% chance)
6	**Moderate**	Obvious fault that indicates failure is possible under normal conditions within re-inspection period (better than 1:10 – 10% chance)
4	**Unlikely**	Obvious fault that indicates failure is unlikely to occur under normal conditions within re-inspection period (better than 1:50 – 2% chance)
2	**Rare**	Obvious fault that indicates failure is very unlikely to occur under normal conditions within re-inspection period (better than 1:100 –< 2% chance)
1	**Not expected**	No observable fault that would suggest failure is likely to occur within re-inspection period

Likelihood of Impact

10	**Constant Use 1:3**	An area that is used or occupied more than 8 hours per day by human beings or other transient situations, such as parked cars
8	**Frequent Use 1:6.25**	An area that is used or occupied between 4 & 8 hours per day by human beings or other transient situations, such as parked cars
6	**Occasional Use 1:12.5**	An area that is used or occupied between 2 & 4 hours per day by human beings or other transient situations, such as parked cars
4	**Minimal Use 1:25**	An area used or occupied between 1 & 2 hours per day by human beings or other transient situations, such as parked cars
1	**Low Use <1:25**	An area used or occupied for less than 1 hour per day by human beings or other transient situations, such as parked cars

Consequences

10	**Catastrophic**	1. HUMAN impacts - paraplegia, quadriplegia, brain damage or death 2. Extensive property damage - will require the building to be rebuilt; potential for a consequence catastrophic Property damage likely to be more than $100,000
8	**Major**	1. HUMAN impacts - serious and / or extensive injuries requiring medical treatment with hospital admission 2. Significant property damage / partial loss - will require substantial works to repair the building; consequence major Damage likely to be greater than $20,000 and less than $100,000
6	**Moderate**	1. HUMAN impacts - moderate injuries requiring medical treatment but without hospital admission 2. Moderate property damage requiring repair work; damage to building medium; consequences moderate Damage likely to be more than $5000 and less than $20,000
4	**Minor**	1. HUMAN impacts - minor injuries immediately treated on-site with First Aid treatment 2. Minor property damage - damage to building light; minor affect on persons inside; consequences minor Damage likely to be more than $1000 and less than $5000
1	**Insignificant**	1. HUMAN impact - unlikely to cause injuries 2. Insignificant damage likely to the building or property; consequences insignificant Damage will be less than $1000 e.g. broken tiles or windows