



# **Preliminary Tree Assessment**

for

## **Macedon Ranges Shire Council**

Assessment of trees at Kyneton Showground

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## Executive Summary

The Preliminary Tree Assessment is an arboricultural report which provides an assessment of the existing trees on a property to assist the preparation of a development design. It is not an assessment of the impact of proposed development on the trees.

Ten English Elms were assessed at Kyneton Showground. Preliminary investigations are being undertaken in regard to potential for site upgrades/redevelopment and the health, condition and arboriculture retention value of existing trees has been assessed early in the design phase to determine any development constraints the trees may present.



Figure 1: Kyneton Showground. Assessment area indicated by red polygon.

The trees were assessed for their health, structure, landscape contribution and Useful Life Expectancy (ULE) and were assigned an arboricultural retention value.

Four trees (Trees 1-4) are in fair condition and have a ULE of 10-20 years. They have some structural defects but with ongoing arboricultural input, have the potential to be medium-term landscape components. Trees 1-4 have Medium retention value. Where practicable, such trees should be retained and protected throughout site works. Where this cannot be achieved, replacement planting should be undertaken to compensate for amenity loss.

Six trees (Trees 5-10) have Poor health with significant deadwood and decay throughout the canopy. Four of them are in fair to poor condition and have a ULE of 5 – 10 years, and two are in poor condition due to advanced decline, with a ULE of less than 5 years. Trees 5-10 have Low retention value; such trees are generally not considered worthy of impeding development and tree protection measures would not need to be considered in any future development design.

Designs for future site development should locate new constructed elements outside of the Tree Protection Zone of any tree to be retained. Where this is not practically achievable an Arboricultural Impact Assessment will be required to determine the level of impact on the tree/s and the tree protection measures required to ensure the tree/s can be successfully retained in the landscape.

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Table 1: Table of Revisions

Rev No.	Report Date	Description	Author	Internal Review Date	Reviewed by
0	04/05/2023	Draft for internal review	MNB	04/05/2023	BJP

## 1. Introduction

Homewood Consulting Pty Ltd has been engaged to provide a Preliminary Tree Assessment report on ten *Ulmus procera* (English Elm) trees at Kyneton Showground.

An arborist report is required to assess the condition and arboricultural retention value of the trees, to assist in future planning for site development.

This report provides Tree Protection Zone (TPZ) dimensions, Structural Root Zone Dimensions (SRZ) and design considerations in accordance with the Australian Standard (AS 4970-2009) *Protection of Trees on Development Sites* for the subject trees.

## 2. Method

On Friday, 14 April 2023 Megan Brittingham conducted a site inspection.

Data collected for the trees included:

- Photograph
- Botanical Name
- Tree Dimensions
- Diameter at Breast Height (DBH)
- Diameter above basal root flare
- Health
- Structure
- Useful Life Expectancy (ULE)
- Landscape Contribution
- Retention Value.

For definitions and descriptors of the data collected on site see Appendix 1.

A 'Visual Tree Assessment' (VTA) was conducted for each tree. A VTA consists of a detailed visual inspection of a tree and its surrounding site, including a complete walk around the tree, looking at the buttress roots, trunk, branches and leaves. The tree is observed from a distance and close up to consider crown shape, landscape context and surroundings.

The assessment was conducted from ground level with no instruments used other than a diameter tape to measure trunk diameter. Any assessments of decay are qualitative only.

Tree location was recorded using differentially corrected GPS (generally +/- 1.0m accuracy). Location should be verified by a surveyor if decision making requires greater accuracy.

## 3. Introduction to the Tree Protection Zone

The Tree Protection Zone (TPZ) is the principal means of protecting trees on development sites. It is a combination of the root area and crown area which is isolated from construction disturbance, so that the tree remains viable. The TPZ incorporates the Structural Root Zone (SRZ), the area around the base of a tree required for the tree's stability in the ground; with the woody root growth and soil cohesion in this area necessary to hold the tree upright. Further description of the TPZ and SRZ, and methods used for their calculation can be seen in Appendix 2.

Construction Impact is determined based on the level of encroachment into the TPZ of a tree as specified in Australian Standard AS4970-2009. If encroachment is less than 10% of the area of the TPZ and is outside the SRZ ('minor' encroachment), detailed root investigations should not be required. Where the proposed encroachment is greater than 10% of the TPZ or inside the SRZ ('major' encroachment), the project arborist must demonstrate how, or if, the tree will remain viable.

Table 2 displays the assessment data for the trees, including retention values and the dimensions of the TPZs and SRZs.

## Preliminary Tree Assessment

Macedon Ranges Shire Council  
Kyneton Showground, Kyneton



## 4. Tree Assessments

Table 2: Summary of tree assessments

Tree ID	Botanical Name	Height & Width (m)	DBH (cm)	TPZr (m)	SRZr (m)	Health	Structure	Observations	ULE (years)	Landscape Contribution	Retention Value
1	<i>Ulmus procera</i>	14 x 11	66	7.9	3.0	Fair	Fair	Codominant trunks, Cavity in trunk, Deadwood	10 - 20	Low	Medium
2	<i>Ulmus procera</i>	14 x 10	62	7.4	2.8	Fair	Fair	Codominant trunks, Decay in trunk, Trunk lopped	10 - 20	Medium	Medium
3	<i>Ulmus procera</i>	12 x 10	54	6.5	2.7	Fair	Fair	Extended branches in canopy, Deadwood	10 - 20	Medium	Medium
4	<i>Ulmus procera</i>	12 x 8	68	8.2	3.1	Fair	Fair	Mechanical damage to trunk, Canopy wound from previous failure, Deadwood	10 - 20	Medium	Medium
5	<i>Ulmus procera</i>	11 x 8	58	7.0	2.9	Poor	Fair	Decay in canopy, Deadwood	5 - 10	Medium	Low
6	<i>Ulmus procera</i>	8 x 7	45	5.4	2.6	Poor	Fair	Cavity in trunk, Mechanical damage to trunk, Decay in canopy, Canopy lopped, Deadwood	5 - 10	Medium	Low
7	<i>Ulmus procera</i>	8 x 10	63	7.6	3.0	Poor	Poor	Decay in trunk, Decay in canopy, Deadwood, Canopy lopped,	5 - 10	Low	Low
8	<i>Ulmus procera</i>	11 x 9	67	8.0	3.0	Poor	Fair	Mechanical damage to trunk, Decay in trunk, Trunk wound from previous failure, Canopy wound from previous failure, Decay in canopy, Deadwood	5 - 10	Low	Low
9	<i>Ulmus procera</i>	11 x 6	74	8.9	3.2	Poor	Poor	Decay in trunk, Trunk wound from previous failure, Decay in canopy, Canopy lopped	< 5	Low	Low
10	<i>Ulmus procera</i>	11 x 14	70	8.4	3.2	Poor	Poor	Extended branches in canopy, Decay in canopy, Deadwood	< 5	Low	Low

Reference: 4857

## 4.1 Retention Value

Four trees (Trees 1-4) have Fair health and structure and a ULE of 10-20 years. These trees have some structural defects but, with ongoing arboricultural input, have the potential to be medium-term landscape components. The trees provide a moderate contribution to the local landscape and canopy cover and have Medium retention value. Where practicable, trees with Medium retention value should be retained and protected throughout site works. Where this cannot be achieved, replacement planting should be undertaken to compensate for any amenity loss.

Six trees (Trees 5-10) have Poor health indicated by significant deadwood and decay throughout the canopy. Of these, Trees 5-8 have Fair or Poor structure and a relatively short ULE of 5-10 years. Trees 9 & 10 have Poor health and structure and are in decline, both have a ULE of less than 10 years. Trees 5-10 have Low retention value; such trees are generally not considered worthy of impeding development and tree protection measures would not need to be considered in any future development design.

As a group, the trees provide a moderate landscape contribution providing shade and amenity around the netball court.

## 5. Site Plan



## 6. Conclusion and Recommendations

10 English Elm trees were assessed at the Kyneton showground. Four trees are in fair condition and have Medium retention value. Six trees are in fair or poor condition and have Low retention value.

Designs for future site development should locate new constructed elements outside of the Tree Protection Zone of any tree to be retained. Where this is not practically achievable an Arboricultural Impact Assessment will be required to determine the level of impact on the tree/s and the tree protection measures required to ensure the tree/s can be successfully retained in the landscape.

If the trees are removed to facilitate development of the site, consideration should be given to replanting to compensate for loss of amenity.

## 7. References

AS 4970 - 2009, *Australian Standard, Protection of Trees on Development Sites*, Standards Australia.

Biddle, P.G., 1998, *Tree root damage to buildings, Causes, Diagnosis and Remedy*, Willowmead Publishing Ltd., Wantage, UK.

Mattheck, C. and Breloer, H. 1994, *The body language of trees: a handbook for failure analysis*, London: HMSO.

## Appendix 1. Data Collection Definitions & Descriptors

Tree assessments are based on the assessor's experience and opinion of the tree.

### 1.1 Botanical name

The scientific name identifying the genus and species of the tree. Each species has only one scientific name.

### 1.2 Common Name

The colloquial name for a tree species, usually in plain English. Common names for a species are often local or regional and each species can have multiple common names.

### 1.3 Tree dimensions

Tree height and canopy width in metres (estimated unless stated otherwise).

### 1.4 DBH

Diameter of the trunk at breast height (1.4m above ground level) measured using a diameter tape. Used to calculate the Tree Protection Zone radius.

### 1.5 Basal diameter

Diameter of the trunk above the root buttress, measured using a diameter tape. Used to calculate the Structural Root Zone radius.

### 1.6 Health

Category	Description
Good	The tree is demonstrating good or exceptional growth. The tree exhibits a full canopy of foliage and has only minor pest or diseases problems.
Fair	The tree is in reasonable condition and growing well. The tree exhibits an adequate canopy of foliage. There may be some deadwood present in the crown. Some grazing by insects or possums may be evident.
Poor	The tree is not growing to its full capacity; extension growth of the laterals is minimal. The canopy may be thinning or sparse. Large amounts of deadwood may be evident throughout the crown. Significant pest and disease problems may be evident or there may be symptoms of stress indicating tree decline.
Very Poor	The tree appears to be in a state of decline. The tree is not growing to its full capacity. The canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.
Dead	The tree is dead.



## 1.7 Structure

Category	Description
Good	The tree has a well-defined and balanced crown. Branch unions appear to be sound, with no significant defects evident in the trunk or the branches. Major limbs are well defined. The tree is considered a good example of the species.
Fair	The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance, and some branch unions may be exhibiting minor structural faults. If the tree has a single trunk, it may be on a slight lean or exhibiting minor defects.
Poor	The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered root damage.
Very Poor	The tree has a poorly structured crown. The crown is unbalanced or exhibits large gaps with possibly large sections of deadwood. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. Branches may exhibit large cracks that are likely to fail in the future. The tree may have suffered major root damage.
Has Failed	A section of the tree has failed or is in imminent danger of failure and the tree is no longer a viable specimen.

## 1.8 Age Class

Category	Description
Mature	Tree has reached the expected size for the species at the site.
Semi-mature	Established tree that has not yet reach the expected size for the species at the site.
Young	Recently planted tree or juvenile self-sown tree (generally less than 5 years old).

## 1.9 Useful Life Expectancy (ULE)

Category	Description
40+ years	The tree is in excellent condition and under normal conditions and with appropriate management is expected to continue as a viable landscape component in excess of 40 years.
20 - 40 years	The tree is in good condition and under normal conditions and with appropriate management is expected to continue as a viable landscape component for 20-40 years.
10 - 20 years	The tree is in fair condition and under normal conditions and with appropriate management is expected to continue as a viable landscape component for 10-20 years.
5 - 10 years	The tree is in fair to poor condition or it is not a long lived species. Removal and replacement may be required within the next 10 years.
Less than 5 years	The tree is in poor condition due to advanced decline or structural defect. Removal and replacement may be required within the next 5 years.
0 years	The tree is dead or is considered hazardous in the location. Removal may be required.

### 1.10 Tree Origin

Category	Description
Exotic	The species originates in a country other than Australia.
Australian Native	The species originates within Australia.
Indigenous	The species originates within the local environs.

### 1.11 Contribution to the Landscape

Category	Description
High	Generally, a large tree which is a significant component of the local landscape and provides canopy cover to the site. May offer shade and other amenities such as screening. The tree may assist with erosion control, offer a windbreak or perform a vital function in the location (e.g.: Habitat, shade, flowers or fruit).
Medium	Generally, a medium sized tree or group of small-medium trees which provide a moderate contribution to the local landscape and canopy cover. The tree may offer screening in the landscape or serve a particular function in the location.
Low	The tree offers little in the way of screening, amenity or canopy cover.
Negligible	The tree offers extremely little to nothing in the way of screening, amenity or canopy cover.

### 1.12 Tree Retention Value

Term	Description
Very High	Tree of exceptional quality in good condition. A prominent landscape feature and/or of historic, cultural, ecological or other significance. Has the potential to be a long-term landscape component where managed appropriately. All efforts should be made to retain the tree and protect from arboricultural impact.
High	Tree of high quality in good to fair condition. Generally, a prominent landscape feature. Has the potential to be a medium to long-term landscape component where managed appropriately. All efforts should be made to retain the tree and protect from arboricultural impact.
Medium	Tree of moderate quality in fair condition. Generally, a modest landscape feature. May have a health or structural issue that can be resolved with arboricultural input or may refer to a medium to small tree in good condition. Has the potential to be a medium to long-term landscape component where managed appropriately. Where practical, design modifications should be considered in order to retain and protect from arboricultural impact.
Low	Either: Tree of low quality in poor condition. Generally, provides little amenity value. Unlikely to be a long or medium term landscape component. The tree may be considered a weed species, structurally unsound, dead/dying/diseased, nearing the end of its ULE or may not be suitable for the site. Or: small tree of good or fair condition which is easily replaced in the landscape through planting of advanced stock.

## Appendix 2. Tree Protection Zones & Structural Root Zones

All parts of the tree may be damaged by development and damage to any one part of the tree may affect its functioning as a whole.

Root damage is the most common cause of damage to trees on development sites. Roots may be directly damaged when removed, wounded, crushed or torn during grading, excavation or trenching. Soil compaction from foot traffic and vehicle traffic indirectly damages tree roots, resulting in loss of pore space within the soil which is essential for the exchange of gases between the soil and atmosphere and for soil drainage.

Trunks of trees may be wounded mechanically during demolition and construction work. This not only predisposes a tree to potential decay, but it also interferes with the transport of water, nutrients and sugars throughout the tree. Serious impacts may structurally weaken the tree.

The canopy of trees can be damaged through incorrect pruning techniques or mechanical injury by trucks, cranes, excavators etc. The removal of leaves reduces the level of photosynthesis and reduces the tree's capacity to function normally and to withstand stresses. Incorrect pruning and mechanical damage can produce wounds that are susceptible to infection by wood decay organisms.

For trees to be retained and their requirements met, procedures must be in place to protect trees at every stage of the development process. This needs to be taken into account at the earliest planning stage of any outdoor event or design of a development project where trees are involved.

### 2.1 Tree Protection Zones

The most common method of protecting trees during construction is by establishing a Tree Protection Zone (TPZ). The TPZ is an area isolated from construction disturbance area, so that the tree remains viable. The TPZ radius has been calculated according to the Australian Standard (AS 4970-2009) for the subject trees. This method calculates the TPZ as 12 times the trunk diameter at 1.4m above ground level (DBH).

A TPZ should not be less than 2m nor greater than 15m, except where additional crown protection is required. The TPZ of palms, other monocots, cycads and tree ferns should not be less than 1m outside of the crown projection.

### 2.2 Structural Root Zones

The Structural Root Zone (SRZ) is the minimum volume of roots required by the tree to remain stable in the ground. If the SRZ is breached the chances of windthrow are significantly increased. Windthrow is an event where the entire tree fails/falls over.

It is important to note that the SRZ is not related to tree health. It refers to the physical volume of roots required for the tree to remain stable in the ground (Figure 2). It is in no way related to the physiological requirements of the tree but is the minimum volume of roots required for the tree to remain standing (Mattheck & Breloer 1994).

According to AS 4970-2009 the SRZ radius of the trees has been calculated using the equation:

$$R_{SRZ} = (D \times 50)^{0.42} \times 0.64$$

Where: D = trunk diameter, in m, measured above the root buttress

NOTE: The SRZ for trees with trunk diameters less than 0.15 m will be 1.5 m

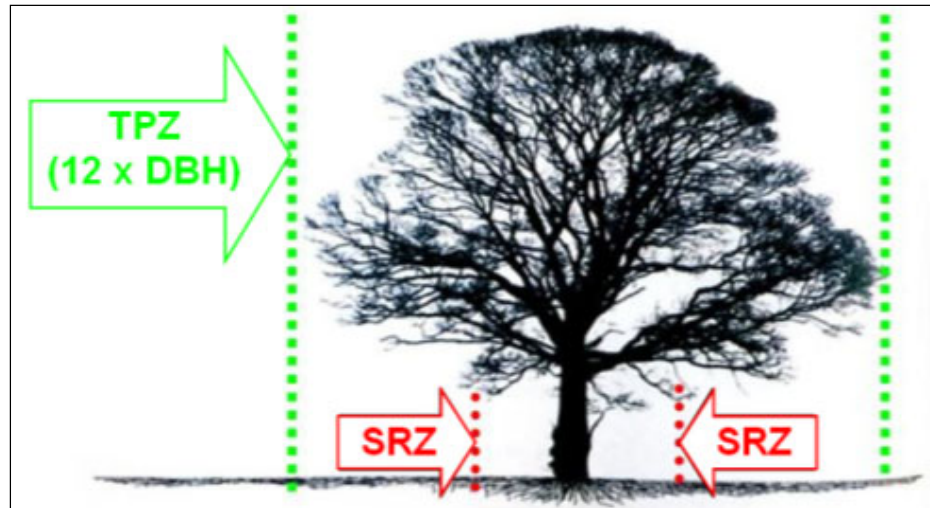


Figure 2: The SRZ = minimum volume of roots required to maintain tree stability (Biddle 1998).

### 2.3 TPZ and SRZ encroachment

It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes (but is not limited to) excavation, compacted fill and machine trenching.

Table 3: Levels of TPZ encroachment as defined by AS 4970-2009

Level of Encroachment	Description / Definition	Requirements
Minor	Encroachment of less than 10% of the TPZ and outside the SRZ is deemed to be minor encroachment.	Detailed root investigations should not be required but the encroachment must be compensated with an extension to the TPZ elsewhere (Figure 3). Variations must be made by the Project Arborist considering other relevant factors including tree health, vigour, stability, species sensitivity and soil characteristics.
Major	Encroachment of more than 10% of the TPZ or into the Structural Root Zone (SRZ) is deemed to be major encroachment.	The Project Arborist must demonstrate that the trees would remain viable. This may require root investigation by non-destructive methods and/or consideration of relevant factors of tree health, vigour, stability, species sensitivity and soil characteristics.

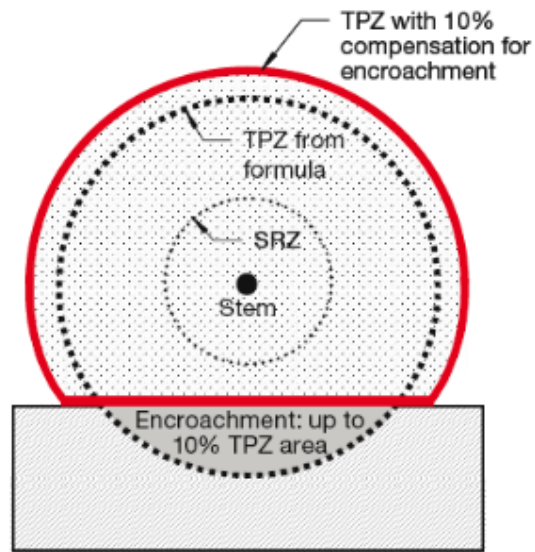


Figure 3: Example of minor TPZ encroachment and compensatory offset (image from AS 4970-2009).

**Tree Number:** 1  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 14 x 11  
**DBH (cm):** 66  
**Health:** Fair  
**Structure:** Fair  
**ULE:** 10 to 20 years  
**Landscape Contribution:** Low  
**Retention Value:** Medium  
**TPZ radius (m):** 7.92  
**SRZ radius (m):** 3.01  
**Observations:** Codominant trunks, Cavity in trunk, Deadwood



**Tree Number:** 2  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 14 x 10  
**DBH (cm):** 62  
**Health:** Fair  
**Structure:** Fair  
**ULE:** 10 to 20 years  
**Landscape Contribution:** Medium  
**Retention Value:** Medium  
**TPZ radius (m):** 7.44  
**SRZ radius (m):** 2.81  
**Observations:** Codominant trunks, Decay in trunk, Trunk lopped



**Tree Number:** 3  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 12 x 10  
**DBH (cm):** 54  
**Health:** Fair  
**Structure:** Fair  
**ULE:** 10 to 20 years  
**Landscape Contribution:** Medium  
**Retention Value:** Medium  
**TPZ radius (m):** 6.48  
**SRZ radius (m):** 2.65  
**Observations:** Extended branches in canopy,  
Deadwood



**Tree Number:** 4  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 12 x 8  
**DBH (cm):** 68  
**Health:** Fair  
**Structure:** Fair  
**ULE:** 10 to 20 years  
**Landscape Contribution:** Medium  
**Retention Value:** Medium  
**TPZ radius (m):** 8.16  
**SRZ radius (m):** 3.14  
**Observations:** Mechanical damage to trunk,  
Canopy wound from previous  
failure, Deadwood



**Tree Number:** 5  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 11 x 8  
**DBH (cm):** 58  
**Health:** Poor  
**Structure:** Fair  
**ULE:** 5 to 10 years  
**Landscape Contribution:** Medium  
**Retention Value:** Low  
**TPZ radius (m):** 6.96  
**SRZ radius (m):** 2.88  
**Observations:** Decay in canopy, Deadwood



**Tree Number:** 6  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 8 x 7  
**DBH (cm):** 45  
**Health:** Poor  
**Structure:** Fair  
**ULE:** 5 to 10 years  
**Landscape Contribution:** Medium  
**Retention Value:** Low  
**TPZ radius (m):** 5.4  
**SRZ radius (m):** 2.63  
**Observations:** Cavity in trunk, Mechanical damage to trunk, Decay in canopy, Canopy lopped, Deadwood





**Tree Number:** 7  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 8 x 10  
**DBH (cm):** 63  
**Health:** Poor  
**Structure:** Poor  
**ULE:** 5 to 10 years  
**Landscape Contribution:** Low  
**Retention Value:** Low  
**TPZ radius (m):** 7.56  
**SRZ radius (m):** 2.97  
**Observations:** Decay in trunk, Decay in canopy, Deadwood, Canopy lopped,



**Tree Number:** 8  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 11 x 9  
**DBH (cm):** 67  
**Health:** Poor  
**Structure:** Fair  
**ULE:** 5 to 10 years  
**Landscape Contribution:** Low  
**Retention Value:** Low  
**TPZ radius (m):** 8.04  
**SRZ radius (m):** 2.98  
**Observations:** Mechanical damage to trunk, Decay in trunk, Trunk wound from previous failure, Canopy wound from previous failure, Decay in canopy, Deadwood



**Tree Number:** 9  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 11 x 6  
**DBH (cm):** 74  
**Health:** Poor  
**Structure:** Poor  
**ULE:** Less than 5 years  
**Landscape Contribution:** Low  
**Retention Value:** Low  
**TPZ radius (m):** 8.88  
**SRZ radius (m):** 3.2  
**Observations:** Decay in trunk, Trunk wound from previous failure, Decay in canopy, Canopy lopped



**Tree Number:** 10  
**Botanical Name:** *Ulmus procera*  
**Common Name:** English Elm  
**Origin:** Exotic  
**Maturity:** Mature  
**Height & Width (m):** 11 x 14  
**DBH (cm):** 70  
**Health:** Poor  
**Structure:** Poor  
**ULE:** Less than 5 years  
**Landscape Contribution:** Low  
**Retention Value:** Low  
**TPZ radius (m):** 8.4  
**SRZ radius (m):** 3.15  
**Observations:** Extended branches in canopy, Decay in canopy, Deadwood

