Department of Landscape Architecture

Bachelor of Landscape Architecture

Studio LAND5021
Planting Design Handbook

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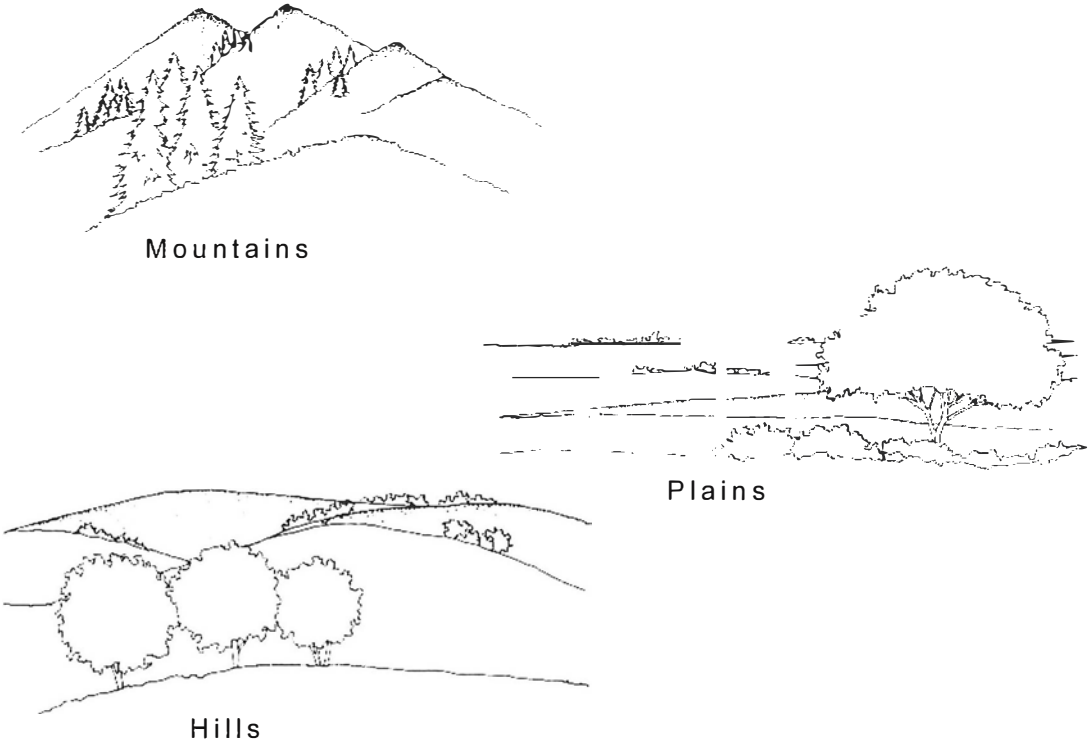
Introduction : Designing with plants

Planting design is central to the practice of landscape design, and today we start a series of sessions of different aspects of using plants in design.
Plants are the design material which give landscape designers their **unique** palette choices, different from other design professions.
In these sessions we will concentrate on designing with plants, but I'm sure you will make the strong connection with the importance of your Plant Files in giving you the opportunity to build up the resource base to have a wide choice of plant material with which to design.

FORM

Form is an obvious physical property to use in design. The most important aspect is the mature silhouette of the plant, but consideration should also be given to plant's intermediate shape as well, especially for slow growing plants.

- Most plant forms are rounded and more horizontal than vertical in shape. Since rounded forms are very common and are restful to the eye they are a good choice for mass framework planting.
- Rounded and horizontal forms are less dramatic than vertical and pyramidal forms which demand attention. These forms attract the eye and so should be used sparingly.
- The form of native plants usually follows the **shape of the terrain** so the predominant landscape form determines the usual form of the planting.



Plant forms tend to reflect the natural terrain of the area to which they are native. Good design calls for the use of these predominant forms to blend with the natural surroundings. [1]

- The form of a plant can be manipulated by pruning and training, but the designer must be sure that management will continue if this particular form is required.
- Silhouettes formed by a group of plants is the most important contribution of form to a composition. Form should always provide more than one function (shade, screen, windbreak, enclosure, production, as well as pleasing lines)

[1] Source: Hannebaum, L. (1981) *Landscape Design: A Practical Approach*. p.140

TEXTURE

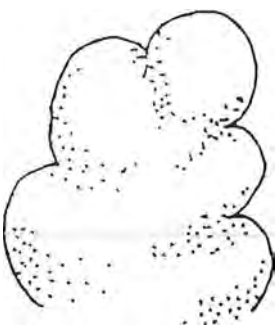
Texture is a very important element in planting design but is not usually well used. Textural effects are more subtle than colour effects but if used well create strong lasting impressions, and give long term enjoyment to the users.

In landscape design texture is a visual quality which can be defined in two ways as:

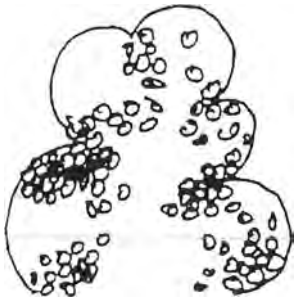
- the contrast of light and dark when viewing the plant (or other surface).
- the relationship between the size and interval of the visual components of the plant.

Stems, leaves, bark, branch structure & buds all determine the texture of a plant.

Textures may be broadly classified as fine, medium or course, but the terms are relative. A plant with large shiny leaves will catch light on the upper leaf surfaces but cast dark shadows underneath. This plant will be coarse in texture. A fine leafed plant will not produce such strong contrasts between light and dark and so is considered finer in texture.



fine



medium

coarse

Density and branching patterns also plays a part in determining the texture. A dense plant will appear less coarse since there is less shadow cast. A closely clipped hedge for example will appear finer in texture than the same plant growing wild, as the surface is more even. The plant's branching formation determines the distribution of the foliage thus determining the play of light and shadow.

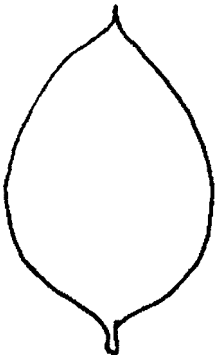
dense foliage appears fine textured

open foliage has more shadow and appears coarser in texture

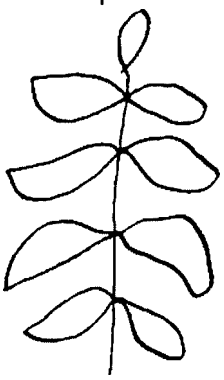
Texture & leaf shape

A simple leaf appears coarser than a compound leaf:-

simple

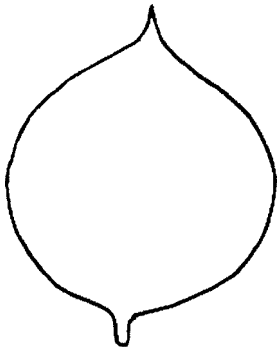


compound

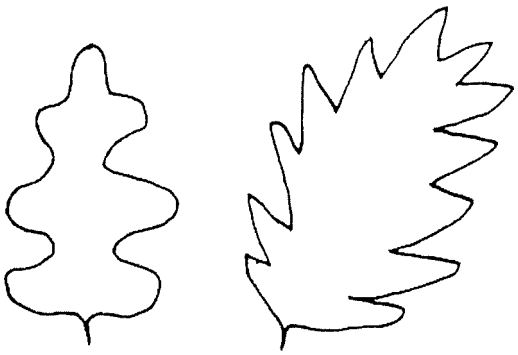


An entire or smooth leaf margin will appear coarser than an indented leaf margin:-

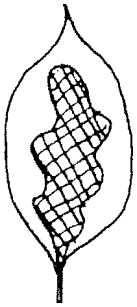
entire



indented



Variegations on the leaf surface will visually disrupt the leaf surface, making the leaf appear finer than the green form of the same plant:-



The distance from which plants are viewed also determines texture. The further away the viewer, the finer the apparent texture of the plant.

Texture in Design

Texture can be used to create particular effects, eg large leafed plants give a tropical effect. In the past, texture has been used in particular ways. In 17th century French gardens texture was less important than pattern - dramatic textural effects would only distract from the patterning. Texture, however, was very important in 19th century English gardens as well as in Californian gardens of the modernist period, and was used to best advantage.

The juxtaposition of one texture against another is of paramount importance to the overall effect. Designers should not consider the individual plants so much as the composition, ie, the placement of plants in relation to each other.

A good way to determine whether the textural composition is effective is to take a black and white photograph of the composition. This enables the composition to be read without the visual distraction of colour.

Principles of Planting Design

COLOUR

Some of the greatest gardens in the world are limited in the use of colour, some as much as to suggest that there is no colour at all.

Italian Renaissance	compositions in form and mass, light and shade
Versailles	flower colour in the parterres is entirely coincidental to the architecture and spatial concept.
English Landscape Gardens	space, plane & modelling. Green, stone and water.

Sir William Chambers was the first person to suggest grouping plants to form a patch of colour. This was brought to a fine art by Gertrude Jekyll

Today there is huge emphasis on colour (Garden Centre's "potted colour" and "colourwave" etc) but there is very little understanding or knowledge about it. The criterion seems to be 'brightness' regardless of what effect colours have on each other. Colour in foliage is also seen as an 'improvement' to 'mere' green - sold because they are a colour, rather than an improvement of the plant.

Colour.....

- can emphasise the architectural properties of a shape and can reinforce other design techniques eg focal points.
- is a strong unifying factor
- is an identifier (eg corporate colours - UNITEC green)

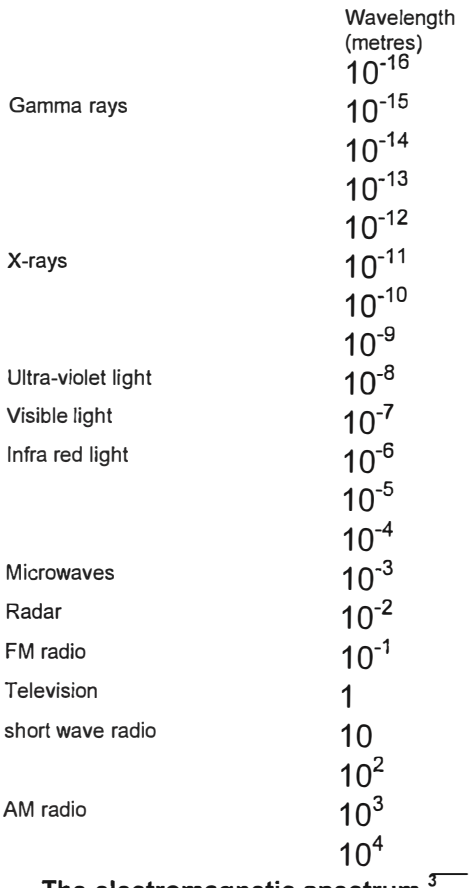
- is always noticed first and therefore it must be used with the greatest care.
- has both psychological and physiological effects on people

As colour has physical energy, the physiological effects that colour has on people is not dependent on their background (race, gender, education etc).

> *"One of the most striking features of the results concerning colour/mood associations is the consistency from one individual to another, from group to group and cross culturally... Monkeys have been compared to man, men to women, children to adults and laymen to architects. The results indicate either that our heritage is such that we learn correct responses or that there is some innate mood reaction to different colours".*[2]

Colour Theory

Radiation can be measured in terms of wavelengths, ie the distance between crests of the energy wave. The longer the wavelength the less energy it has. The electromagnetic spectrum comprises radiation from the universe ranging from radio waves (with very low energy), through to gamma rays (with very high energy).



The electromagnetic spectrum [3]
Only a very small portion can be seen by humans

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[2] Kuller, 1981 *Colour and Light in Man Made Environments.* Mahnke and Mahnke.
[3] Re-drawn from Zelanski, P & MP Fisher (1989) *Colour: for Designers and Artists.* The Herbert Press, London. P12

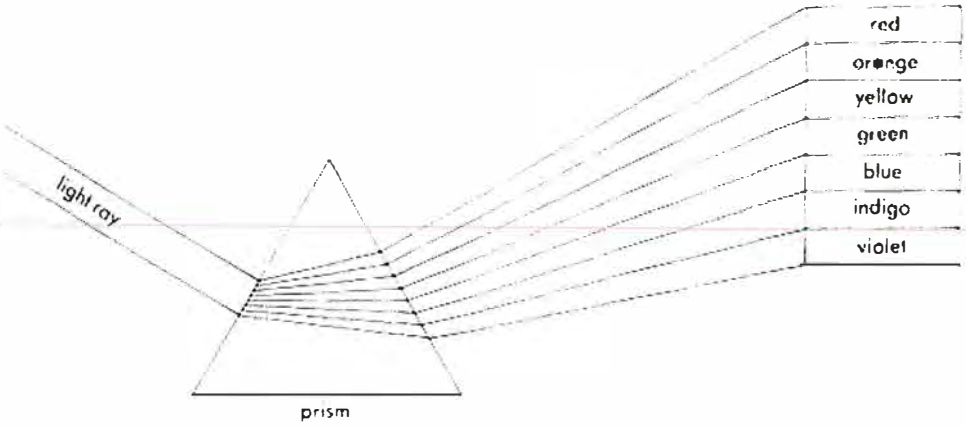
In the middle of the spectrum are the small range of waves which are emitted by the sun as light, these are infra red through to ultra violet.

infra red ← red → violet → ultra violet

human range *bees*

Only wavelengths red through to violet are visible to human eye. While humans can see this particular range, other animals and insects may see a slightly different range (eg honey bees see ultra violet but we do not, making their view of the world quite different).

We can prove that the sun's light is made up of different colours since white light can be broken up into its component wavelengths - each perceived as a different colour. This can be demonstrated by the use of a prism. As sunlight enters a prism, the light rays are separated and a spectrum of colours are emitted from the other side (making a "rainbow").



White light is broken into the colours of the spectrum by passing it through a prism[4]

When light strikes an object some wavelengths (rays) are absorbed and some are reflected.

- if all rays are absorbed we see black (absence of colour)
- if all are reflected back we see white

Usually a mix of colour rays is reflected back & thus we see a colour. The mix of reflected wavelengths determines the actual colour.

[4] Source: Zelanski, P & MP Fisher (1989) *Colour: for Designers and Artists*. The Herbert Press, London. P11

Terms to describe colour

Hue

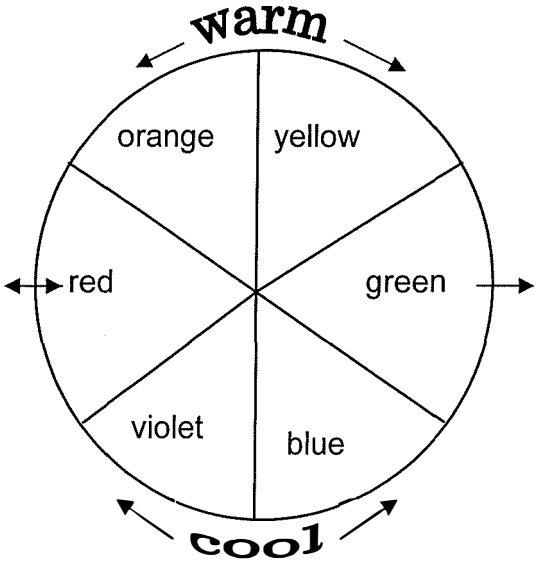
The quality we identify by a colour name eg red, yellow, brown, pink etc. It corresponds to the distinctive wavelength of a colour.
A pure hue is the colour without black, white (ie light or dark) or grey. It is rare in nature to have pure hues, and when they do occur, they tend to be used very sparingly.

Value (or Reflectance Value)
Indicates the amount of light reflected ie how light or dark the hue is. Small amount of reflected light = dark. The higher the value the lighter the colour.
eg red → pink
Also know as TINT or SHADE (tint = + white, shade = + black)

Intensity (or Saturation)
How bright (pure) the colour is ie how much hue it contains in proportion to its greyness. The greater the saturation the brighter the colour.
Also known as TONE, CHROMA or PURITY)

The colour wheel

Traditionally there are six segments to the colour wheel. There are three primary colours: yellow, blue and red. When two primary colours are mixed, they form a secondary colour – these are green (yellow + blue), violet (blue + red) and orange (yellow + red).



Complementary colours - opposite colours on the wheel (eg green and red are complementary colours)

Harmonising colours - adjacent colours on the wheel – they share a hue eg yellow & orange are harmonising colours - both contain yellow (orange is made from mixing red + yellow)

Contrasting colours - share no hues

The colour wheel can be divided into two distinct halves: warm & cool. Gertrude Jekyll divided the colour wheel down mid point of red/green. (ie red & green have the capacity to be either cool or warm - scarlet, which contains yellow, is warm, but crimson, which contains blue, is cool).

Colour harmonies

Monochromatic Harmony

Consists of one pure hue with its variation in value and intensity (ie tints, tones & shades) eg from red to pink (tint), yellow to mustard (tone), blue to navy blue (shade). To avoid an insipid or monotonous effect maintain strength or intensity of hues

Adjacent Harmony

Combines two or three neighbouring hues on the colour wheel.
An axis bisecting the green and red segments creates the simplest choice of harmonious schemes - crimson/violet/blue/green - all sharing a blue pigment. Scarlet/orange/yellow/yellowish green - all sharing a distinct yellowish bias. Harmonies of shared pigment colour follow natural laws and require no focal adjustment.

Complimentary Harmony

Combines two colours opposite each other on the colour wheel eg blue and orange found in *Strelitzia* (Bird of Paradise)

Triadic Harmony

Uses three hues an equal distance from each other on the colour wheel.
eg all the primary colours, red - blue - yellow.
More difficult to use. Again balance is important and less intense (ie greyer) forms of the hues are easier to use.

Polychromatic Harmony

A wide sweeping harmony using many colours together. A multicoloured colour scheme is harder to make successful. Soft hues, either of high value (ie lighter) or lower intensity (ie greyer), are easier to bring to harmony than strong ones.

Colour and the human eye

The eye registers 4 colours distinctly: red, yellow, blue and green, each giving a unique sensation. Orange (red and yellow) has no such individuality. Same with violet (red and blue).

Our eye sees green the easiest, it is the eye's natural focal point - other colours require the eye to re-focus. Because of the focal length change colours appear to either come forward or to recede.

Red	comes forward
Green	"restful"
Blue	recedes

This fact enables designers to trick the observer, changing apparent distance and dimensions. For example blue located at the end of a vista will lengthen the distance from the viewer while red or yellow located in the same place will foreshorten the distance.

While it is important to be aware that these effects can be unpredictable due to light qualities changing the relationships between colours, it generally tends to work.

Colours change in appearance depending on a number of factors. These include:

- the colour the eye saw before (successive contrast)
- the colour next to it (simultaneous contrast)
- the texture and form of the surface
- the quality of light (time of day, season, weather patterns etc)
- the quantity (colours appear stronger in large areas)
- the reflectivity of the two adjoining colours

Successive Contrast

The eye which has been staring at a given colour has a tendency to evoke an image of it's complementary. If you stare at a colour, then at a blank sheet of white you see the complementary of the colour you have been looking at. ie red evokes green and violet evokes yellow etc. This can take 20 - 40 seconds.

The complementary colour is the easiest transition for the eye as if it is almost expecting to see that colour next.

Simultaneous Contrast

This is an optical phenomenon that needs to be considered when creating a colour scheme in the garden. When 2 colours are side by side and effect each other (this effect is immediate). Each colour is tinged by a new colour. A colour is tinged with the complementary of the colour it is next to.

Example - blue next to yellow

- blue is tinged with violet (complementary of yellow)
- yellow is tinged with orange (complementary of blue)

The colours are driven further apart, or made as different as possible from one another.

If the pair is already complementary it will intensify the contrast, for example red and green or blue and orange. Their contrast is exaggerated.

White and grey

- colours retain their purest hue next to white, but the colour loses saturation (ie becomes less bright). Colours are brightest next to black.
- blocks of white tend to give visual “holes” in the composition
- grey reflects all light but less strongly than white
- grey accents the purity and brightness of adjacent flowers (the grey leaves are tinted with the complementary of the colour they are next to)
    - pure hues are more vivid
    - pale pastel tints brighten

Reflectivity

If a light (high reflectivity) and dark (low reflectivity) colour adjoin, the light area encroaches on the dark, so the light area appears larger.

Gender and colour perception

Consider this passage from Nori and Sandra Pope's book *Color by Design* (1998, p 11)

> *"The human eye contains two kinds of receptors: rods respond to light or darkness; cones are sensitive to color and detail. Men's eyes have more rods, a thousand times more sensitive to light than cones, so men wait for low light, often seeing better in the dark. With a plethora of cones, women may stumble in the dark but are better able to respond to the subtle blush of a rose. It doesn't stop there. Men and women process the information that comes in through their eyes differently. Women store visual information on both sides of their brain, men on one side only; this gives men better depth perception, but at the price of color recall, which is easier for women. Ten percent of men are functionally color blind, and almost none have the selective capacity of a women's eye, well trained."*

Colour and light

Our perception of colour changes with the quality of the light. The quality of light depends on where you live. It also changes over the course of the day and with the season.

- Bright sunlight tends to "yellow" all flower colours. In fierce midday sun even vivid colours fade so really bright colours are needed to get strong colours.

- In temperate and cool climates colours tend to glow more. English light makes everything pearly and soft. Translating European ideals to NZ can be very difficult as the quality of the light is different, and colours can become garish.

- In shade, flower colours tend towards violet - the opposite to the yellow of sunlight. Deep reds, blues and greens are more easily subdued by shade than whites, yellows and pastel colours, making them more brilliant by contrast.

- Artificial light has different wavelength components therefore the colours will change
    - fluorescent light has a blue cast
    - Incandescent has a yellow cast.

Green Foliage

Green is a secondary colour made up of yellow and blue, and often one of these colours predominates.

The exact shade of green should be selected with care, and consideration given to what it is to be combined with. For example, the yellow-green of tarata (*Pittosporum eugenoidies*) won't combine as well with the grey-green strap-leaves of rengarenga (*Arthropodium cirrhatum*) as it will with the darker green of taupata (*Coprosma robusta*) or the dark, blue-green, of a clipped totara (*Podocarpus totara*) hedge.

Foliage plants play an important role in establishing the garden's framework or 'bone' structure. The organisation of green can provide unity through repetition or visually link together different portions of the design. Darker greens provide a sense of solidity and weight to a design and are excellent for forming a garden's framework. They tend to be better as a base material than lighter or yellow greens, as they tie the composition to the ground (darker colours have more visual weight than lighter ones, so are better 'foundation' plants).

A green foliage framework also provides an excellent backdrop to display other colours and forms. Dark green hedges are perfect for this display which are why they are used so frequently. For example the success of the garden at Sissinghurst completely depends on the framework of green hedges which define space, tie the garden together, and act as a backdrop against which flowering plants are displayed. The stronger the green framework, the more latitude you have when experimenting with colour.

However, the addition of colour is not strictly necessary. A balanced composition solely of green, which capitalises on well-composed texture and form, without the distraction of colour, can be deeply satisfying (for example, Italian renaissance gardens).

References:

Designer's Guide to Color. Angus & Robertson, (UK). 1994.
Hobhouse, P. 1985. *Color in Your Garden*. Little, Brown and Company, Boston.
Johnson, H. 1979. *The Principles of Gardening: The science, practice and history of the gardeners art*. Mitchell Beazley. London.
Pope, N & S. 1998. *Color by Design: Planting the contemporary garden*. Soma, San Francisco.
Zelanski, P & MP Fisher (1989) *Colour for Designers and Artists*. Herbert Press, London.

DESIGNING WITH PLANTS

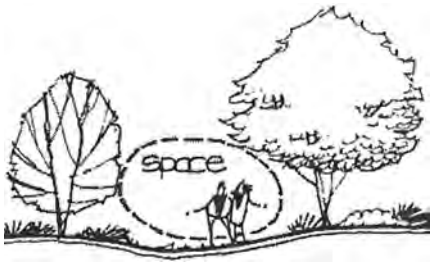
Reading:
Clouston, B (ed) (1990) *Landscape Design with Plants* Second edition.
Read: Chapter 4. Jacobsen, P "Shrubs and Groundcover" (Incl. in this Handbook.)

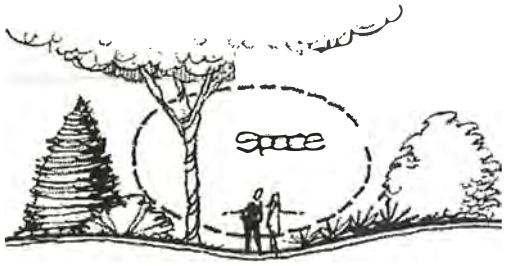
When plants are included in a design they are usually fulfilling more than one function. While plants are generally selected for their aesthetic qualities and used for the formation of space, they are by no means limited to this. Plants have a wide range of applications in both the architectural and engineering areas as well as use in climate modification. Uses in these areas include:

Architectural uses

- plants as walls, ceilings, floors. ie room making, space articulation.

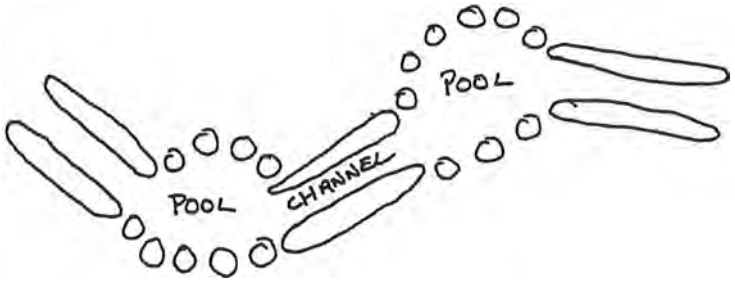
Trees can be used to create walls and ceilings in outdoor spaces.



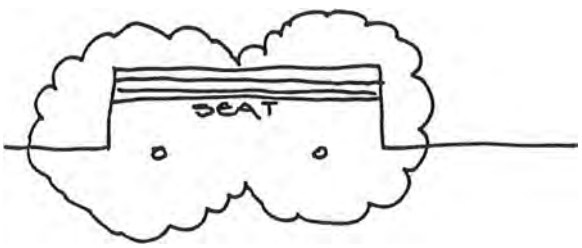


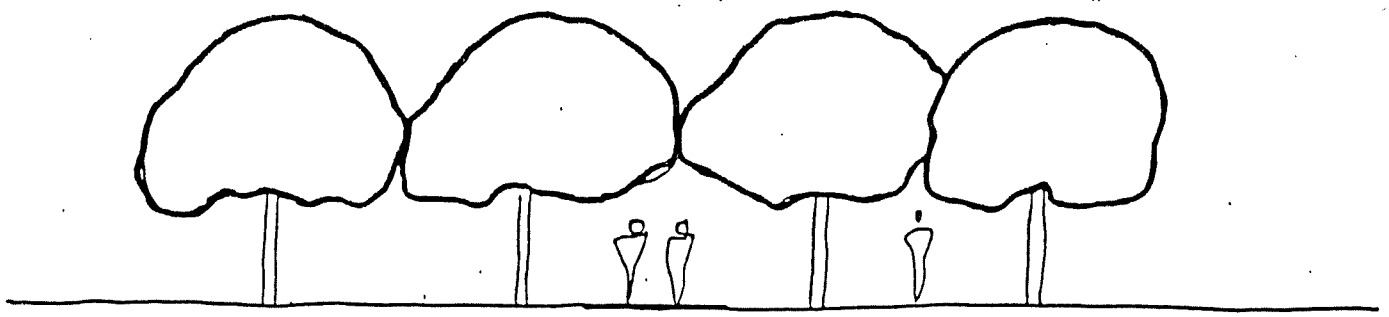
Source:
Booth & Hiss (1991) p 305

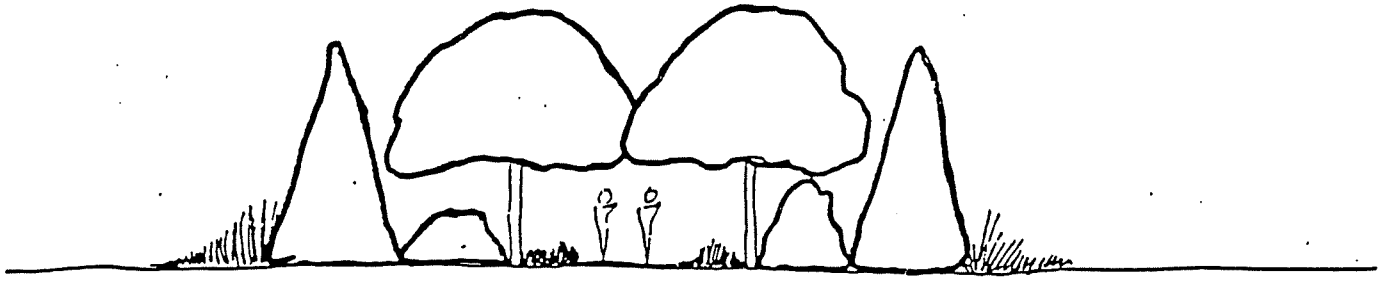
- direction - pooling and channelling

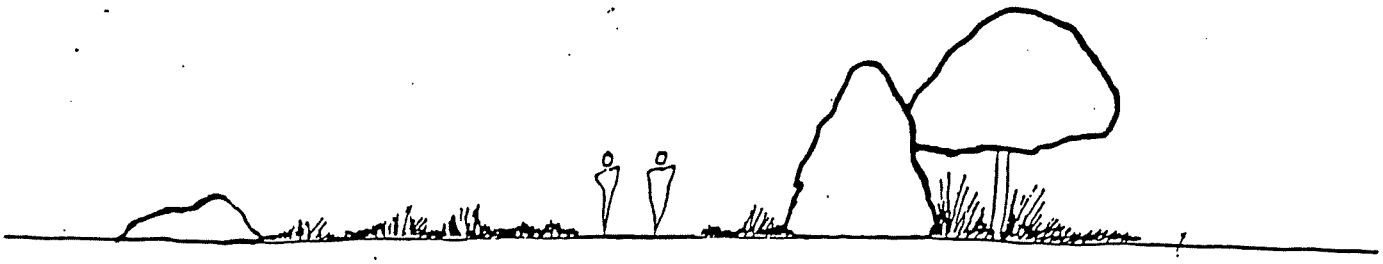


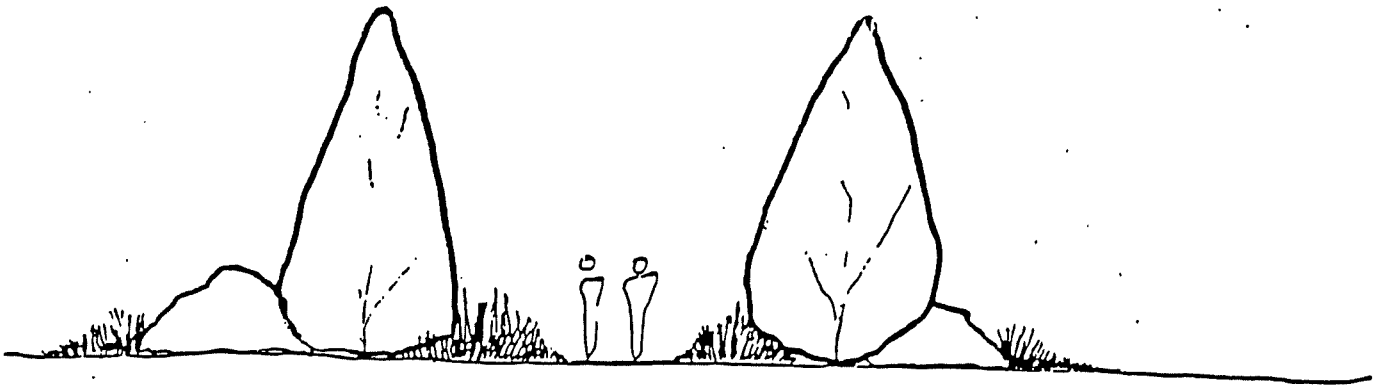
- enclavement

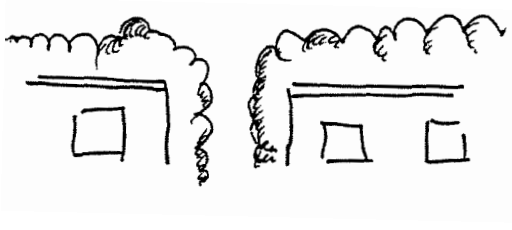




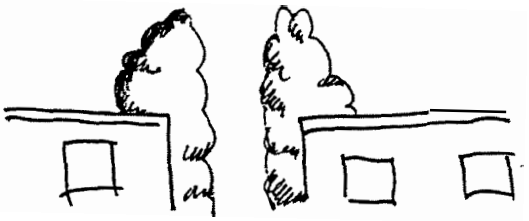




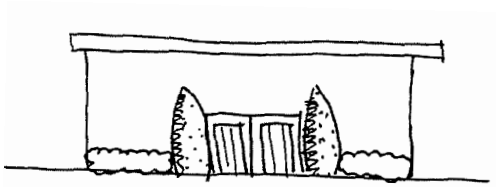


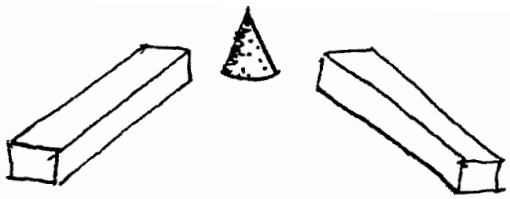


- enlargement

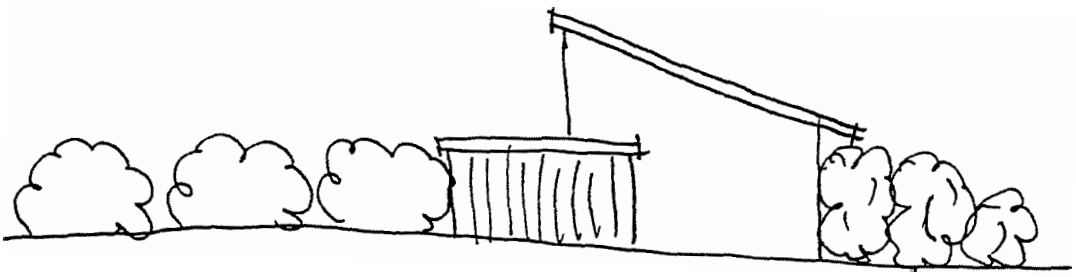


- reduction



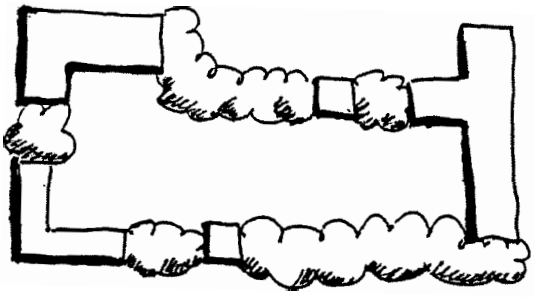


- emphasis



Carry lines of architecture out into the landscape

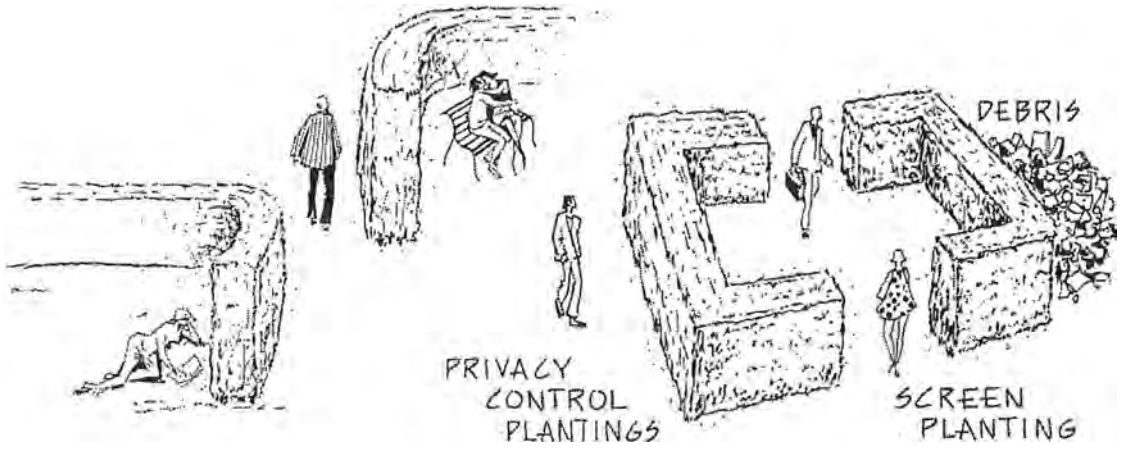
- compliment



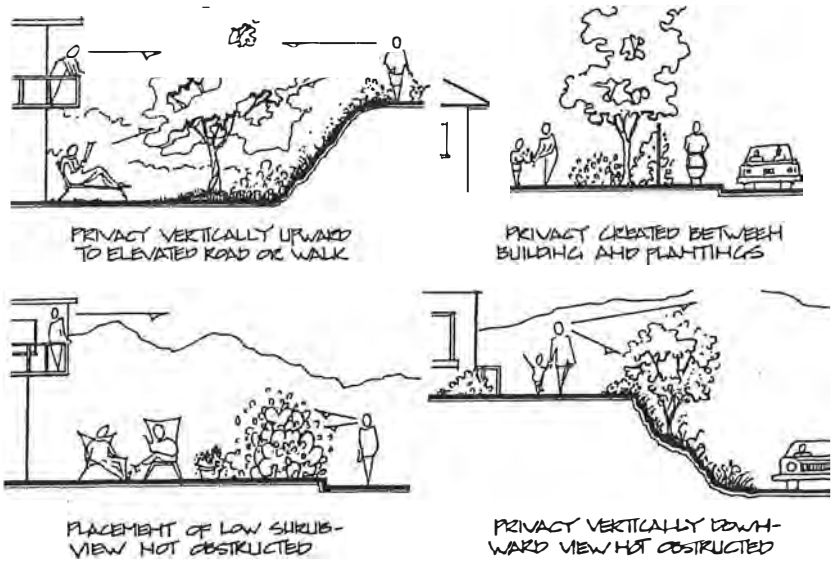
- linkage

- framing

- screening and privacy control
- enclosure
- progressive realisation (screening and revealing)



Privacy is created through visual control. Source: Carpenter & Walker p 158



The effectiveness of plant screens for privacy will be determined by plant size in relation to terrain. Small plants will block a view uphill without obscuring a view from above. Taller plants may be needed for complete screening, which may increase the time needed before the screen matures fully.

Source: Carpenter & Walker p 160

The landscape experience can also be controlled through the use of:

- **pivot points** - the observer is physically and visually forced to change direction
- **tension points** - space is narrowed down or constricted before opening up and expanding into another space
- **bridging points** - balanced tension used to indicate a change in the landscape

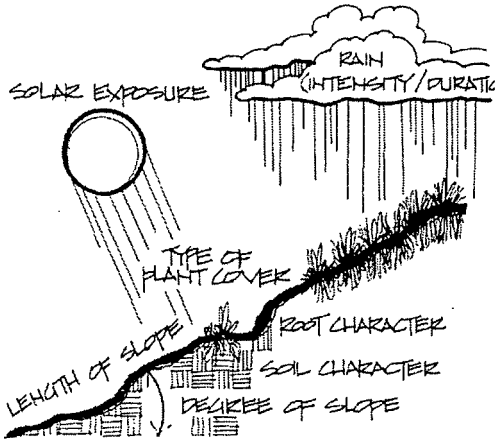
(See reading *Shrubs and Groundcover*, as above, for illustrations)

Functional uses

- **erosion control** - Severity of erosion depends on the climatic conditions and the gradient of the slope etc. Erosion may be controlled by planting. Plants influence the infiltration water into the soil by reducing the impact of rain hitting the soil giving the water more chance to infiltrate. The better

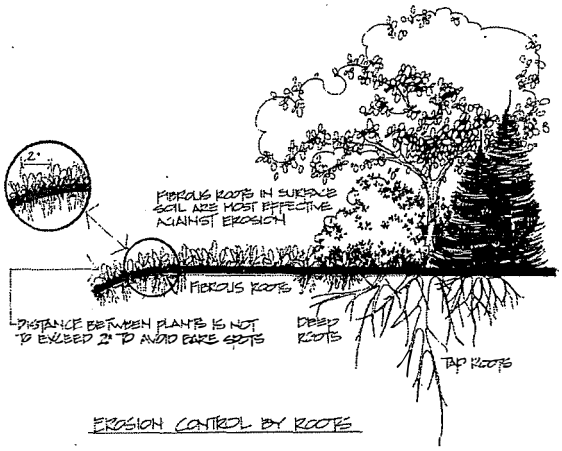
the infiltration the less run-off occurs. Plant roots also hold the soil together.

Many factors influence the extent to which an area can be eroded. Plants are the best form of erosion control



EROSION FACTORS

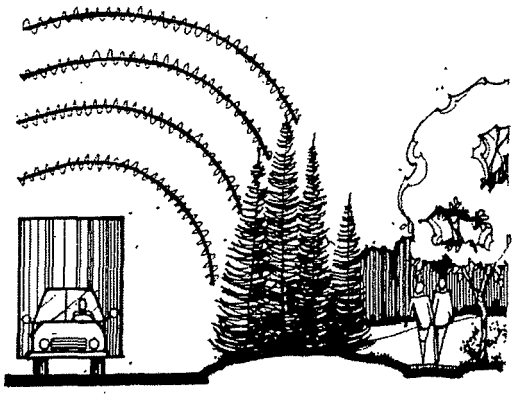
A plant density that leaves no bare spots is essential for protection against erosion.



Source: Carpenter & Walker p169

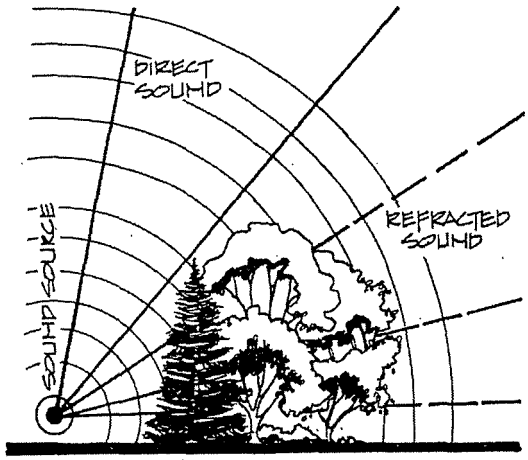
- **sound control** - Plant material will reduce noise considerably by scattering and reflecting the noise waves so that the waves lose intensity. To be effective the planting needs to be closer to the source than the listener. The planting needs to be 7m wide or greater to be effective. The type of trees used is important as different woods effect different frequencies. Plant material mainly effects the higher frequency noises. It should be noted that the psychological effects of planting on noise reduction are often more important than the actual effects in most cases, and shouldn't be underestimated (a case of what the eye doesn't see the ear doesn't hear!).

In flat terrain wide plantings on mounded strips are needed to provide satisfactory noise control



Source: Carpenter & Walker p166

Mixed plantings give better sound attenuation than plantings of a single species. Deciduous materials, however, are not effective during the winter months.



NOISE SCREEN

- **atmospheric purification** - Some plants are more tolerant than others to high levels of pollution. Plants will clean the air to a certain extent in the following ways:

  Oxygenation - the plant supplies oxygen to the air so heavily polluted air has more oxygen (dilution)

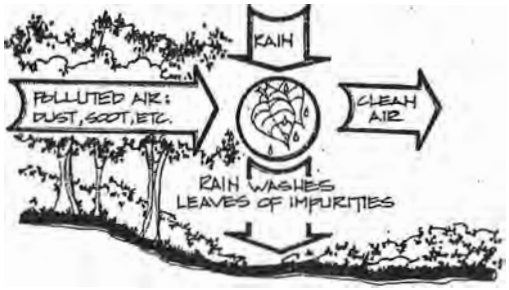
Absorption - some plants have the ability to absorb harmful substances which may either be stored in the leaves or converted into harmless substances. Deciduous plants can be less sensitive than evergreen plants since leaves containing toxins are dropped in autumn, reducing toxic build-up in the plant.

Trapping - some plants trap pollution from the air on their leaf surfaces. pollution then gets washed off when it rains (especially true for dust type air pollution).

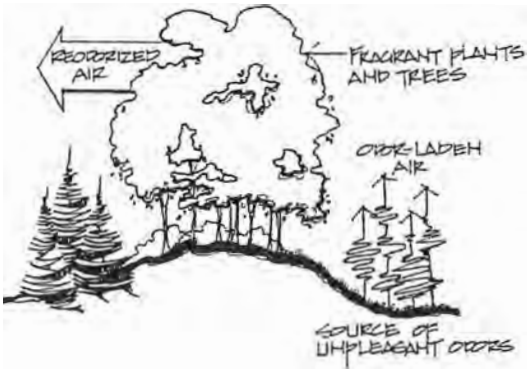
Odourisation - mask any unpleasant smells of po lutant with own scent.

take into account win / weather patterns

Plants serve a function by filtering and re-odorising air thus, they have the ability to lessen air pollution.



FILTRATION/AIR CLEANSING



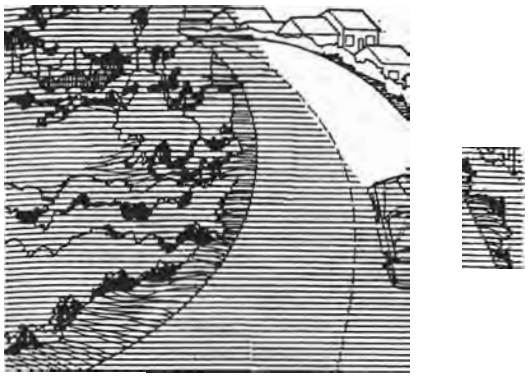
REODORIZATION

Source: Carpenter & Walker p168

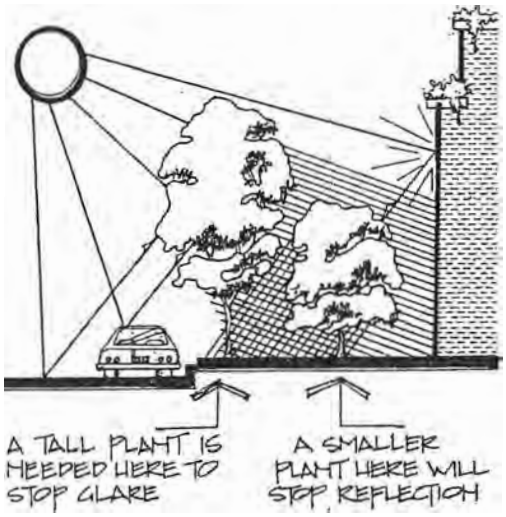
- **pedestrian traffic control/vandal resistance** - Use of dense or prickly plants to keep people to the paths & prevent short-cuts.

- **glare and reflection control** - median strip planting on motorways and next to motorways stops glare of on-coming headlights. Also on streets to prevent lights shining into houses. Plants can also be used to prevent reflection from water, cars and other shiny surfaces.

Plants can be used to screen against moving lights on a highway, for the comfort of residents near it.



Trees of varying heights help reduce glare from paving and building surfaces, making pedestrian and vehicular traffic more comfortable.



Source: Carpenter & Walker p153 & 155

Climatic modification with plants

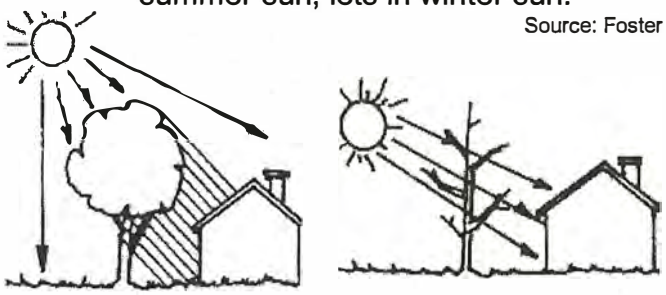
The major elements of human comfort are:

* radiation
* humidity or precipitation
* temperature
* wind

- **Radiation** - Plants can control solar radiation (shade): Canopy gives protection from direct sun and also provides cooling from transpiration.

A strategically placed deciduous tree keeps out summer sun, lets in winter sun.

Source: Foster p15



Summer Sun Winter Sun

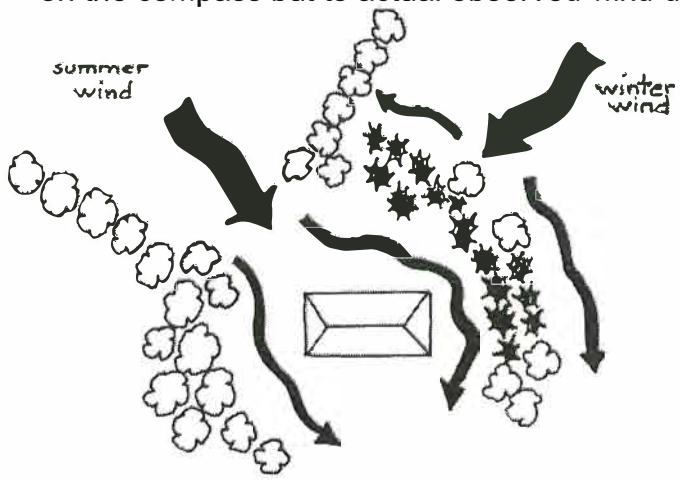
Precipitation control - Plants can influence precipitation by intercepting rain, reducing the intensity of the water drops hitting the ground (decreasing erosion and increasing infiltration rate). Plants also absorb a certain amount of the rain, increasing humidity. Plants also collect fog & dew in leaves where there is little rain. Plants can control snow drifts.

- **Temperature control** (temperature is a result of solar radiation, wind, precipitation). Temperature is reduced as a result of transpiration. Vegetation reflects radiation rather than absorbing it (like concrete does) so they don't heat up. It may be up to 25°C cooler in the bush than in the open.

- **Plants for wind control**

Winter protection screen. Summer collecting funnel. Because the exact direction of wind for each location is variable, wind screens and funnels are not oriented to points on the compass but to actual observed wind direction.

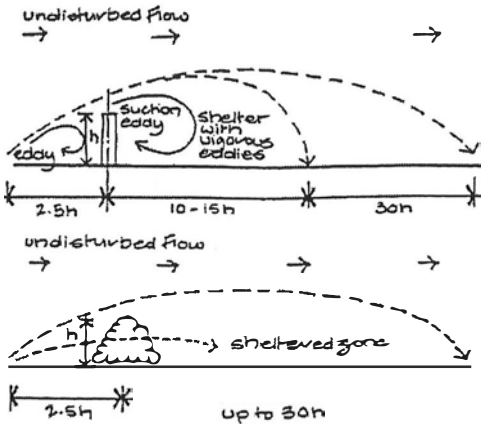
look at dir. of plants in surrounding site ascertain

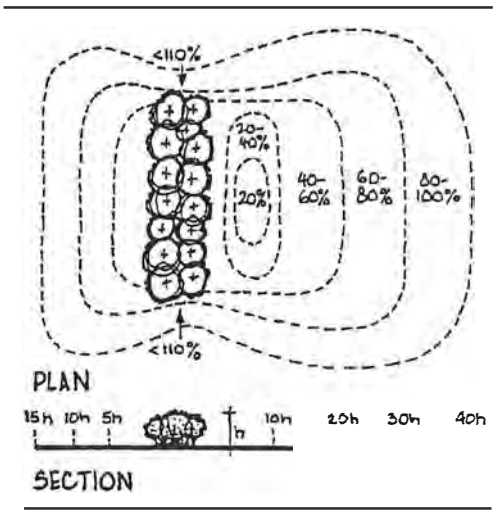


Source: Foster p29

⇒ obstruction (to block cold winter winds)

⇒ deflection and guidance (to channel in summer breezes)





⇒ filtration - wind velocity can be reduced with a semi-permeable wind break giving protection to a distance of 30 times the height of the shelter. Solid shelter creates eddies and offers less wind protection.

Aesthetic uses

- positive and negative aesthetic elements (positive element is where the plant itself is noticed; a negative element is where the plant directs the eye to something else.)

- two dimensional
  - ⇒ shadow
  - ⇒ silhouette
  - ⇒ reflection (in water)

- three dimensional
  - ⇒ sculptural qualities
  - ⇒ textural effects
  - ⇒ colour
  - ⇒ dynamic characteristics (change over time & with seasons)
  - ⇒ visual control
  - ⇒ perspective control
  - ⇒ unify
  - ⇒ attract
  - ⇒ scale
  - ⇒ mood
  - ⇒ sound
  - ⇒ scent
  - ⇒ touch

References:

Booth, N & J Hiss (1991) *Residential Landscape Architecture*. Prentice Hall, New Jersey.
Carpenter, P & T Walker (1990) *Plants in the Landscape*. Second Edition. Freeman, New York.
Foster, R (1978) *Landscaping That Saves Energy Dollars.* David McKay, New York.

PLANT SELECTION AND COMPOSITION

The choice of plant material will depend on a combination of the following:

- function
- aesthetics
- physical constraints
- theme
- the three dimensional effect required.

Once the basic physical use parameters are determined, the next issue to consider is the effect to be created, ie what theme is there?

All the plants selected for a design should contribute to the overall theme. This must be done in sympathy with the architecture, site and location. There may be more than one theme which is appropriate for the site, but generally the designer should limit themselves to one.

One of the easiest ways to identify a theme of planting and to determine which plants work well together is by looking at natural plant associations.

Plant Communities

In nature plants tend to be arranged in definite communities eg forest, swamp, grassland etc. Most environments support groups of species associated together in such communities. These communities can be large or small, simple or complex.

In their undisturbed state communities are comparatively well defined, stable and easily distinguished.

The main factors affecting the composition of a community are:

1. **Soil factors** - eg type of soil, air/water levels in the soil, humus and mineral levels.

2. **Climatic factors** - eg duration and intensity of sunlight, air & soil temperatures, wind, rainfall, humidity.

3. **Biotic factors** - effects of the pressure of other living things eg grazing animals, insects, birds, other plants, humans and their actions.

An alteration in any of these factors produces an alteration in the structure of the community.

Some major vegetation types in New Zealand include:

- Coastal
- Forest
- Lowland shrub

- Grasslands
- High mountains
- Inland water, swamps & bogs.

In garden terms these habitat groupings translate into slightly different community categories such as:

- Sub-tropical (wet)
- Sub-tropical (dry)
- Xerophytic (hot or cold)
- Shady
- Wet
- Alpine
- Coastal etc

Plant Selection

In order to grow plants successfully in a garden one of two approaches may be taken:

1. reproduce as nearly as possible the particular conditions under which the plants grow naturally
2. select plants suited to the particular environment into which they are to be placed

The latter approach is generally more reliable and less resource intensive.

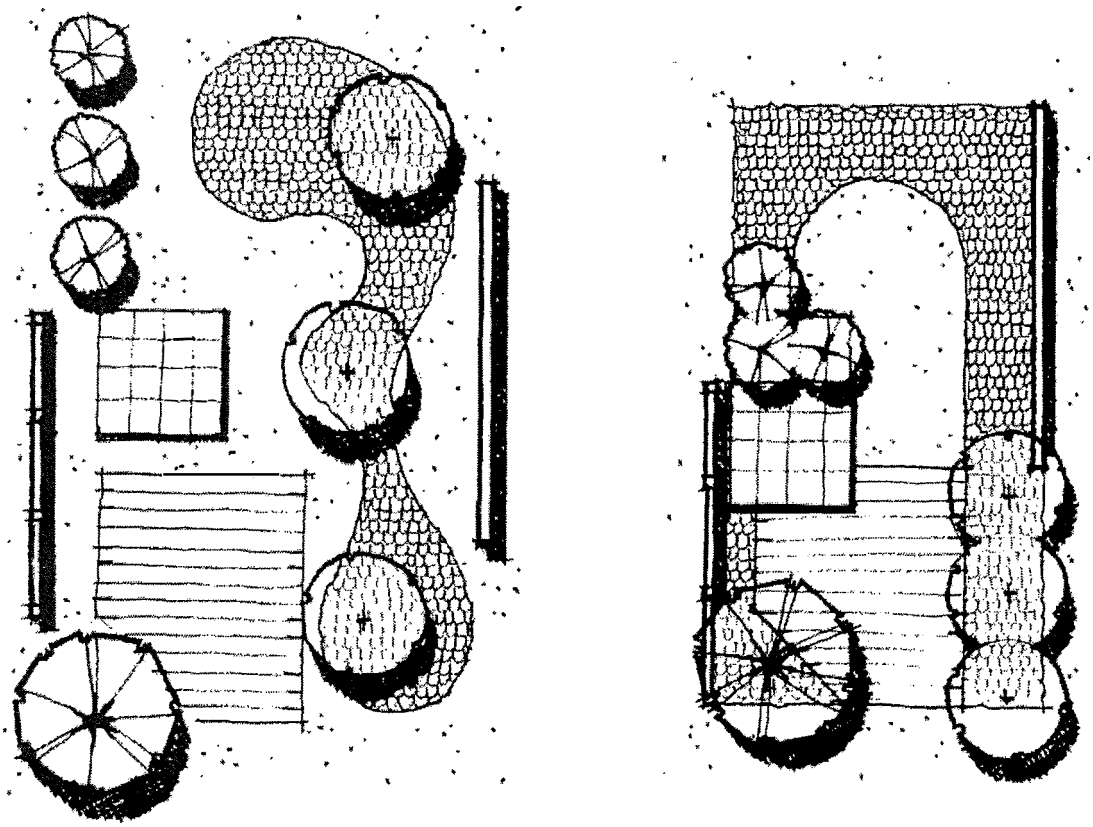
Which ever method (or combination of methods) is selected it is important to ensure the plants chosen flourish, and are consistently reliable over time.

Plant Composition

Colour, form and texture are the main characteristics a designer works with. These can be composed in terms of:

- variety
- repetition
- balance
- sequence
- scale
- emphasis

The ultimate goal being unity



No! Yes!

Order is created in the landscape when design elements are massed together

Source: Booth & Hiss (1991) p 214

Line is also an important factor to consider. Line is a basic design tool to create or control patterns. Lines become edges or boarders, lines can direct the attention of a viewer to points of interest. Lines can control both physical and visual movement, in straight or curved directions. Different kinds of line are created depending on the plant used eg a hedge will have a different effect to a row of trees.

Units of composition

The main compositional groupings include:

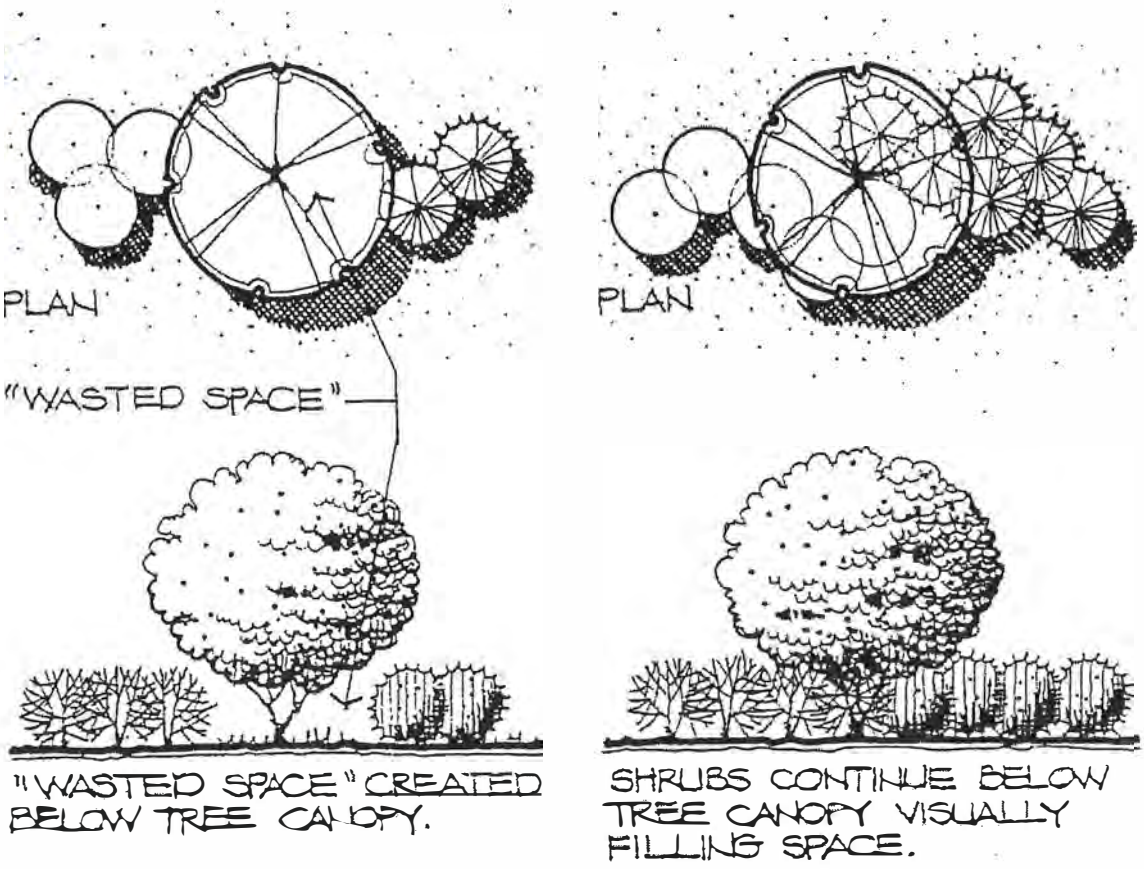
- Single plant compositions
- two plants - 1:2 relationship
- 3 plants - consisting of:
  - dominant
    - ⇒ usually taller
    - ⇒ stronger texture, form or colour
    - ⇒ could have a strong branching pattern
  - co-dominant
    - ⇒ generally lower
    - ⇒ more of them
  - subordinate
    - ⇒ generally groundcovers
    - ⇒ lots of them
- More than three plants (terminology varies depending on the author)

Plant grouping

Some commonly accepted guidelines for grouping plants include:

1. Use odd numbers of one plant species (1,3,5,7)

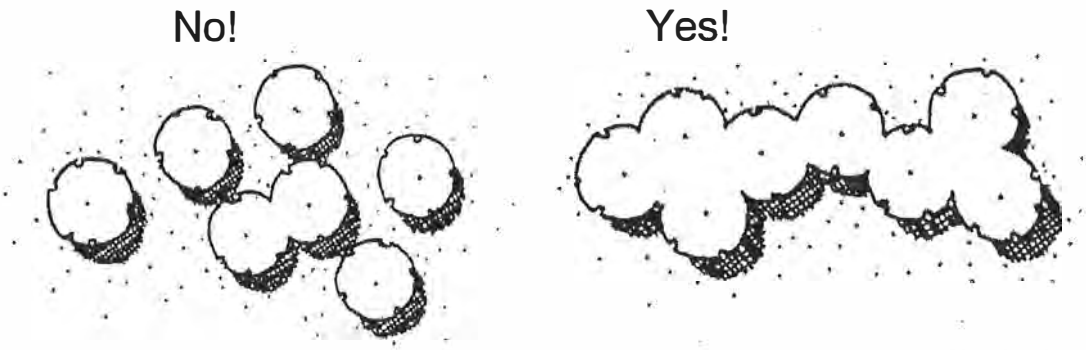
2. Cover the ground



Source: Booth (1983) p 124

3. Asymmetrical staggering (rather than straight lines) for mass planting

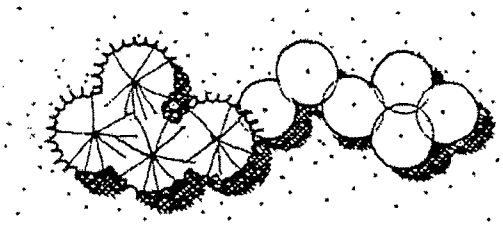
4. Mass plants - don't dot. Maximise plant interface



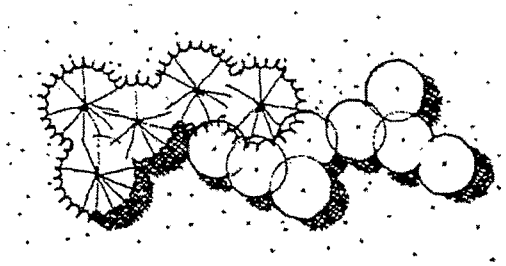
Individual plants in composition are scattered & 'spotty'

Individual plants in composition are massed together

Source: Booth (1983) p 122



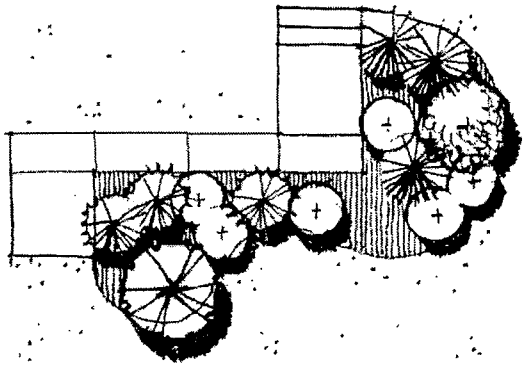
Masses of different plant material merely touch one another



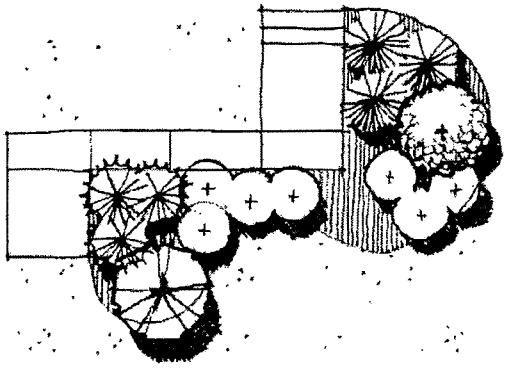
Masses of different plant material overlap & maximise interface between each other

Source: Booth (1983) p 123

5. Plant in well-defined beds
6. Avoid acute angles in planter bed design
7. Group evergreens together to unify rather than break up composition, and group like-plants together within masses.



Similar plants are separated within the masses - less order



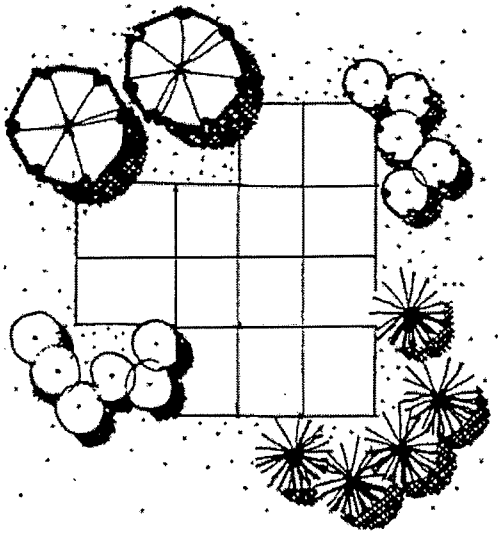
Similar plants are grouped together within the masses - more order

Source: Booth & Hiss (1991) p 215

8. use plant material to reinforce ground plane forms

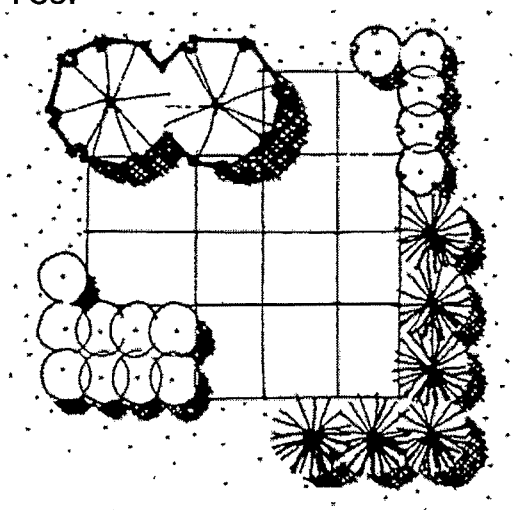
Plant material is poorly co-ordinated with ground plane forms

No!



Plant material relates to and reinforces ground plane forms

Yes!



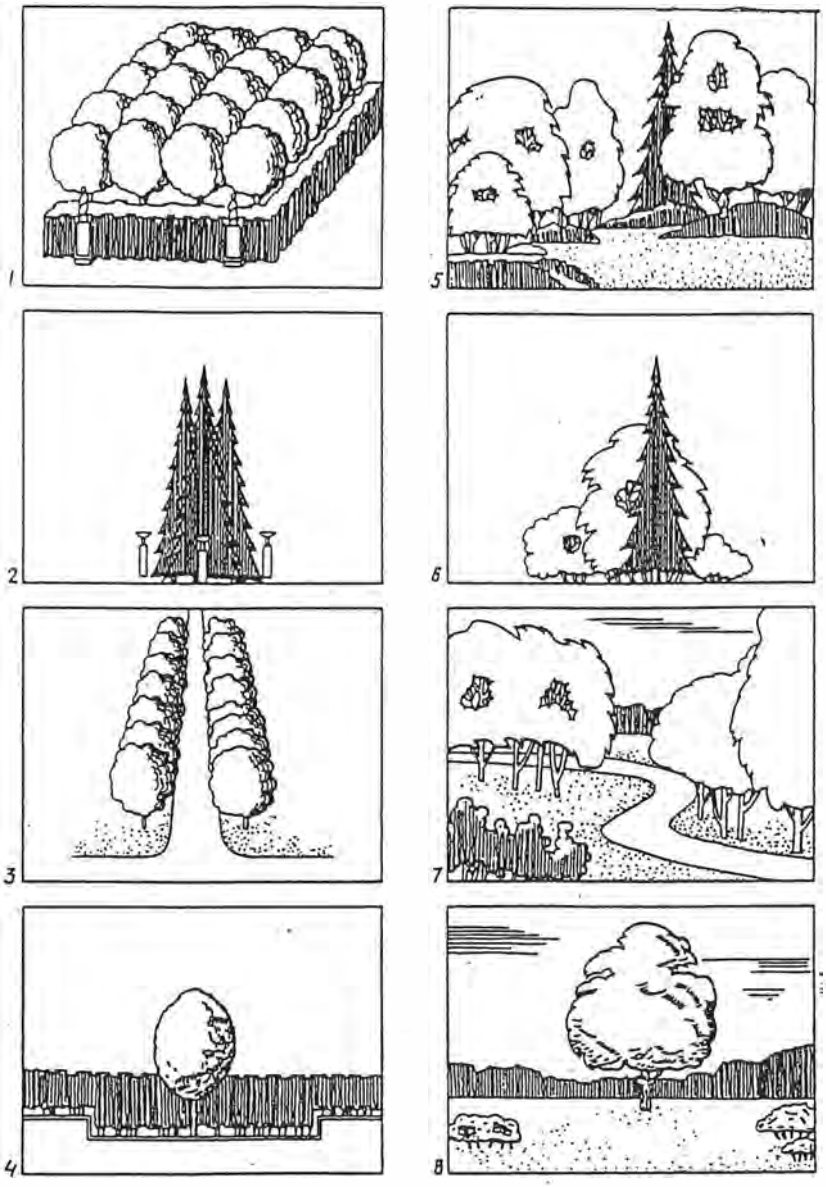
Source: Booth (1983) p 125

References:

Booth, NK & JE Hiss. (1991). *Residential Landscape Design.* Prentice Hall, New Jersey.

Booth, NK (1983). *Basic Elements of Landscape Architectural Design.* Waveland Press Illinois (Re-issued 1990)

Carpenter, P, T Walker & F Lanphear (1975) *Plants in the Landscape.* W H Freeman San Francisco. Chapter 8



Elements of landscape compositions

A: Formal:

1. Bosquet
2. Group
3. Alley
4. Solo tree

B: Informal:

5. Massif (forest, grove, bushland)
6. Group
7. Alley
8. Solo tree

I. Bogovaya, L. Fursova (1988). Landscape Art, Moscow, p. 136

PLANTING PLANS

The Planting Plan

A planting plan gives details of the specific plants which are to be planted in a landscape design, how many of each species are to be planted and where they are to be located. It is a *technical* drawing, and as such, uses a different set of graphic techniques than required for a concept plan. Planting plans do not 'sell' the design. They are *instructions* and should be treated in the same way as other construction drawings ie be as clear and unambiguous as possible.

Drawing a Planting Plan
Planting plans are drawn to scale and show the *outline* of the landscape features to orient the viewer. Paths, planters, lawn and paving etc. are included, but drawn in a simplified manner. There is no need to include detail such as paving patterns. There must be a title, north point, scale and the designer's name and contact details.

Plants are represented by graphic symbols, usually a circle. In most cases plain circles are used, although sometimes, for clarity, it may be useful to use a non-plain edge to the circle, or to select another symbol that will help the reader interpret the plan. For example:

Alternative outlines | Alternative symbol | For mass planting, outlines can be used

The diameter of the circles indicates the mature width of the plant. For groundcovers and shrubs the 10-year size given in the Palmer's Manual[5] is appropriate. However for trees, the mature size is usually much larger than that stated in Palmer's, so the Reader's Digest[6] size is more appropriate.

When spacing circles for groups of plants, connect only the outline of the circles, not the overlaps. Overlap the circles slightly (approx 10%), so that as the plants grow, the branches will intermingle and no gaps of bare earth will occur. All plantings (except specimen trees) must be in a garden bed with a defined edge.

Labelling Plants

There are many ways of labelling plant material on the planting plan. For simplicity, while you are at UNITEC, you are to use the following guidelines for labelling plant material on the planting plan:

- Label using the full botanical name where possible

---

[5] Palmer, S J. *Palmers Manual of Trees, Shrubs and Climbers*
[6] *The Readers Digest Gardener's Encyclopaedia of Plants & Flowers.*

- If there is not enough room for the botanical names you may abbreviate the name into a code.
- You may use two or three letter codes. These may be all capitals or combinations of upper and lower case. For example *Pittosporum tenuifolium* 'Varigatum' can be: PTE or Pte or PT or Pt. You do not need to include the cultivar name in the code unless you have more than one cultivar of the same plant. If you do include the cultivar name in the code it may be written in upper case, if you have used lower case for the species name - otherwise use block capitals ie PtV or PTV in the above example. (Whichever system you adopt, be consistent!)
- Never put quotation marks or full stops in a code (eg Pt'V' or Pt.V.)
- Do not use alphabet codes (A, B, C etc) or number codes (1, 2, 3 etc)
- Do not use other kinds of symbols to code plant material. (eg different kinds of circles, lines, patterns etc)
- For mass planting, always state how many plants are in each group (eg 5 TE). The spacing of mass planting must be stated on the schedule.
- Use straight lines as pointers - never cross lines - don't make lines unnecessarily long - be consistent.

Plant Schedules

Plant schedules are included on a planting plan as an interpretation key to the plan and as a shopping list for the total number required of each plant species. They also indicate the size of plant to be purchased in terms of the planter bag size[7]. Plant spacing and notes are also recorded in the plant schedule.

Common sizes for plants are as follows:

Important specimen trees	PB95 or PB150 (for very large specimens)
Other trees	PB40
Feature shrubs	PB8
Massed shrubs	PB5
Groundcovers	PB5
Massed groundcovers	PB3

Schedules

- Include the schedule on the planting plan rather than on a separate sheet. This is especially important when some sort of code is used. Always list plants alphabetically by botanical name. You may divide the schedule into types and list the plants alphabetically under each type eg trees, shrubs, climbers.

[7] PB size = the number of pints of media that fit in the bag eg PB 8 holds 8 pints of media. Some pot sizes are "L" or litres - this is a metric version of the PB size ie 10L pot holds 10 litres of media

- A word processed table takes up less room and is usually neater than a hand written one.

For typed schedules - Write botanical names as you would in text - ie italics and the correct combinations of upper and lower case letters. ALWAYS use correct botanical writing conventions when typing. Common names will always start with lower case letters, except proper names (not italics).

Code	Botanical Name	Common Name
HSu	*Hebe* 'Sutherlandii'	
Mex	*Metrosideros excelsa*	pohutukawa
Mho	*Myosotidium hortensia*	Chatham Island forget-me-not
Mpp	*Myosotis petiolata* var. *pansa*	

For hand written schedules - Use BLOCK CAPITALS for all parts of the botanical name - do not underline, do not use italics. Don't forget to include single quote marks for cultivar names.

BOTANICAL NAME	COMMON NAME
HELLEBORUS NIGER 'APPLE BLOSSOM'	CHRISTMAS ROSE.

Do NOT mix small and large block capitals eg MAGNOLIA SALICIFOLIA 'JERMYNS'

Do NOT use lower case letters, in hand written schedules (unless your printing is exceptionally good!). You may use lower case for labelling the plant material on the plan (in which case do not underline - Always **print** - never write or use italics.)

ALL texts, notations, plant names etc on plan should be written parallel with the top edge of the sheet, and be aligned to the LHS.

For all schedules (typed or hand-written):

DO NOT use ditto marks or abbreviate generic names eg

Botanical name
Metrosideros excelsa
" *carminea*
Magnolia salicifolia 'Fasciata'
M. salicifolia 'Wada's Memory'

Spelling - always double check the spelling of botanical names. This is vital. (All spelling on the plan should be correct, spelling mistakes will undermine your credibility as a designer)

Notes (or Remarks) are additional information you need to give the client or contractor such as:

"clipped to form 1.5m hedge"
"topiary into a ball, 1m from the ground"

"under existing oak" (if it is difficult to read in the plan)

"virus free stock only".

When there are only a few notes, use footnotes at the bottom of the schedule.

Don't state obvious things like "tree" or "groundcover", although for a plant which has different forms (but the same name) you can state what you require. For example *Metrosideros carminea* has a climbing form as well as a shrub form - you will need to specify which one you want. Normally this would appear in brackets after the botanical name eg *Metrosideros carminea* (shrub form).

Spacing

Only state spacing for group planting. Many plants will not require spacing specifications, as this will be indicated on the plan.

Be consistent with your unit of measurement. Do not use *cm* for some and *mm* for others (mm are the most commonly used measurement for garden plans).

Calculating Plant Numbers

For small areas: Use a sheet of butter paper over the area on the plan to draw in circles representing the spread of the plant. Then count them up.

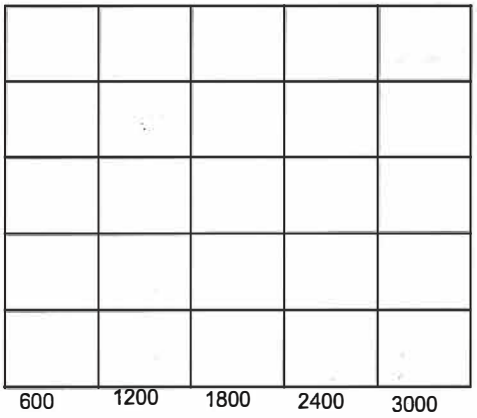
For large areas:

Calculate a rate per square meter then multiply by the number of metres.

Example 1

If the planting rate is 600 centres.

First, multiply up the centres until you reach a whole number ie

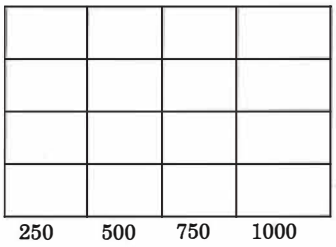


In $9m^2$ (a 3 x 3m grid) you need 25 plants (5x5) therefore in a 1 metre square you need 25÷9 = 2.777 plants.

So in $5m^2$ you will require 5 x 2.777=13.88 (say 14 plants)

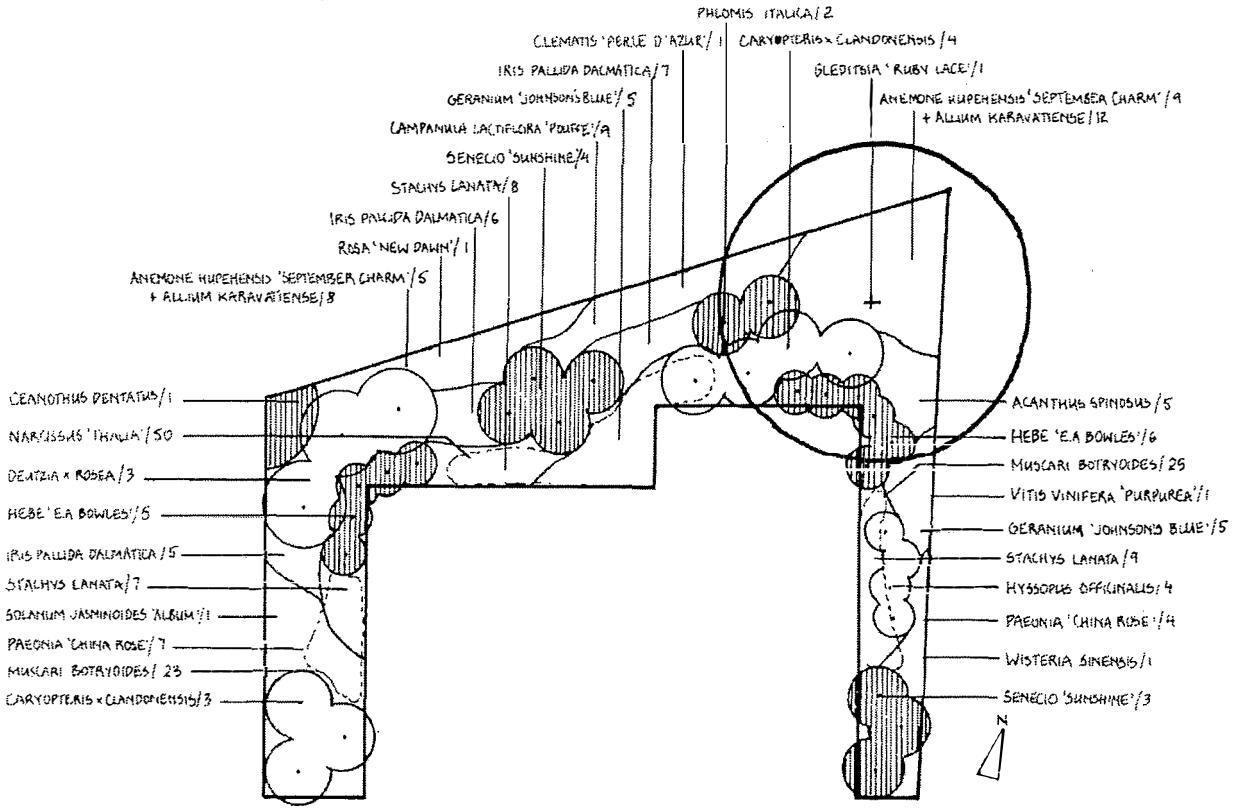
Example 2

If the planting rate is 250mm then:

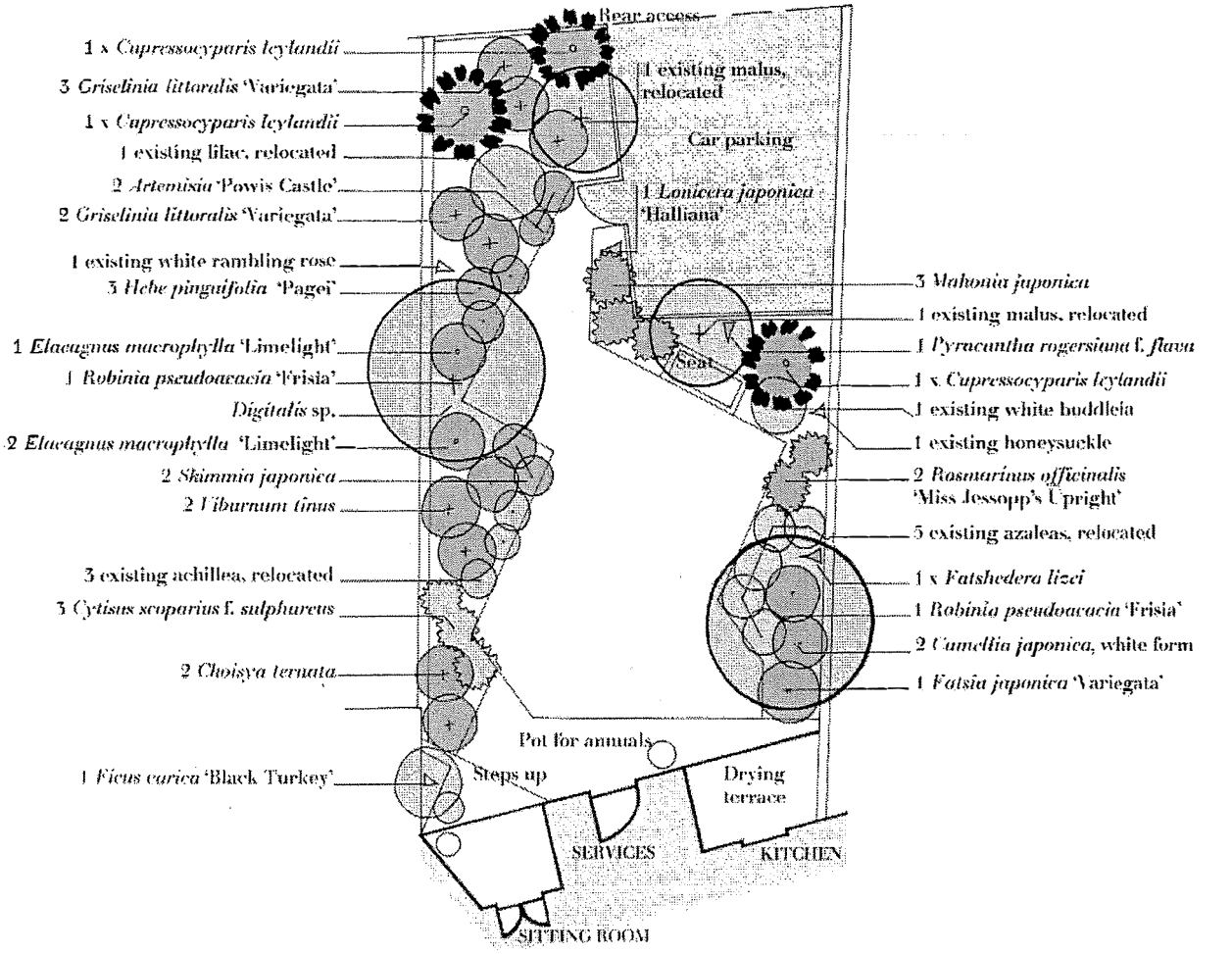


Rate will be 4x4 (16) plants per metre.

Planting Plans – Examples



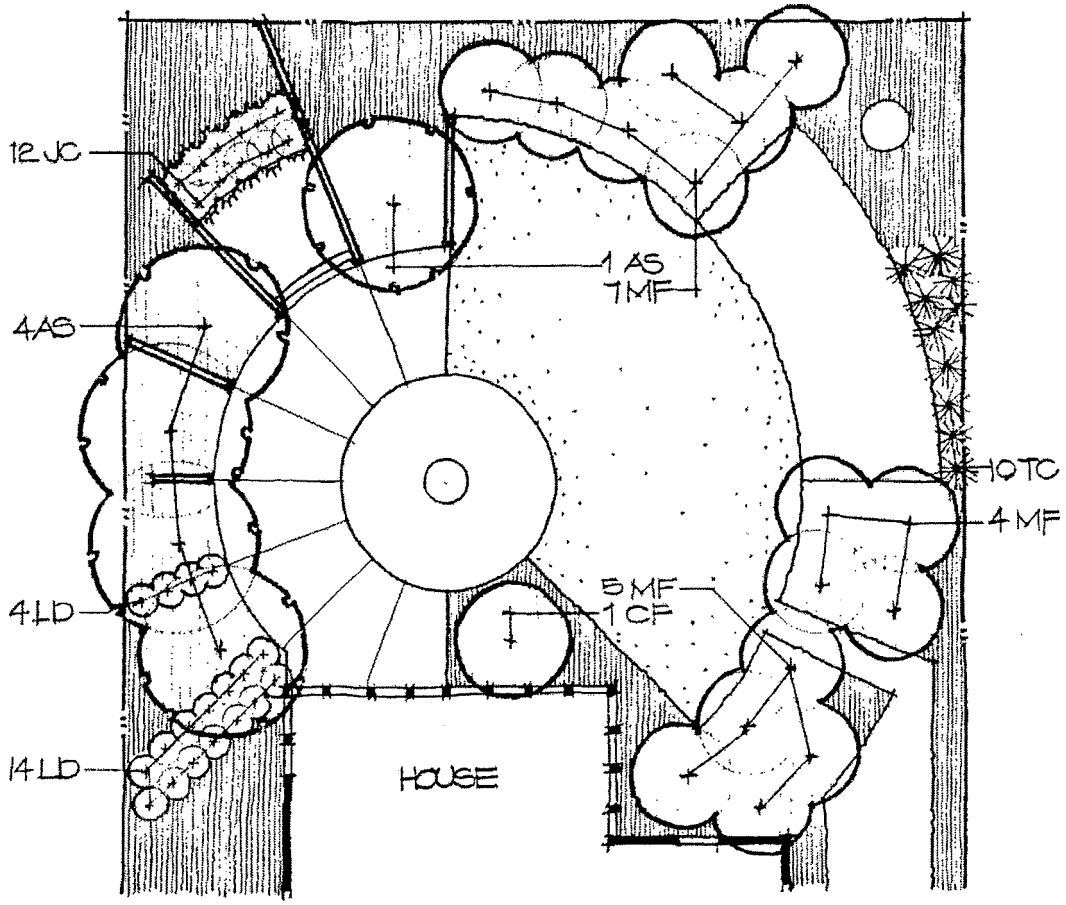
Source: Alexander, R (1994) *A Handbook for Garden Designers* Ward Lock , London. p 88



Source: Brookes, J (1991) *The Book of Garden Design.* MacMillan, New York. p119

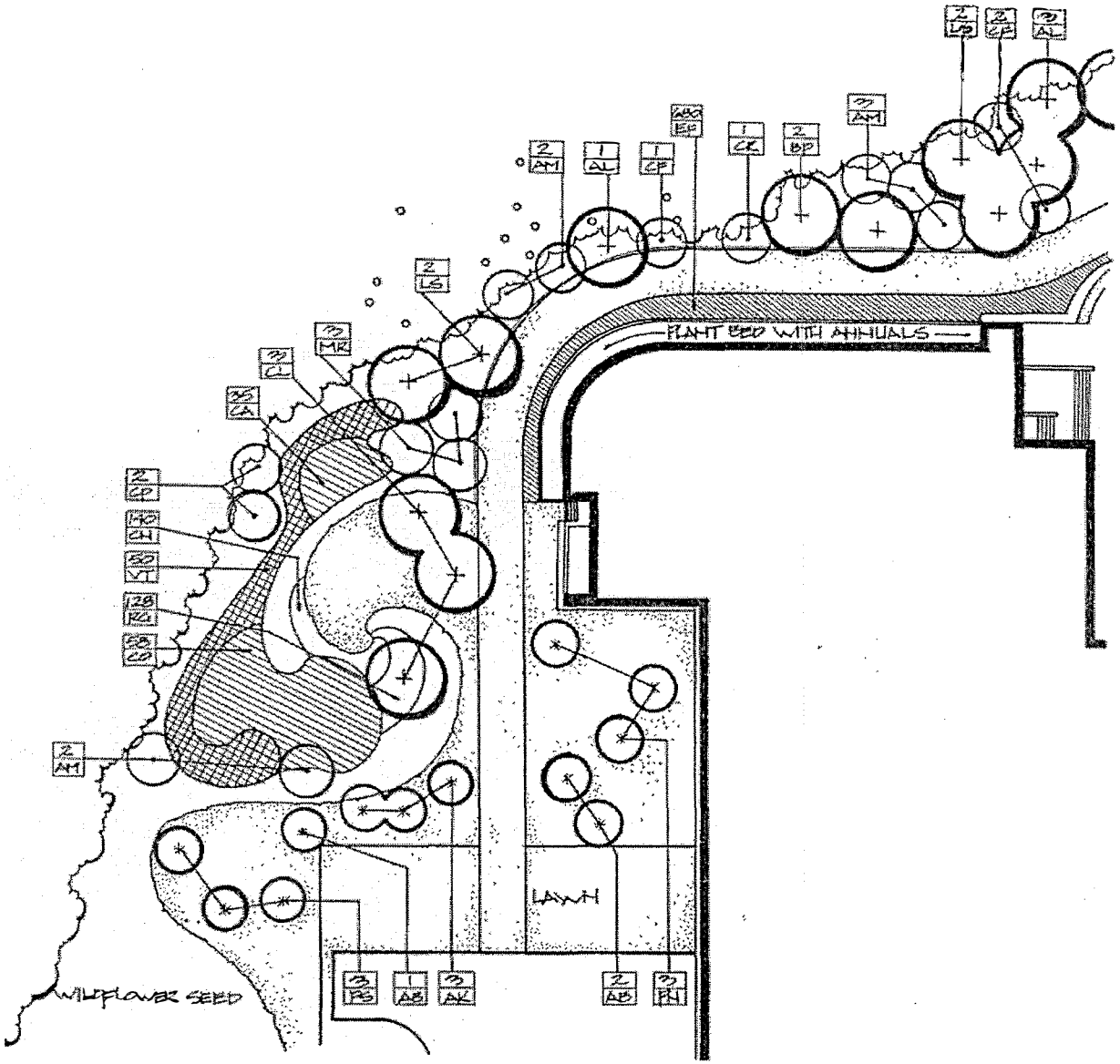
Source: Booth N & J Hiss (1991) *Residential Landscape Architecture.* Prentice Hall, New Jersey. p342

An example of a planting plan



PLANT SCHEDULE

Code	Name	Common name	Quantity
AS	*Angophora subvelutina*	angophora	12
CF	*Caesalpinia ferrea*	Brazilian ironwood	1
JC	*Juniperus communis*	common juniper	12
LD	*Lithodora diffusa*	lithodora	18
MF	*Malus floribunda*	crab apple	16
TC	*Tritonia crocata*	prince of orange	10



Plant list

Key	Botanical Name	Common Name	Size
AB	*Abies concolor*	White fir	8′–9′ ht.
AK	*Abies koreana*	Korean fir	8′–9′ ht.
AL	*Acer saccharum laciniata*	Sweet shadow sugar maple	4″–4 1/2″ cal.
AM	*Amelanchier canadensis*	Shadblow	12′–14′ ht.
BP	*Betula papyrifera*	Paper birch	14′–16′ ht. (clump)
CA	*Clethra alnifolia*	Summersweet clethra	2 1/2′–3′ ht.
CF	*Cornus florida*	Flowering dogwood	12′–14′ ht.
CL	*Cladrastis lutea*	Yellowwood	3″–3 1/2″ cal.
CN	*Centaurea dealbata*	Persian cornflower	1 qt. pot
CO	*Coreopsis verticillata*	Tickseed	1 qt. pot
CP	*Crataegus phaenopyrum*	Washington hawthorn	12′–14′ ht.
CR	*Cornus florida 'rubra'*	Pink flowering dogwood	12′–14′ ht.
EF	*Euonymus fortunei 'longwood'*	Longwood wintercreeper	18″–24″ spd.
LS	*Liquidambar styraciflua*	Sweetgum	4″–4 1/2″ cal.
MR	*Malus radiant*	Radiant crabapple	2 1/2″–3″ cal.
PN	*Pinus nigra*	Austrian pine	10′–12′ ht.
PS	*Pinus strobus*	Eastern white pine	10′–12′ ht.
RG	*Rudbeckia 'goldstrum'*	Coneflower	1 qt. pot
VT	*Viburnum trilobum*	American highbushcranberry	4′–5′ ht.

In this planting plan for a large office complex for a life insurance company, the graphics were kept simple to make the plan easy to read. Design credit: CR3, Inc. Landscape Architects.

Source: Carpenter, P & T Walker (1990) *Plants in the Landscape*. Second Edition. Freeman, New York & Oxford. pp218-9

PLANTING SPECIFICATIONS

Planting specifications describe in words and diagrams, how landscape plans are to be installed.
All tender and contract documents must include a thorough specification of the work to be carried out. They have many sections, covering different aspects of the work, usually grouped under three main headings:

1. **Contract details -** General and special conditions of the contract.

2. **Preliminary and General clauses -**

3. **Trade Sections – covering material standards and methods of installation, and maintenance requirements eg Planting.** Schedule of materials, which includes a copy of the plant schedule are included in the appendices?