

**Date:** 12/01/19

**Reference:** Tree risk assessment and arboricultural recommendations for Tamahere Reserve.

**Location:** Tamahere Reserve, Tauwhare Road, Tamahere

**Inspection date:** 10/01/19

**Re-inspection due:** 10/01/20

**Overall risk assessment (VALID), see appendix 1:**

- Risk is now: *Not tolerable*
- Risk after tree works recommendations are carried out: *Tolerable (if managed a low as reasonably practicable)*

**Target Zones:** The highest occupancy target zone is the Tauwhare Road area followed by the car park area to the north east of Tamahere Reserve. Elsewhere in the reserve the occupancy is low therefore the risk from tree hazards is deemed acceptable. It is assumed that the reserve is not used by many people during bad weather, if it is a further risk assessment should be carried out.

**Tree Value:** The majority of the pine trees at the reserve are classified as category A trees on the TreeAZ categorisation of trees system, see appendix 2. These are described as trees of moderate value which provide many eco-system services and functions. The predominant function of the trees at Tamahere Reserve is slope stabilisation and erosion reduction. Amongst these trees there are individual trees that are of a lesser value due to their defects, which are highlighted on the VALID risk assessments. There are also lower value trees within the reserve which are likely to fail due to their poor height diameter ratios and saturated rhizospheres. These are classified as category Z6 as they have little or no future potential, they are also less likely to be potential bat roosts due to their younger age and less inviting morphology like deadwood and crevices, see photographs 1 & 2.



Photograph 1 & 2, Category Z8 self-seeded and slender pines in water saturated rootzone.

**Slope Stabilisation:** The planting of pine trees on slopes was once best practice for rapid slope stabilisation. As a group, pine trees exhibit a large shared aerodynamic canopy that absorb strong winds and intercept physical erosion from raindrops. They establish quickly and due to their interlocking roots they tend to dominate their growing substrate. However, once these trees reach maturity it is common for a group of pine trees to gradually lose their positive functional capabilities. The removal or decline of just one tree usually has a subsequent risk to neighbouring trees. The increased wind loading on the long drawn up canopies and the reduction of interlocking root strength results in inclined stems and subsiding canopies, which in turn are more likely to fail. This domino effect is common among many old unmanaged pine plantations, and it should be considered before removing individual trees here. If not managed properly the risk and management costs from the pine trees will increase significantly. There are examples of pine trees along Tauwhare Road that have already inclined due to past tree removal or decline, however they have since become more vertical and appear to have stabilised.

It is important that any removal of the pines should be carefully considered alongside immediate erosion reduction methods to retain slope stability, for example the utilisation of felled timber as log erosion barriers and replanting with native species. It is recommended that a continuous cover forestry approach be considered, which is defined as ‘the use of silvicultural systems whereby the forest canopy is maintained at one or more levels without clear-felling’, see *reference 1*.

**Hydrology:** There are three small erosion gullies caused by road surface run off next to Tauwhare Road. These are gradually eroding the rootzones of the mature pine trees and could with time increase their risk of wind-throw. It is also important to minimise the amount of antecedent moisture that can accumulate on the slope, therefore surface water should be directed into the reserve more effectively here. At the entrance to the reserve the larger more established drainage flow from the road also passes through mature root zones. It is recommended that more robust natural fascine drainage be installed here to allow the water to pass with alacrity and not saturate the slope area any further.

**Planting and Ecological Succession:** The pine trees produce an acid soil and provide little light penetration making understory native planting difficult without first removing the upper canopy. However, already present at the reserve are black tree ferns (*Cyathea medullaris*) which are a frequent pioneer of disturbed areas (e.g.. landslides) or edge environments and sometimes forming near continuous canopies. As black tree ferns can already grow readily in this environment they should be encouraged as a high tree fern abundance influences the assembly of seedling communities, see *reference 2*. Their establishment will provide a nursery environment for native shade tree species which in time will dominate the ecology. Native trees also have stronger more tensile roots, shorter canopies and more stable buttress root morphologies compared with non-native trees therefore helping to stabilise the slopes.

**Conclusion:** A common sense approach should be taken towards the risk posed by the trees at the Tamahere Reserve. As the reserve becomes a more desirable place to visit it is important to strike a balance between the many benefits the trees present and the risk they pose. With a considered management plan covering all aspects of ecology, arboriculture, geology, hydrology and human geography the Tamahere Reserve could become an even more important natural asset for the local area.

**Ken Scarlett** B.Sc.  
Consultant  
GeoArb Ltd

#### References:

1. Barton. I.: *Continuous Cover Forestry*, Tane’s Tree Trust (2008)
2. Brock et al.: *Tree ferns influence community assembly*, New Zealand Journal of Ecology (2018)

#### Appendices:

**Appendix 1** – VALID tree risk assessments Tamahere Reserve 2019

followed by

**Appendix 2** – TreeAZ categorisation of trees methodology.

**Pine (WDC0023)**

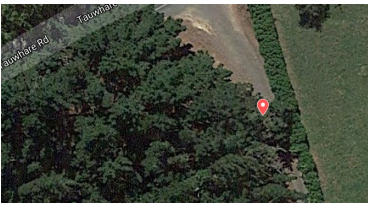


**Summary Risk**

<b>Highest Risk</b>	<b>? Tolerable</b>
Risk reduction	Over Extended
Tree Management	Crown Reduction
<b>Review</b>	<b>2020</b>
Date Assessed	2019-01-10 09:47 AM
Assessed By	Ken Scarlett
Phone Number	078080809
Email	info@geoarb.nz



**Tree Details and Location**

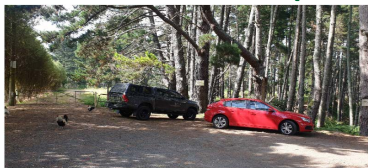


Species	Height (m)	Stem (cm)	Crown (m)
Pine ( <i>Pinus radiata</i> )	8	50	10

Car Park  
Tamahere Reserve  
Tauwhare Road

**Risk Inputs**

**Likelihood of Occupation**



Weather Affected  
  
Traffic  
  
Source

**Consequences**



Tree Failure	
Stem Failure	<b>X</b>
Branch Failure	
Deadwood	
Property	<b>X</b>



**Likelihood of Failure**

<b>VITALITY</b>	<b>V</b>	crown density woundwood response growth	<b>A</b>
<b>ANATOMY</b>	<b>A</b>	wood properties architecture H/D ratio	<b>A</b>
<b>LOAD</b>	<b>L</b>	exposure changes to the tree changes around tree	<b>G</b>
<b>IDENTITY</b>	<b>I</b>	species profile age of wounds CODIT	<b>G</b>
<b>DEFECT</b>	<b>D</b>	soundwood decay - extend feature or fault	<b>A</b>

Wound wood response average.  
  
Off balanced crown, main stem ripped out sometime ago.



**Additional Notes**

Wound appears sound, over extended branches close to powerlines.

Reduce over extended canopy 2m to 4m away from power lines.

Z5 on the TreeAZ classification. Of low quality due its excessive crown imbalance. Worthy of retention for slope stability reasons.

**Summary Risk**

**Pine (WDC0024)**

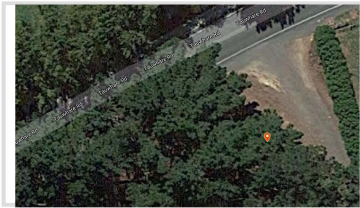


**Highest Risk** **Not Tolerable**  
 Risk reduction Inclined Tree & Split Branches  
 Tree Management Monitor incline remove defects

**Review** **2020**  
 Date Assessed 2019-01-10 10:27 AM  
 Assessed By Ken Scarlett  
 Phone Number 078080809  
 Email info@geoarb.nz



**Tree Details and Location**

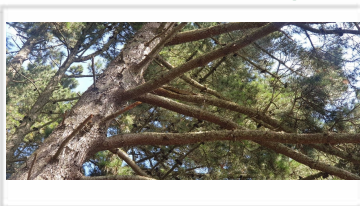


Species	Height (m)	Stem (cm)	Crown (m)
Pine ( <i>Pinus radiata</i> )	25	68	8

Car Park  
 Tamahere Reserve  
 Tauwhare Road

**Risk Inputs**

**Likelihood of Occupation**



Weather Affected

Traffic

Source

**Consequences**



Tree Failure	X
Stem Failure	
Branch Failure	
Deadwood	
Property	X



**Likelihood of Failure**

VITALITY	<b>V</b>	crown density woundwood response growth	G
ANATOMY	<b>A</b>	wood properties architecture H/D ratio	A
LOAD	<b>L</b>	exposure changes to the tree changes around tree	A
IDENTITY	<b>I</b>	species profile age of wounds CODIT	G
DEFECT	<b>D</b>	soundwood decay - extend feature or fault	R



Some surface erosion in root zone. Tree is inclined but seems to be straightening up. Good growth of roots on slope side.

Split on over extended branch.

**Additional Notes**

Z9 on TreeAZ due to what appears to be historic poor anchorage. Inclined stem towards car park. Some exposed roots which have thickened on downward slope side. Over extended branches have ripped out over car park. Remove split branches and deadwood over car park. Monitor incline of tree over next year. Reduce surface erosion if possible.

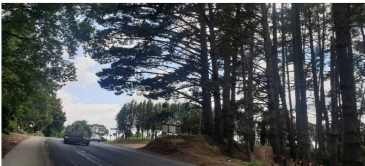
**Pine (WDC0025)**



**Tree Details and Location**



**Likelihood of Occupation**



**Consequences**



**Likelihood of Failure**

<b>VITALITY</b>	<b>V</b>	crown density woundwood response growth	<b>A</b>
<b>ANATOMY</b>	<b>A</b>	wood properties architecture H/D ratio	<b>G</b>
<b>LOAD</b>	<b>L</b>	exposure changes to the tree changes around tree	<b>G</b>
<b>IDENTITY</b>	<b>I</b>	species profile age of wounds CODIT	<b>G</b>
<b>DEFECT</b>	<b>D</b>	soundwood decay - extend feature or fault	<b>R</b>

**Additional Notes**

**Highest Risk**  
Risk reduction  
Tree Management

**Not Tolerable**  
Crossing branch  
Remove upper crossing branch

**Review**  
Date Assessed  
Assessed By  
Phone Number  
Email

**2020**  
2019-01-10 10:51 AM  
Ken Scarlett  
078080809  
info@geoarb.nz



Species	Height (m)	Stem (cm)	Crown (m)
Pine ( <i>Pinus radiata</i> )	20	80	10

Roadside  
Tauwhare Road  
Tamahere

**Risk Inputs**

Weather Affected  
Traffic 100 km/h  
Source



Tree Failure  
Stem Failure  
Branch Failure  
Deadwood **X**  
Property



Subsided crossing branch resting on lower branch exhibiting defects and swelling.

Z9 classification on TreeAZ due to its crown instability which can be mitigated with tree work. Roadside tree with subsided upper branch crossing crutch of lower branch. Evidence of defect which could lead to total branch failure.

**Pine (WDC0026)**



**Tree Details and Location**



**Likelihood of Occupation**



**Consequences**



**Likelihood of Failure**

VITALITY	V	crown density woundwood response growth	A
ANATOMY	A	wood properties architecture H/D ratio	G
LOAD	L	exposure changes to the tree changes around tree	G
IDENTITY	I	species profile age of wounds CODIT	G
DEFECT	D	soundwood decay - extend feature or fault	A

**Additional Notes**

<b>Highest Risk</b>	<b>Acceptable</b>
Risk reduction	None
Tree Management	None
<b>Review</b>	<b>2020</b>
Date Assessed	2019-01-10 11:07 AM
Assessed By	Ken Scarlett
Phone Number	078080809
Email	info@geoarb.nz

Species	Height (m)	Stem (cm)	Crown (m)
Pine ( <i>Pinus radiata</i> )	22	60	8

Near Bridge  
Tauwhare Road  
Tamahere

**Summary**

**Risk**



**Risk Inputs**

Weather Affected	
Traffic	100 km/h
Source	



Tree Failure	
Stem Failure	
Branch Failure	
Deadwood	X
Property	

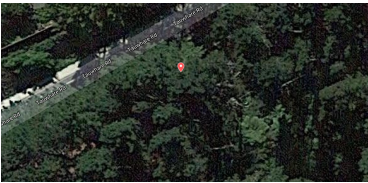


Z4 on TreeAZ, as it has deteriorating health with little realistic prospect of recovery. Possible red needle cast, no significant targets underneath tree. Decline likely to be from top down.

Pine (WDC0027)



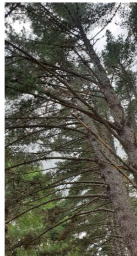
Tree Details and Location



Likelihood of Occupation



Consequences



Likelihood of Failure

VITALITY	V	crown density woundwood response growth	G
ANATOMY	A	wood properties architecture H/D ratio	G
LOAD	L	exposure changes to the tree changes around tree	A
IDENTITY	I	species profile age of wounds CODIT	G
DEFECT	D	soundwood decay - extend feature or fault	G

Additional Notes

<b>Highest Risk</b>	<b>Acceptable</b>
Risk reduction	None
Tree Management	Monitor
<b>Review</b>	<b>2020</b>
Date Assessed	2019-01-10 11:15 AM
Assessed By	Ken Scarlett
Phone Number	078080809
Email	info@geoarb.nz

Species	Height (m)	Stem (cm)	Crown (m)
Pine ( <i>Pinus radiata</i> )	25	80	9

Roadside  
Tauwhare Road  
Tamahere

Summary

Risk



Risk Inputs

Weather Affected	
Traffic	70 km/h
Source	



Tree Failure	X
Stem Failure	
Branch Failure	
Deadwood	
Property	



Removal of neighbouring tree some years ago has reduced the strength of interlocking roots and allowed the tree to subside and incline towards the road. The tree has grown vertically now and there does not appear to be any progression in the direction of lean.

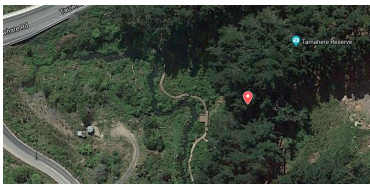


Category A tree on TreeAZ, as it is of moderate quality. Inclined tree towards road. Upper canopy has grown more vertical and rectified incline indicating stabilisation. Monitor tree for changes in incline angle over next year.

**Pine (WDC0028)**



**Tree Details and Location**



**Likelihood of Occupation**



**Consequences**



**Likelihood of Failure**

<b>VITALITY</b>	<b>V</b>	crown density woundwood response growth	<b>A</b>
<b>ANATOMY</b>	<b>A</b>	wood properties architecture H/D ratio	<b>G</b>
<b>LOAD</b>	<b>L</b>	exposure changes to the tree changes around tree	<b>G</b>
<b>IDENTITY</b>	<b>I</b>	species profile age of wounds CODIT	<b>G</b>
<b>DEFECT</b>	<b>D</b>	soundwood decay - extend feature or fault	<b>R</b>

**Additional Notes**

<b>Highest Risk</b>	<b>Acceptable</b>
Risk reduction	Root Decay
Tree Management	Remove Upper Crown
<b>Review</b>	<b>2020</b>
Date Assessed	2019-01-10 11:26 AM
Assessed By	Ken Scarlett
Phone Number	078080809
Email	info@geoarb.nz



Species	Height (m)	Stem (cm)	Crown (m)
Pine	18	80	7

Next To Work Shed  
Tamahere Reserve

**Risk Inputs**

Weather Affected	Yes
Traffic	
Source	



Tree Failure	<b>X</b>
Stem Failure	
Branch Failure	
Deadwood	
Property	



Decayed structural roots.



Z4 category on TreeAZ due to deteriorating health with little prospect of recovery. Beetle damage and decay on lower structural buttress root and up to 2m from ground level on north side of tree. Target (shed) could be relocated. A cautious approach would be to remove crown and leave standing deadwood.





## TreeAZ Categories Field Sheet

(Version 10.04-ANZ)



TreeAZ

[www.TreeAZ.com](http://www.TreeAZ.com)





# TreeAZ

[www.TreeAZ.com](http://www.TreeAZ.com)

## Preface

This download is most useful if the TreeAZ categories and brief explanatory notes on the last two pages are printed and used as a quick reference when in the field. It is more durable for field use if it is printed on both sides of one sheet and encapsulated with a clear plastic cover. It is not subject to copyright and can be copied freely for use, with or without modification, but its source should be acknowledged. It should be interpreted in conjunction with the further explanatory information that can be downloaded at [www.TreeAZ.com](http://www.TreeAZ.com).

It has been produced by Barrell Tree Consultancy (BTC) ([www.barrelltreecare.co.uk](http://www.barrelltreecare.co.uk)) and is distributed through their tree assessment website ([www.TreeAZ.com](http://www.TreeAZ.com)). The BTC business is based in the UK, although it does have a background of training and development in other countries. BTC has no direct income through the publication of its planning guidance and finances the development of its tree assessment methods through its UK business. The objective of these endeavors is to enhance the international dissemination of best practice guidance through the BTC websites.



## TreeAZ Categories Field Sheet (Version 10.04-ANZ)

**CAUTION:** TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at [www.TreeAZ.com](http://www.TreeAZ.com).

### Category Z: Unimportant trees not worthy of being a material constraint

**Local policy exemptions:** Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

<b>Z1</b>	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
<b>Z2</b>	Too close to a building, i.e. exempt from legal protection because of proximity, etc
<b>Z3</b>	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc
<b>High risk of death or failure:</b> Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure	
<b>Z4</b>	Dead, dying, diseased or declining
<b>Z5</b>	Severe damage and/or structural defects where a high risk of failure <u>cannot</u> be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
<b>Z6</b>	Instability, i.e. poor anchorage, increased exposure, etc
<b>Excessive nuisance:</b> Trees that are likely to be removed within 10 years because of unacceptable impact on people	
<b>Z7</b>	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
<b>Z8</b>	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc
<b>Good management:</b> Trees that are likely to be removed within 10 years through responsible management of the tree population	
<b>Z9</b>	Severe damage and/or structural defects where a high risk of failure can be <u>temporarily</u> reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
<b>Z10</b>	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
<b>Z11</b>	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
<b>Z12</b>	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

**NOTE:** Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

### Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

<b>A1</b>	No significant defects and could be retained with minimal remedial care
<b>A2</b>	Minor defects that could be addressed by remedial care and/or work to adjacent trees
<b>A3</b>	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
<b>A4</b>	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

**NOTE:** Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

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### Further explanations to assist categorization

<b>Z1</b>	Any existing statutory definitions of trees that are too small to be legally protected should be applied and trees less than those heights or diameters will be Z1. If there are none, then if the tree has been planted for less than 5 years it is Z1. If it is less than 5m in height, it will be Z1 unless it is significant, i.e. clearly mature, but small trees are not Z1. If it is greater than 10m in height it is not Z1 unless it was planted in the last 5 years. Applying Z1 to trees between 5–10m is a matter of judgment; the most obvious test being that the tree could be easily and reliably moved or replaced. Ideally, the replacement tree should not be less than 20% of the replaced tree's trunk, height and spread dimensions.
<b>Z2</b>	Any existing statutory rules that prevent protection of trees within a fixed distance of a structure will allow a tree to be subcategorized as Z2.
<b>Z3</b>	Any existing statutory rules or guidance that prevent protection of trees for reasons other than size and proximity dictate Z3, i.e. invasive or alien species. If none exist, then Z3 cannot be applied.
<b>Z4</b>	This subcategory is for trees that are unlikely to recover from a serious health problem. The condition must be terminal with no obvious potential to recover, i.e. severe crown dieback related to excavation damage or root decay, to the extent that the structural branch framework is compromised. Trees that are likely to recover or improve should not be placed in this subcategory, i.e. trees suffering from a foliar problem that has little impact on the branch framework and varies from year to year.
<b>Z5</b>	Severe means so bad that there is no realistic chance of the tree achieving its full potential and there is a high of failure risk. In many cases, the risk of failure can be reduced by dramatic reduction in tree size, but this has severe health, maintenance cost and amenity implications, so is unlikely to be a sustainable management option. A common example is a severely unbalanced tree within a group that will be particularly vulnerable in adverse weather conditions and the adjacent trees mean there is no hope of remedial works resulting in an

	improvement. Topped trees do not automatically fit into this subcategory, although there is an obvious temptation. Species prone to decay, such as willow and poplar, often have severe decay at the origin of vigorous re-growth, creating a high risk of failure in adverse weather conditions. Z5 is clearly appropriate for them. However, this needs to be a careful judgment because topping in itself does not necessarily condemn a tree to this subcategory. Some trees, such as plane, oak and lime, are particularly good at coping with this treatment and often are able to mature with a low risk of failure. If remedial works will allow the tree to be retained with no significant adverse impact on amenity, health or maintenance costs, then it does not fit here.
Z6	Trees can become poorly anchored because of soil erosion through climatic factors, i.e. water or wind, wear from traffic - pedestrian or vehicular, changing soil conditions - increasing wetness, sudden and severe physical stress from storms and root damage such as decay or severance reducing root strength. In some cases, i.e. storm induced instability, there may be a realistic chance of recovery and a subcategorization of Z6 may be premature. However, if excessive remedial work is required, it is likely that Z6 is a defensible subcategory. Alterations to tree exposure to the wind occurs because of changes in the shelter provided by adjacent objects such as buildings or trees. This often applies to groups of trees where one large dominant individual will be lost because of poor health or a structural problem, which then dramatically exposes the remaining trees.
Z7	<p><b>Establishing thresholds of acceptable levels of inconvenience:</b> In its broadest sense, inconvenience is the interference with the authorized use of land. In relation to trees, it can be in the form of roots disrupting landscaping and hard surfacing, parts of trees physically preventing land use, tree debris such as leaves and fruit falling and tree crowns causing excessive shade. The principles for establishing what are acceptable levels of inconvenience are the same irrespective of the cause. In a community context, it is generally accepted that trees provide a significant benefit to society and it is reasonable for individuals to tolerate some level of inconvenience from their presence. However, the precise location or value of these thresholds is not always obvious and is often a subjective interpretation rather than a definitive point. There will always have to be a balancing of the benefit to the community weighed against the inconvenience suffered by the individual. What is an acceptable, tolerable or reasonable level of inconvenience is often a matter of judgment for each specific situation, tempered by experience and common sense. This, in turn, should be guided by court, tribunal and planning decisions that have made informed judgments on these issues.</p> <p><b>Common examples:</b> Very large trees near existing occupied buildings can dominate to the extent that the disbenefit from the anxiety of the occupants outweighs the benefit of the tree. Regular and severe staining caused by fallen debris to a swimming pool surround may be unacceptable because the stark contrast in colours creates a dirty impression whereas the same staining on a path or drive surface may be more acceptable. In contrast, falling leaves blocking gutters causing them to be cleaned once a year is not that much of a local inconvenience in the context of the wider benefits that trees impart.</p> <p><b>Making the decision:</b> Assessing inconvenience is almost entirely a subjective judgment, based on experience and understanding of what is perceived as being reasonable and unreasonable for a normal person. As with all these judgments, a simple test is to imagine a court hearing where a judge has to decide if the levels of inconvenience are intolerable. If they are, then the tree is Z7; if they are not that bad, then the tree belongs in another subcategory.</p>
Z8	Where more serious damage occurs to property from root action, then court/tribunal judgments on liability help to focus on what level of damage is deemed tolerable by society. The most common example is direct damage from roots, trunks and branches to structures and surfacing. Repairs to walls may require such extensive excavation and cutting of roots that the tree cannot be retained. However, the use of innovative techniques may reduce root damage, but still produce a viable boundary, allowing the tree to be retained. Root damage to surfacing is often a sustainable reason for removal if rectifying the damage will significantly adversely affect the tree. In contrast, the potential for roots to deform surfacing would be a less reliable basis for allocation to this subcategory because it is so unpredictable. As a general rule, there would need to be good evidence for ongoing damage, with little scope for remedial works, before a tree could be reliably allocated to this subcategory.
Z9	This is a similar subcategory to Z5, but where the defect is not so severe that remedial works have to be extensive and immediate. Quite often, there are less severe defects that are so bad there is no realistic potential for the tree to improve, but it could be retained in the short term with some significant remedial works. This would only be seen as a temporary measure because to continue applying the same principle would not be cost-effective compared to replacement. A typical example would be a tree with a large and progressive cavity that will clearly prevent it ever improving its condition or contribution to amenity. However, substantial thinning and reduction would allow it to be retained in the short term to allow other replacement trees to develop to buffer its inevitable loss. The benefit of retaining it in the short term might outweigh the cost of doing the works as a one-off, but not on a regular basis.
Z10	It is common to find trees that are obviously not good enough for long term retention because they look unhealthy or are so unbalanced or so tall and thin or that they will never improve. However, the problems are not so severe that there is a high risk of death or failure, and they cannot be discounted for that reason. This subcategory is for those trees and relies on the principle of sustained amenity to justify the allocation. Trees with no potential to improve are taking up space where new trees could be growing, which would be enhancing the desirable objective of an uneven age class structure. The replacements would obviously be small trees and these would then fall into the Z1 subcategory. As set out in the Z1 explanations, the precise location on the site is not often that critical, so these trees would not generally be considered worthy of being a material constraint.
Z11	This applies to trees in groups where one individual is destructively interfering with another. The judgment of which is the better tree is obviously subjective and would be informed by which tree had the best potential for sustainable retention. An obvious example is one tree growing up through another and directly rubbing causing damage. Retaining both would probably result in the loss of each, whereas removing one may allow the other to achieve its full potential. Another example would be one tree shading and preventing the sustainable development of a neighbour to the extent that both trees would be prematurely removed if left alone. The removal of one tree may be justified if it allowed the remaining tree to reach its full potential. If both trees could be retained as a group and achieve their full potential, then they should not be included in this subcategory.
Z12	This is a matter of judgment and may vary widely. It primarily applies to existing trees that are not suited to their location, but there is resistance to their replacement. As a general principle, all trees will incur some management costs and these would normally not be a valid reason for removal. However, as those costs increase, their acceptability decreases to a point where it will be more cost-effective to plant a new tree more suited to the location rather than incur the burden of repeated and excessive costs indefinitely. Typical examples include topped trees with excessive decay, pollarded trees to reduce subsidence risk, trees beneath power lines and trees close to buildings, roads and paths. All these examples will require high levels of maintenance that may not be financially acceptable unless the benefits that arise from retaining the trees are particularly high.
A1	Trees that do not require any specific remedial works above those that would be required for normal maintenance.
A2	Trees with minor defects likely to recover from remedial works to be retainable in the long term, i.e. pollards with little decay.
A3	'Special' means unusual, rare or uncommon, i.e. a tree of some historical/cultural significance, etc.
A4	Trees can be valuable ecological habitat that may be protected by legislation, which may be a material constraint on the type and timing of changes that can occur on a site. If an ecological assessment has not been carried out by the time of the survey, and the arborist suspects there may be habitat issues, the tree should be identified as A4, and specialist assessment should be sought.