



Irrawang HS

CARPARK ADDENDUM

Aaron Bath

ASSURANCE TREES | PO BOX 852, MAITLAND, NSW, 2320

21 SEPTEMBER 2023

Contents

1. Summary.....	3
2. Scope of Addendum	4
3. Design Changes.....	5
4. Impacts of Changes	6
References.....	7
Appendix A - Tree Data.....	8
Appendix B – Maps.....	10
Appendix C – Site Image	13
Appendix D – Limitations and Disclaimer.....	20
Appendix E – Glossary of Terms	21

1. Summary

- 1.1. This Addendum is to be read in conjunction with the *Irrawang HS Arboriculture Impact Assessment Final Issue V2* dated 19th December by *Assurance Trees*.
- 1.2. 10 additional trees will require removal to facilitate the carpark design changes.
Detail of retention values for trees that will be removed are as follows:
 - 1.2.1. High Retention Value Trees (A Grade) – 1
 - 1.2.2. Moderate Retention Value Trees (B Grade) – 5
 - 1.2.3. Low Retention Value Trees (C Grade) – 4
- 1.3. Trees that require removal and all associated data on these trees are listed in *Appendix A – Tree Data*.
- 1.4. The map provided in *Appendix B* of this Addendum must be used as an update to the map provided in the original AIA.

2. Scope of Addendum

Assurance Trees have been engaged by the client (SINSW) and directed by the client representative (APP) to investigate the impacts of changes to the carpark design that have been requested by the determining authority. We have prepared this addendum to be used in conjunction with the original *Arboriculture Impact Assessment* dated 19th December. This addendum includes:

- Assesses design changes against the original AIA.
- Plot extension of the carpark footprint onto the Tree location map to identify any additional impacts. Include this plan in this report.
- Specify retention or removal for all trees around the carpark that have potential impacts.
- Summarise impacts on trees and associated retention values.
- Provide an updated table for tree data on trees that will be impacted.
- Produce a clear map of additional trees to be removed.
- Identify changes to Tree Exclusion Zones.

3. Design Changes

- 3.1. A map is provided in *Appendix B* of the design changes provided by *EJE*.
- 3.2. Carpark is extended significantly to the West of the site impacting on 2 clusters of trees previously listed for retention.
- 3.3. The carpark increases in footprint to the north slightly, however, does not significantly impact on additional trees.
- 3.4. A few extra carparks are being included in the previous island area at the Southeast corner of the carpark, impacting a tree.
- 3.5. The extension of the carpark to the East only impacts a single tree as there is an existing carpark covering most of this area already that will be demolished, resulting in minimal increase in footprint. A single tree is impacted in the East.

4. Impacts of Changes

- 4.1. All impacts have been mapped in *Appendix B, Figure 2 Updated Tree Plan*.
- 4.2. The carpark extension to the North has encroached slightly on trees number 240 241 and 245, however the encroachment is still classified as Minor (less 10%) so no additional protection measures will be required. Follow protection measures in original AIA.
- 4.3. The carparks and footpath in the Northwest corner will impact on 6 trees, 5 of which will require removal and one that will have only minor encroachments so no management changes will be required. Trees to be removed are numbers 258, 259, 260, 261 & 262. Tree 263 can be retained by following standard Tree Protection measures as detailed in the original AIA.
- 4.4. Carpark and footpath extension in the Southwest corner will impact on 4 trees, 3 of which will require removal and one that will need to be managed during footpath construction to ensure that no damage to roots will occur inside the TPZ. Project arborist to supervise works in this area as encroachment is greater than 10%. Trees requiring removal are 265, 266 & 267.
- 4.5. Carpark extension towards the entrance on the South side will cause additional impacts resulting in the requirement to remove tree 272. Follow original tree management for the other trees along the roadside (trees 268, 269, 270 & 271).
- 4.6. Carpark extension to the East will cause additional impacts on tree 75 which will require removal. No other impacts identified in this area. Follow tree management procedures listed in original AIA.
- 4.7. Slight changes to the exclusion zone fencing will be required to facilitate the increased footprint. See *Figure 2 Updated Tree Plan* in *Appendix B* which has all updated exclusion fencing for this carpark area.

References

Standards Australia, 2007. *AS 4373 Pruning of Amenity Trees*, Sydney: Standards Australia.

Standards Australia, 2009. *AS 4970 Protection of Trees on Development Sites*, Sydney: Standards Australia.

Architectural Plans Carpark Option 3, EJE, 2023

Appendix A - Tree Data

Tree	Botanical Name	Common Name	Trees in Group	Estimated DBH (mm)	Estimated DRB (mm)	Radial TPZ (m)	TPZ area (m ²)	Radial SRZ (m)	Tree Height	Canopy (m)	Health	Structure	Age	ULE (Yrs.)	Outcome	Tree Quality Score
75	<i>Eucalyptus paniculata</i>	Grey Iron Bark	1	500	550	6.0	113.10	2.6	15-20	15-20	Good	Fair	Mature	15 -25	Remove	B
258	<i>Pittosporum undulatum</i>	Sweet Pittosporum	1	150	165	1.8	10.18	1.6	<5	<5	Good	Good	Juvenile	10-15	Remove	C
259	<i>Grevillea robusta</i>	Silky Oak	1	200	220	2.4	18.10	1.8	5-10	<5	Good	Good	Juvenile	15-25	Remove	C
260	<i>Corymbia maculata</i>	Spotted Gum	1	350	385	4.2	55.42	2.2	20-30	10-15	Good	Fair	Semi Mature	25-50	Remove	B
261	<i>Corymbia maculata</i>	Spotted Gum	1	500	550	6.0	113.10	2.6	20-30	10-15	Good	Good	Mature	25-50	Remove	A
262	<i>Corymbia maculata</i>	Spotted Gum	1	350	385	4.2	55.42	2.2	15-20	5-10	Good	Fair	Semi Mature	25-50	Remove	C
263	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	1	900	990	10.8	366.44	3.3	10-15	10-15	Good	Fair	Mature	10-15	Retain	B
264	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	1	600	660	7.2	162.86	2.8	10-15	10-15	Good	Fair	Mature	10-15	Retain with Supervision	B
265	<i>Eucalyptus paniculata</i>	Grey Iron bark	1	500	550	6.0	113.10	2.6	10-15	10-15	Good	Fair	Mature	25-50	Remove	C
266	<i>Eucalyptus paniculata</i>	Grey Iron bark	1	500	550	6.0	113.10	2.6	15-20	10-15	Good	Fair	Mature	25-50	Remove	B
267	<i>Eucalyptus tereticornis</i>	Forest Red Gum	1	950	1045	11.4	408.28	3.4	20-30	15-20	Fair	Fair	Mature	15-25	Remove	B
268	<i>Eucalyptus tereticornis</i>	Forest Red Gum	1	300	330	3.6	40.72	2.1	5-10	5-10	Fair	Fair	Juvenile	15-25	Retain	C
269	<i>Eucalyptus tereticornis</i>	Forest Red Gum	1	450	495	5.4	91.61	2.5	15-20	5-10	Good	Fair	Semi Mature	15-25	Retain	B
270	<i>Eucalyptus tereticornis</i>	Forest Red Gum	1	700	770	8.4	221.67	3.0	15-20	15-20	Good	Fair	Mature	25-50	Retain	A
271	<i>Eucalyptus tereticornis</i>	Forest Red Gum	1	600	660	7.2	162.86	2.8	15-20	15-20	Good	Fair	Mature	25-50	Retain	A
272	<i>Eucalyptus botryoides</i>	Southern Mahogany	1	400	440	4.8	72.38	2.3	5-10	5-10	Good	Fair	Semi Mature	15-25	Remove	B

Appendix B – Maps

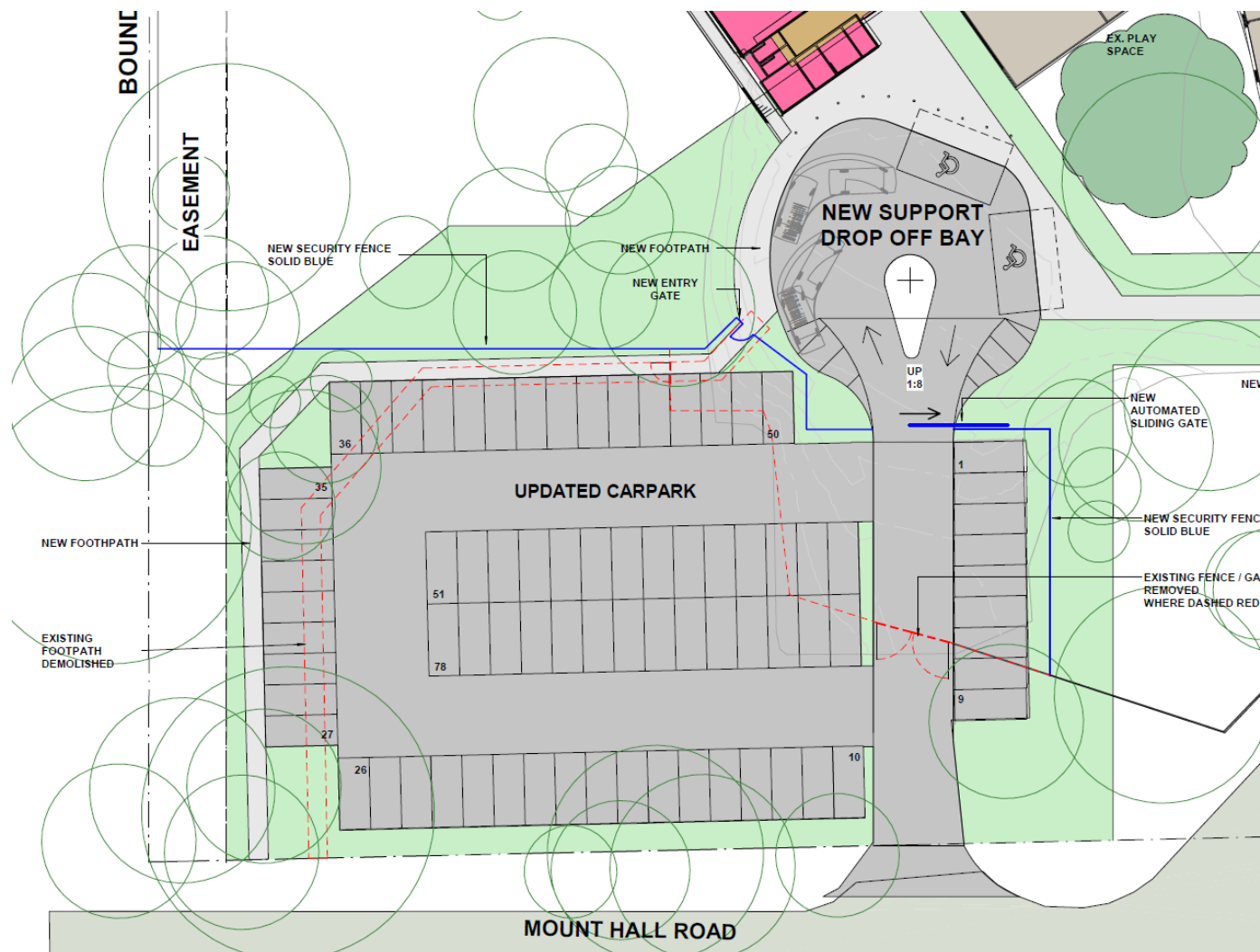


Figure 1 - Changes provided by EJE

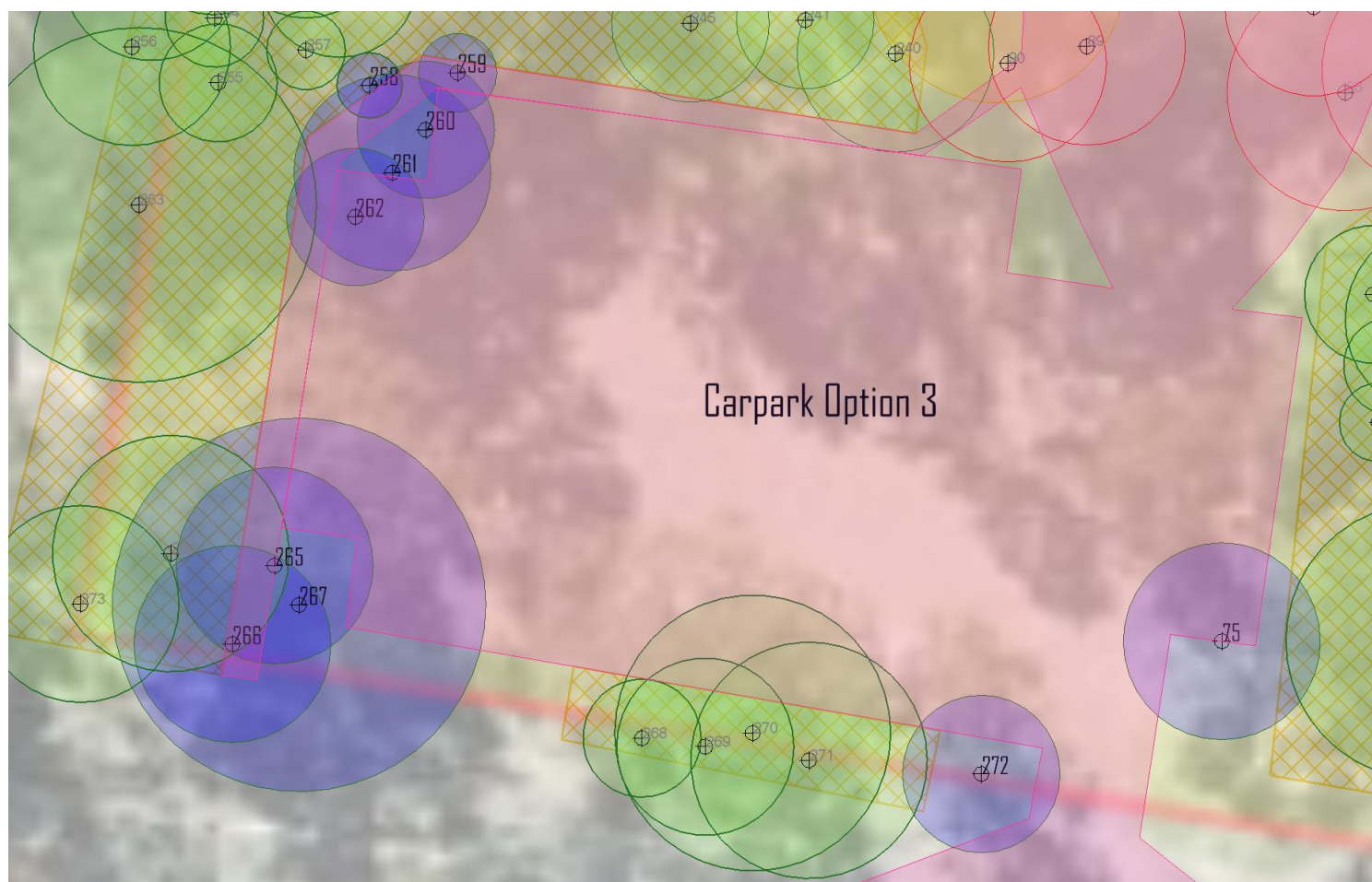


Figure 2 – Updated Tree Plan, Blue trees to be removed, Changes to yellow hatched areas (exclusion zones)

Appendix C – Site Image



Figure 3 - Existing carpark in East will extend towards the South



Figure 4 - Trees in Northwest corner that will require removal



Figure 5 - Trees in Southwest corner



Figure 6 - Trees that can be retained in the South along the road



Figure 7 - Image of existing carpark from tree 272 facing North



Figure 8 - Existing carpark to be demolished and footprint to be incorporated into new carpark design

Appendix D – Limitations and Disclaimer

1. The details of this report are specific to the site/tree(s) assessed and may not constitute general advice to be used in other applications.
2. This report and any attachments should be read in its entirety, and no individual part of the report or its attachments should be interpreted without reference to the original AIA report for the site.
3. The consultant shall not be required to give testimony or attend court for matters pertaining to this report unless a separate contract is arranged to provide expert witness services or the like with a fee payable for these services.
4. Care has been taken when referencing supporting documents or the opinions of others in this report, however no responsibility can be taken for the accuracy or correctness of the information provided by others.
5. It is assumed that all legal information provided by the client pertaining to the ownership of property is correct. The consultant takes no responsibility for any legal matters.
6. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is not contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
7. Following significant weather events, the condition of a tree onsite may change.
8. Maps, images, and graphics are not necessarily to scale.

Appendix E – Glossary of Terms

Abatement - Reduction in hazard, either by remedial tree works and/or removal of target(s).

Abnormal Lean - Abnormal departure of trunk from the vertical or near vertical position.

Amenity Value - The environmental and landscape benefits of a tree as opposed to its commercial value for timber. Many of these benefits are intangible or difficult to measure.

Arboriculture - The care, cultivation and management of individual trees or groups of trees in the landscape primarily for their amenity value.

Arborist - A specialist in the cultivation and care of trees and shrubs, including tree surgery, tree identification, the diagnosis, treatment, and prevention of tree diseases, and the control of pests.

Basal Flare - The rapid increase in diameter that occurs at the confluence of the trunk and roots, associated with stem and root tissue.

Bifurcation - To divide or fork into two parts, usually equal in size and occurring at a narrow angle.

Bleeding/Sap flow - The exudation of sap/resin from wounds and/or other injuries, may be accompanied by a foul odour.

Bole - The central stem of the tree. Another meaning for trunk.

Bow - The gradual curve of a branch or stem.

Bracket Fungi/Fungal Fruiting Body - Fruiting of spore producing body of wood decay fungi, forming on the external surface of the stem or trunk.

Branch Attachment - The structural linkage of branch to stem.

Branch Collar Wood - which forms around branch attachments, frequently more pronounced below the branch.

Brash Wood Type - of reaction wood which is weaker than normal due to thin cell walls and decreased fibre content; presence increases the likelihood of failure.

Burl - More correctly identified as a Lignotuber (a mass of dormant, tightly arranged buds). It is a generally circular swelling on the main stem or branch; not considered a defect.

Buttress Support - of branch, stem or root; usually associated with exaggerated growth.

Buttress Root - A large woody root located at the base of the trunk (the root crown) which is important to the overall stability of the tree due to its contributions to basal flare.

Buttress Wood - Wood under tension, in a structurally critical portion of a trunk or branch.

Callus - Can be detected within weeks after cells on the edge of a wound die and is produced by the enlargement or increased division of cells adjacent to the edge of cell dieback. Often associated with wound wood development post pruning.

Cambium - A layer of delicate meristematic cells between the inner bark or phloem and the wood or xylem, which produces new phloem on the outside and new xylem on the inside in stems, roots, etc., originating all secondary growth in plants and forming the annual rings of wood.

Canker - A localised area of dead tissue on a stem or branch, caused by fungal or bacterial organisms, characterised by wound wood development on the periphery; may be perennial or annual.

Canopy - Parts of the tree above the trunk, including leaves, and lateral and scaffold branches.

Cavity - An open wound, often characterised by the presence of decay and resulting in a hollow.

CODIT - An acronym for Compartmentalisation of Decay in Trees, this scientific theory was developed by the late Dr. Alex Shigo which now forms the basis of our knowledge of how trees respond to wounding, infection and decay.

Co-dominant Stems - Equal in size and relative importance, usually associated with either the trunks/stems or scaffold limbs/branches in the crown. Not necessarily a structural defect.

Compartmentalisation - Physiological process which creates the chemical and mechanical boundaries that act to limit the spread of disease and decay organisms within trees (see also CODIT).

Compression Wood - Type of reaction wood produced on the underside of branches and leaning trunks.

Coppice - To cut a tree to ground level to stimulate regenerative growth.

Core Drill - A technique involving creating a series of vertical cores within a tree's root zone which can be filled with a variety of materials to stimulate root initiation and growth. Often used on ageing and/or stressed trees.

Crack - Breakage in the stem, involving bark, cambium, and xylem.

Crown - Parts of the tree above the trunk, including leaves, and lateral and scaffold branches (see also Canopy).

Crown Uplift - Pruning technique where lower limbs are removed, thereby raising the overall crown above the ground.

DBH - Diameter of the trunk, measured at breast height i.e. 1.4m from ground level.

Deadwood - Branch or stem wood bearing no live tissues. (Small deadwood <2cm, medium deadwood 2-10cm, large deadwood >10cm).

Deadwooding - The act of removing deadwood from the canopy.

Decay - Process of degradation of woody tissues by fungi and bacteria through decomposition of cellulose and lignin.

Decorticate - To remove bark, rind, or husk.

Decurrent - Referring to crowns which are made up of a system of co-dominant scaffold branches, lacking a central leader.

Defect - Any structural weakness or deformity.

Dehisce - (of a pod or seed vessel, or a cut or wound) Gape or burst open.

Dieback - Death of shoots and branches, generally from tip to base.

Disease/Pathogens - A malfunction in, or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms.

Dominant - In crown class, trees whose crowns extend above the general stand canopy and are not restricted by adjacent trees.

DRC (Diameter at Root Crown) - The diameter of the very lowest part of the trunk where root buttressing begins and often used to calculate a tree's structural root zone (SRZ).

End Weight - The concentration of excessive foliage toward the branch extremity.

Epicormic Growth - Shoots which result from adventitious or latent buds, generally initiated in times of distress, and are generally poorly attached.

EWP - Elevated Work Platform.

Excessive Thinning - Having relatively little extent from one side of the canopy to the opposite. In relation to pruning; excessive pruning of lateral branches at their point of origin, usually associated with removal of large amounts of live tissue.

Exclude Site Use - Implement control measures to prevent people from entering an area that has the capacity to cause harm or damage i.e. due to hazardous trees.

Fasciation - (or Cresting) Abnormal twig proliferation.

Flush Cut - Pruning technique where both branch and trunk tissue are removed behind the branch collar; considered poor practice.

Frass Bore Dust - Excrement and other debris left by wood boring insects.

Fungal Fruiting Body - (see Bracket Fungi)

Gall - In branches and stems, an abnormal, localised growth, generally seen as a large knob of undifferentiated woody tissues.

Girdling Root - A root or roots which circles and constricts the stem or roots causing death of phloem and/or cambial tissue.

Habitat Prune - (or King Prune) Reducing or removing the crown of a tree and retaining its trunk as a habitat for wildlife.

Hanger - A partially attached (but clearly broken) or unattached branch which remains lodged in the crown.

Hazard - A hazard is an action or item that has the capacity to cause harm or damage, which may be serious.

Hydrophobic - Used to describe a soil profile that is difficult to rehydrate as water either pools on it or runs off it. Generally associated with very dry, nutrient-poor soils.

Ilex - A tree or shrub of a genus that includes holly and its relatives.

Inappropriate Location - The tree's present growing environment is not suitable due to its surroundings, such as buildings, car parks etc. in relation to the inherent characteristics of the tree species.

Included Bark - Pattern of development at branch junctions where bark is turned inward rather than pushed out; contrasting with branch bark ridge. Also referred to as Embedded bark. Such a formation generally results in weakened attachment.

Infection - The establishment of parasitic micro-organism in the tissues of a tree.

Irrigation - The watering of land by artificial means to foster plant growth.

Kino - The resin which flows from Eucalypts and its relatives such as *Corymbia* sp. and *Angophora* sp.

Leader - The primary terminal shoot or trunk of a tree.

Lean/Leaning - Departure of trunk from the vertical or near vertical position.

Lerp - A type of Psyllid that commonly predares on many species of Eucalypts and its relatives.

Loading - Refers to the mechanical stresses imposed by the weight, orientation etc. of trees and branches in relation to the site, the architecture of the tree and the weather. The amount of loading upon a tree can be directly influenced by its level of exposure to the prevailing winds.

Lopping - The removal of the crown of a tree, or a major proportion of it. Incorrect pruning method of removing branches to stubs, resulting in poor form and weak branch unions.

Mycorrhiza - A mutual association between certain fungi and the roots of vascular plants often resulting in an increased efficiency in the absorption of mineral nutrients.

Mulch - Material laid down over the rooting area to help conserve soil moisture, suppress weeds and regulate soil temperature.

Nutrition - The elements and compounds required to support healthy plant growth, of which at least 17 are known.

Parasitic and semi parasitic plants - Vascular plants such as Mistletoes which infect host plants via the penetration of specialised roots called haustorium to gain access to the host's vascular system for water and mineral nutrients.

Pathogen - (See Disease/Pathogens).

Pests/Pest Insects - Pests such as Wood Borers, Termites, Leaf Beetles, Gumleaf Skeletoniser, Leafblister Sawfly, Lerps or Elm Leaf Beetle that cause tree decline. There are various methods of treatment to remove pests as well as prevent their return.

Phellinus sp. - A genus of bracket forming, wood decaying fungi which occurs in native and exotic species. Whilst the decay associated with this fungus is often localised it has a reputation for being quite destructive.

Phytotoxic - A substance which is toxic to plants.

Phloem - The part of a vascular bundle consisting of sieve tubes, companion cells, parenchyma, and fibres and forming the food-conducting tissue of a plant.

PICUS Sonic Tomograph - A specialised piece of diagnostic equipment generally used to determine the level of internal decay within a branch or trunk using sound waves.

Pollard - The removal of the tree canopy, back to the stem or primary branches. Pollarding may involve the removal of the entire canopy in one year, or may be phased over several years.

Poor Pruning - Pruning techniques (such as lopping) which are undertaken without regard for the tree's natural biology and which can cause decline, decay and potentially lead to part or whole tree failure.

Potenz Hydrogenous (pH) - The measure of soluble Hydrogen ions in a solution which is used to measure its acidity or alkalinity. Affects nutrient availability to plants.

Previous Failures - Denotes a tree has previously had a leader or branches fail. Previous failures can result in wounding if a required action is not attended to (see Wound).

Propagate/Propagation - To reproduce a plant, sexually by means of seed or asexually by cuttings, grafting or divisions, so that it is genetically identical to the parent (true to type).

Pruning - The removal or cutting back of twigs or branches.

Psyllid - A common and diverse group of sap-sucking insects related to whiteflies, aphids, and scales. They are regularly associated with native plants and most species appear to be host specific or confined to a group of closely related plants. Sustained infestations can lead to tree decline if untreated.

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading, often in response to internal defect or decay and loss of strength.

Risk - The likelihood that a hazard will cause harm within a variable period of time.

Root Collar/Root Crown - The transitional area between the stem/stem and roots.

Saprophyte - An organism which obtains its nutrition from dead or decaying organic matter. This term is often associated with fungi and with some groups of vascular plants such as Orchids.

Scaffold Limb - Primary structural branch of the crown.

Senescence - The stage of a tree's life cycle between maturity and death, whereby a tree will naturally decline over several years.

Softfall - An impact absorbing layer that is laid beneath a finished surface

Soil Compaction - Area of compacted soil covering the root system. Affected soil becomes less able to absorb rainfall and water, thus increasing runoff and erosion. Trees have difficulty growing in compacted soil because soil particles are pressed together leaving little space for oxygen and water, which are essential for root growth.

Soil Problems - Soil problems such as compaction, salinity, erosion can cause tree decline and potentially lead to tree failure.

Split - Breakage in stem, affecting bark, cambium and xylem.

SRZ - Structural Root Zone.

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, e.g. A lack of soil moisture, inadequate nutrition or extremes of temperature.

Structural Defect - Internal or external points of weakness which reduce the structural integrity of branches and/or stems or roots. Defects in roots may impact upon tree stability.

Structural Roots - Contribute significantly to the structural support, anchorage and stability of a tree, often found close to the base.

Sucker - A shoot which appears from an underground root.

Suppressed - In crown class, trees which have been heavily shaded by others from above or the side and whose crown development is wholly or partially restricted.

Symbiosis - A mutual association between two organisms whereby the presence of one is beneficial to the other.

Target - Persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it.

Terminally Reduce - Cutting back/reducing branches from their extremity.

Thinning/Excessive Thinning - Having relatively little extent from one side of the canopy to the other. In relation to pruning; excessive pruning of lateral branches at their point of origin, usually associated with removal of large amounts of live tissue.

TLE - Tree Life Expectancy (see Useful Life Expectancy).

Topping - Synonymous with lopping it is the indiscriminate removal of the crown of a tree, or a major proportion of it. Incorrect pruning method of removing branches to stubs, resulting in poor form and weak branch unions.

TPZ - Tree Protection Zone.

ULE - Useful Life Expectancy refers to an expected period of years that a tree can be retained before its amenity values decline to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property.

Understorey - Vegetation beneath the main canopy.

VTA - An acronym for Visual Tree Assessment which is the process undertaken when systematically assessing trees for attributes such as their species, health, age, defects and pest or disease infestations.

Wall 4 - A chemical and anatomical barrier formed by the cambium present at the time of wounding, which inhibits the spread of decay into xylem tissue formed after the time of wounding.

Weak Unions - A stem or branch union which is exhibiting signs of a potential structural weakness through its growth habit and/or as a result of pest and/or disease infestation.

Weed - A plant that is not valued where it is growing and is usually of vigorous growth; especially one that tends to overgrow or suppress desirable plants.

Whorl - The arrangement of foliage or flower parts around a stem whereby they radiate from a single point.

Windthrow - The blowing over of a tree at its roots.

Wound - Any injury which induces a compartmentalisation response.

Wound Wood - Develops from callus tissue or from uninjured vascular cambium at the margins of injuries/wounds that have damaged or exposed the phloem, vascular cambium, or sapwood.

Xylem - A compound tissue in vascular plants that helps provide support and that conducts water and nutrients upward from the roots, consisting of tracheids, vessels, parenchyma cells and woody fibres.

End of Report