



**ÖKOLOGIE** CONSULTING

# **Ocean Grove Significant Residential Tree Project**

**Prepared for:  
City of Greater Geelong**



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## Document Information

Ocean Grove Significant Residential Tree Project

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## Document Control

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## Summary

Okologie Consulting was engaged by City of Greater Geelong to undertake a significant residential tree survey in Ocean Grove, Victoria.

The survey was undertaken to identify the extent of significant trees on public and private land, and provide guidance for future management and planning controls.

The project area was characterised by indigenous trees within road reserves and private properties, interspersed with planted native and exotic trees and shrubs. However, several streets and private properties throughout the project area were devoid of indigenous trees.

A total of 517 significant street trees were recorded, comprising 362 indigenous trees and 155 planted native trees. This included 30 indigenous street trees and 11 planted native trees not previously recorded. The assessment of private property trees identified 1050 trees, consisting of 480 indigenous trees and 570 planted native trees.

Bellarine Yellow-gum *Eucalyptus leucoxylon* subsp. *bellarinensis* was the most common indigenous street tree (269 trees) within the project area. Bellarine Yellow-gum is listed as Endangered in Victoria and is endemic to the Bellarine Peninsula.

Comparison of the survey results with previous Council tree data and recent aerial photography indicates that recent residential development has resulted in the loss of indigenous and planted native canopy tree cover throughout the township, with some streets altogether devoid of indigenous trees. Development often results in incremental tree loss from damage to root zones resulting in tree failure or long-term impacts to tree health.

The protection and management of Bellarine Yellow-gum within residential Ocean Grove is crucial to the long-term conservation of the species. The importance of maintaining the substantial canopy tree cover, as the dominant visual and environmental feature of public and private land should be prioritised to maintain the unique coastal and vegetated character of the township.

The precincts that support significant indigenous and planted native trees require formal identification through the planning scheme. Amendment to the existing planning provisions is also required to protect, enhance and manage these assets, with the intent of protecting significant trees and vegetation communities and the unique character of the area.

A Vegetation Protection Overlay should be considered for the precincts supporting significant trees, as it is specifically designed to protect significant native in an urban environment. It can be applied to individual trees or areas of significant vegetation.



# 1 Introduction

## 1.1 Project Background

Okologie Consulting was engaged by City of Greater Geelong (CoGG) to undertake a significant residential tree survey in Ocean Grove, Victoria.

The survey was undertaken to identify the extent of significant trees on public and private land, and provide guidance for future management and planning controls.

Areas of public and private land within established Ocean Grove support an extensive cover of native and indigenous trees that provide important ecological and cultural values, which contribute to the unique coastal and vegetated character of the Township. The aim of the assessment was to identify how these values can be preserved and enhanced, identify appropriate planning measures to better protect the remaining vegetation and review the balance of tree cover retained within development sites.

Okologie Consulting (2015) also completed an *Assessment of Vegetation Cover for the Significant Landscape Overlay – Schedule 7, Ocean Grove*, which should be reviewed in conjunction with this report.

## 1.2 Objectives

The objectives of the assessment was to:

- Identify the extent of significant trees on public and private land.
- Provide guidance for future management and planning controls, and inform the Ocean Grove Structure Plan.

## 1.3 Site Description

The Significant Residential Tree project area extended from Thacker Street to the north, Tuckfield Street to the east, Asbury Street East to the south and Field Street to the west. The project area also covered a small pocket further to the west that included Bell Street, Blackwell Street, Mann Street and Asbury Street West (Figure 1).

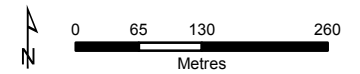
The project area is located within the Otway Plain bioregion, the Corangamite Catchment Management Authority boundary and the City of Greater Geelong municipality. It is zoned General Residential Zone – Schedule 2 and is subject to Design and Development Overlay – Schedule 14 under the Greater Geelong Planning Scheme (DELWP 2015b).



**Figure 1**  
*Significant Residential  
 Tree Project*  
 Ocean Grove

**Legend**

 Project Area



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## 2 Methodology

### 2.1 Desktop Assessment

The desktop assessment included review of the existing CoGG tree data (i.e. tree location, species, height and age), and to establish an overview of the tree values throughout the project area. GIS layers from the existing CoGG tree data were overlaid onto GIS and aerial photography to allow confirmation and ground-truthing during the field assessment.

The Biodiversity Interactive Map (DELWP 2015a) was also reviewed to determine the modelled extent of Ecological Vegetation Classes (EVCs), threatened species and vegetation communities across the site.

### 2.2 Survey Methods

The Significant Residential Tree survey was undertaken between 7 and 21 July 2015 for the street trees and between 28 August and 4 September 2015 for private property trees. The survey was undertaken on foot and by car, by Mark Stockdale (Ecologist) and Matt Branagh (Arborist).

The assessment of significant street trees involved recording the point location using a Trimble Juno differential GPS (accuracy  $\pm$  one metre post processing), with TerraSync field software, and processed in ArcGIS. GIS layers from the existing CoGG tree data were entered onto the Trimble unit and the fields were updated according to the assessment criteria. The point location of any trees not previously identified by CoGG was also recorded.

The assessment of trees on private property was undertaken from the road reserve and identified on recent aerial photographs, and then recorded through ArcGIS post processing. Private property was not accessed during the survey to record the GIS point location of trees.

### 2.3 Significant Street Tree Criteria

The significant tree criteria was informed by the *Vegetation Protection in Urban Areas* guidelines (DPCD 1999), and was based on a combination of ecological, arboricultural, cultural and historical values, which considered conservation status, health and structural condition, botanical or horticultural quality, historical value, and state or local significance (Appendix 1).



The significance criteria for street trees was rated into three levels (low, moderate and high) and was applied to indigenous canopy tree species >3 metres tall, and planted native trees >5 metres tall (Table 1).

**Table 1. Significance criteria rating, values and description of street trees**

Significance Level	Significance Values	Significance Description
High	<ul style="list-style-type: none"> <li>• Conservation status</li> <li>• Outstanding specimen</li> <li>• Outstanding size (height, age or structure)</li> <li>• Remnant species</li> <li>• Habitat value</li> </ul>	Trees with the potential to positively contribute to the site due to their botanical, horticultural, historical or local significance in combination with good characteristics of structure, health and future development.
Moderate	<ul style="list-style-type: none"> <li>• Horticultural value</li> <li>• Historical value</li> <li>• Landscape context</li> </ul>	Trees with some beneficial attributes that may benefit the site in relation to botanical, horticultural, historical or local significance but may be limited to some degree by their future growth potential at the site by maintenance requirements now or in the future.
Low		Trees that offer little in terms of contributing to the future landscape for the reasons of poor health or structural condition, species suitability in relation to unacceptable growth habit, low ULE, or a combination of these characteristics.

The survey also recorded the following parameters of significant street trees:

- Origin (indigenous or planted native);
- Tree species (botanical and common name);
- Conservation status (Endangered, Vulnerable or Rare in Victoria);
- Diameter at Breast Height (0.0-0.2, 0.2-0.4, 0.4-0.6, 0.6-0.8, 0.8-1.0, >1.0 metre);
- Estimated height;
- Age (young, semi-mature, mature);
- Health (poor, fair or good);
- Structure (poor, fair or good);
- Hazard (low, moderate or high);
- Habitat value (hollows present or absent); and,
- Useful Life Expectancy (ULE) (Appendix 1).

Scientific and common names of tree species followed the Australian Plant Census (ANBG 2015). Street trees were also identified according to *Permitted clearing of native vegetation – Biodiversity assessment guidelines* (the Guidelines), which classifies native vegetation as a *remnant patch* or *scattered tree* under the following criteria.

A remnant patch of native vegetation (measure in hectares) is either:



- An area of native vegetation<sup>1</sup>, with or without trees, where at least 25 per cent of the total perennial understorey plant cover is native plants.
- An area with three or more indigenous canopy trees where the tree canopy cover is at least 20 per cent.

#### Scattered tree

- An indigenous canopy tree<sup>2</sup> that does not form part of a remnant patch (DEPI 2013a).

## 2.4 Significant Private Property Tree Criteria

The criteria for assessing significant trees on private property were modified to account for the limitations associated with site access and the ability to observe trees in detail. Trees were identified as either indigenous or planted natives and were not identified to genus or species level. Tree significance was rated as high, moderate or low using the following criteria:

- Origin (indigenous or planted native);
- Conservation status (Endangered, Vulnerable or Rare in Victoria);
- Health (poor, fair or good);
- Structure (poor, fair or good);
- Hazard (low, moderate or high); and,
- Useful Life Expectancy (ULE).

## 2.5 Limitations

The Significant Residential Tree survey was limited to indigenous and planted native trees that met the assessment criteria outlined above. The significance criteria were based on an objective assessment of scientific information and review of relevant documents.

Private property was not accessed during the survey, and trees that were not visible from the road reserve were interpreted from review of aerial photography and typical floristic characteristics, which limited the ability to identify trees to genus or species level or observe potential issues with tree health, structure and hazard in detail. However, the survey methodology was considered adequate to meet the objectives of this assessment.

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<sup>1</sup> An area of native vegetation is defined as *continuous and unbroken native vegetation*. A break in remnant patch will occur where the definition of remnant patch has not been met for a continuous width of at least 10 metres (DEPI 2013a).

<sup>2</sup> DEPI defines a scattered tree as 'A canopy tree is a mature tree that is greater than three metres in height and is normally found in the upper layer of a vegetation type' (DEPI 2013c).



The information outlined in this report relies on the accuracy of ecological database information, GIS layers and spatial imagery at the time of the assessment. To minimise potential errors, the most current available data was obtained from relevant sources.



## 3 Results

### 3.1 Ecological Values

The Biodiversity Interactive Map modelling for the Otway Plains bioregion indicates the pre-1750 EVC mapping for the project area would have predominantly comprised of Grassy Woodland (EVC 175). Extant (2005) mapping shows a sparse cover of Grassy Woodland in the southwestern section of the project area (DELWP 2015a).

Areas of remnant vegetation within the project area were attributed to Grassy Woodland, based on floristic, life form and ecological characteristics.

Grassy Woodland is described as *variable open eucalypt woodland to 15 metres tall or occasionally Sheoak woodland to 10 metres tall over a diverse ground layer of grasses and herbs. The shrub component is usually sparse. It occurs on sites with moderate fertility on gentle slopes or undulating hills on a range of geologies* (DELWP 2015a).

Indigenous vegetation associated with Grassy Woodland generally comprised of Bellarine Yellow-gum *Eucalyptus leucoxylon* subsp. *bellarinensis*, Narrow-leaf Peppermint *Eucalyptus radiata*, Swamp Gum *Eucalyptus ovata*, Manna Gum *Eucalyptus viminalis*, Drooping Sheoak *Allocasuarina verticillata* and Sweet Bursaria *Bursaria spinosa*.

Planted native species included Yellow-gum *Eucalyptus leucoxylon*, Sugar Gum *Eucalyptus cladocalyx*, Southern Mahogany *Eucalyptus botryoides*, Bundy *Eucalyptus goniocalyx*, River Red-gum *Eucalyptus camaldulensis*, Bushy Yate *Eucalyptus lehmannii*, Tuart *Eucalyptus gomphocephala*, Spotted Gum *Corymbia maculata* and Red Flowering Gum *Corymbia ficifolia*.

### 3.2 Threatened Species and Communities

The Biodiversity Interactive Map identifies that areas of Grassy Woodland correlate with Coastal Moonah Woodland floristic community (number 460), listed as Threatened under the *Flora and Fauna Guarantee Act 1988* (FFG Act). One threatened flora species, Bellarine Yellow-gum, was recorded during the survey. Bellarine Yellow-gum is listed as Endangered in Victoria and Threatened under the FFG Act (DEPI 2014).

### 3.3 Fauna Habitat

The site supports one main habitat type (modified woodland). Areas of modified woodland (Grassy Woodland EVC) is likely to facilitate fauna movement between habitats throughout an otherwise cleared landscape. Several mature Bellarine Yellow-gum trees supported hollows for species such as Rainbow Lorikeet and Eastern Rosella. Indigenous and planted native trees also provide perching, roosting and foraging habitat for a range of common bird species, including Australian Raven,



Eastern Spinebill, Magpie-lark, Red Wattlebird, Welcome Swallow, Grey Shrike-thrush and New Holland Honeyeater. Mammals such as Brush-tailed Possum and Common Ring-tailed Possum are also likely to utilise this habitat.

### **3.4 Street Tree Values**

A total of 517 significant street trees were recorded within the project area, which comprised 362 indigenous trees and 155 planted native trees. This included 30 indigenous street trees and 11 planted native trees not previously recorded. The survey results are summarised in Tables 1 and 2.

The street tree survey results for indigenous trees identified the majority of trees were Bellarine Yellow-gum (74%). The remaining indigenous species comprised of Narrow-leaf Peppermint, Swamp Gum, Manna Gum, Drooping Sheoak and Sweet Bursaria. The tree health assessment identified 69% of trees were in good health, 58% were of fair structure, 87% were of low hazard, 50% were semi-mature trees and 74% were of high significance. The majority of trees were found to have a ULE of 10-20 years (52%). Five trees supported hollows for fauna habitat.

The results for planted native trees identified 78% were in good health, 45% were of fair structure, 94% were of low hazard, 45% were mature trees and 69% were of low significance. The majority of trees were found to have a ULE of 10-20 years (56%). No planted trees contained hollows for fauna habitat.

### **3.5 Private Property Tree Values**

The assessment of private property trees identified 1050 trees, consisting of 480 indigenous trees and 570 planted native trees (Table 3). The survey results are summarised in Table 3.

The results identified that 45% of trees were indigenous, with 92% of high significance, 3% of moderate significance and 4% of low significance. The majority of private property trees were planted native trees (54%), with 0.8% being of high significance, 89% of moderate significance and 10% of low significance.

### **3.6 Comparative Analysis and Discussion**

The project area was characterised by indigenous trees within road reserves and private properties, interspersed with planted native and exotic trees and shrubs. However, several streets and private properties throughout the project area were devoid of indigenous trees.

The survey identified the project area is comprised of several precincts that support significant indigenous and planted native trees on public and private land, including a large component of the remnant Bellarine Yellow-gum population. Several precincts



supporting significant trees have been identified to support future planning decisions (Figure 2).

Bellarine Yellow-gum was the most common indigenous street tree (269 trees) within the project area, and the majority of trees comprised a fair structure, which is typical of the habit and form of this species. Bellarine Yellow-gum is endemic to the Bellarine Peninsula and the pockets of the project area supports a large population, which is contiguous with an extant population further to the north of the project area.

The main threats to this species are clearing for residential development, infrastructure and agricultural activities, with canopy dieback and inadequate regeneration present in remaining populations (DSE 2003). Planting of specimen trees of *Eucalyptus leucoxylon* (not subspecies *bellarinensis*) on roadsides and in private and public gardens on the Bellarine Peninsula has led to hybridisation between subspecies, and genetic pollution is considered a major threat to the species (DSE 2003). Hybridisation was evident amongst some Yellow Gum trees in the project area, and these species were identified as Yellow Gum, and not subspecies *bellarinensis*.

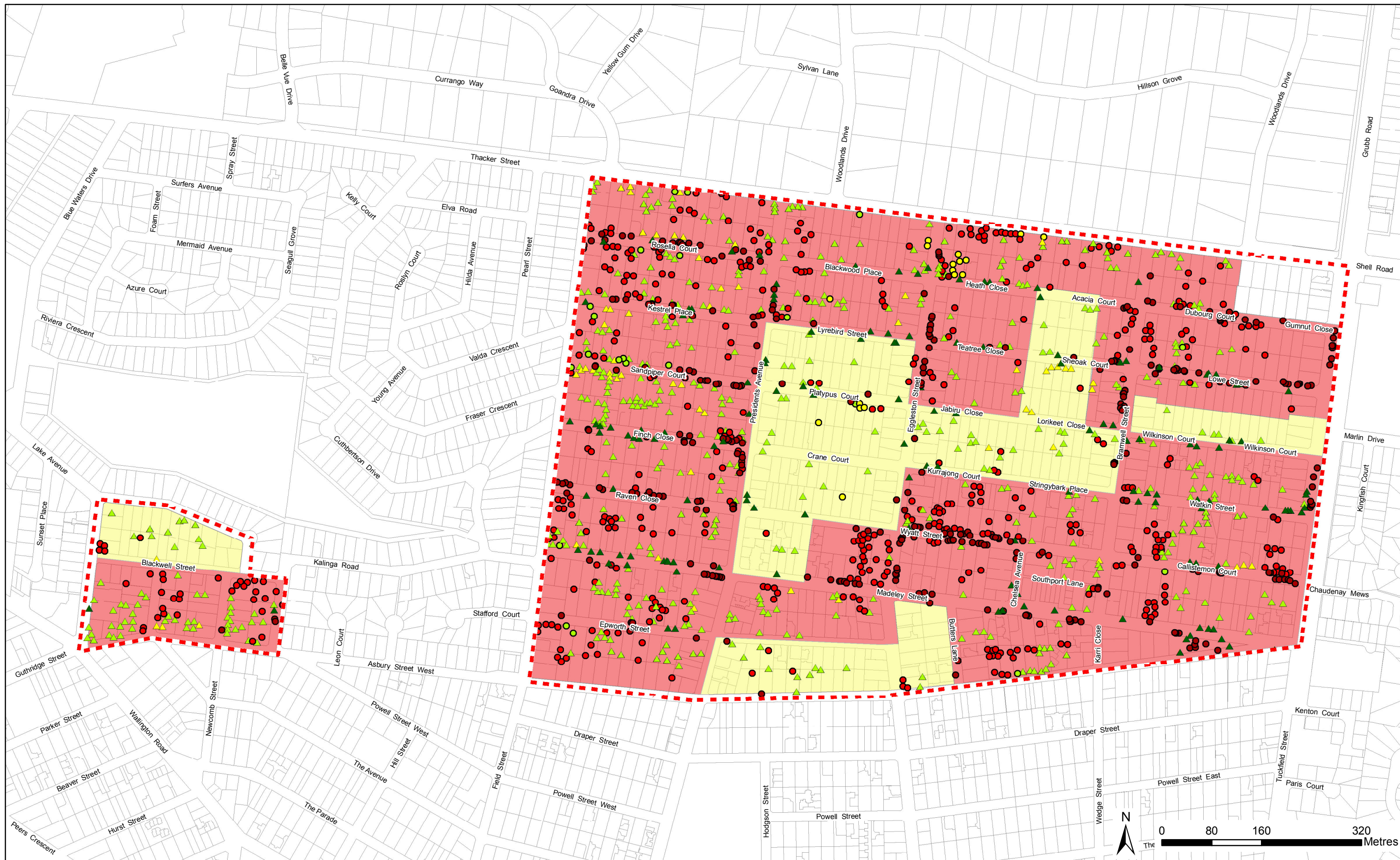
Future management of the Bellarine Yellow-gum population within the project area should consider the insufficient level of recruitment of mature trees in an urban landscape. The replacement of senescent mature trees will be required through ongoing planting; however, seed should be of local provenance and collected from the broader area to maintain genetic diversity within the species. It is recommended that a tree replacement strategy should be prepared, and include a formal procedure for seed collection and revegetation.

Most planted native street trees were in good health, with a fair structure and of low hazard, and the majority of trees were semi-mature with a long ULE. No planted native trees were found to support hollows for fauna, however, these trees provide important habitat throughout an otherwise modified urban landscape.

The influence of residential development was evident on the loss of indigenous tree cover throughout specific section of the project area. Comparison of the survey results with previous CoGG tree data and recent aerial photography indicate that numerous trees have been removed in recent years for development, with some streets altogether devoid of indigenous trees. A significant number of native birds were observed in areas dominated by indigenous trees that were not otherwise observed in areas without indigenous trees.

Impacts to the health of several private property trees were also observed as a result of development within Tree Protection Zones. The lack of existing planning controls for indigenous and planted native species on private property presents requires consideration to avoid potential impacts from future development.

No historically significant trees were recorded during the survey.



# Ocean Grove Tree Study - Potential precincts

## Legend

Study area

### Street trees

#### Origin

- Indigenous
- Planted Native

### Significant tree area - private property

#### Tree origin and Significance

- Indigenous, High
- Indigenous, Moderate

- Indigenous, Low
- Planted Native, Low
- Planted Native, Moderate

### Potential precincts

- Remnant & indigenous vegetation - tree protection and planning controls to limit the impact of development recommended
- Dispersed mature vegetation - tree protection recommended





**Table 1: Survey results for indigenous street trees**

Age			Health			Structure			Hazard			Significance			Hollows			ULE				
Mature	Semi-mature	Young	Good	Fair	Poor	Good	Fair	Poor	High	Mod	Low	High	Mod	Low	Present	Absent	n/a	Unsafe	<5yrs	5-10yrs	10-20yrs	>20yrs
171	183	8	251	84	27	105	210	47	14	32	316	269	5	88	5	300	57	5	11	39	189	118

Notes

**Table 2: Survey results for planted street trees**

Age			Health			Structure			Hazard			Significance			Hollows			ULE				
Mature	Semi-mature	Young	Good	Fair	Poor	Good	Fair	Poor	High	Mod	Low	High	Mod	Low	Present	Absent	n/a	Unsafe	<5yrs	5-10yrs	10-20yrs	>20yrs
71	76	8	122	30	3	62	70	23	2	6	147	0	47	108	0	155	0	0	1	9	88	57

**Table 3: Survey results for private property trees**

Indigenous			Planted Native		
Significance					
High		Moderate		Low	
442		17		21	
High		Moderate		Low	
5		506		59	



## 4 Tree Management Requirements

### 4.1 Tree Management

The management of indigenous and planted native trees as arboricultural assets is a necessary management technique in retaining trees in healthy sound condition. All trees should be managed to meet the requirements of *AS 4373—2007 Pruning of Amenity Trees* (Standards Australia 2007). Management of public trees should be undertaken to reduce the risk to public safety, mitigate potential damage to property, provide clearances around services and utility lines, manage tree health, and tree or branch failure resulting from severe storms or other damaging activity.

It is recommended that all tree works should be undertaken by a qualified level 3 arborist, as per the guidelines of Australian Standard *AS 4373—2007 Pruning of Amenity Trees* (Standards Australia 2009).

### 4.2 Tree Protection Zones

When designing and planning for development in the vicinity of trees on public and private land, the guidance of *AS4970-2009 Protection of Trees on Development Sites* should be implemented in all site planning (Standards Australia 2009).

It is recommended the responsible authority request a level 5 arborist assessment for development proposals on how individual significant trees can be protected through Tree Protection Zones (TPZs) (Appendix 2), and management measures on public and private land.

### 4.3 Considerations for Development Near Trees

Standards Australia has adopted a process for the best practice of the management of trees in and around development sites (Standards Australia 2009). *AS4970-2009 Protection of Trees on Development Sites* recommends that a level 5 arborist assess each tree within and around a development site, establish the Tree Protection Zone (TPZ) and provide management of trees on and adjoining development sites. Encroachment into the TPZ from development is sometimes unavoidable; however, mitigation measures can assist in avoiding impacts resulting in unnecessary damage or loss (Appendix 3).

It is recommended the responsible authority request tree surveys by a Level 5 arborist for established trees on proposed future development sites to manage tree impacts.



## 5 Statement of Significance

*Ocean Grove is the largest coastal township on the Bellarine Peninsula. Areas of public and private land within established Ocean Grove support an extensive cover of indigenous trees that form a strong bush garden character and support important ecological values, which contribute to the unique coastal and vegetated character of the township.*

*Bellarine Yellow-gum *Eucalyptus leucoxylon* subsp. *bellarinensis* is endemic to the Bellarine Peninsula and is listed as threatened in Victoria. The residential streetscape and private gardens of Ocean Grove supports a large component of the remnant Bellarine Yellow-gum population. The main threats to this species are clearing for residential development and genetic pollution from planting of specimen trees of *Eucalyptus leucoxylon* (not subspecies *bellarinensis*) on roadsides and in private and public gardens. The protection and management of Bellarine Yellow-gum within residential Ocean Grove is crucial to the long-term conservation of the species.*

*Recent residential development has resulted in the loss of indigenous and planted native canopy tree cover throughout the township. Council and the local community have identified the vulnerability of the local Bellarine Yellow-gum population from ongoing development, and the importance of maintaining the substantial canopy tree cover as the dominant visual and environmental feature of public and private land.*

*Planning provisions are required to enable the retention of significant indigenous and planted native canopy species within future residential development, with allocation for the adequate replacement of mature trees as an important component to maintain and strengthen the ecological values and the vegetated characteristic of the township.*



## 6 Conclusion

A total of 517 significant street trees were recorded, comprising 362 indigenous trees and 155 planted native trees. This included 30 indigenous street trees and 11 planted native trees not previously recorded. The assessment of private property trees identified 1050 trees, consisting of 480 indigenous trees and 570 planted native trees.

The survey identified the project area is comprised of several precincts that support significant indigenous and planted native trees on public and private land, including a large component of the remnant Bellarine Yellow-gum population.

However, comparison of the survey results with previous CoGG tree data and recent aerial photography indicates that recent residential development has resulted in the loss of indigenous and planted native canopy tree cover throughout the township, with some streets altogether devoid of indigenous trees. Many losses are through incremental removal and damage to root zones resulting in impacts to tree health and tree failure.

The protection and management of Bellarine Yellow-gum within residential Ocean Grove is crucial to the long-term conservation of the species. The importance of maintaining the substantial canopy tree cover, as the dominant visual and environmental feature of public and private land should be prioritised to maintain the unique coastal and vegetated character of the township.

The areas that support significant indigenous and planted native trees require formal identification through the planning scheme. Several precincts supporting significant trees have been identified to support future planning decisions. Areas without trees in the project area may benefit from inclusion in a broader precinct to encourage future planting on both public and private land.

Amendment to the existing planning provisions is also required to protect, enhance and manage these assets, with the intent of protecting significant species and vegetation communities and the unique character of the area.

A Vegetation Protection Overlay, Significant Landscape Overlay or Environmental Significance Overlay should be considered for the precincts supporting significant trees. In addition a tree replacement strategy should be prepared, and include a formal procedure for seed collection and revegetation.

### 6.1 Recommendations

It is recommended the responsible authority:

- Develop precincts within Ocean Grove that identify areas of significant indigenous and planted native trees on public and private land.



- Prepare a Vegetation Protection Overlay, Significant Landscape Overlay or Environmental Significance Overlay to protect significant indigenous and planted native trees within precincts of Ocean Grove.
- Include permit triggers for vegetation removal with thresholds for indigenous vegetation over 3 metres tall, planted native trees over 5 metres tall, and all Bellarine Yellow-gum trees.
- Develop a Design and Development Overlay to ensure best practice of the management of significant trees in and around development sites, which includes allocation for the adequate replacement of mature trees.
- Request a level 5 arborist assessment for development proposals on how individual significant trees can be protected through TPZs, and management measures on public and private land.
- Request tree surveys by a level 5 arborist for established trees on proposed future development sites to manage tree impacts.
- Ensure all tree works within precincts of Ocean Grove should be undertaken by a level 3 arborist



## 7 References

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## Appendices

### Appendix 1 – Significance Criteria

#### Tree Health Rating

Good: Foliage of tree is entire, with good colour, very little sign of pathogens and of good density. Growth indicators are good i.e. Extension growth of twigs and wound wood development. Minimal or no canopy die back (deadwood).

Fair: Tree is showing one or more of the following symptoms; < 25 dead wood, minor canopy-die back, foliage generally with good colour though some imperfections may be present. Minor pathogen damage present, with growth indicators such as leaf size, canopy density and twig extension growth typical for the species in this location.

Poor: Tree is showing one or more of the following symptoms of tree decline; > 25 deadwood, canopy die back is observable, discoloured or distorted leaves. Pathogens present, stress symptoms are observable as reduced leaf size, extension growth and canopy density.

Dead or dying: Tree is in severe decline; > 55 deadwood, very little foliage, possibly epicormic shoots, minimal extension growth (Source: Let's Talk About Trees).

#### Hazard Rating

Low: Tree appears to be structurally sound, is healthy with no signs of pests or disease, has good vigour and is clear of any hazards.

Medium: Tree displays signs of structural problems, evidence of pests or disease, signs of low vigour, deadwood, decay, may be growing into an area that could create a hazard.

High: Tree is an immediate hazard with the potential to fail this should be rectified as soon as possible (Source: Let's Talk About Trees).

#### Tree Structure

Good: Trunk and scaffold branches show good taper and attachment with minor or no structural defects. Tree is a good example of the species with a well-developed form showing no obvious root problems or pests and diseases.

Fair: Tree shows some minor structural defects or minor damage to trunk e.g. bark missing, there could be cavities present. Minimal damage to structural roots. Tree could be seen as typical for this species.



**Poor:** There are major structural defects, damage to trunk or bark missing. Co-dominant stems could be present or poor structure with likely points of failure. Girdling or damaged roots obvious. Tree is structurally problematic.

**Hazardous:** Tree is an immediate hazard with potential to fail, this should be rectified as soon as possible (Source: Let's Talk About Trees).

### **Useful Life Expectancy (ULE)**

**Long ULE:** Trees that appears to be retainable with an acceptable level of risk for more than 20 years.

- Structurally sound trees located in positions that can accommodate future growth.
- Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery.
- Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

**Medium ULE:** Trees that appear to be retainable with an acceptable level of risk for 10 to 20 years.

- Trees that may only live between 15 and 40 years.
- Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals.
- Trees that may live for more than 40 years but would be removed during the course of normal management for safety and nuisance reasons.
- Storm damage or defective trees that can be made suitable for retention in the medium term by remedial work.

**Short ULE;** Trees that appear to be retainable with an acceptable level of risk for 5 to 10 years.

- Trees that may live for 5 to 10 years.
- Trees that may live for more than 10 years but would be removed to allow the safe development of more suitable individuals.
- Trees that may live for more than 10 years but would be removed during the course of normal management for safety and nuisance reasons.
- Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.

**Remove:** Trees with a high level of risk that would need removal within the next 5 years.

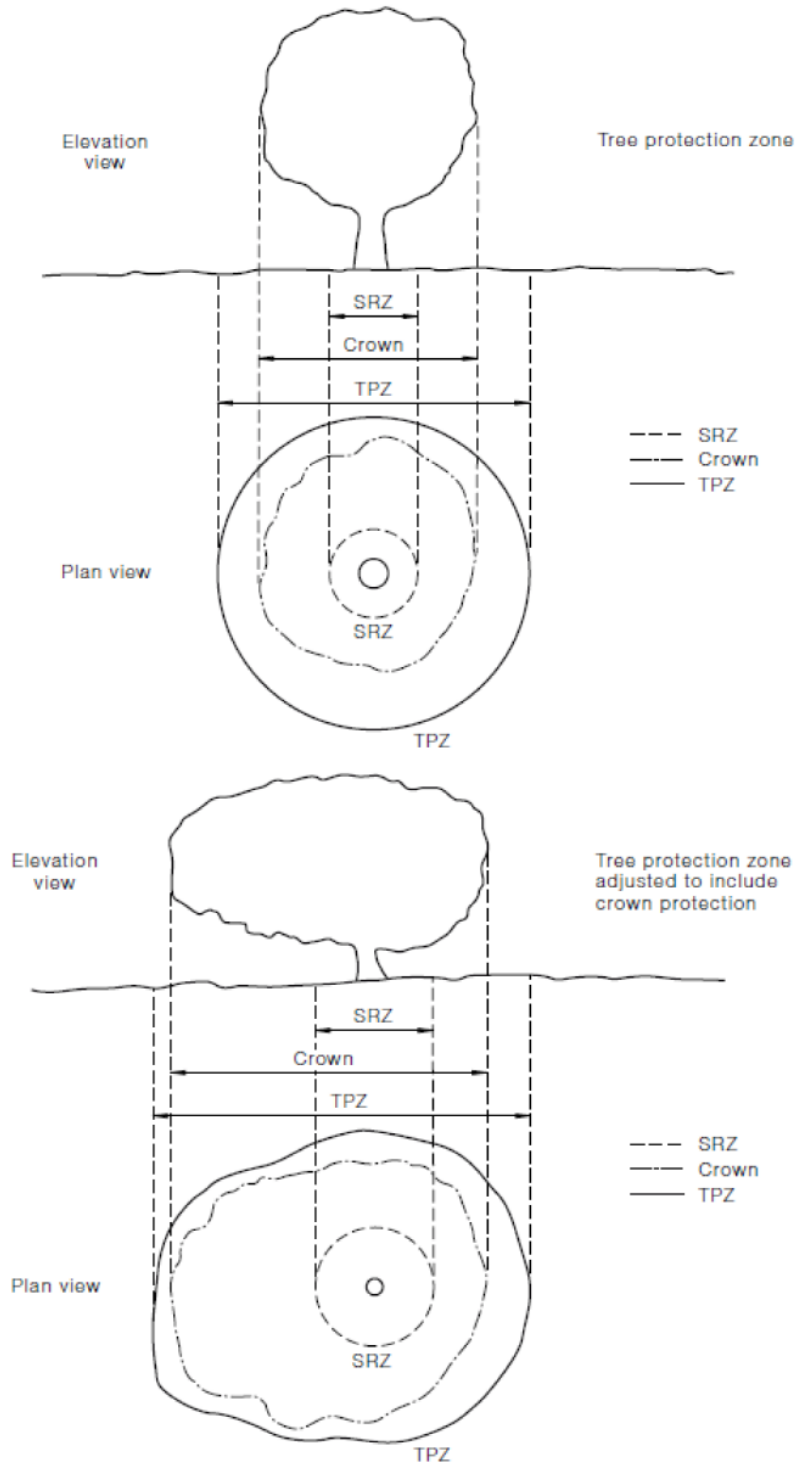
- Dead trees.
- Dying or suppressed and declining trees through disease or inhospitable conditions.
- Dangerous trees through instability or recent loss of adjacent trees.



- Dangerous trees through structural defects including cavities, decay, included bark, wounds or poor form.
- Damaged trees that are considered unsafe to retain.
- Trees that will become dangerous after removal of other trees for the above reasons (Source: Let's Talk About Trees).



## Appendix 2 – Tree Protection Zone



NOTE: Refer to Clause 3.2 for calculation of TPZ.

FIGURE 2 INDICATIVE TREE PROTECTION ZONE



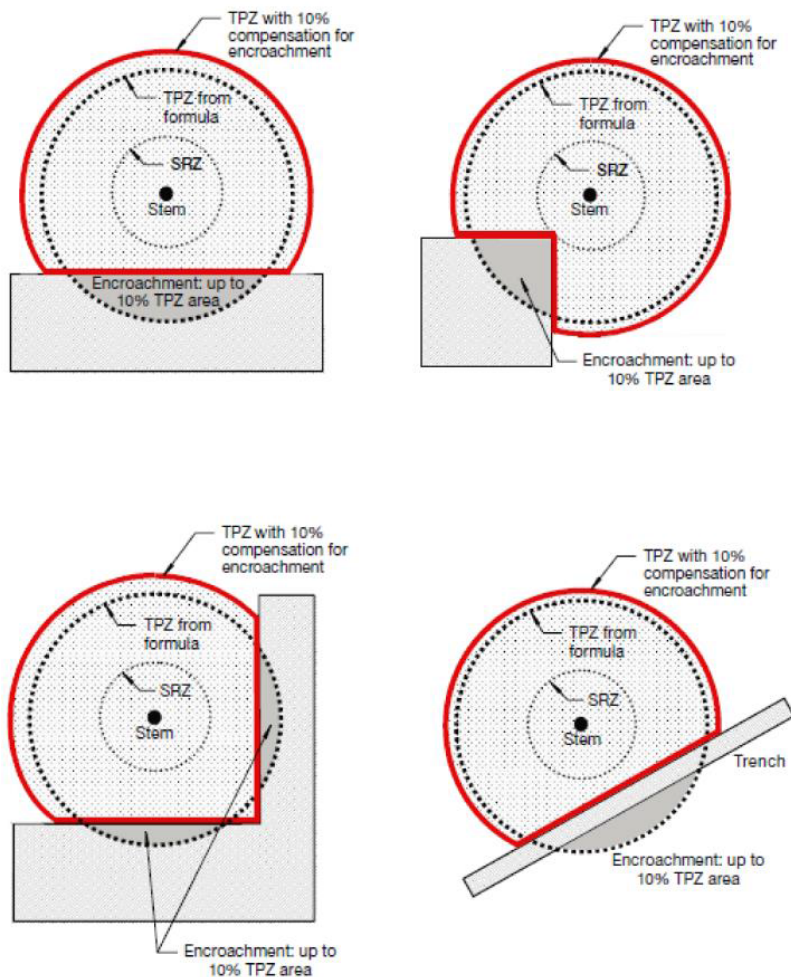
## Appendix 3 – Tree Protection Zone – Examples of Encroachment

29

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### APPENDIX D ENCROACHMENT INTO TREE PROTECTION ZONE (Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

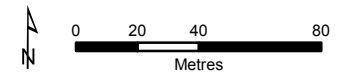
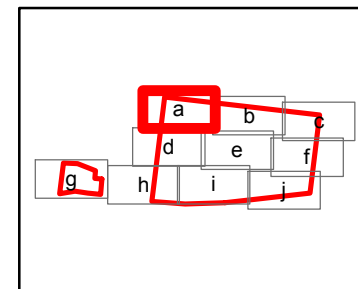
FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ



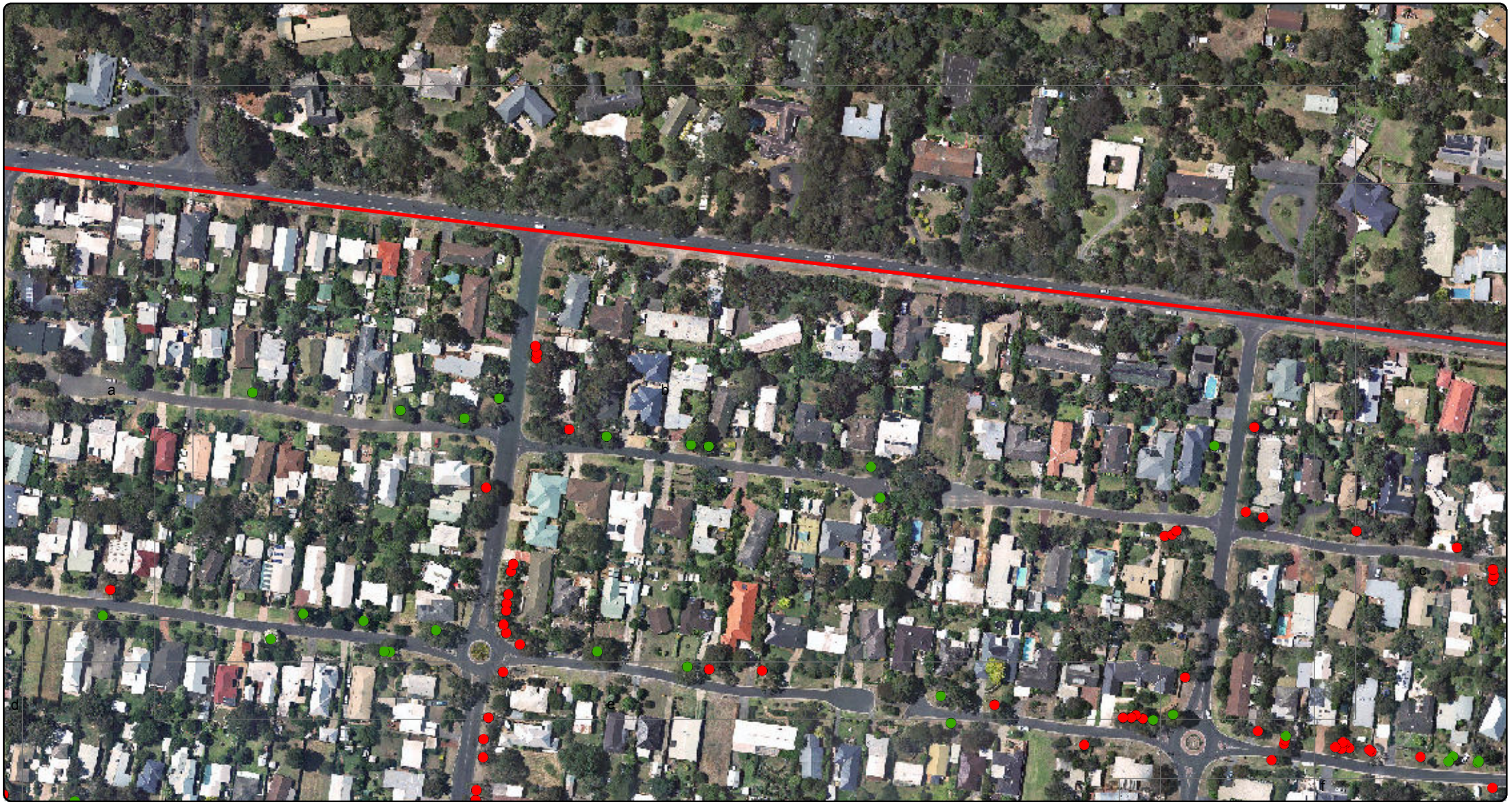
**Figure 1a**  
*Street Tree Assessment*  
*Significant Tree Project*  
*Ocean Grove*

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



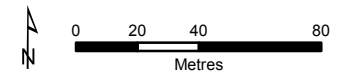
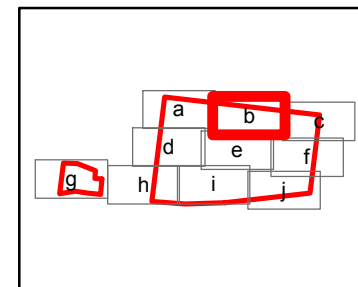
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**Figure 1b**  
*Street Tree Assessment*  
*Significant Tree Project*  
*Ocean Grove*

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



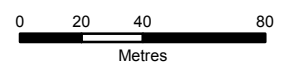
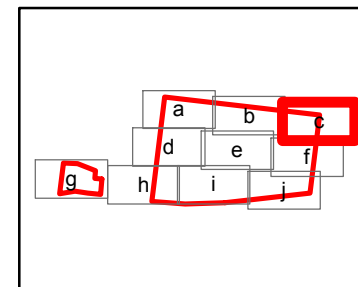
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**Figure 1c**  
*Street Tree Assessment*  
*Significant Tree Project*  
 Ocean Grove

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



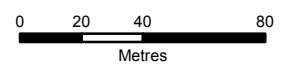
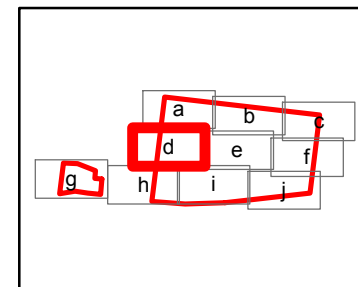
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**Figure 1d**  
*Street Tree Assessment*  
*Significant Tree Project*  
*Ocean Grove*

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



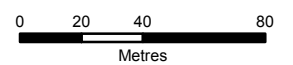
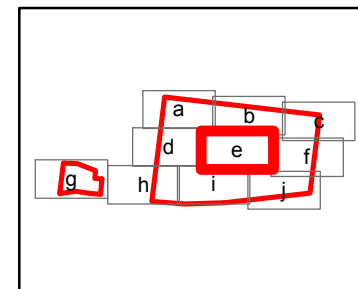
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**Figure 1e**  
*Street Tree Assessment*  
*Significant Tree Project*  
 Ocean Grove

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



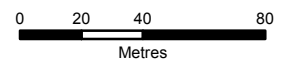
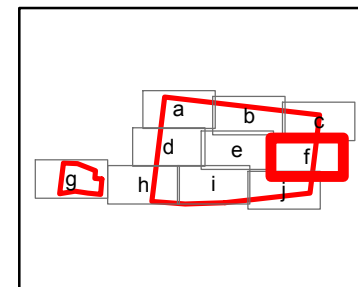
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**Figure 1f**  
*Street Tree Assessment*  
*Significant Tree Project*  
 Ocean Grove

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



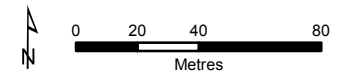
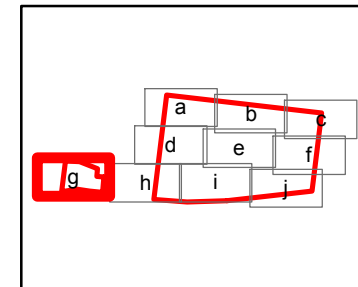
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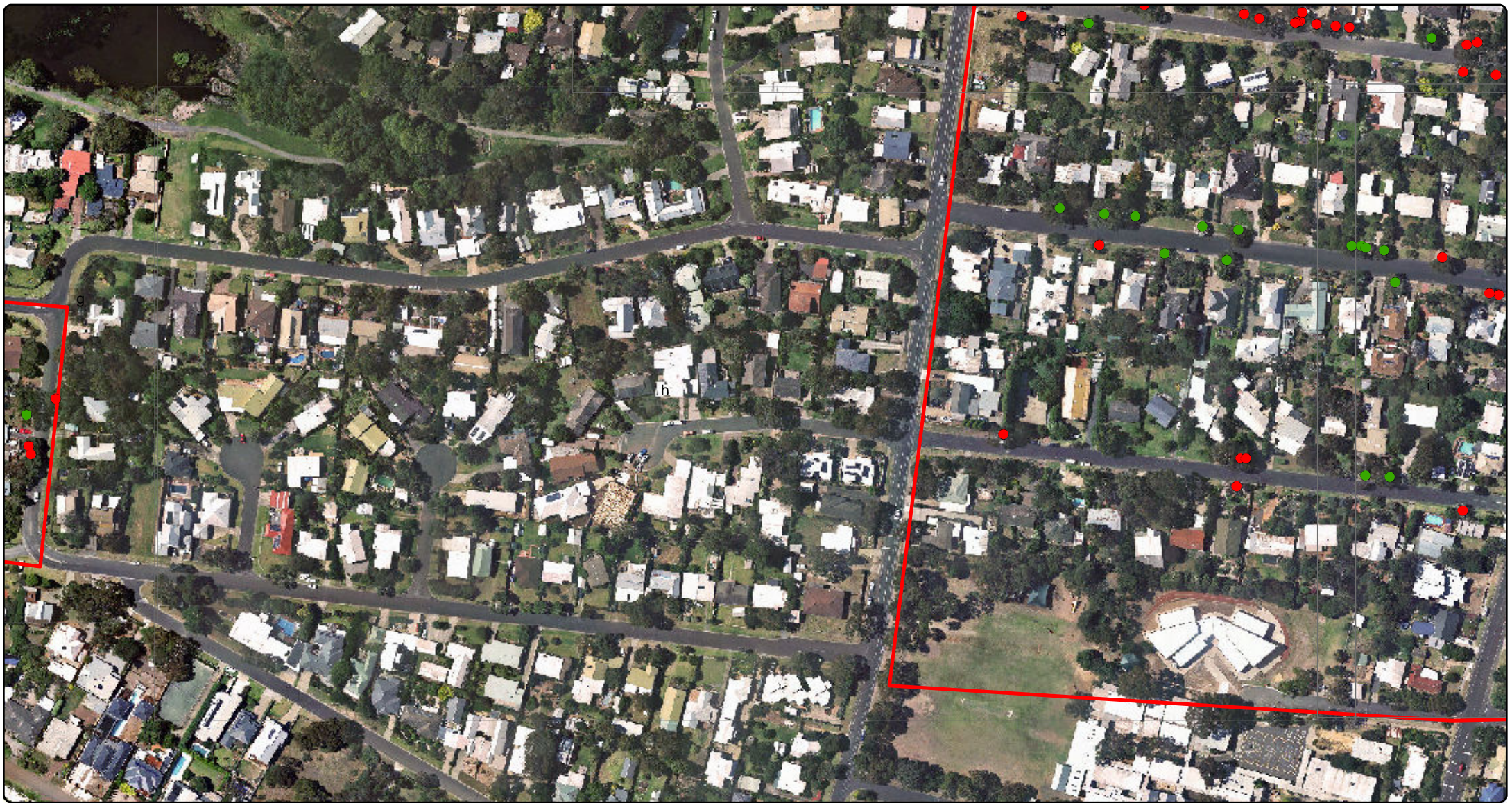
**Figure 1g**  
*Street Tree Assessment*  
*Significant Tree Project*  
*Ocean Grove*

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



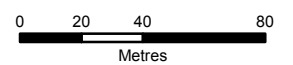
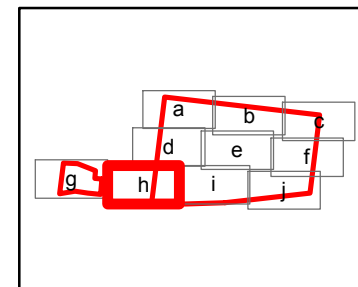
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**Figure 1h**  
*Street Tree Assessment*  
*Significant Tree Project*  
 Ocean Grove

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



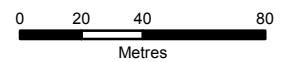
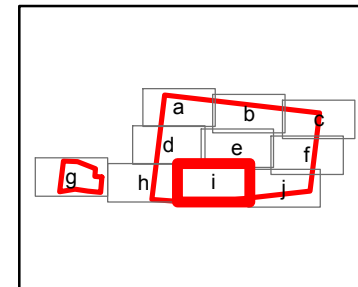
**ÖKOLOGIE CONSULTING**



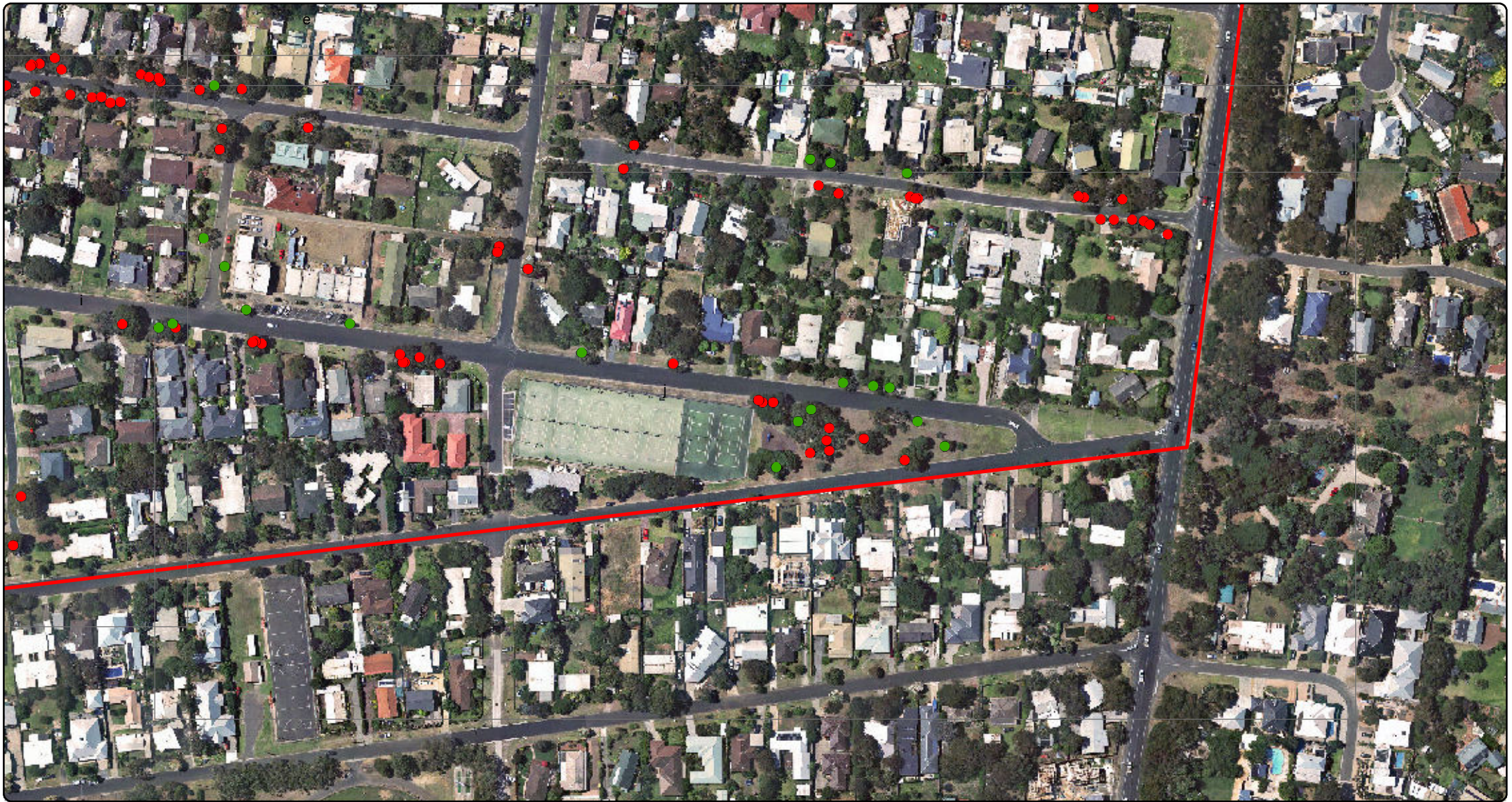
**Figure 1i**  
*Street Tree Assessment*  
*Significant Tree Project*  
 Ocean Grove

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



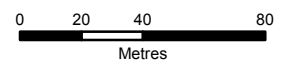
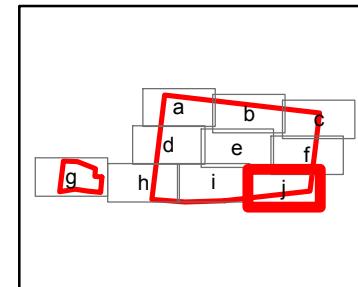
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**Figure 1j**  
*Street Tree Assessment*  
*Significant Tree Project*  
*Ocean Grove*

**Legend**

- Study Area
- Indigenous Trees
- Planted Native Trees



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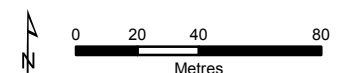
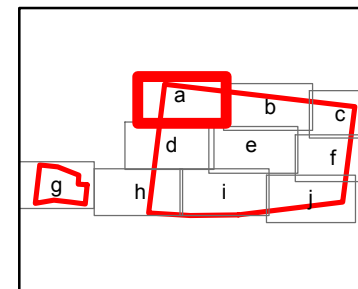
**Figure 4 – Significant Private Property Tree Survey Results**

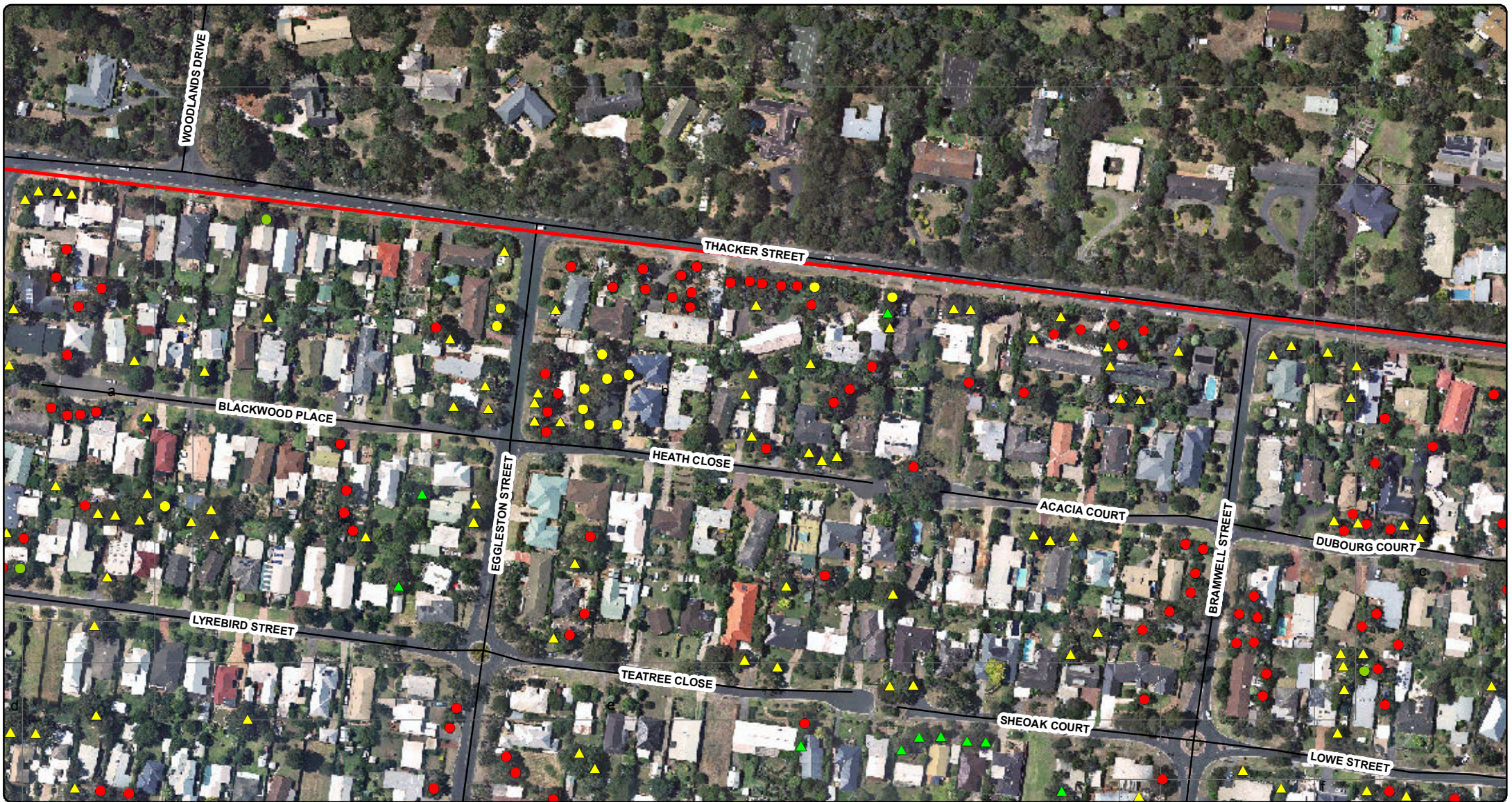


**Figure 1a**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

- Study Area
- Tree Origin and Significance**
- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low





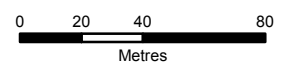
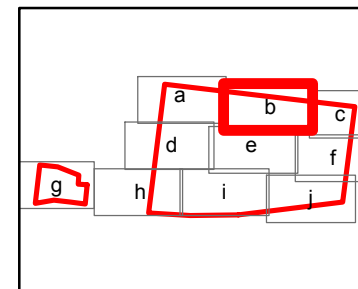
**Figure 1b**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

Study Area

**Tree Origin and Significance**

- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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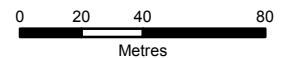
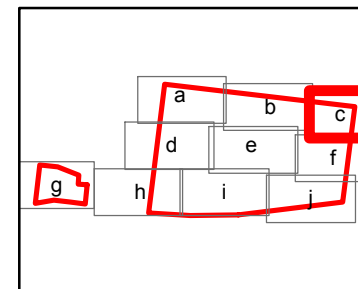
**Figure 1c**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

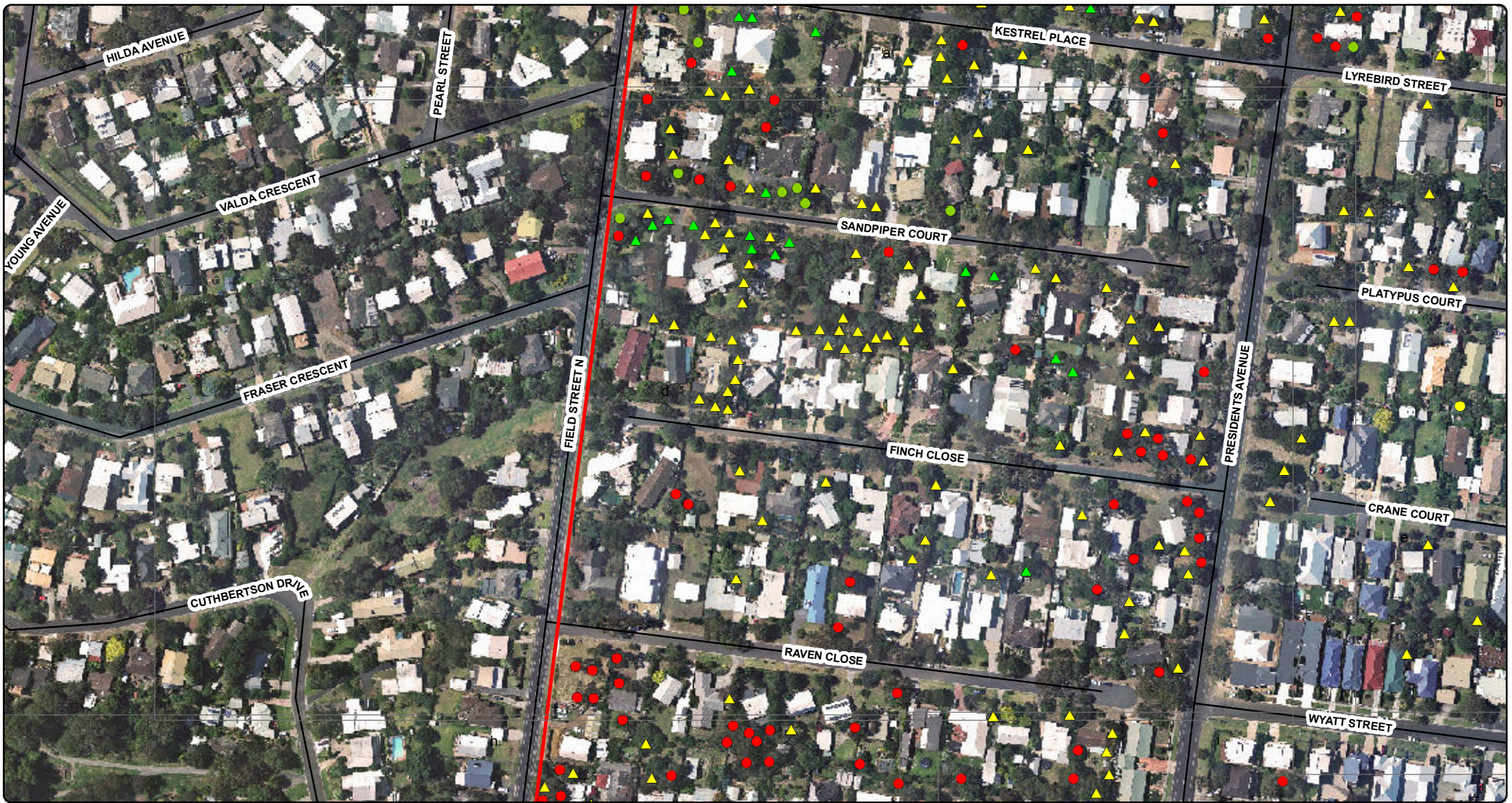
Study Area

**Tree Origin and Significance**

- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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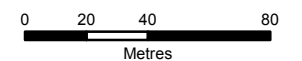
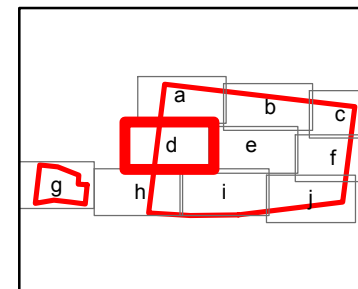
**Figure 1d**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

Study Area

**Tree Origin and Significance**

- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low




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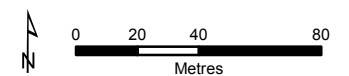
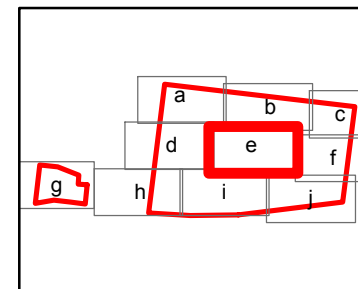
**Figure 1e**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

 Study Area

**Tree Origin and Significance**

-  Indigenous, High
-  Indigenous, Moderate
-  Indigenous, Low
-  Planted Native, Moderate
-  Planted Native, Low




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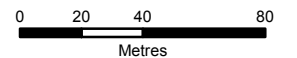
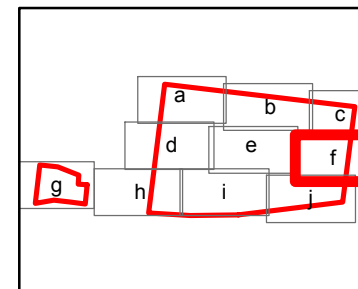
**Figure 1f**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

 Study Area

**Tree Origin and Significance**

-  Indigenous, High
-  Indigenous, Moderate
-  Indigenous, Low
-  Planted Native, Moderate
-  Planted Native, Low



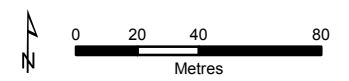
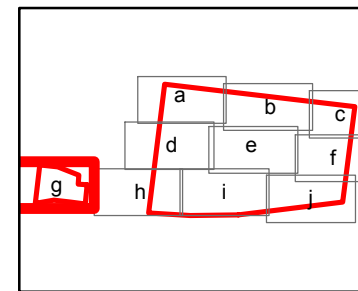
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**Figure 1g**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

- Study Area
- Tree Origin and Significance**
- Indigenous, High
- ▲ Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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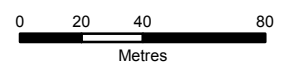
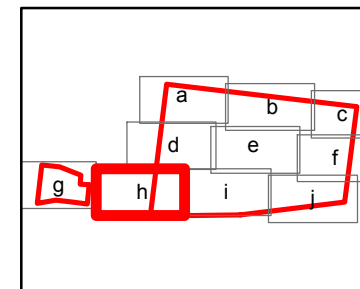
**Figure 1h**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

Study Area

**Tree Origin and Significance**

- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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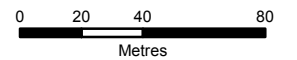
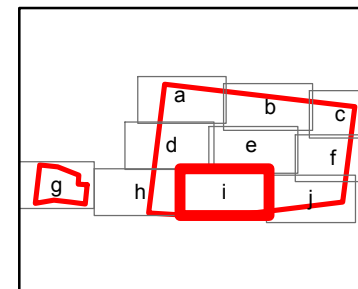
**Figure 1i**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

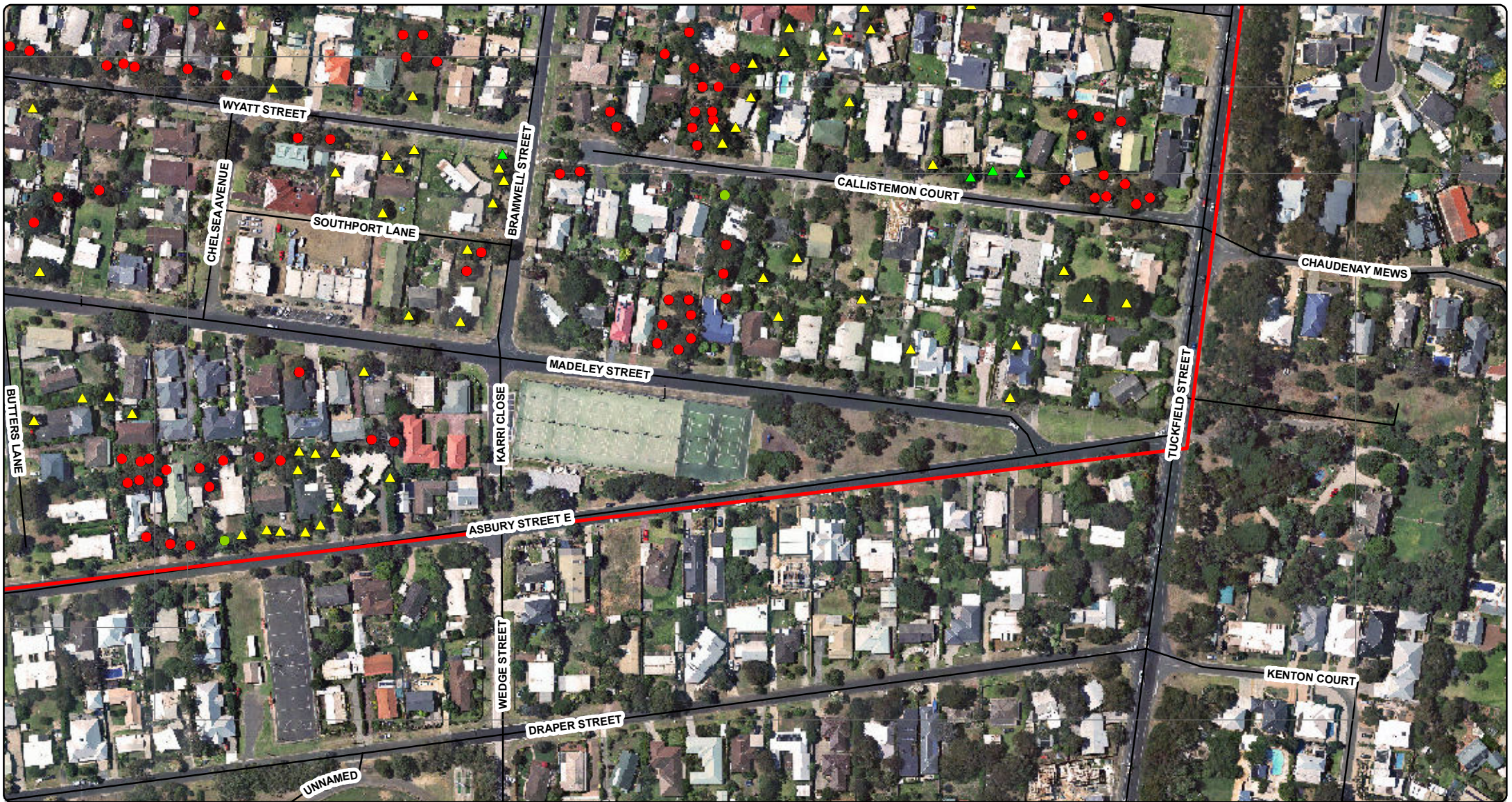
Study Area

**Tree Origin and Significance**

- Indigenous, High
- Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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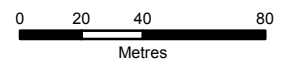
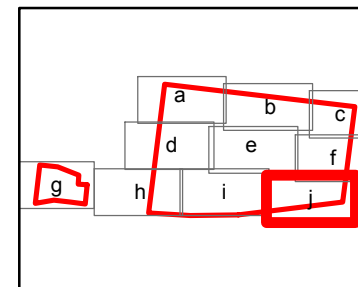
**Figure 1j**  
*Tree Assessment*  
*Private Property*  
*Ocean Grove*

**Legend**

Study Area

**Tree Origin and Significance**

- Indigenous, High
- ▲ Indigenous, Moderate
- Indigenous, Low
- ▲ Planted Native, Moderate
- ▲ Planted Native, Low



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