

Tree Registration Manual

for National Registrations and
Local Authority District Plan Heritage Listings



Notable Trees New Zealand

A voluntary project established in 1977 by the
Royal New Zealand Institute of Horticulture



In association with the
New Zealand Arboricultural Association Inc.



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Preface — Tree Protection

The Threat to Trees

The growing of trees in the Southern Hemisphere is now considered vital due to the great loss of trees suffered by Northern Hemisphere countries as a result of pollution and high population densities. By world standards, New Zealand is fortunate in having a small population and a large number of trees.

However, this should not encourage complacency. Large consortia of investors are now operating in New Zealand and are developing urban sites, rural landscapes, forest and tourist areas. Many of these developers are refugees from denuded urban and industrial landscapes. Enormous financial power is available to them and they are drawn to our wooded land for refreshment, enjoyment and financial gain. Token gestures for sustainable development will not be sufficient. Sadly, exploitation of our resources can occur before environmental impact assessments. Not all environmental impacts are visual or localised, and notable trees can be overlooked during these assessments. Important trees that are not recognised and recorded can be lost forever. The public are becoming increasingly disturbed by the loss of so many trees due to rapid land development of lifestyle sections and urban infill.

Ecological & Anthropological Significance

The recognition of a familiar face is built from identifying features that are important to that face. We accept that humans and animals recognise each other by these identifiable features and markings, and by previous experience. With this as a basis for recognition, then the landscape must also have a set of identifiable features that evoke familiarity and a human response. These cognitive factors extend to the environment, and people have been able to create or destroy their environments at will.

The realisation that world resources are finite has encouraged a wider appreciation of the need to make laws to protect the environment. This awareness has brought about legislation to provide holistic environmental laws within New Zealand. Qualitative Environmental Impact Assessments based on method are now required when decisions are made on environmental matters.

Changes to the Law in New Zealand

The Town and Country Planning Act 1977 was superseded by the Resource Management Act 1991. Section 88 [6][b] states that consideration must be given to the following:

“Any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural, or other special value for present and future generations”

The Act does not make specific reference to trees, but does require local authorities to maintain inventories of items of local amenity and cultural importance. Imperative within the spirit of the RMA is that local authorities establish guidelines for their community environment and heritage. Trees are a case in point often because of their long-held association with the local community. Most local authorities are using the Standard Tree Evaluation Method (STEM) (Flook, 1996) to complete their District Plan listings of important trees.

On 1 July 1993, the NZ Historic Places Act became law (HPT Act, 1993). Clause 23 refers to:

*“Criteria for registration of historic places and historic areas”,
“having regard to any of the following criteria”,*

including:

*“The technical accomplishment or value, or design of the place”
“The extent to which the place forms part of wider historical and cultural complex or
historical and cultural landscape”*

The NZ Historic Places Trust may assign a Category I or Category II status to any historic place. An example occurred in the Hastings District. Strong pressure from the NZ Historic Places Trust (Bay of Plenty Branch) resulted in saving the trees lining Oak Avenue, Hastings, by registering the whole avenue on the Hastings District Precinct Register (number 7021). Oak Avenue extends north-east on both sides of Omaha Road for 1.4 km.

Other recent examples which have caused great public outcries have been the threats to the centuries old Rimu on the West Coast and the Kauri forests in Northland.

Meanwhile, urban infill is rampant as well as lifestyle blocks that are carving up the countryside into a new suburbia denuded of trees for the sake of urban housing densities, views from hilltops or drowning in the current lifestyle vogue of creating wetland ponds.

Tree Evaluation Today

The wider interests of the community now have to be acknowledged through the RMA Act 1991. The Act requires local authorities to list community assets and recognise cultural values together with other environmental considerations. To do this, systems must be in place to evaluate buildings, artefacts and trees. The danger to trees is widely accepted more particularly as District Plan Lists of Heritage Trees are not adequate.

Discontinued - Go to www.nzherald.co.nz/trees.org.nz to register trees

Contents

Preface — Tree Protection

Royal NZ Institute of Horticulture — Notable Trees New Zealand.....	1
Introduction	1
Purpose	1
Structure of the NTNZ Voluntary Group	2
NTNZ Tree Registrars	2
RNZIH Publications	3
1. Selecting Trees for Registration	4
1.1. Background Publications	4
1.2. Heritage Tree Lists in District Plans	4
1.3. Methods used for Tree Evaluation	4
1.4. Beginning a Tree Inventory	4
1.5. New Zealand Arboricultural Association.....	5
1.6. Examples of Approaches for Heritage Tree Listings	5
2. How to Register a Notable Tree	6
2.1. Tree Registration Forms.....	6
2.2. Measuring Trees.....	6
2.3. Measuring Canopy Spread	6
2.4. Volume of a Canopy	6
2.5. Tree Girth.....	6
2.6. Definitions of a Stand or Group of Trees	6
2.7. Location of a Tree	7
2.8. Registration Form — Notes on Significance.....	7
3. Documentation	8
3.1. Identifying Trees and Botanical References	8
3.2. Photographing Trees	8
3.3. Registration Fee	8
3.4. Labelling Trees	8
4. Goodwill	9
5. NTNZ Contributors and Register Management	9
5.1. General Contributors.....	9
5.2. Registrars.....	9
5.3. Information Management.....	9
5.4. Registration Processing by the National Registrar.....	9
Appendices	
i) NTNZ Registration Form	12
ii) Measuring Trees	14
Indian Method.....	14
Ruler and String (Treeby & Arthur) Method	15
Vertical Angle Method.....	17
Measuring a tree on level ground.....	17
Measuring a tree on ground that slopes up to the base of the tree	18
Measuring a tree on ground sloping down to the base of the tree.....	20
iii) Logarithmic Tables	21
iv) Measuring the Volume of the Canopy and Root Spread	22
v) Accompanying Notes on Significance for the Registration Form	23
vi) Plaque Design Examples	25
vii) Sketch of Method for Fixing Plaques	27
Useful References	28

Royal New Zealand Institute of Horticulture — Notable Trees New Zealand

Introduction

In 1940, Dr H. H. Allan prepared the first recognised listing of historic trees in New Zealand. His pioneering work was followed by S. W. Burstall, who worked for the Forest Research Institute (FRI) at Rotorua. In the late 1960–70's, Mr Burstall travelled widely through New Zealand, recording both notable and historic trees of national and local importance in *Forest Mensuration Reports no. 16 to 23* (Burstall, 1973). From this work, a further publication called *100 Great Trees of New Zealand* was produced by Burstall and Sale (1984).

The RNZIH have been the foremost promoter of the need for legislation in New Zealand for tree protection. In 1977, a committee was established by the RNZIH to administer a **Notable and Historic Trees Scheme**. The Committee was (and still is) responsible to the RNZIH National Executive. Before his death, Mr Burstall gave permission for his list of trees to be used by the RNZIH as a guide for locating trees for their National Register.

In 1997, some twenty years after the scheme's inception, a name change to **Notable Trees New Zealand (NTNZ)** was adopted. In the same year, the **New Zealand Arboricultural Association** officially declared support for the NTNZ initiative as part of their 10th Anniversary Conference in Hamilton (November, 1997).

The shortened name is more easily remembered, and broadens the appeal, encouraging other organisations to contribute — e.g., there are many local tree groups such as the Nelson Tree Planters who like to be involved with tree matters only. Another reason for the name change is to facilitate access through the Internet. A search on the RNZIH website <http://www.rnzih.org.nz> can locate the Notable Trees subsite.

The NTNZ committee has to date been responsible for registering over 3000 nationally important trees within about 386 registrations during the past 26 years. The RNZIH Notable Tree Register is lodged at the National Office at Lincoln University. A publication called *The Introduction to the Notable Trees of New Zealand* was published in 1994 (Flook, 1994). Trees registered as 'Notable' are identified by means of an enamel plaque. Public attention is drawn to these labels, and this publicity provides a measure of protection for the trees. These trees also have great significance for visitors, scientists and tree lovers from all over the world.

A new designation called 'Noble Trees' was added in 2002, to recognise those trees of more than 27 m, whether in height, canopy spread or both. These are regarded as trees of National Importance.

Purpose

New Zealand's great trees provide an invaluable natural and cultural asset. They are an important part of our environment for reasons of either their stature, cultural and/or scientific values. Present legislation is inadequate for their protection and NTNZ continues to seek to redress this issue. The aims of NTNZ are:

- **To identify, list and label** New Zealand's nationally significant trees, both native and exotic.
- **To secure statutory recognition** afforded within the RMA 1991, Section 6, which requires local authorities throughout New Zealand to list their Heritage Items in their District Plans. Heritage Items for inclusion are to be of both natural and cultural importance to local

communities. Trees are not specifically mentioned but are regarded as natural objects.

- **To strive for both public and private awareness** as a means of protecting important trees through education, publicity and labelling trees (Appendix vi).
- **To add to the existing Notable Tree Register** and build a National Tree Database for public use and interest in New Zealand and abroad.

Structure of the NTNZ Voluntary Group

NTNZ operates from an administration centre in Nelson. NTNZ registration forms are used to record tree measurements, and to provide supporting research material that include photographs, all of which establish the importance of a tree. The material evidence confirming Notable Tree status is then taken through the registration process.

On acceptance, the registration is included in the NTNZ National Register held in the RNZIH National Office at Lincoln University. Copies are sent to the owner, local authority and the tree registrar. A registered Notable Tree is identified by a plaque fixed to the tree or located within the site (Appendix vi, vii). This draws public attention to the tree's importance. Regular progress reports are made to the respective Annual General Meetings of both the RNZIH and the NZAA as the parental organisations. The work is voluntary and carried out by an advisory support group that comprises of the following consultants:

- National Registrar
- National Research Archivist
- Botanist
- Arborist
- Database Designer
- Webmaster

There are three categories of voluntary registrars who collect data for potential Notable Tree Registrations:

- Regional Registrars
- District Registrars
- Members of the public or community groups with a particular interest in trees

NTNZ Tree Registrars

Regional Tree Registrars successfully register 30 trees each year and the appointment is reviewed biennially. This approved voluntary position may be publicised by the individual registrar. The opportunity of being a regional co-ordinator can be rewarding and fulfil a valuable role in that region. This role also benefits the District Tree Registrars both in providing a support network and the exchange of experience and information. The Regional Tree Registrars are active in ensuring the inclusion of trees as "Heritage Items" for the RMA 1991 requirement on District Councils to include lists of trees within their District Plans.

District Tree Registrars

District Tree Registrars have a minimum of five Notable Trees each year accepted for registration or ten Registered Notable Trees over a 2-year period. The approved District Tree Registrars monitor any unauthorised attempts at removal or the inflicting of wilful damage on both Notable Trees and Heritage Trees of national and local importance. This voluntary position may be publicised in both local and regional media, and notice of the appointment may be sent on request to the appropriate regional and local authority.

Note: Approved NTNZ Registrars may advertise registrar status. This approval is reviewed biennially.

Members of the Public or Community Groups who have a deep interest in trees are able to submit trees for Notable Tree registration providing that the registration form is filled out with accurate and complete documentation. A group of individuals can offer joint expertise for the completion of the registration form. There are many local groups who organise tree-planting days etc who could assist in submitting trees for NTNZ registration. It is particularly important that the work of recording trees is done locally for NTNZ and for Heritage Trees of local importance. They should both be listed on the local District Plan under Heritage Items of Community Importance, which is their best protection. (RMA 1991, Section 6).

Note: All trees submitted for national listing must be approved by the National Registrar or for local listing by an appropriate Local Authority Officer.

RNZIH Publications

The following are the RNZIH publications to date (this list excludes the numerous articles written for a wide spectrum of journals and magazines):

Allan, H. H. 1940: Historic Trees in New Zealand. *Journal of the Royal New Zealand Institute of Horticulture, Vol. 10, No 1.*

Commission for the Environment and the Royal New Zealand Institute of Horticulture 1985: Recommendations to the Minister for the Environment from the Working Party on the Preservation of Notable Trees. Department of Conservation, New Zealand.

Flook, R. R. (ed.) 1994: An Introduction to the Notable Trees of New Zealand. Royal New Zealand Institute of Horticulture, P.O. Box 12, Lincoln University, Canterbury. ISBN 0-959-7756-2-5.

RNZIH 1984: Notable Trees Scheme Guidelines for Tree Registration Officers.

Smuts-Kennedy, O. (ed.) 1988: A Tree Evaluation Method for New Zealand. Compiled by Flook, R. R., Royal New Zealand Institute of Horticulture, Wellington, NZ. ISBN 0-473-00680-4.

Note: Electronic copies of this *Tree Registration Manual* are available at <http://www.rnzih.org.nz/pages/notable3.htm>

Discontinued - Go to www.rnzih.org.nz to register trees

1 Selecting Trees for Registration

1.1 Background Publications

A good starting point is to consult Burstall's *Forestry Mensuration Reports no. 16-23* (Burstall, 1973). Copies of pages for the relevant region or district can be obtained from the National Registrar or direct from the Forest Research Institute (FRI), Rotorua. These eight unpublished reports are divided into regions.

Burstall compiled a list of trees, their location and classification into groups, as native or exotic, notable and historic and of either national or local importance. These listings from 1969 to 1972 are now out-of-date due to tree losses. The extent of these losses were recently assessed in Hamilton through research conducted by an arboricultural student at the Waikato Polytechnic (Moohan, 2000). Hamilton has a population of over one million and is the only city in New Zealand where the tree population has been recently studied. Moohan's (2000) work showed that only 29 Notable Trees remain out of the 85 recorded by Burstall in 1971.

However, Burstall's early work does provide a basis for comparison against which other trees can be judged. Burstall and Sale (1984) recorded a selection of great trees in their book entitled *100 Great Trees of New Zealand* (Burstall & Sale, 1984). The RNZIH have also published Notable Tree Registrations in *An Introduction to the Notable Trees of New Zealand* (Flook, 1994). This book has descriptions and notes on the RNZIH registrations arising from the work of volunteers since 1977. Many more trees have now been registered and these are all on a computer database (a web version is currently accessible at <http://www15.brinkster.com/notabletrees/>).

1.2 Heritage Tree Lists in District Plans

District Plans operate locally to protect important trees, and some of these will also be of national importance. From this, it follows that all trees listed on the Register of Notable Trees should ideally also be listed in the relevant District Plans.

1.3 Methods used for Tree Evaluation

A Tree Evaluation Method for New Zealand (RNZIH, 1988) was used as an elementary way of assessing the importance of a tree. It has now been superseded by a *Standard Tree Evaluation Method* (STEM) (Flook, 1996). This publication has been widely accepted as the preferred tree assessment method, and adopted by the RNZIH, the NZ Arboricultural Association and the NZ Institute of Landscape Architects. It can be used for the evaluation of trees and their importance to local communities or used in a wider context for trees of regional and national importance. STEM assesses a tree in three ways — for Health (Condition), Community Interest (Amenity), and the potential for national recognition (Notable status) (Appendix i, STEM Registration Form). Copies of STEM are available from selected sources or on interloan (Flook, 1996).

The STEM method also allows for regional climatic differences in tree growth. Points are scored for each section on the assessment form and when added will provide the tree with a quality rating for importance. Top scores for trees will vary regionally due to geographic factors. General experience has shown that National Notable Tree status is achieved by trees attaining over 160 points, and can be used as an initial benchmark for recognising a Nationally Notable Tree. Top scoring trees should be submitted on NTNZ registration forms and sent to the NTNZ Nelson office. The NTNZ Advisory Group will decide eligibility for National Notable status. Trees that are significant, but do not achieve national status, should be regarded as potential future Nationally Notable Trees, and submitted to the appropriate local authority for inclusion on the District Plan Heritage Tree List.

1.4 Beginning a Tree Inventory

Perusal of a local authority's District Plan Heritage List (whether in draft or finalised form) should contain items of cultural importance and include a list of important trees. While the RMA 1991 does not specifically refer to trees it refers to Heritage Items. Many local authorities have included lists of trees as important Heritage Items and have used STEM to evaluate their quality. Copies of District Plan Heritage Lists are held in the Planning Department of the local authority offices and also in local

public libraries. Some local authorities have been slow to spend time on Heritage Tree Lists, which are now regarded as Community Assets.

Local councillors and council officers should be made aware of any omissions and be lobbied for the further development of Heritage Tree Lists. Benefits can be gained by liaising with council officers who are generally sympathetic to an approach from the public. They are aware of the RMA (1991) requirements and need community support to influence local councillors. Most local councils now employ qualified arboriculturists, and their knowledge and support are a great help with listing trees.

1.5 New Zealand Arboricultural Association

The New Zealand Arboricultural Association are active supporters of NTNZ. They are trained, have a wide knowledge and interest in tree registers. They are invaluable advisors on tree matters. Together with council officers and using various government employment schemes, opportunities exist for finding basic labour assistance for checking and listing trees of local and national importance.

1.6 Examples of Approaches for Heritage Tree Listings

In 1994, Nelson City Council successfully used a Task Force Green grant to employ a local person for six months, and with arboricultural supervision were able to evaluate and define a Heritage List of important trees for the region. STEM was used to evaluate trees for their listing. Single trees, stands or groups of trees can all be evaluated using STEM. Their inventory consists of approximately 1000 trees that have now been publicised and included in the Nelson Regional and District Plan. All are now being labelled with the NTNZ logo. This shows how much progress can be made with even modest funding.

An enthusiastic amateur with local knowledge can help greatly by evaluating district trees and putting them forward as worthy of inclusion. To supplement this local knowledge, it would also be useful to consult the recommended references (Burstall, 1973; Flook, 1994).

District Plans are not static and are updated periodically, but the process does take a 10-year turnaround cycle.

Discontinued - Go to www.insta-trees.org.nz to register trees

2 How to Register a Notable Tree

2.1 Tree Registration Forms

Registration forms are supplied free by NTNZ Nelson, and are also available for download on the RNZIH website at <http://www.rnzih.org.nz/pages/notable3.htm>. On this web page, there is also an electronically submittable registration form. These forms have to be filled in with the required information explained on the form. Only one form is needed for each registration except for groups of trees (Appendix i — NTNZ Registration Form). Once the information has been entered, it should be signed by the owner of the tree and the Registrar responsible. The registration form, photo, and fee or donation are sent to the National Registrar in Nelson.

As each registration is approved, the National Tree Registrar will send a copy of the registration to the tree registrar, the tree owner and to the regional and local body where the particular tree is located (refer Section 5.4). A weatherproof enamel plaque engraved with the tree's name is also supplied for fixing on the tree or at the base of the trunk on a timber plinth (Appendix vii).

2.2 Measuring Trees

There are several methods for measuring trees (Appendix ii). The tree height is the vertical distance in metres rounded off to within 0.5 m taken from ground level at the base of the tree to the highest point of the tree. The preferred methods are:

- **Ruler and String (Treeby & Arthur) Method**
- **Vertical Angle Method using an Abney Level**
- **Vertical Angle Method using a Clinometer**
(see Appendix iii for trigonometric tan and cosine tables)

2.3 Measuring Canopy Spread

Measured as the average of two right-angled readings from the trunk surface. Single trees that are growing unrestricted normally have hemispherical, conical or frond canopies. Because tree canopies have an irregular spread, the spread is measured by taking the average of the widest and narrowest widths.

2.4 Volume of a Canopy

This is a measurement that can provide valuable evidence in cases of dispute. It is used to identify the growing area of a tree, whether in root or limb (Miller & Lightner, 1987). This volume measurement can help establish the tree's vulnerability to damage within the proximity of both canopy and root growing zones (Appendix iv).

2.5 Tree Girth

Measured usually at 1.40 m from ground level (gl). Trees standing on sloping ground should be measured at the median of the top and bottom of the slope adjacent the trunk. Branching or divided trunks may necessitate taking the measurement at one of the following recommended heights:

- preferably at 1.40 m above gl
- 1.00 m above gl
- 0.60 m above gl
- at ground level

2.6 Definitions of a Stand or Group of Trees

A Stand is made up of one species only. A single registration form can be used for a stand. This applies to avenues as well. For avenues or large groups of the same species it is suggested that a minimum of three trees be measured to find an average.

A Group is made up of several species. Separate registration forms are required for each dissimilar tree or trees within the group. This would be termed a stand within a group. As an example, a group

of six Oaks, seven Totara, one Douglas fir, and three Sequoias would require one registration form for each species. Avenues are treated in the same way.

Stands or groups of trees are measured by:

- **Height** of the tallest and shortest tree for stands. For dissimilar single trees within the group, each would need to be measured. Where the canopy spread is linked, measure the largest visible tree height and the lowest visible tree height to gain an average for the group of trees.
- **Spread** is taken as the average of the widest and narrowest canopy measured from the trunk of the tree. For linked canopies the area covered can be used.
- **Girth** of the largest and the smallest tree trunk for stands, and each girth for groups of different species at prescribed heights above ground level (gl).

2.7 Location of a Tree

There are options for locating trees accurately but it is helpful to use as many location references as are available. These is useful should any hearings, legal disputes or court actions arise. The Electoral Roles are useful to identify owners and the correct address of a tree. Tree locations are documented using:

- **Grid reference** on appropriate 1:50,000 (NZMS 260) map. Full details are given on each NZMS 260 map on how to work out the grid reference.
- **Region and Districts** can be verified using InfoMap 319B, Local Authority Boundaries.
- **Aerial photographs** are available from any District Office of the NZ Department of Survey and Land Information (DOSLI). Local Authorities also have a set of aerial photographs at scales 1:1,000 or 1:500.
- **A legal description** of the property on which the tree(s) is/are situated.
- **Sketch of the tree(s) location** relative to named roads, buildings and other landmarks in the district.

In addition, hand-held GPS (Global Positioning Systems), and CD and Internet mapping tools are becoming increasingly useful.

2.8 Registration Form — Notes on Significance

Notes give the reasons why a tree is of national importance. There are criteria for why a tree is important nationally (Appendix v). The notes are recorded on or attached to the registration form. It is helpful to have full notes on, for example, personalities or events associated with the tree. Library and media references are especially valuable for the register. These notes greatly help the NTNZ Advisory Group decide on the importance of the tree nationally.

Sound documentation can often be the means of saving a tree.

3 Documentation

3.1 Identifying Trees and Botanical References

Tree identifications are made by the Registrar at either the regional or local level. The reason for this is to standardise identifications amongst registrars. It is imperative that the identification of a tree is accurate. Correct information is needed for research purposes and for answering overseas enquiries. There are many qualified botanists throughout the country who are able to verify identifications. The use of other than those preferred references might be needed to check the identification of rare species.

Botanical References

- Bean, W. J. 1970: *Trees and Shrubs Hardy in the British Isles*. London: John Murray. Eighth ed. Revised Vol. I, A-C. Reprinted 1979. Vol. II, D-M 3rd Imp. 1981. Vol. III N-RH 2nd Imp. 1980. Vol. IV. RI-Z. Reprint corrections, 1981.
- Dallimore, W. & Jackson, A. B. 1974: *A Handbook of Coniferae and Ginkgoacea*. Fourth Edition, Arnold, London.
- Kelly, S. 1969: *Eucalypts*. Nolan, Sydney. 2 Vols.
- Makins, F. K. 1948: *The Identification of Trees and Shrubs*. Dent, London.
- Salmon, J. T. 1991: *Native Trees of New Zealand*. Octopus Publishing Group (NZ.) Ltd., 3rd reprint, Auckland.
- Webb, C. J.; Sykes, W. R. & Garnock-Jones, P. J. 1988: *Flora of New Zealand Vol. IV, Naturalised Pteridophytes, Gymnosperms, Dicotyledons*. Botany Division, Department of Scientific and Industrial Research, Christchurch, New Zealand.

Note: NTNZ has a voluntary National Botanical Consultant for the identification of rare species. Please contact the National Registrar in cases of doubt.

3.2 Photographing Trees

A completed registration form must be accompanied by a good quality colour photograph of the tree. These photographs can be in print form, as a 35 mm negative or mounted slide, or recorded in digital format as jpeg attachments if using an electronic registration form. These images are kept on file with the registration form, and serve a number of useful purposes:

- **provide** a record of the condition of the trees at the time of registration.
- **allow** for comparison of specimens distributed throughout the country.
- **help** in the future location and identification of particular trees.
- **provide** useful publicity material for Notable Trees New Zealand.

3.3 Registration Fee

There are costs involved in tree registrations. These are for photocopies, stamps, envelopes, phone calls, labels etc and these costs have to be recovered. Although the RNZIH and NZAA contribute towards administrative costs there is a need for further financial support. A fee or donation of \$25 or more is always much appreciated. Special circumstances do require special consideration e.g., it is very often the elderly on limited incomes who see the need to register their favourite trees.

3.4 Labelling Trees

After a tree registration is approved a tree plaque will be sent to either the Tree Registrar or the owner as requested. These plaques are fixed either on the tree in a position where they can be easily read or fixed to a post at the base of the tree.

The plaque is made of an enamel anodised plate with the logo of NTNZ and the tree name and registration number. A plaque for a single Notable Tree is 150 mm × 100 mm and for stands or groups of trees the plaque is 150 mm wide × 200 mm long (Appendix vii. Method of Fixing Plaques).

4 Goodwill

The Notable Trees Advisory Group work on a voluntary basis. They work many hours at no cost to the NTNZ. They are passionate about the need for tree protection and therefore believe that this outweighs personal costs. Notable Trees New Zealand would welcome a major sponsor who see the commercial and other benefits in aligning with us.

To have a comprehensive list lodged with a regional or local authority has proved an invaluable tool in protecting national, regional and local district trees of importance.

Goodwill is greatest when a proactive stance is taken in tree registration. Avoid reactive registrations as they are most damaging to goodwill from owners, local authorities, interest groups and communities.

5 NTNZ Contributors and the Register Management

5.1 General Contributors

Action by individuals who note a tree of importance — for reasons of national interest e.g., stature, form, historic, commemorative planting etc. (Appendix v).

5.2 Registrars

A person who is a Tree Registrar for a district or a region. Requirements are simple but exact.

- Measure the tree for height, spread and girth.
- Identify the tree or send a sample to the NTNZ office in Nelson for identification.
- Locate the tree accurately by address and pinpoint the position on an Ordinance Survey map of the area.
- Photograph the tree.
- Obtain the owners signature (the registration is invalid without it).
- Send complete documentation to the National Registrar for registration approval at 539 Rocks Road, Tahunanui, Nelson. Most details can be completed through email (flook@netaccess.co.nz) or online at (<http://www.rnzih.org.nz/pages/notable3.htm>)

5.3 Information Management

The database already contains some 3000 records, and there is continual updating as registrations are received and approved. General steps for managing information on NTNZ include:

- Research trees from each district and write to local authorities requesting their latest District Plan Heritage Tree List.
- Check that NTNZ Registered Trees are on that list and make known to the local authority if not.
- Retrieve from the database details to answer local, national and international queries.
- Select registrations of groups of trees often within the grounds of nationally significant gardens.
- Follow up on family histories associated with NTNZ Registrations (e.g., the Goulter family of Marlborough) for adding historical notes on notability.

5.4 Registration Processing by the National Registrar

Once a registration has been accepted by the NTNZ Advisory Group the National Registrar processes the form and completes the following package:

NTNZ Registration Package

For Tree Owner

Covering letter of thanks

Registration Presentation Cover

Copies of certificate of registration
laser print(s) of photo(s)
research material
letter to local authority
original tree plaque and method of fixing
flyer for Introduction to the Notable Trees of NZ
flyer for STEM
three registration forms

For Tree Registrar

Letter of appreciation to registrar (refer to Burstall's lists if required)

Copies of letter of thanks to the owner
certificate of registration
laser print(s) of photo(s)
research material
letter to local authority
photocopy of tree plaque and method of fixing
flyer for Introduction to the Notable Trees of NZ
flyer for STEM
three registration forms

For Local Authority

Letter requesting addition to District Plan Heritage Tree List including request for a copy of the Heritage List.

Copies of certificate of registration
laser print(s) of photo(s)
research material
photocopy of tree plaque
flyer for Introduction to the Notable Trees of NZ
flyer for STEM

RNZIH Lincoln Office

Copies of letter of thanks to the owner
letter of thanks to registrar
letter to local authority
certificate of registration
laser print(s) of photo(s)
research material
photocopy of tree plaque

National Registrar

Copies of certificate of registration
original print(s) of photo(s)
research material
letter of thanks to the owner
letter of thanks to registrar
letter to local authority

Total Number of copies required

registration presentation cover	1
certificate of registration	5
laser and original print(s) of photo(s)	4
research material	5
letter of thanks to the owner.....	4
letter of thanks to registrar	3
letter to local authority	5
photocopy of tree plaque.....	4
method of fixing plaque	2
registration forms	6
introduction flyer	3
STEM flyer	3

Note: Variations will occur in numbers of copies according to circumstances.

Discontinued - Go to www.notabletrees.org.nz to register trees

Appendix (i)

NOTABLE TREES



NEW ZEALAND



NOTABLE TREES
FOUNDED IN 1978

Royal New Zealand Institute of Horticulture Inc.

With the support of:
New Zealand Arboricultural Association Inc.



NEW ZEALAND
ARBORICULTURAL
ASSOCIATION INC

Registration Form

Regn. Approved _____ Plaque sent _____ Registration number _____

BOTANICAL NAME _____

COMMON NAME _____

Planted by (full name if known) _____ Year planted _____ (exact or estimated?)

NOTABLE TREE MEASUREMENTS _____ Year measured _____

Height calculation method _____

Single Tree Height of tree _____ (m) Average width of canopy _____ (m)
Girth of trunk _____ mm above ground level is _____ mm
(Indicate if girth was measured at ground level (gl) or at 600mm or at 1.00m or at 1.40m).

Stand (Same species) or **Group** (Mixed) No. of trees _____

Maximum height _____ Minimum height _____

Average height _____ Area covered _____

STEM Score _____ **STEM Value** (optional) \$ _____
(for STEM Evaluation and Descriptive Notes see reverse page).

LOCATION

Address _____

District _____ Local Authority _____

NZMS 260 Sheet No. _____ Sheet Name _____

Grid Reference _____ **and/or** Legal description of land _____

Photograph date _____ **Registration Fee (\$25.00) and/or donation** \$ _____

Registration by _____

Owner _____

Address _____

Send completed form to:
Ron Flook, National Registrar,
Notable Trees New Zealand,
539 Rocks Road, Nelson, New Zealand

STEM: (Standard Tree Evaluation Method 1996 pub. Ron Flook)

Tree Evaluation Score Sheet

Condition Evaluation

Points	3	9	15	21	27	Score
Form	Poor	Moderate	Good	Very good	Specimen	
Occurrence	Predominant	Common	Infrequent	Rare	Very Rare	
Vigour/Vitality	Poor	Some	Good	Very good	Excellent	
Function	Minor	Useful	Important	Significant	Major	
Age (yrs)	10yrs. +	20yrs. +	40yrs. +	80yrs.+	100yrs. +	

Subtotal Points

Amenity Evaluation

Points	3	9	15	21	27	Score
Stature (m)	3 to 8	9 to 14	15 to 20	21 to 26	27+	
Visibility (km)	0.5	1	2	4	8	
Proximity	Forest	Parkland	Group 10+	Group 3+	Solitary	
Role	Minor	Moderate	Important	Significant	Major	
Climate	Minor	Moderate	Important	Significant	Major	

Subtotal Points

Notable Evaluation

Recognition	Local	District	Regional	National	International	
Points	3	9	15	21	27	Score
Stature	Feature					
	Form					
Historic	Age 100+					
	Association					
	Commemoration					
	Remnant					
	Relict					
Scientific	Source					
	Rarity					
	Endangered					

Subtotal Points

Total Points

Notes: (add page for extra notes)

Send completed form to:
 Ron Flook, National Registrar,
 Notable Trees New Zealand,
 539 Rocks Road, Nelson, New Zealand

Appendix (ii): Measuring Trees

Measuring Height

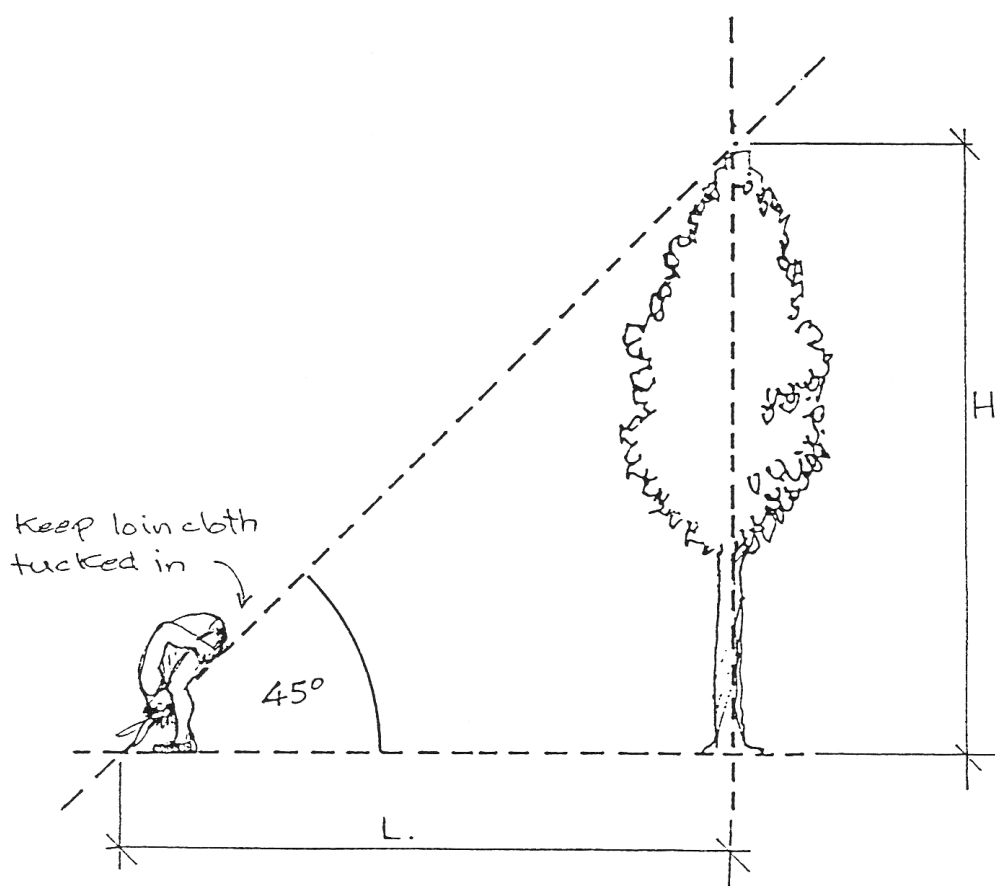
The total height is the vertical distance in metres from the highest point of the ground at the base of the tree to the highest part of the tree. For stands of trees give the height of the tallest tree in the stand.

There are several methods for measuring trees and they are arranged in order of increasing accuracy.

Indian Method

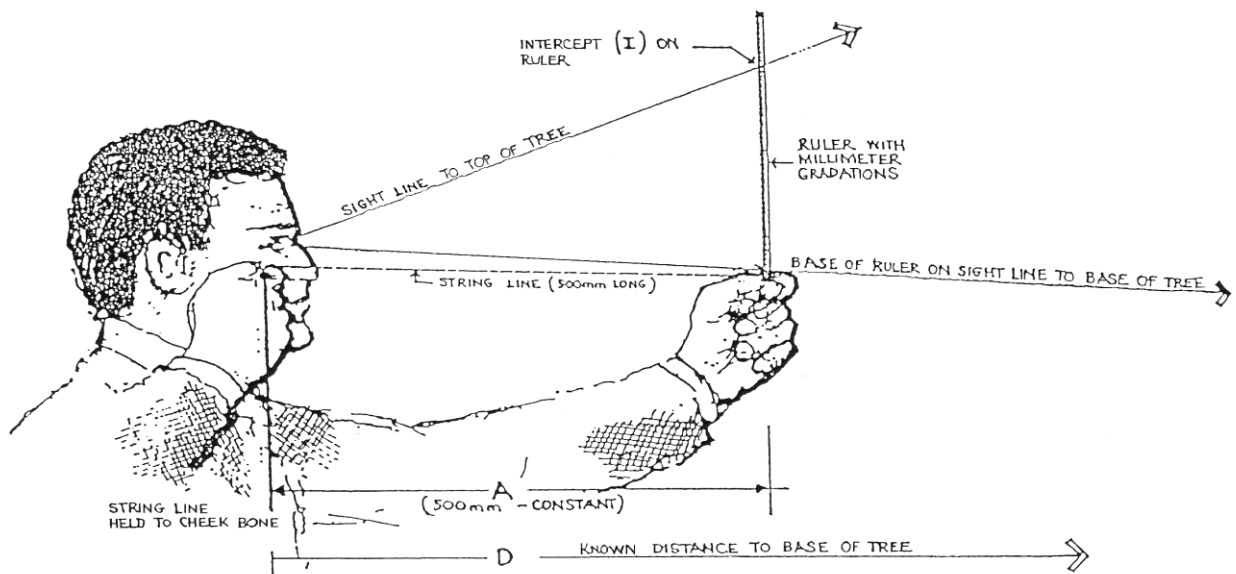
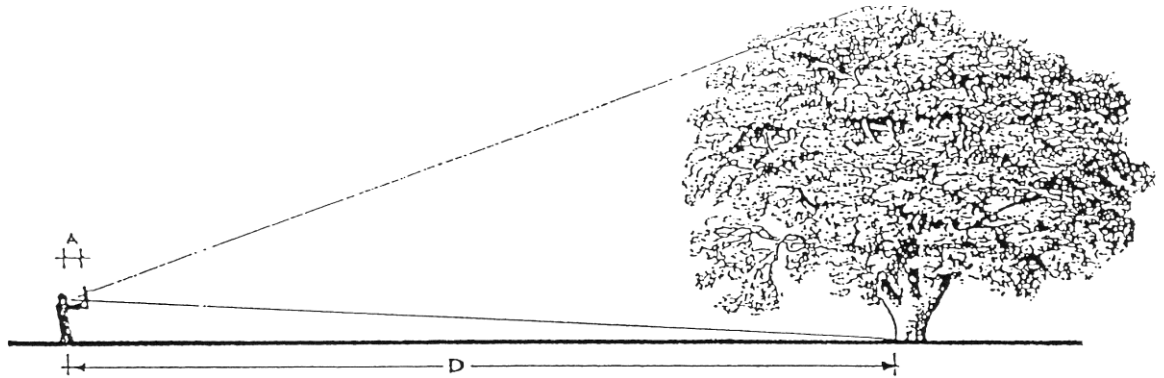
No equipment is required for this method that was used by primitive tribes to estimate timber height for building their canoes. A supple back is useful.

- Stand with your back to the tree.
- Bend over and look at the tree between your legs.
- Move towards or away from the tree until you can just see the top of the tree. At this point your distance from the tree is approximately equal to the height of the tree. Pace the distance to the tree and convert the paced distance as metres. This is the approximate height of the tree. The Indian method is based on a 45-degree triangle. Length = height.



Ruler and String (Treeby & Arthur) Method

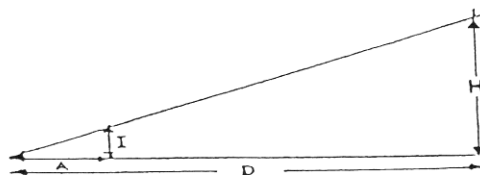
This method requires a 30 cm ruler graded to millimetres. Some plastic rulers can be purchased with a hole at one end and this is used for attaching a string 50 cm long. The sketch below shows the detail of taking a position and sighting to the tree. This system was devised by Bruce Treeby and Gerald Arthur NZTC (Treeby & Arthur, 1988).



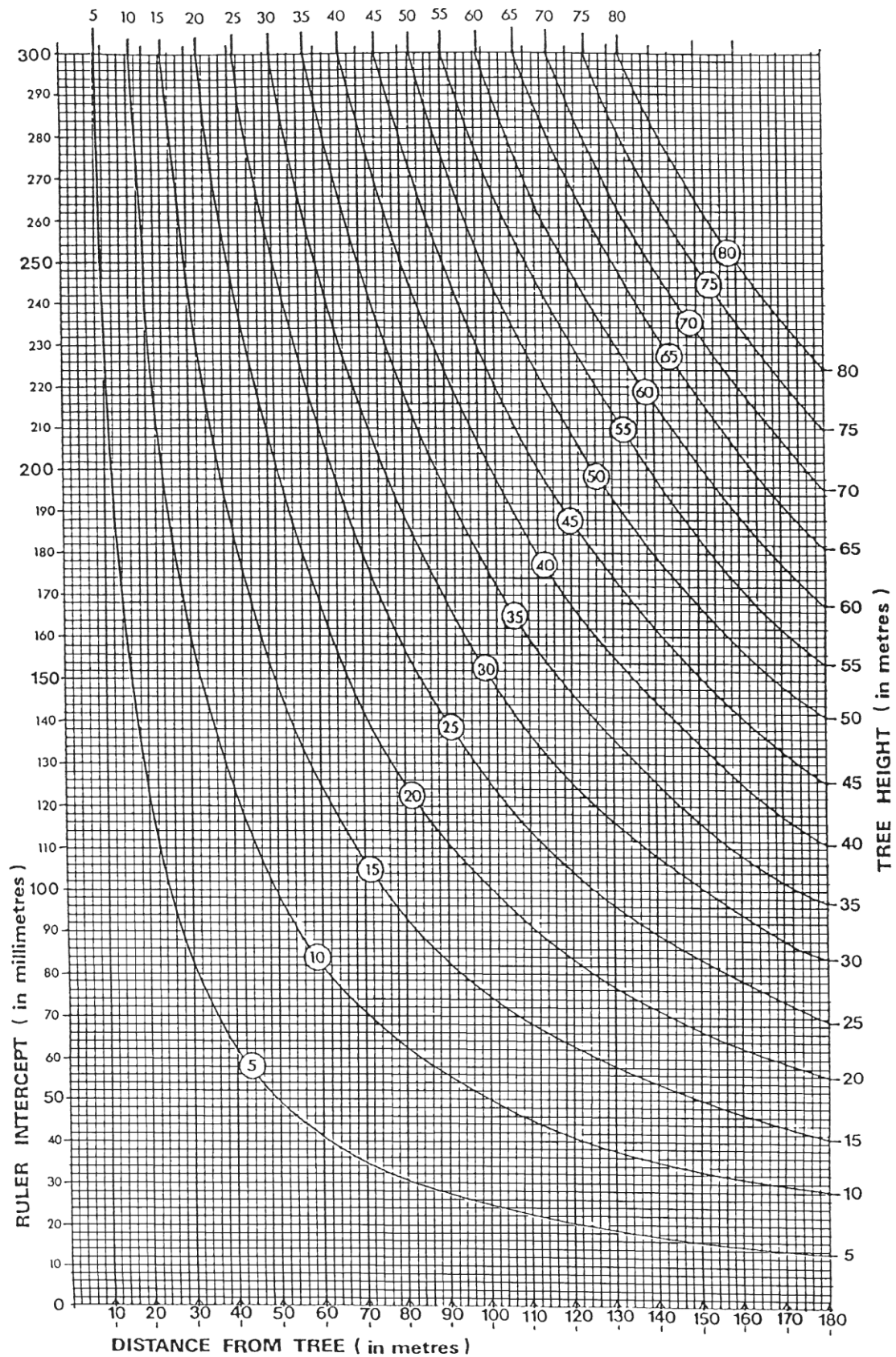
$$\frac{H}{D} \text{ HEIGHT} = \frac{I}{A} \text{ INTERCEPT ON RULER}$$

DISTANCE STRING LENGTH (500mm)

$$H = \frac{D \times I}{A}$$



Once the readings have been taken the following graph is used to locate the height of the tree read from the intercept reading on the ruler and the distance from the tree. The tree height is read from the measurement scale graph below in metres.

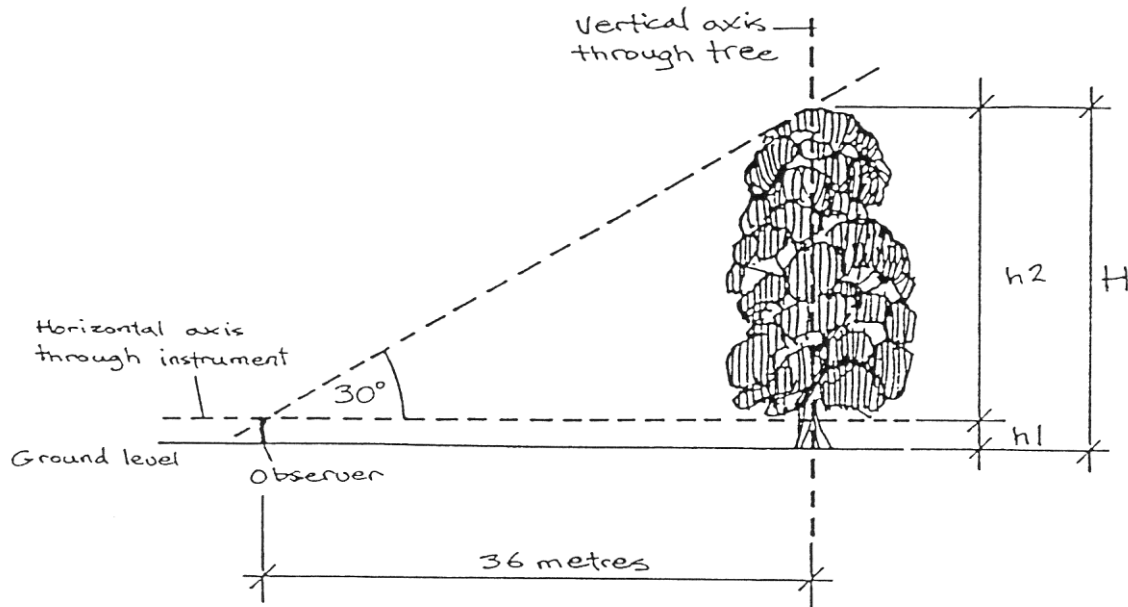


5

Vertical Angle Method

The equipment required is a tape measure, an instrument for taking vertical angle readings such as an Abney level or Clinometer. More up-to-date equipment is available but at a cost. Trigonometric tables for tangent and cosine and a calculator are needed. It is useful to have laminated trigonometric tables for outdoor calculations.

Measuring a tree on level ground



The height of the tree h is the sum of h_1 and h_2

h_1 is the height of the observer's eye level above ground.

h_2 is the height of the tree above a point on the trunk level with the observer's eye level. **h_2** is found by multiplying the horizontal distance from the observer to the tree by the tangent of the vertical angle from the observer's eyes to the tree top. Note that a good reading is better taken from a distance to where the top of the tree is clearly seen. This is not always possible due to terrain but should be attempted for good results.

Example

The observer stands on level ground 36 m away from the tree being measured. The angle of 30 degrees is to the tree-top. To find **h_2** is the tangent of 30 degrees which is 0.577. This is multiplied by the distance from the tree 36×0.577 and result is 20.77 m for **h_2** . Eye level above ground averages at 1.70 m and this is added to give the full height of the tree.

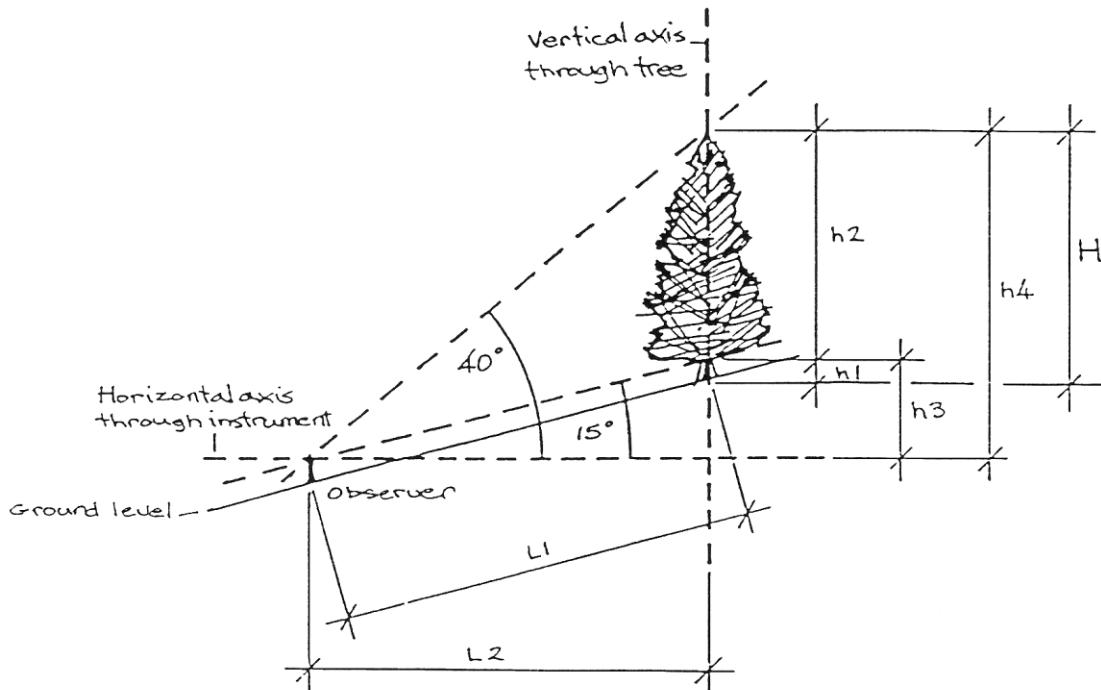
$$\begin{aligned} h &= h_2 + h_1 \\ &= 20.77 \text{ m} + 1.70 \text{ m} \\ &= 22.47 \text{ m} \end{aligned}$$

Note: To check that the ground level is constant can be done by taking a similar reading of the vertical angle to a point on the trunk to eye level.

Slopes

Should the ground slope up or down to the base of the tree one of the following formulae should be used.

Measuring a tree on ground that slopes up to the base of the tree



Example

The height of the tree is h which is the sum of h_1 and h_2 .

h_1 is the height of eye level above ground (1.70 m).

To find h_2 it is necessary to find h_4 . h_4 is the vertical difference between tree top and eye level. This is subtracted from h_3 which is the vertical difference between eye level and a point on the trunk that is the same height above ground as eye level.

$$h_2 = h_4 - h_3.$$

To find h_4 and h_3 the horizontal distance from the observer to the vertical axis of the tree L_2 must be found. In the example shown above the ground distance from the observer to the tree L_1 is 26 m and the vertical angle from the observer to the top of h_3 is 15 degrees. L_2 is L_1 multiplied by the cosine of 15 degrees. In this case:

$$\begin{aligned} L_2 &= L_1 \times \cos 15 \text{ degrees} \\ &= 26 \text{ m} \times 0.966 \\ &= 25.12 \text{ m} \end{aligned}$$

To find h_4 :

$$\begin{aligned} h_4 &= L_2 \times \tan 40 \text{ degrees} \\ &= 25.12 \text{ m} \times 0.839 \\ &= 21.08 \text{ m} \end{aligned}$$

To find **h3**:

$$\begin{aligned} \mathbf{h3} &= \mathbf{L2} \times \mathbf{\tan 15 \text{ degrees}} \\ &= \mathbf{25.12} \times \mathbf{0.268} \\ &= \mathbf{6.73 \text{ m}} \end{aligned}$$

To find **h2**:

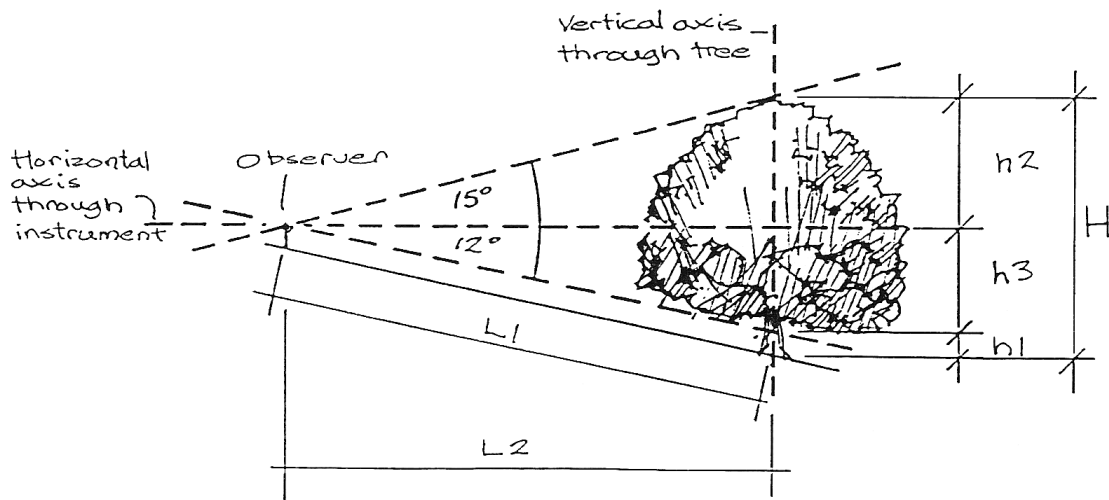
$$\begin{aligned} \mathbf{h2} &= \mathbf{h4 - h3} \\ &= \mathbf{21.08 \text{ m} - 6.73 \text{ m}} \\ &= \mathbf{14.35 \text{ m}} \end{aligned}$$

Therefore to find **h** (height of the tree):

$$\begin{aligned} \mathbf{h} &= \mathbf{h2 + h1} \\ &= \mathbf{14.35 \text{ m} + 1.70 \text{ m}} \\ &= \mathbf{16.05 \text{ m}} \end{aligned}$$

Discontinued - Go to www.notabletrees.org.nz to register trees

Measuring a tree on ground sloping down to the base of the tree



The height of the tree h is the sum of $h_1 + h_2 + h_3$.

h_1 is the height of eye level above ground 1.70 m (trees on sloping ground should be measured at the median of the top and bottom of the slope adjacent the trunk).

h_2 and h_3 are found by multiplying L_2 (the horizontal distance from the observer to the vertical axis of the tree) by tangents of 15 degrees and 12 degrees respectively.

L_2 is found by multiplying L_1 by the cosine of 12 degrees.

Example:

To find L_2 :

$$\begin{aligned} L_2 &= L_1 \times \cos 12 \text{ degrees} \\ &= 30 \text{ m} \times 0.978 \\ &= 29.34 \text{ m} \end{aligned}$$

To find h_2 :

$$\begin{aligned} h_2 &= L_2 \times \tan 15 \text{ degrees} \\ &= 29.34 \text{ m} \times 0.268 \\ &= 7.86 \text{ m} \end{aligned}$$

To find h_3 :

$$\begin{aligned} h_3 &= L_2 \times \tan 12 \text{ degrees} \\ &= 29.34 \text{ m} \times 0.213 \\ &= 6.25 \text{ m} \end{aligned}$$

To find h (the height of the tree):

$$\begin{aligned} h &= h_1 + h_2 + h_3 \\ &= 1.70 \text{ m} + 7.86 \text{ m} + 6.25 \text{ m} \\ &= 15.81 \text{ m} \end{aligned}$$

Appendix (iii): Logarithmic Tables

Deg	Cos	Deg	Cos	Deg	Tan	Deg	Tan
1	1.000	46	0.695	1	0.017	46	1.036
2	0.999	47	0.682	2	0.035	47	1.072
3	0.999	48	0.669	3	0.052	48	1.111
4	0.998	49	0.656	4	0.070	49	1.150
5	0.996	50	0.643	5	0.087	50	1.192
6	0.995	51	0.629	6	0.105	51	1.235
7	0.993	52	0.616	7	0.123	52	1.280
8	0.990	53	0.602	8	0.141	53	1.327
9	0.988	54	0.588	9	0.158	54	1.376
10	0.985	55	0.574	10	0.176	55	1.428
11	0.982	56	0.559	11	0.194	56	1.483
12	0.978	57	0.545	12	0.213	57	1.540
13	0.974	58	0.530	13	0.231	58	1.600
14	0.970	59	0.515	14	0.249	59	1.664
15	0.966	60	0.500	15	0.268	60	1.732
16	0.961	61	0.485	16	0.287	61	1.804
17	0.956	62	0.469	17	0.306	62	1.881
18	0.951	63	0.454	18	0.325	63	1.963
19	0.946	64	0.438	19	0.344	64	2.050
20	0.940	65	0.423	20	0.364	65	2.145
21	0.934	66	0.407	21	0.384	66	2.246
22	0.927	67	0.391	22	0.404	67	2.356
23	0.921	68	0.375	23	0.424	68	2.475
24	0.914	69	0.358	24	0.445	69	2.605
25	0.906	70	0.342	25	0.466	70	2.747
26	0.899	71	0.326	26	0.488	71	2.904
27	0.891	72	0.309	27	0.510	72	3.078
28	0.883	73	0.292	28	0.532	73	3.271
29	0.875	74	0.276	29	0.554	74	3.487
30	0.866	75	0.259	30	0.577	75	3.732
31	0.857	76	0.242	31	0.601	76	4.011
32	0.848	77	0.225	32	0.625	77	4.331
33	0.839	78	0.208	33	0.649	78	4.705
34	0.829	79	0.191	34	0.675	79	5.145
35	0.819	80	0.174	35	0.700	80	5.671
36	0.809	81	0.156	36	0.727	81	6.314
37	0.799	82	0.139	37	0.754	82	7.115
38	0.788	83	0.122	38	0.781	83	8.144
39	0.777	84	0.105	39	0.810	84	9.514
40	0.766	85	0.087	40	0.839	85	11.430
41	0.755	86	0.070	41	0.869	86	14.300
42	0.743	87	0.052	42	0.900	87	19.081
43	0.731	88	0.035	43	0.933	88	28.635
44	0.719	89	0.017	44	0.966	89	57.286
45	0.707	90	0.000	45	1.000	90	INF

Not continued - Go to www.notabletrees.org.nz to register trees

Appendix (iv): Measuring the Volume of the Canopy and Root Spread

Abstract from STEM (Flook, 1996)

The Canopy

For coherence it is suggested that the shapes of trees can be broadly fitted into three mathematical volume formulae. For broadleaves a hemisphere is used. Conifers are measured as a cone and palms are measured as a cylinder. This does not mean that a conifer has to be measured as a cone (e.g., cryptomerias are rounded conifers). Instead, the most appropriate volume formula is applied to whichever form the tree takes. It is understood that some trees may not be a perfect hemisphere or cone. For example, the Amenity Evaluation Worksheet has a place for the description of the tree and also a place for entering the tree volume whichever volume formula is appropriate. This formula also allows for the drip line root protection and will include the tree's irregularities with some allowance for the future growth of the canopy. Work on orchard apple trees done in the USA used this volume canopy method for fruit production assessments.

“The volume of space occupied by the canopy of fruit trees provides a parameter to estimate potential yields, measure growth response to various cultural treatments, develop orchard plans and determine optimum spray application”. Miller & Lightner (1987, p.32).

For avenues or large groups of the same species it is suggested that a minimum of three trees be measured to find an average.

The Root System

The volume formula also helps in giving partial protection to the tree roots within the canopy spread at ground level. It is generally accepted that the drip line of trees covers the area in which most trees are particularly vulnerable and where the roots are substantial. This formula allows for the tree's drip line dimension to include some root protection that would be very important say for a Weeping Elm's well being. The volume formula appropriate for this tree would be that of a hemisphere (see Amenity Evaluation — Stature). Another example is a Norfolk Pine, measured from ground level to canopy as a cylinder, then added to the volume of the canopy measured as a cone.

The volume measurement is a method of quantifying the three dimensional stature of a tree. Root spread has to be encompassed for the tree's well being. The severing of any root, which is over 50 mm in diameter can cause serious damage to part of the tree's canopy.

Trees often have a wider root spread but at least some measure of consideration for the roots is achieved by using a volume formula.

The use of a volume formula to describe root spread also helps explain to building contractors on development sites why they should not place all their working materials and machinery under the tree's canopy. This area should be fenced off and the tree protected by a bond agreed at the time of letting the contract.

Volume Formulae

$$\begin{aligned} \text{Hemisphere} &= \frac{2}{3} \pi r^3 \\ \text{Cylinder} &= \pi r^2 h \\ \text{Cone} &= \frac{1}{3} \pi r^2 h \end{aligned}$$

where:

$$\begin{aligned} \pi &= 3.14159 \text{ (approximately } \frac{22}{7} \text{)} \\ r &= \text{radius of base circle} \\ h &= \text{height of cylinder or cone} \end{aligned}$$

Appendix (v): Accompanying Notes on Significance for the Registration Form

Stature

Feature Trees that qualify in this section are those that can be verified as having exceptionally large proportions. They would be of special visual interest due to their height, spread, trunk dimensions, unusual or sculptural shape e.g., windswept.

Form The tree would have to be recognised as an outstanding example of the species. This can also apply to groups of trees.

Historic

The Royal New Zealand Institute of Horticulture has a set of criteria for Notable and Historic Trees that have been developed since 1977. Trees can be registered that satisfy the definitions set out in the NZ Historic Places Act. It should be noted that any of the following attributes, if proven with written evidence, could qualify the tree for some legal protection. This is possible in cases where tree protection needs to be invoked for the reasons set out below.

Age To qualify under this sub-heading the tree would need to have an authoritative and well documented age of over 50 years.

Association Trees must have a well recorded association with a major natural or planned event, an eminent person, family or perhaps be known and revered for traditional or cultural significance.

Commemoration Trees that have been planted to commemorate an occasion would qualify under this criterion. This is particularly the case with early Arbor Day plantings or links with occasions of importance in New Zealand's history such as battles or treaties.

Remnant "...a trace or vestige" (Delbridge & Orsman, 1986).

This applies to remnants of native forest or exotic tree plantations e.g., some areas of Cornwall Park (One Tree Hill), Auckland. This section may give added weight to the outstanding merits of a tree because of its intrinsic value to a particular ecosystem. Points for proven importance to flora or fauna can also be awarded.

Relict "...a plant or animal species living in an environment which has changed from that which is typical for it" (Delbridge & Orsman, 1986).

This description applies when a tree exists in an environment which has changed from that which is typical for that tree species.

Note: The NZ Historic Places Act 1993, Clause 23, defines the Criteria for the Registration of Historic Places and Historic Precinct Areas. This could also be used.

Scientific

Source Trees that gain special recognition under "source" would gain points for their exceptional species qualities or generic derivation.

Rarity These trees need to have authenticated scientific documentary evidence of their rarity.

Endangered Trees in this category are assessed as threatened under the criteria developed by the International Union for the Conservation of Nature.

- Locally threatened
- Rare

- Endangered
- Threatened
- Critical

Discontinued - Go to www.notabletrees.org.nz to register trees

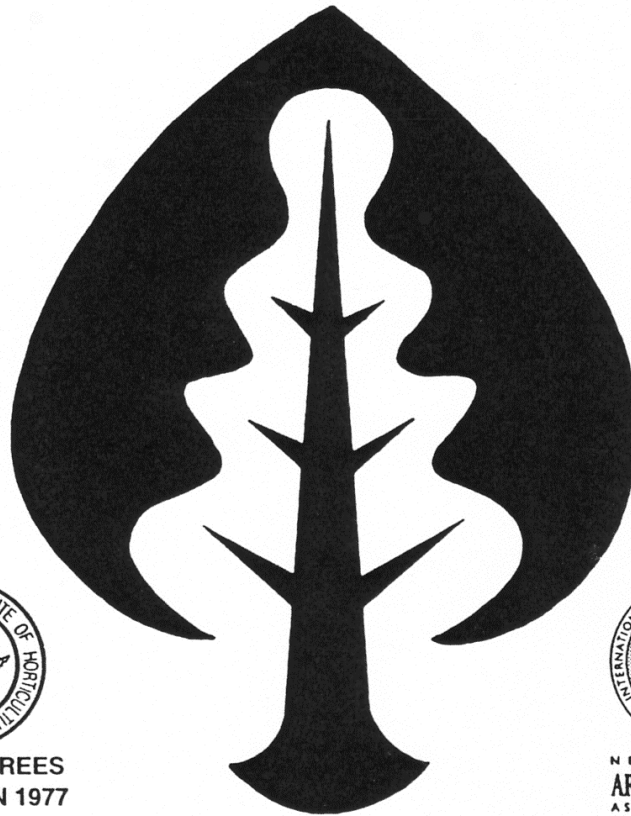
Appendix (vi): Plaque Design Examples



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PLAQUE SPONSORED BY RALPH BALLINGER OBE



NOTABLE TREES
FOUNDED IN 1977



NEW ZEALAND
ARBORICULTURAL
ASSOCIATION INC

NOTABLE TREE

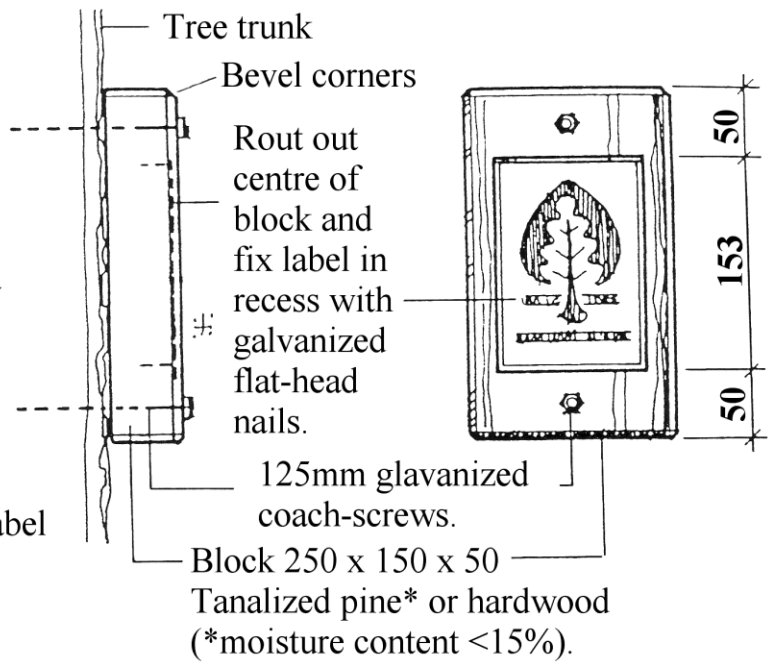
Ulmus americana
White elm Reg. 378 a
B. Allport & S. Shaw

Appendix (vii): Sketch of method for fixing plaques

Fix to block as shown and screw block to tree with galvanized coach screw.

As tree ages, unscrew screw a little to allow room for trunk-girth increase.

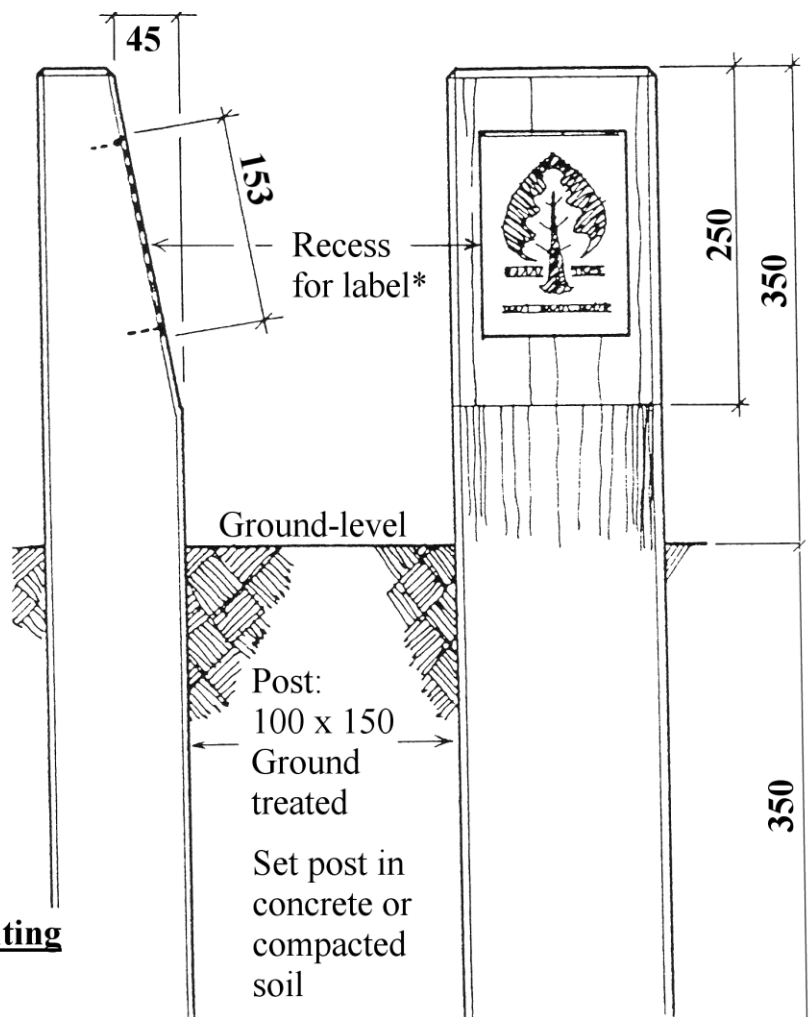
⚠ If timber is unseasoned allow 2mm each side of label for contraction of recess.



Fixing a plaque directly to a tree presents problems.

If the plaque is nailed loosely there is risk of theft: if nailed firmly there is, as the tree grows, a risk of inclusion with ultimate distortion and destruction of plaque.

These notes and drawings may help resolve these problems.



Suggested method of mounting label on post BESIDE tree

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Discontinued - Go to www.notabletrees.org.nz to register trees