Arboricultural report

for

the Growth Areas Authority

(GAA)

Arboricultural assessment of Tarneit

Precinct Structure Plan (PSP) 1089

Site

PSP 1089
Tarneit North

Submission date

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Prepared for

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Treetec reference

GAA0412.1089.mc

1 Executive summary

Treetec was commissioned by the Growth Areas Authority (GAA) to map and assess any trees of High or Very High Arboricultural Retention Value (ARV) that exist within the PSP 1089- Tarneit boundary. Any trees within waterway conservation corridors were not inspected, as these are expected to be retained within the development. The field investigations were undertaken during March and April 2012, across all properties for which access was obtained.

Prior to European arrival, the vegetation across PSP 1089 was dominated by Plains Grassland Ecological Vegetation Class (EVC). This EVC is typically identifiable in the landscape as a treeless plain, dominated by native grass species. Although occasionally observed, trees are rare within the vegetation type and as a result of the intensive historical and continuing agricultural land-use within the precinct, the site has remained predominantly treeless. Treetec consider that most trees observed on site are planted, and either exotic or non-indigenous native in origin. No remnant trees were found, however a small number of planted indigenous trees exist on site.

Treetec found only two (2) Individual trees that justified detailed inclusion as being of higher ARV. A large, mature Sugar Gum (*Eucalyptus cladocalyx)* and a semi-mature River Red Gum (*Eucalyptus camaldulensis)* were both located in the north-western quarter of the precinct. Although the Sugar Gum is significant in the landscape, it has significant structural weaknesses and presents a higher degree of risk than is suitable in an urban environment. The River Red Gum is in good condition but is comparatively young. Both trees have been assessed as being of 'Moderate' ARV.

Due to the paucity of significant trees in the landscape, tree groups were also considered to identify areas that may be worth retaining or protecting to enhance the future amenity of the planned urban landscape. Eleven (11) tree groups were identified. These groups consisted mostly of juvenile, native planted trees occasionally growing above a native understory. It is important to note that none of these groups are considered by Treetec to be significant enough to influence important design considerations for the precinct.

Large numbers of taller trees (almost exclusively Sugar Gums) exist as wind rows throughout the precinct. These trees would present management concerns (risk) within an urban environment and therefore are not considered to have a High ARV.

Contents

2 Introduction

Treetec has been commissioned by the Growth Areas Authority (GAA) to map, inspect and assess the tree population within the Tarneit North PSP area (1089) located in the City of Wyndham (see Figure 1, below).

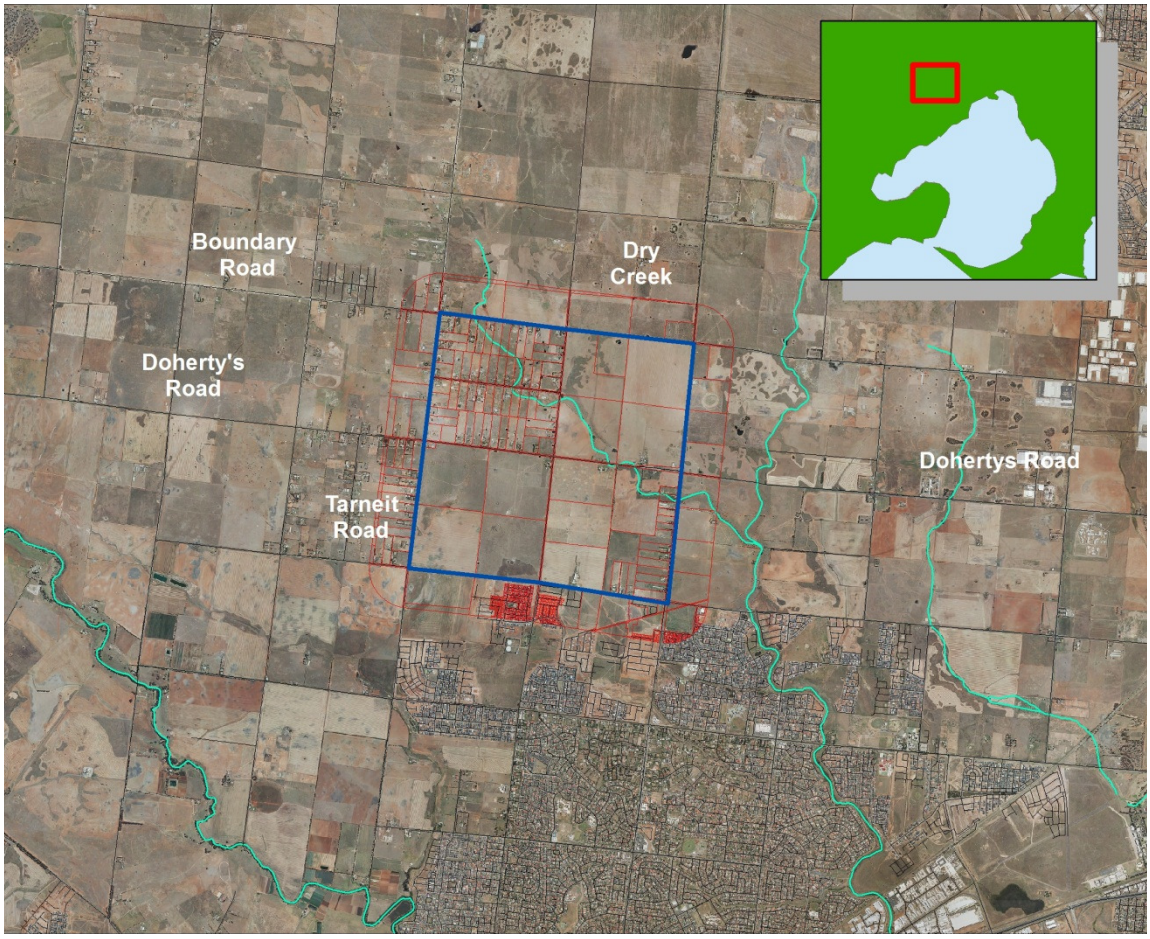


Figure 1- Location Map of PSP area 1089- Tarneit North

Treetec understands that the data collected during the field assessment will be used to inform the precinct structure planning process, by identifying those trees present within the landscape that contribute to the natural amenity of the precinct, that are considered to be of sufficient vitality to persist within an urbanised landscape, and for which retention should be considered during the design of the precinct.

2.1 Arboricultural Retention Value (ARV)

As requested within the tender documentation, this report identifies all individual trees or groups of trees that Treetec consider to be of high or very high Arboricultural Retention Value (ARV). Trees that are deemed to fit these criteria are included, however the lack of significant trees within the precinct encouraged the consideration of other trees that are of lesser significance, but that have potential to grow into valuable specimens.

Arboricultural Retention Value is defined by the consulting arborist as being:

A rating assigned to a tree or group of trees related to the value of retaining those trees in situ. The judgement is based on tree condition (Health, Structure & Form), Useful Life Expectancy (ULE), Origin and Age.

Age is a primary consideration as it is the determining factor when considering how long it would take to replace the amenity lost when trees are removed.

Very High	• Mature tree in good condition, long lived species with High Amenity value • Semi-mature or mature rare species in fair to good condition
High	• Semi-mature to Mature tree in good condition, long lived species with a High Amenity rating • Juvenile rare species • Trees of moderate condition that offer exceptional Amenity due to factors such as species, size or ecological value
Moderate	All trees that don't fit in the alternative categories and that have a ULE of 15+ years
Low	• Juvenile trees (not including rare species) • weeds that offer Medium or High amenity value
Nil	Contribution in the landscape is of no value or detrimental – usually associated with small dead or dangerous trees or environmental weeds

2.2 Project scope and timing

Treetec was engaged to assess a neighbouring precinct - Oakbank (PSP area 1088).The Treetec reference for that report is GAA0412.1088.mc.

The original (contracted) delivery date for the 1st draft of this report was the 23rd March, however that date was subsequently changed to the 16th April 2012.

3 Key objectives

The key objectives of this arboricultural investigation are:

1- To identify all trees within the precinct that are considered to have High or Very High ARV as determined by the consultant arborist

2- Collect and document data on the subject trees including (but not limited to) the species, dimensions (diameter, height, spread), estimated age, origin, vitality of the tree (health, structure), Useful Life Expectancy (ULE) and the Tree Protection Zone (TPZ) of each tree

3- Present the locations of each tree visually

4- Discuss the suitability of retention for each of the subject trees

5- Provide recommendations relating to the protection of the subject trees, including TPZ's and other relevant methods of ensuring continued vitality of the tree

4 Methodology

4.1 Aerial Photograph Interpretation

Prior to commencing fieldwork, Treetec staff undertook Aerial Photograph Interpretation (API) to gain an understanding of the extent and location of overstorey vegetation across the precinct. This analysis encouraged familiarity with the site, allowing fieldwork to be conducted in a targeted, efficient manner.

4.2 Geographic Information Systems (GIS)

All relevant information relating to each precinct was uploaded onto mobile mappers for use in the field. Roadways, cadastral boundaries and aerial photographs, as well as custom data collection forms were used during fieldwork. The custom forms allowed the rapid collection of relevant data for each tree or group of trees, while simultaneously recording the geographic location of each tree.

4.3 Site inspection

An arboricultural assessment of PSP 1089 was undertaken by Mark Cashmore and Christopher White between the 19th of March and the 6th of April.

The Growth Areas Authority provided a list of those properties for which permission for access had been granted, as well as the names and contact details of the landowners. Of the properties for which access was granted, only those supporting significant overstorey vegetation were visited. There were a number of trees and tree groups of significance located on properties for which there was no access, and landowners were unavailable at the time of the assessment. In such cases, any significant trees were recorded from the closest property boundary to the subject tree and binoculars were used when required. Properties visited are marked on the site plan shown in Section 5.8.

Data collected is set out in section 5 below, and relevant definitions are found in Appendix 1.

4.4 Trees not listed

Only trees considered to have High or Very High ARV as determined by the consultant arborist were required to be included in this report. In addition to this, groups of trees that exhibited potential to provide higher amenity were included. Most other trees were not detailed.

Trees within waterway exclusion zones (conservation corridors) were not included. Exclusion zones were set at 50 metres either side of a natural waterway.

4.5 Inspection method

- All observations were taken at ground level, using the Visual Tree Assessment (VTA) method (Mattheck and Breloer 1994)
- Excavation at the site was not undertaken
- Aerial examination (climbing) of the tree structures was not required
- Heights and canopy widths have been estimated
- Diameter at Breast Height (DBH) of subject trees were measured for those properties for which access was granted and estimated for those properties for which access was not obtained
- The site was not surveyed
- Subject trees (or groups) have been numbered
- Data and location was recorded using GPS/GIS enabled handheld computers (accurate to ±5m)

5 Tree assessments/Results

5.1 Condition of roots

Excavations were not undertaken for this report therefore root condition has not been included unless above ground signs, such as soil heaving or cracking were observed.

5.2 Impact assessment

This report relates to the subject trees, their condition and significance. This judgment is based on the site inspections and information supplied to Treetec for the purposes of conducting an arboricultural assessment (drawings, plans etc), and is current at the time of the submission of the report.

5.3 Hazards and risk

Risk assessment of trees relies on an appraisal of the structural integrity of a tree or population of trees in conjunction with the likelihood of tree failure (either whole tree or limbs) adversely impacting people or property.

Any tree exhibiting high potential for failure is not considered to have High ARV in an urban setting and therefore is excluded from this report.

5.4 Tree age

All trees that have been detailed in this report are mature or semi-mature in age. Given that the size of a tree has a strong influence on its ARV (typically the larger a tree, the higher the ARV) it would be unusual for semi-mature or juvenile trees to attract a Very High or High rating.

ARV, to a large degree, is dependent on how long it would take to replace the amenity a tree provides. For this reason very few juvenile or semi mature trees are likely to attract a rating of High or Very High.

5.5 Tree groups

The majority of trees within the survey area have been planted in close groups as a result of revegetation works by landowners. These trees are typically juvenile to semi-mature in age. Such trees contribute to the amenity of the precinct and if retained following subdivision, could become valuable natural features in an urban landscape. Tree groups were included in this report where it was determined that they currently provide, or could soon provide (within 10-15 years) significant amenity value. Characteristics that determine the value of a group may include the quality and/or quantity of the trees, maturity, the extent and quality of the understory, species selection, hazard potential, spacing or canopy continuity and the ecological value of the group.

The lack of significant, individual trees within the precinct means that the value of these groups of semi-mature trees is higher than it may otherwise be in a landscape with large numbers of individual trees.

The areas defined as a group (and listed in Section 5.8) were limited to incorporate the healthier trees in better condition whilst excluding wind rows with poor form or scattered younger trees. Priority was focussed on either indigenous or non-indigenous native species over exotic species. The younger or more sparsely planted groups or groups without diversity of species or of higher potential risk have not been mapped.

5.6 Wind rows – Sugar Gums

Wind rows, typically dominated by Sugar Gums, are prevalent throughout the precinct. These rows of trees are a dominant feature within the landscape given their size and the paucity of other tall or mature trees. Many of these trees have been topped, and the subsequent epicormic growth contributes to thick foliage screens along a number of property frontages.

These rows of trees are not detailed within this report due to the associated risk they are likely to present in an urban environment. These trees are typically in fair condition at best and would present considerable risk in what may become a heavily utilised urban area. The epicormic growth, if not maintained and cut regularly, will develop as co-dominant leaders with minimal taper that will often be attached poorly to the top of the cut trunk. These trunks are often impacted by decay near the wound. Failures would be regular in occurrence and as such, both the older windrows and the shorter, topped trees are not considered suitable for built up urban areas.

5.7 Data - Individual trees

Tree #	Species	Common name	Origin	Calliper	Height (m)	Spread (m)	Age class	Health	Structure	ULE	Arb' retention value	TPZ (m)
1	*Eucalyptus cladocalyx*	Sugar Gum	Non-indigenous Native	150	17	15	Mature	Fair	Poor	15	Moderate	15

Notes
Large tree offering High amenity value, however decay within lower trunk and failure potential makes it unsuitable in a high use urban environment unless the target area was kept free of people / property.

Geographic Location- 29.4076º, -58.1366º

2	*Eucalyptus camaldulensis*	River Red Gum	Indigenous	45	14	9	Semi-mature	Good	Good?	25+	Moderate	5.4

Notes
Although this tree was observed from the property boundary, no structural issue were evident. This tree is included here because of its size and condition while possibly being one of few indigenous species in the survey area. It is a planted specimen and is not considered remnant.

Tree 1

Tree 2

Geographic Location- 29.5368º, -58.1231º

5.8 Tree groups

Groups with higher ARV have been listed below. Although most individual trees within each group are not significant, these patches offer opportunities to retain tree related amenity within the development. As with most individual trees in the survey area, the amenity provided by these groups could be replaced or reproduced in a fairly short timeframe.

Group 1.

There may be some individual trees of higher ARV within this group. Although the group is moderate in value, there is little vegetation within proximity and therefore it is a dominant arboreal feature.

Geographic Location- 29.6161º, -58.1195º

Group 2.

Moderate retention value, semi-mature Sugar Gums. Potentially contains some hazardous trees, and others that may warrant retention.

Geographic Location- 29.6197º, -58.1334º

Group 3.

Moderate retention value stand of non-indigenous, mallee form natives in good health. The patch of trees is likely to be of significantly less risk in an urban environment than taller Sugar Gum stands.

Geographic Location- 29.4414º, -58.1343º

Group 4.

Driveway / avenue planting of native trees into a treed area well away from the main road. Mostly juvenile to semi-mature specimens.

Geographic Location- 29.4341º, -58.1339º

Group 5.

Heavily revegetated with non-indigenous natives and some overstorey species. All trees are juvenile or semi-mature in age. Higher proportion of understory in comparison with similar patches- contains grasses and shrubs which appear to be attractive to fauna species.

Geographic Location- 29.4001º, -58.1330º

Group 6.

Small number of planted specimen trees in good condition: Ironbark, Bushy Yate and a single River Red Gum.
Not High value however of note given the good condition of these individuals and the poor quality of surrounding vegetation.

Geographic Location- 29.5130º, -58.1278º

Group 7.

Sugar Gum stand, Moderate to High retention value due to large size. Individual trees within the group are likely to be of High retention value. Stand may present a higher degree of risk.
Closer inspection required.

Geographic Location- 29.4189º, -58.1252º

Group 8.

A more open park style of planting, predominantly trees rather than shrubs. Mostly juvenile to semi-mature.

Geographic Location- 29.5433º, -58.1281º

Group 9.

Revegetation patch with a higher proportion of shrubs. Patch contains dense plantings as well as open areas.

Geographic Location- 29.4487º, -58.1276º

Group 10.

Selected specimen trees amongst structures / dwellings and various vegetated garden areas. Comparatively large area. Range of ages including some more mature trees.

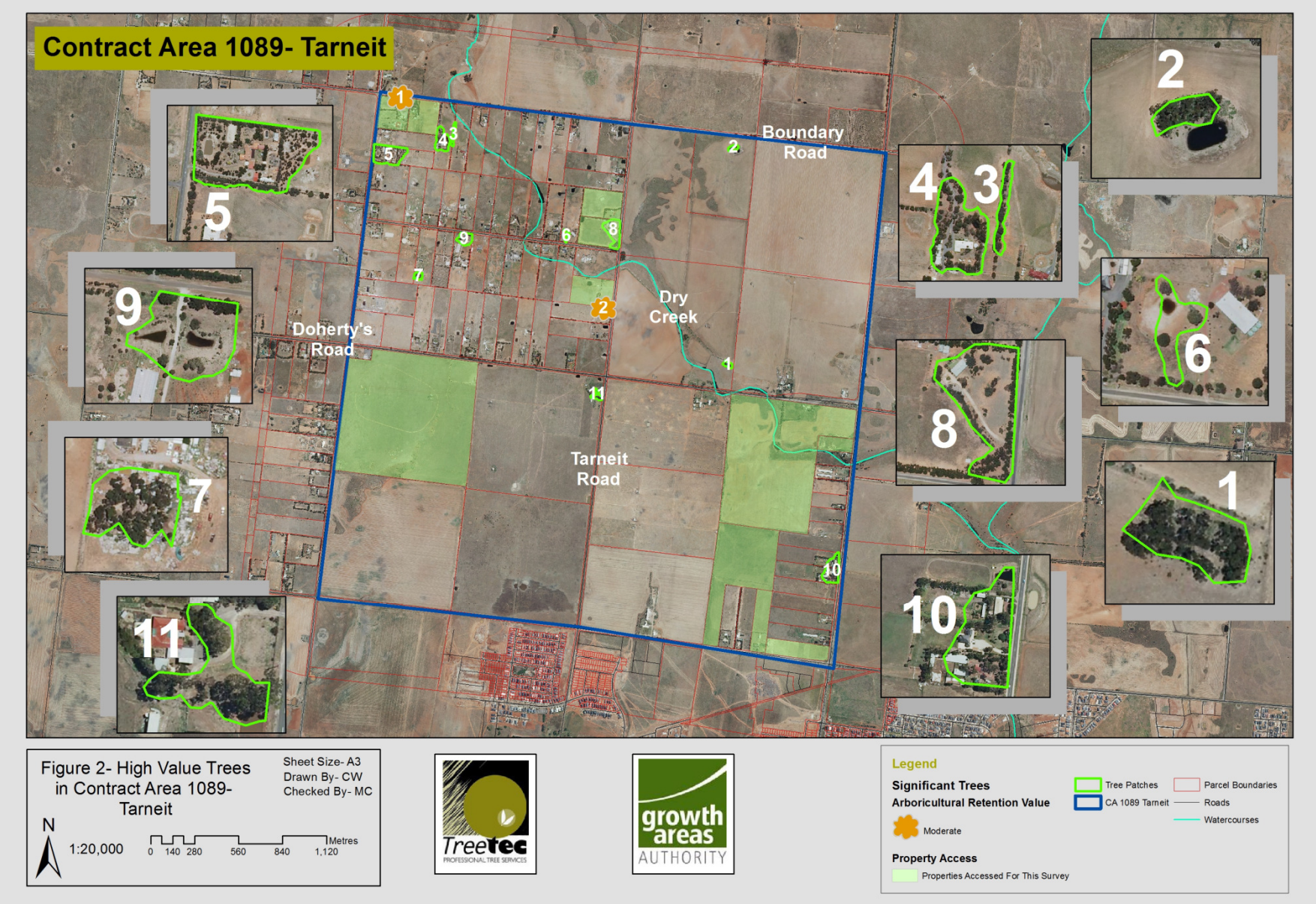
Geographic Location- 29.6826º, -58.1064º

Group 11.

Significant stand of Sugar Gums, mature and tall however all have been coppiced, and are structurally unsound.

Geographic Location- 29.5328º, -58.1176º

5.9 Site plan


Contract Area 1089- Tarneit
Boundary Road
Dry Creek
Doherty's Road
Tarneit Road
1
2
3
4
5
6
7
8
9
10
11
Figure 2- High Value Trees in Contract Area 1089- Tarneit
Sheet Size- A3
Drawn By- CW
Checked By- MC
N
1:20,000
0 140 280 560 840 1,120
Metres
Treetec
growth areas AUTHORITY
Legend
Significant Trees
Arboricultural Retention Value
Moderate
Tree Patches
CA 1089 Tarneit
Parcel Boundaries
Roads
Watercourses
Property Access
Properties Accessed For This Survey

6 Observations / discussions

6.1 Site summary

PSP area 1089 is a generally flat site with very little local relief. The area is located some 9 km north of the town of Werribee, and some 25km due west of Melbourne's CBD. Boundary Road forms the northern boundary of the site, Leakes Road forms the southern boundary. Tarneit Road dissects the site in a north south direction, and Dohertys road divides the site in an east-west direction. The site includes reaches of Dry Creek.

The site appears to have been heavily impacted by past and continuing agricultural use, and the overstorey vegetation across the precinct is dominated by planted, non-indigenous native Eucalyptus species, most of which are Sugar Gums. As described earlier, the site was dominated by Plains Grassland EVC prior to European arrival, and this EVC is typically treeless. Only one indigenous tree (planted) has been included in this report as being of significance, and indeed it is likely that this is one of very few indigenous trees that exist across the site. Most of the valuable vegetation is contained within the higher density areas where land has been subdivided into smaller parcels for hobby farms or residential development. There are a number of windrows of mature trees primarily Sugar Gums.

The structure of the vegetation across the site is consistent with the original EVC, however most of the indigenous species have now been replaced by exotic pasture grasses and broad-leaf weeds.

There are very few mature trees and no trees of Very High ARV. The highest ARV in the report has been given to the most valuable tree groups. In general those few trees that do exist across the site are in good to fair condition, are juvenile or semi mature and mostly planted non indigenous natives.

6.2 Site details

6.2.1 Site habitat significance

The faunal habitat significance of most trees observed was very low. Most of the trees observed within the precinct are juvenile to semi-mature in age, and are not yet likely to support hollows. The flowering Eucalypts throughout the precinct are likely to provide feeding habitat for a range of native avian species.

6.3 General comments

6.3.1 Potential for failure

Any tree can fail and all trees present a risk, this impacts the ARV assigned to a given tree or group of trees. There were some trees identified which have High amenity value particularly given the scarcity of trees in the area however a larger tree with a higher (and predictable) chance of failure is usually not suitable for retention in an urban environment.

Trees are dynamic structures that change in response to their growing conditions, state of maturity and in accordance with the species. This changing nature also changes their potential to fail and therefore the risk they present.

Failure potential will be increased with:

- Poor tree structure
- Poor tree health
- Increased wind or changes in wind loadings such as those experienced after the removal of nearby trees or structures
- Drought or rain, particularly saturating rains
- Interference with root systems including compaction, disturbance, contamination, trenching or removal (excavations)
- Changes in water regimes such as those experienced when drainage patterns are changed
- Inappropriate pruning of a tree

Different species and provenances of species will influence the likelihood of a failure event as will the siting of a specimen. Also a tree may shed limbs or fail for no apparent reason. Therefore it's important to be aware of the characteristics of a species and monitor any changes in structural or environmental conditions and manage trees accordingly to reduce risk.
All trees present a hazard. Predominantly the hazard will be associated with failure potential however other hazards exist such as the production of allergens. Trees may impact on structures through changes in soil moisture content.
Risk assessment will determine the degree of risk associated with a hazard and risk control is the process of implementing appropriate measures to reduce the risk to an acceptable level.

6.3.2 Controlling risk

Risk mitigation measures may include:

- Pruning to remove weak or damaged components of a tree
- Complete tree removal
- Relocation of targets such as seating or playgrounds
- Fencing of an area to exclude targets from under trees
- Erecting a structure over a target that can withstand a tree failure
- Appropriate signage

Though branch shedding and tree failure cannot be eliminated, by implementing regular arboricultural inspections as well as risk assessment and control; failure events and therefore risk, will be significantly reduced.
Any works undertaken such as pruning and tree removal should be undertaken by a suitably qualified contractor.
In some circumstances landscaping such as the introduction of garden beds or thick shrubbery may reduce risk. Thick plantings of shrubs such as Rosemary Grevillea (*G. rosmarinifolia*) or Dagger Hakea (*H. teretifolia*) which are both prickly, may sufficiently keep people from dangerous areas.

6.3.3 Soil compaction

Soil compaction reduces the number and size of soil pores, subsequently reducing the available water and oxygen to a tree, this then impedes a trees ability to respire (consume reserved energy supplies) and increases stress. Subsequent symptoms may include thinning or dying crown, reduced or no seasonal extension growth, limb shed or death of the tree. Insect infestation may increase as a trees natural ability to withstand pests is diminished.

6.3.4 Physical / mechanical damage to trees

Physical damage to tree parts, particularly the trunk, is unsightly and provides entry points for pests and diseases such as fungal infections. This may cause long-term decay and can lead to partial or complete tree failure and death.

6.3.5 Alteration of soil levels

Alteration of soil levels around trees will affect the root zone and stability of a tree as well as tree metabolism. This may result in reduced tree health, excessive deadwood, thinning foliage and poor vigour; it can take some years for the impact to become evident at which time it is normally irreversible

6.3.6 Maintaining Tree Protection Zones (TPZ)

Where it is determined that a TPZ is to be established, the area should be fenced prior to commencement of demolition/construction work, this area must be protected; no materials, equipment, waste, chemicals or vehicles are to be stored or parked within this area. The soil profile and level within the TPZ should not be disturbed or altered.

If at any time the TPZ may need to be infringed upon for works such as excavation for the installation of pipes or drainage or the movement of equipment or any other interference that may cause a change in the availability of water or oxygen to the tree, a suitably qualified arborist should be consulted to supervise the works.

It may be possible to work within a TPZ without significantly impacting a tree however the size and number of roots in the area would need to be determined prior to commencement and design and construction methods may need alteration to minimize tree impact.

Extract from AS 4970-2009 Protection of trees on development sites

Variations to the TPZ

General
It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching.

Minor encroachment
If the proposed encroachment is less than 10% of the area of the TPZ and is outside the SRZ detailed root investigations should not be required. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ.
Variations must be made by the project arborist considering relevant factors listed in (see standard)....

Major encroachment
If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable.
The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors listed in (see standard)

6.3.7 Pruning standards / Lopping

An Australian standard exists to give guidance on pruning of trees.
It is important that all tree works are carried out by a competent contractor in accordance with the Australian Standard. (AS. 4373 2007 - Pruning of Amenity Trees)

Lopping (as defined within the standard) is detrimental to trees, often resulting in decay and poorly attached epicormic shoots. Natural Target Pruning methods should be used wherever possible when removing sections from trees.

7 Conclusions

7.1 Report summary

Treetec was commissioned by the Growth Areas Authority (GAA) to map and assess any trees of High or Very High Arboricultural Retention Value that exist within the PSP 1089 - Tarneit boundary, excluding trees within waterway conservation corridors. The field investigations were undertaken during March and April 2012, across all properties for which access was obtained.

Once dominated by Plains Grassland EVC, the site has remained predominately treeless. The exception to this is the planted windrows or garden settings dominated by planted exotic or non-indigenous native trees. No remnant trees were found within the precinct.

Treetec found only two (2) individual trees that justified detailed inclusion in this report however both are only of 'Moderate' ARV, not High or Very High.

Due to the paucity of significant trees in the landscape, larger tree groups were also considered with a view to identifying areas that may be worth retaining or protecting to enhance the future amenity of the planned urban landscape. Eleven (11) tree groups were identified. These groups mostly consist of young non-indigenous native planted trees, occasionally supporting a native understory. It is important to note that none of these groups are considered by Treetec to be significant enough to influence important design considerations for the precinct.

Large numbers of taller trees (almost exclusively Sugar Gums), exist as wind rows throughout the precinct. These trees would present management concerns (risk) within an urban environment and therefore are not considered to have a High ARV.

8 Recommendations

Where trees or tree groups of higher ARV are to be retained, measures should be taken to protect them from adverse development related impacts.

Tree related amenity can be maximised within the precinct in two ways; either through the protection of existing trees or the planting of new specimens (or both). If existing trees are to be retained they should be protected in line with AS 4970-2009 Protection of trees on development sites, and the General Comments section of this report. If trees are to be planted, careful consideration should be given to the selection of species that are both tolerant of harsh conditions and suitable for urban environments. Also the planting site should be prepared to optimise growing conditions. Currently the soils are depleted and measures should be taken to improve the growing medium.

9 References

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Mattheck, C., Breloer, H (1994). The body language of trees. A handbook for failure analysis. Research for Amenity trees No.4, The Stationary Shop.

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Standards Australia. 2009, AS 4970-2009 Protection of trees on development sites

Standards Australia, 2007, AS 4373-2007 Pruning of amenity trees

10 Assumptions and limiting conditions

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10. Site plans, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

11. Information in this report covers only those items that were examined in accordance with the Terms of Reference, and reflects the condition of those items that were examined at the time of the inspection.

Appendix 1. Glossary

AGE CATEGORY	The age of the tree is represented as Juvenile, Semi-mature, Mature or Senescent.	
	Juvenile:	A young tree, given normal environmental conditions for that tree it will not yet flower or fruit.
	Semi-mature:	Able to reproduce but not yet nearly the size of a mature specimen in that location.
	Mature:	Has reached or nearly reached full size and spread for that species in the given location.
	Senescent:	Has passed maturity, tree health in a state of decline.
AMENITY VALUE	A judgment of amenity and/or utility the tree provides based on Species, size, Age, Health and local environment. Amenity may be based on ecological or landscape value or both. Documented as Low, Medium or High. Amenity value does not consider the degree of risk associated with a tree, a weedy species will not be rated as High for Amenity value.	
ARBORICULTURAL RETENTION VALUE (ARV)	A rating assigned to a tree or group of trees related to the value of retaining those trees in situ. The judgement is based on Tree condition (Health, Structure & Form), Useful Life Expectancy (ULE), Origin and Age. Age is a primary consideration as it is the determining factor when considering how long it would take to replace the amenity lost when trees are removed.	
	Very High	• Mature tree in good condition, long lived species with High Amenity value • Semi-mature or mature rare species in fair to good condition
	High	• Semi-mature to Mature tree in good condition, long lived species with a High Amenity rating • Juvenile rare species • Trees of moderate condition that offer exceptional Amenity due to factors such as species, size or ecological value
	Moderate	All trees that don't fit in the alternative categories and that have a ULE of 15+ years
	Low	• Juvenile trees (not including rare species) • weeds that offer Medium or High amenity value
	Nil	Contribution in the landscape is of no value or detrimental – usually associated with small dead or dangerous trees or environmental weeds
CALLIPER (DBH)	The diameter of the trunk measured at or near 1.4m above ground level. Where there is more than 1 stem originating below 1.4m the measurement recorded is calculated as described in AS 4970-2009	
CAMBIUM LAYER	A layer of cells between the bark and wood tissue that divide to form new cells. Usually a slimy green layer just under the bark.	
CANOPY SPREAD	Overall size of the canopy as looking from a plan view. Recorded at the widest point.	

CO-DOMINANT STEMS	Two stems of approximately the same thickness and height originating from the same position in the tree.	
COPPICE GROWTH	Re-growth arising after a tree or shrub is cut back to near ground level.	
CROWN WIDTH	See 'Canopy spread'	
DBH	See 'Calliper'	
DEAD (AS DEAD)	Cessation of all metabolic processes (or very soon to be)	
DE-OXYGENATION	A lack of oxygen, normally referring to the state of the soil	
EPICORMIC SHOOTS	Re-growth from the trunk or branches, originating from dormant buds under the bark, usually poorly attached, often an indicator of tree stress.	
FORM	Reference to the symmetry of the crown as observed from all angles and in accordance with the morphology of that species, and documented as Poor, Fair or Good.	
FORMATIVE PRUNING	Pruning of juvenile trees for form and structure.	
HAZARD	Anything that has the potential to cause injury or damage	
HEALTH	A trees vigour as exhibited by the crown density, leaf colour, seasonal extension growth, presence of stress indicators, ability to withstand diseases and pests, and the degree of dieback.	
	Dead:	Cessation or near cessation of all metabolic processes
	Poor:	Indicating symptoms of extreme stress such as minimal foliage, or extensively damaged leaves from pests and diseases. Death probable if condition of tree deteriorates.
	Fair:	Not nearly of 'Good' condition (see below)
	Good:	Usual for that species given normal environmental conditions – full canopy with only minor deadwood, normal leaf size and extension growth, minimal pest or disease damage
	Excellent:	Better than usual for that species under normal conditions
HEIGHT	The distance in metres from the ground to the highest point in the crown, calculated in the vertical plane. This measurement unless otherwise specified is an estimation only.	
INCLUDED BARK UNION	A union within a tree that has included bark (bark pressing on bark), these unions are usually poorly attached and more likely to fail as the included bark is equivalent to a split. Often characterized by an acute angle and sometimes forming ribs or flaring immediately below the union where the tree reacts to the weakness by placing secondary growth. Though these unions are weaker than a 'good ' union, the risk of failure cannot be calculated.	
LOPPING / TOPPING	The removal of parts of a tree giving no consideration to the trees natural defence systems.	
ORIGIN	Origins of the species related to its setting – Indigenous is native to that location, Non-indigenous Native is Australian but not local, Exotic is not from Australia. Sometimes a classification of Weed will be assigned; this indicates that the species is generally unwanted within this geographic area (regardless of origin)	
PATHOGEN	Disease causing agent	
PRUNING	Systematic removal of branches of a plant whilst giving consideration to the trees natural defence systems.	
RETENTION VALUE	See 'Arboricultural retention value'	
RISK	The chance and degree of injury or loss presented by a hazard	

SPECIES	A group of interbreeding individuals not interbreeding with another such group.	
STRUCTURAL ROOT ZONE (SRZ)	The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, this is different from the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.	
STRUCTURE	Reference to the structural integrity of the tree with consideration of the crown, trunk and roots. Determined using the Visual Tree Assessment (VTA) method (Matheck and Breloer 1994) . The failure of small (<60mm calliper) live or dead limbs is normal and not considered here.	
	Very poor:	Clear indications that a significant failure is likely in the near future
	Poor:	Signs of structural weakness obvious and failure likely, one might expect a significant failure event within the next 5 years, possibly tomorrow
	Fair:	Signs of weakness present though not obviously significant, likely to become worse over time
	Good:	No obvious signs of structural weakness
TARGET	People or property	
TREE NUMBER	Identifying number allocated to individual trees or groups of trees, may be used to locate trees using site plans or tags on trees.	
TREE PROTECTION ZONE (TPZ)	An exclusion area that allows for protection of canopy and roots; both the structural roots that give the tree stability and the smaller absorption roots. The radius of the TPZ is normally calculated for each tree by multiplying the DBH × 12. The minimum distance will be 2m and maximum 15 as stipulated in the Australian Standard 4970-2009 – Protection of trees on development sites.	
TREETEC REFERENCE	Unique identifier assigned to an individual report by Treetec	
ULE	Useful Life Expectancy is an estimation of how many years a tree can be retained in the landscape provided growing conditions do not worsen and any recommended works are completed. It takes into consideration factors such as species, age, health, defects / hazards and site conditions.	