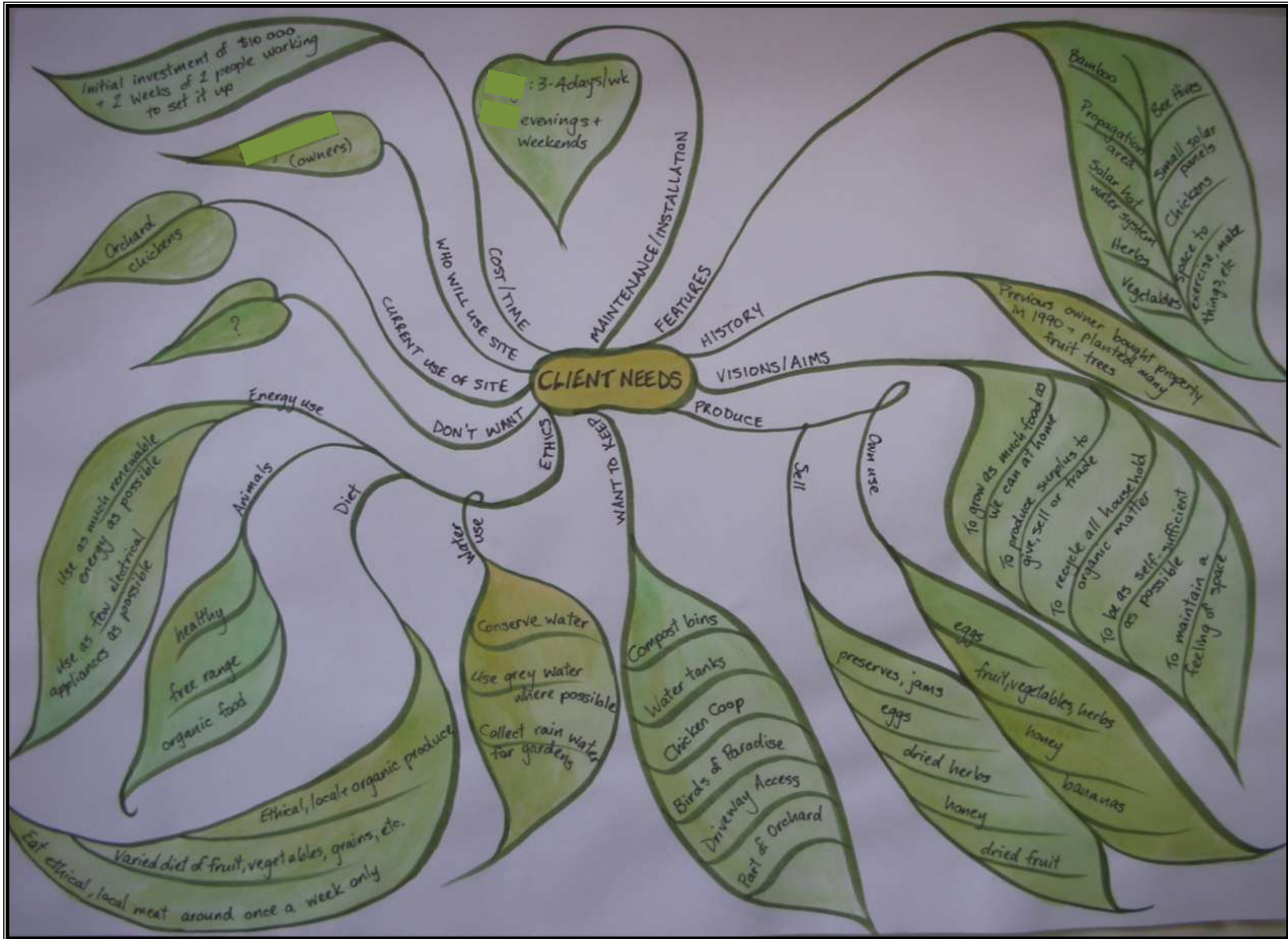


Permaculture Design Certificate

Design Project Submission





SECTOR ANALYSIS
OF SUN, WIND, SLOPE, TRAFFIC

SCALE 1:200



- WHERE WATER POOLS (INCLUDING UNDER HOUSE)
 - DIRECTION OF GRADUAL SLOPE
 - DIRECTION OF WIND
 - SUMMER SOLSTICE SUN PATH (DEC 22)
 - WINTER SOLSTICE SUN PATH (JUN 22)
 - EQUINOX SUN PATH (MAR 22, SEPT 21)
 - HUMAN FLOW - CAR / WALKING
- NOTE: NO TREES SHOWN ON THIS DRAWING



Sector Analysis – Sun Paths

Following are aerial images from NearMap.com which can be used, along with the sector analysis diagram, to see how shade changes on the property at different times of the day, throughout the year.

The notes beside each image provide an estimate of the time of day the image was taken and refer to the changing angles of the sun paths.

In summary:

- The **front yard (North and North East corner)** receives sunlight for most of the day all year round. It is shaded from the hot afternoon sun by the house. Therefore, it would be an ideal place for intensive vegetable beds.
- The **back yard (West)** is partially shaded in the mornings during the Winter Solstice and is always partially (sometimes fully) shaded in the afternoons by the large trees at the back of the property and in the neighbouring property. There is an area which would receive the required 6 hours of sunlight a day for vegetable beds. The rest would be well suited to herb gardens and housing the chickens to provide a mixture of shade and use of chicken tractors.
- The **side yard (South)** receives sunlight in the morning to early afternoon during Summer. During Winter it receives sunlight in the South East corner during the morning. Generally it is often shaded by the house, the front trees, the neighbouring fig tree on the South fence or the back trees on the West fence.

15 October 2009



- Early afternoon
- Most of the property has solar access

2 November 2009



- Late afternoon
- Most of the property is in shade
- Note angle of shadows (Summer Solstice Sun Path)



21 November 2009



- Late afternoon
- Most of the property is in shade
- Note angle of shadows (Summer Solstice Sun Path) and compare to angles at similar time on 11 May 2010

25 April 2010



- Early morning
- Most of the property has solar access; front gardens, side and back of house quite shaded
- Note angle of shadows (Winter Solstice Sun Path) and compare to angles at similar time on 23 January 2010

23 January 2010



- Early/Mid morning
- Most of the property has solar access; front garden beds are shaded by footpath trees
- Note the angle of the shadows (Summer Solstice Sun Path) and compare to angles at similar time on 25 April 2010

11 May 2010



- Late afternoon
- Most of the property is in shade
- Note angle of shadows (Winter Solstice Sun Path) and compare to angles at similar time on 21 November 2009



8 June 2010

12 September 2010



-Morning
 -Approaching
 Equinox Sun Path

20 July 2010



-Late morning/ Midday
 -Most of the property has solar access; front gardens and side of house quite shaded
 - Note angle of shadows (Winter Solstice Sun Path) and compare to angles at similar time on 23 January 2010
 -Compare to 25 April 2010 which is earlier in the morning



Base Plan Analysis – Existing Plants

Following are short profiles on each of the existing plants on the property.

This research is used to aid decision making on which plants to remove, keep or move for the concept plan. The maturity size has been marked on the base plan.

Babaco (*Carica pentagona*)



Description: This attractive torpedo shaped fruit has an effervescent flesh hence its other name the 'champagne fruit'. The texture of the golden fruit is light and refreshing. The slightly acid flavour has a hint of strawberry, pineapple and pawpaw and can be made into a tasty thirst quenching drink. The unripe green fruit is delicious used as a green vegetable in curries and chutney. The babaco is a very close relative of the pawpaw. The babaco is a natural hybrid between mountain pawpaw species in Equador. All babacos are female and do not require pollination, all the fruits are seedless. A mature tree can reward you with up to 25 to 100 fruit per year. Fruits are harvested when they lose their green tinge and turn yellow all over, handle with care as they are easily damaged. It has an average life span of about eight years. The thickness of the trunk is associated with the vigor of the plant.

Current size: approximately 1m high

Maturity size: 1.8m height, 1m width

Ideal location/conditions: The babaco prefers light, fertile, well-drained soil and warm conditions to grow well. A thick layer of organic mulch will keep the weeds at bay, feed your tree and keep the root cool. Babacos require a warm humid climate and perfect drainage. They are not tolerant of strong winds and hot dry conditions. They will grow and fruit in shady locations but prefer a sunny spot. Adequate rainfall or irrigation is essential during the growing phase of the babaco. A plant that has been injured by frost is susceptible to root rot. During the growing season the babaco needs regular applications of nitrogen fertilizers. Feed monthly and adjust to the plant's response. Composted chicken manure makes good mulch.

Current location/conditions: The babaco is in a shaded northern location. It is shaded nearly all day by the neighbours trees. It will not be subjected to frost.

Summary: Even though this plant is in a shaded position it seems to be doing well and apparently will still fruit. It also has enough room to reach full maturity size. Therefore, if the soil is appropriate (light, fertile, well drained) it will remain where it is for the concept design.



Tamarillo (*Cyphomandra betacea*)



Description: *Solanum betaceum* (syn. *Cyphomandra betacea*) is a small tree or shrub in the flowering plant family Solanaceae. It is an erect, branching, shrubby, fast growing evergreen. It has large, heart-shaped, hairy leaves, 15 - 20 cm long. The flowers are small, pale pink and fragrant. It is best known as the species that bears the tamarillo, an egg-shaped edible fruit. Other names include tree tomato and tomate de árbol. Prior to 1967, the tamarillo was known as the "tree tomato" in New Zealand, but a new name was chosen by the New Zealand Tree Tomato Promotions Council in order to distinguish it from the ordinary garden tomato and increase its exotic appeal. The choice is variously explained by similarity to the word "tomato", the Spanish word "amarillo", meaning yellow, and a variation on the Maori word "tama", for "leadership". It is still called Tree Tomato in most of the world. The fruit can be between 2 and 8 centimeters in length. They are held on the tree in clusters as are many other clustered fruit, such as cherries. The trees are grown from cuttings and are very frost-tender when young. It will bear fruit after two years and a single mature tree in good soil will carry more fruit than a normal family can eat for about 3 months. A well-nourished tree can produce up to 66 kilograms of fruit in a year. When the tree is about 1 to 1.5 meters in height it is advisable to cut the roots on one side and lean the tree to the other (direction of the midday sun at about 30 to 45 degrees). This allows fruiting branches to grow from all along the trunk rather than just at the top. The tamarillo is native to the Andes of Peru, Chile, Ecuador, Colombia, and Bolivia. It is cultivated in Argentina, Australia, Brazil, Indonesia, Kenya, Portugal, the United States and Venezuela. It is grown as a commercial crop for international export in New Zealand and Portugal. The first internationally marketed crop produced in Australia occurred around 1996, although permaculture and exotic fruit enthusiasts had increasingly grown Tamarillo around Australia since the mid 1970s. The fruit is eaten by scooping the flesh from a halved fruit. When lightly sugared and cooled, the flesh makes a refreshing breakfast dish. They give a unique flavour when made into a compote, or added to stews (e.g. Boeuf Bourguignon), hollandaise, chutneys, and curries. They are also tasty and decorative in, for example, radicchio salads. Appetizing desserts using this fruit include bavarois and combined with apples in a strudel. In Colombia, Ecuador and Sumatra, fresh tamarillos are frequently blended together with water and sugar to make a juice. It is also available as a commercially pasteurized purée. The flesh of the tamarillo is tangy and mildly sweet, and may be compared to kiwifruit, tomato, or passion fruit. The skin and the flesh near it have an unpleasant bitter taste, and usually aren't eaten raw

Current size: 2.1m high

Maturity size: 1-5m height, 1.5m width (Although I read that the tree can grow to a little more than 6 meters but it is subject to wind damage and needs shelter).

Ideal location/conditions: Tamarillos need a rich, moist, well-drained soil. It will not tolerate waterlogging or drought and the roots are very shallow, so keep it well mulched. Commercially it is only suitable for frost-free subtropical and warm temperate areas, however the range for a home orchard is wider, as it survives light frost, by dropping affected leaves and shooting back in spring. They require protection from wind and frost.

Current location/conditions: The tamarillo is in a shaded northern location. With the recent strong winds it appears to have struggled to stay upright and is now being supported by some sticks.

Summary: It has enough room in its current location to reach full maturity size. For now it can be left where it is but will need to be monitored in regard to wind protection. Therefore, if the soil is appropriate (rich, moist, well drained) it will remain where it is for the concept design.

Tangerine



Description: Specifically reddish-orange mandarin cultivars can be marketed as tangerines, but this is not a botanical classification. For more information see the mandarin section. Citrus fruits are usually self-fertile (needing only a bee to move pollen within the same flower) or parthenocarpic (not needing pollination and therefore seedless, such as the satsuma). Citrus are native to Asia and are attractive, evergreen trees with fragrant blossoms. They are one of the most popular trees in the home garden but unfortunately unhealthy looking specimens are common, as their needs are not always understood. Citrus need regular feeding and attention paid to preventing pests and diseases.

Current size: 1.3m high

Maturity size: 5m height, 6m width

Ideal location/conditions: Choose an open, sunny position, preferably north to northeast facing, with shelter from strong winds. Wind can distort the shape of leaves with the damage becoming apparent months later. A fertile, well-drained soil with a pH between 6-8 is best. Citrus are vulnerable to root-rot so care must be taken to avoid badly drained areas. Ideally, prepare the soil several months ahead by digging over an area 1m in diameter and at least 30 cm deep. Add compost (half a barrow load), 2 kg of gypsum to the m² if the soil is heavy and 300-400 g of lime to the m² if the soil is acid (ph below 6.5). Mulch heavily and leave to decompose. If the drainage is poor it may be necessary to create a mound to plant on. Citrus trees are very hungry feeders with high requirements for trace elements. A regular spray with a seaweed fertiliser will supply trace elements. Fertilise citrus trees in April/May; always water the tree well after fertilising. Never place fertiliser close to the trunk or in heaps, spread it as evenly as possible to just past the drip-line of the tree. Compost or animal manures can be used starting with about 4 kg for a 1-year-old tree to 20 kg for a mature 8-year-old tree. In November/December apply lime or dolomite if necessary to correct the pH. Blood and bone contains mainly nitrogen and phosphorus, boost it into a more 'complete' fertiliser by adding a ¼ cup of sulphate of potash to every kilo of blood and bone. Citrus need regular watering from flower bud formation through to fruit set to retain a good crop. As they are relatively shallow-rooted, trees need even moisture throughout their root zone, water in the early morning or at night, especially during summer. Grass and weeds compete with your tree for water and nutrients, if left to grow long and rank under the tree they also encourage Collar Rot. Wet newspaper, at least 10 sheets thick, can be used to kill weeds and grass under the tree and then topped with mulch regularly to prevent weeds returning. Always mulch past the drip-line of the tree as this is the area where most of the feeder roots are found. Only ever pick dry fruit.

Current location/conditions: North location, shaded by neighbouring trees in early morning. At the moment it has enough room to grow but could be limited by the neighbouring lemon tree in the future. It will grow above its other neighbour, the Gooseberry plant.

Summary: The Tangerine tree and neighbouring Lemon tree are around the same size at the moment and there is plenty of room. As long as they are pruned and kept a reasonable size, they can coexist in the space available. Given that the nearby Orange tree is doing so well, it can be assumed the soil is appropriate for citrus trees. This will be checked in the soil tests. Therefore, it will remain where it is for the concept design.



Lemon



Description: The lemon is both a small evergreen tree native to Asia with an oval yellow fruit. The fruit is used for culinary and nonculinary purposes throughout the world – primarily for its juice, though the pulp and rind (zest) are also used, mainly in cooking and baking. Citrus fruits are usually self-fertile (needing only a bee to move pollen within the same flower) or parthenocarpic (not needing pollination and therefore seedless, such as the satsuma). Citrus are native to Asia and are attractive, evergreen trees with fragrant blossoms. They are one of the most popular trees in the home garden but unfortunately unhealthy looking specimens are common, as their needs are not always understood. Citrus need regular feeding and attention paid to preventing pests and diseases.

Current size: 1.3m high

Maturity size: 7m height, 6m width

Ideal location/conditions: Citrus trees need to be in full sun. If you're short of sunny spots in the garden, grow citrus in pots that can be moved to take advantage of changing patterns of sunlight. In the garden citrus must have good drainage. This is particularly important for the popular, long-bearing lemon variety called 'Eureka' because it's more susceptible to the problems caused by water-retaining soils. In heavy clay soils it's best to put some extra effort into preparation. Before planting, raise the level of the bed as much as possible, dig in some gypsum and plenty of old organic matter (compost, aged manure or commercial soil improver).

See the ideal location/conditions for the tangerine or mandarin for more information on how to look after citrus.

Only ever pick dry fruit. Lemons and limes should be picked 2 weeks before required as they become much easier to juice after this time. Use secateurs to cut citrus from the tree and trim close to the 'button' as leaving a sharp stalk causes damage to the skins of nearby fruit in storage, causing rot. If it is desirable to store lemons for long periods they should be picked just as they are turning yellow, wrapped loosely in paper and stored in an open cardboard box in a cool, dark, well-aired place.

Current location/conditions: North location. At the moment it has enough room to grow but could be limited by the neighbouring Orange tree and Tangerine tree in the future.

Summary: The Orange tree is well developed and producing well so it will not be moved. The Lemon tree and neighbouring Tangerine tree are around the same size at the moment and there is plenty of room. As long as they are pruned and kept a reasonable size, they can coexist in the space available. However, my recommendation is to let the Tangerine tree grow to full maturity size and in future, move the Lemon tree. Given that the neighbouring Orange tree is doing so well, it can be assumed the soil is appropriate for citrus trees. This will be checked in the soil tests. Therefore, it will remain where it is for the concept design with future plans to move it due to space restrictions.

Orange



Description: The orange is a hybrid of ancient cultivated origin, possibly between pomelo (*Citrus maxima*) and mandarin (*Citrus reticulata*). It is a small flowering tree with evergreen leaves, which are arranged alternately, of ovate shape with crenulate margins and 4–10 cm long. The orange fruit is a hesperidium, a type of berry. Oranges originated in Southeast Asia. The fruit of *Citrus sinensis* is called sweet orange to distinguish it from *Citrus aurantium*, the bitter orange. Citrus fruits are usually self-fertile (needing only a bee to move pollen within the same flower) or parthenocarpic (not needing pollination and therefore seedless, such as the satsuma). Citrus are native to Asia and are attractive, evergreen trees with fragrant blossoms. They are one of the most popular trees in the home garden but unfortunately unhealthy looking specimens are common, as their needs are not always understood. Citrus need regular feeding and attention paid to preventing pests and diseases.

Current size: 3m high, 4m wide

Maturity size: 6m height, 6m width

Ideal location/conditions: Oranges can be grown outdoors in warmer climates, and indoors in cooler climates. Oranges, like most citrus plants will not do well unless kept between 15.5°C - 29°C. Oranges require a huge amount of water. The ideal soil for growing an orange tree would be fine sand with great drainage. The soil should be deep enough to allow for extensive root development, since the trees are known for reaching monstrous sizes and requiring lots of support from down below. If you have shallow, easily saturated soil then you should either do something to remedy it or move onto a different type of tree. It is most likely that attempting to grow an orange tree in these conditions would be disastrous.

See the ideal location/conditions for the tangerine or mandarin for more information on how to look after citrus.

Current location/conditions: The Orange tree is in a northern location. It's a developed tree, produces well and is healthy. It must like the soil profile in the area.

Summary: Leave as is.



Persimmon (*Diospyros kaki*)



Description: The Persimmon tree is a perennial plant. Persimmons are generally light yellow-orange to dark red-orange in colour, and depending on the species, vary in size from 1.5 to 9 cm diameter, and may be spherical, acorn-, or pumpkin-shaped. The calyx often remains attached to the fruit after harvesting, but becomes easier to remove as it ripens. They are high in glucose, with a balanced protein profile, and possess various medicinal and chemical uses. Like the tomato, it is not considered a "common berry", but is in fact a "true berry" by definition. It is known for its exceptionally hard black wood that was once used in making piano keys. It's a highly decorative tree, with a semi-weeping habit, and the foliage is often used by florists in flower arrangements. In autumn it's a blaze of colour - reds, oranges and yellows - as the foliage changes. Persimmon trees are deciduous. There are two types of persimmon - the non-astringent type that can be eaten as soon as it colours up - and the astringent one. Look out for one called 'Nightingale' but wait until it goes absolutely soft and squishy in the flesh. There are a huge range of persimmons to buy from the greengrocer when in season or to grow in your garden. For non-astringent types look out for 'Fuyu' - it looks beautiful and is quite crispy and good to eat like an apple - and 'Jiro', which has spectacular coloured fruit. Of the astringent types there's 'Nightingale' and the 'Dai Dai Maru'. The tannins in the astringent persimmons make them virtually inedible until they become really soft and juicy, just like an apricot jam texture. It's a delicious flavour.

Current size: 1.4m high (North West tree); 4.5m high 3m wide (East tree); 3.5m high 3m wide (South West tree)

Maturity size: 7-12m height, 7m width

Ideal location/conditions: Persimmons need an open, sunny spot to grow best - about 3 to 4 metres away from neighbouring trees - so they've got a lovely spread. Buy them in a pot or a bag. Open-rooted or bare-rooted trees are no good because the roots can be susceptible to disease. They get Cinnamon Fungus, phytophthora rot, and so really good drainage is important. If you're living in a frosty area, they don't mind that at all. Tip prune them - just take about 30 centimetres from the top - so they branch out into a fabulous tree. Another tip is to plant your persimmon in a sheltered area, away from the wind, because the tree's wood is brittle and can split when in heavy crop. The plant prefers light (sandy), medium (loamy) and heavy (clay) soils and requires well-drained soil. The plant prefers acid, neutral and basic (alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It requires moist soil.

Current location/conditions: North West tree: Too close to the Orange tree, not in an open sunny spot as shaded by Orange tree and neighbour's trees. East tree: In an open, sunny spot, very established tree that looks very healthy. South West tree: Currently in an open, sunny spot (because surrounding trees are still small), established tree that looks healthy.

Summary: Remove the North West tree as that area is already very dense with citrus trees, the conditions are not ideal for it and it's not a very established tree. Keep the East tree and the South West tree as both are well established and in good positions.

Green Sapote (*Pouteria viridis*)



Description: Close-relative of the popular mamey sapote, the green sapote is slightly smaller in size, with green-yellow or brownish skin and an orange-red pulp much like its cousin. Strangely, the fruit is little known outside of Central America, even though its flavour is often described as superior to the mamey sapote. Fruits take up to 9-10 months to from flowering to ripening. Fruit is mature with first colour break, can be picked hard, and will ripen off the tree. Usually eaten fresh out of hand, but the pulp is also used in making desserts and preserves. The pulp is softer than the mamey sapote. Fruit nearly round to ovoid, pointed at the apex and sometimes at the base; 9-12.5 cm long and 6.25-7.5 cm in diameter, with thin, olive-green or yellow-green skin dotted with red-brown and clinging tightly to the flesh; flesh light-russet, of fine texture, melting, fairly juicy and sweet; of better flavour than the sapote. The seeds are edible and are often roasted. It possesses an abundance of white, gummy latex. The latex (chicle) is collected on commercial scale and marketed like that from the sapodilla for use in chewing gum. Leaves clustered at the tips of flowering branches and irregularly alternate along non-fruiting limbs; oblanceolate, pointed, 10-25 cm long, 5-7 cm wide; hairy on the upper midrib and downy-white beneath. Flowers - borne in groups of 2 to 5 in the leaf axils and massed along leafless branches, tubular, 5-lobed, pinkish or ivory and silky-hairy. The wood is reddish, fine-grained, compact, strong, durable; occasionally used in construction, carpentry, turnery, and for furniture and panelling in Guatemala.

Current size: 1.4m high

Maturity size: Medium to large-sized tree from 13 to 25 m tall.

Ideal location/conditions: Grow in full sun. Water regularly. (Difficult to find any more information than this)

Current location/conditions: This tree is currently growing in the dripline of the Acerola Cherry, in a North facing position.

Summary: Given this is a young tree (that will grow quite large) within the dripline of an established tree, in an area with too many trees at the moment, I recommend its removal for the concept design.



Yellow Sapote (*Pouteria campechiana*)



Description: The yellow sapote is also known as the canistel tree and egg fruit. It is erect and slender in habit or with a spreading crown, it has brown, furrowed bark and abundant white, gummy latex. Young branches are velvety brown. The evergreen leaves, alternate but mostly grouped at the branch tips, are relatively thin, glossy, short- to long-stemmed, oblanceolate, lanceolate-oblong, or obovate, bluntly pointed at the apex, more sharply tapered at the base; 11.25-28 cm long, 4-7.5 cm wide. Fragrant, bisexual flowers, solitary or in small clusters, are borne in the leaf axils or at leafless nodes on slender pedicels. They are 5- or 6-lobed, cream-colored, silky-hairy, about 8-11 mm long. The fruit, extremely variable in form and size, may be nearly round, with or without a pointed apex or curved beak, or may be somewhat oval, ovoid, or spindle-shaped. It is often bulged on one side and there is a 5-pointed calyx at the base which may be rounded or with a distinct depression. Length varies from 7.5-12.5 cm and width from 5-7.5 cm, except in the shrubby form, var. *palmeri*, called *huicon*—1.5-3 m high—which has nearly round fruits only 2.5 cm long. When unripe the fruit is green-skinned, hard and gummy internally. On ripening, the skin turns lemon-yellow, golden-yellow or pale orange-yellow, is very smooth and glossy except where occasionally coated with light-brown or reddish-brown russetting. Immediately beneath the skin the yellow flesh is relatively firm and mealy with a few fine fibers. Toward the center of the fruit it is softer and more pasty. It has been often likened in texture to the yolk of a hard-boiled egg. The flavour is sweet, more or less musky, and somewhat like that of a baked sweet potato. There may be 1 to 4 hard, freestone seeds, 2-5.3 cm long and 1.25-3.2 cm wide, near-oval or oblong-oval, glossy and chestnut-brown except for the straight or curved ventral side which is dull light-brown, tan or grayish-white. Both ends are sharp-tipped. Latex extracted from the tree in Central America has been used to adulterate chicle. The timber is fine-grained, compact, strong, moderately to very heavy and hard, and valued especially for planks and rafters in construction. The heartwood is grayish-brown to reddish-brown and blends into the sapwood which is somewhat lighter in color. The darker the color, the more resistant to decay.

Current size: 1.4m high

Maturity size: Generally no more than 8 m tall, but it may, in favourable situations, reach height of 27-30 m and the trunk may attain diameter of 1 m.

Ideal location/conditions: The egg fruit comes up well in tropical and subtropical climate. Moderate rainfall, frost free and dry climate is ideal for its cultivation. It has a wide adaptability for soil, ranging from loose sandy to heavy clays, but loams with good drainage and high organic matter content stimulate better plant growth and yield. The trees of egg fruit sometimes grow even on shallow calcareous soils with minor nutrient deficiencies that are a problem for other fruit trees. Plants can also tolerate to some extent salinity and iron deficiency. Grow in part-shade or full sun. Water regularly.

Current location/conditions: This tree is currently growing in the dripline of the Acerola Cherry, in a North facing position.

Summary: Given this is a young tree (that will grow quite large), close to the dripline of an established tree, in an area with too many trees at the moment and close to the neighbours fence which has a pool on the other side, I recommend its removal for the concept design.

Acerola Cherry (*Malpighia emarginata*)



Description: Acerola Cherry is a tropical fruit-bearing shrub or small tree in the family Malpighiaceae. Also called Barbados Cherry, West Indian Cherry and Wild Crapemyrtle. It has spreading branches on a short trunk. The leaves are simple ovate-lanceolate, 2–8 cm long, 1–4 cm, and are attached to short petioles. They are opposite, ovate to elliptic-lanceolate, and have entire or undulating margins. Top sides are dark green and glossy. Flowers are bisexual and 1–2 cm in diameter. They have five pale to deep pink or red fringed petals, ten stamens, and six to ten glands on the calyx. There are three to five flowers per inflorescence, which are sessile or short-peduncled axillary cymes. The fruit is a bright red drupe 1–3 cm in diameter with a mass of 3–5 g. Drupes are in pairs or groups of three, and each contains three triangular seeds. The drupes are juicy and very high in vitamin C and other nutrients. They are divided into three obscure lobes and are usually acid to subacid, giving them a sour taste, but may be sweet if grown well. The fruit can vary in taste from tart to sweet depending on variety. Fruit are thin skin-skinned so bruise easily. A little like crab apples in taste and uses. Thick woody branches clothed in shiny deep-green foliage. Trees without adequate pollination can set seedless fruit. Flowers usually appear after periods of rainfall or irrigation. Flowering may occur any time during the year (depending on local rainfall and climate patterns), and can last year-round. After flower set, fruit soon follows and will ripen in just 3-4 weeks. Fruits lose their flavour and nutritional content very rapidly upon harvest. Ripe acerola's should be picked and eaten within a few hours to preserve taste. As a result, the tree is not cultivated for commercial production of fresh fruits.

Current size: 4m high, 4m wide

Maturity size: It is usually 2–3 m tall, but sometimes reaches 6 m in height.

Ideal location/conditions: Suited to most soils including fertile heavy soils in full sun. Water generously. For best results mulching with heavy, rich, compost is recommended. Prune in early Autumn after fruiting. Avoid waterlogging. Heavy soils are preferred to avoid nematodes. Acerola's prefer to grow in warm to hot climates. Trees grow well in slightly acidic soil. They often require little or no care. Will take long periods of drought once established and will adopt a deciduous habit if stressed. They also make good container specimens. The acerola thrives and produces well in tropical and frost-free sub-tropical climates. Trees are very sensitive to wind due to their shallow root systems. A sunny, sheltered position is ideal.

Current location/conditions: In the North West corner it is in full sun and gets lots of water. At the moment it also gets lots of fresh chicken manure as it is within the chicken coop.

Summary: This is a well established tree that is healthy and fruits well. It will stay as is for the concept design.



Macadamia Nut



Description: They are small to large evergreen trees. The leaves are arranged in whorls of three to six, lanceolate to obovate or elliptical in shape, 6–30 cm long and 2–13 cm broad, with an entire or spiny-serrated margin. The flowers are produced in a long slender simple raceme 5–30 cm long, the individual flowers 10–15 mm long, white to pink or purple, with four tepals. The fruit is a very hard woody globose follicle with a pointed apex, containing one or two seeds. The tree does not begin to produce commercial quantities of nuts until it is 7–10 years old, but once established, may continue bearing for over 100 years. The macadamia nut has an extremely hard shell, but can be cracked using a blunt instrument, such as a hammer or rock applied with some force to the nut sitting in a concave surface, or a custom made macadamia nutcracker can be used. Nuts of the "Arkin Papershell" variety crack open more readily. The nuts are sweet and can be enjoyed eaten raw, roasted, fried, chocolate coated, candied, made into nut butters, biscuits, cakes and pies. The two edible species *M. tetraphylla* (Northern NSW) and *M. integrifolia* (S.E. Qld) make up most of the commercial varieties.

Current size: 2.1m high, 2m wide

Maturity size: growing to 2–12 m tall

Ideal location/conditions: Macadamias prefer fertile, well-drained soils, a rainfall of 1,000–2,000 mm, and temperatures not falling below 10 °C (although once established they can withstand light frosts), with an optimum temperature of 25 °C. The roots are shallow and trees can be blown down in storms; they are also susceptible to *Phytophthora* root disease.

Current location/conditions: Currently in a North West position, very close to the more established Acerola Cherry dripline and the neighbour's fence which has a pool on the other side.

Summary: This tree will be recommended for removal in the concept design as it does not have space to grow in the current position.

Dwarf Mango (*Mangifera indica*)



Description: The mango is a very attractive, evergreen tree with glossy, dense foliage. The new shoots are reddish, the mature leaves a dark green. When in full flower there are large pink panicles at the ends of the branches and they cover the whole tree. Mangoes flower profusely and self pollinate very well. The flowering is triggered by cool nights. In the true tropics a severe cold snap will bring out masses of flowers. Initially you may see masses of tiny mangoes on your flower panicles, but the tree will shed a lot of them and keep only what it can handle. So don't worry if you see a lot of them drop off. The flowers are produced in terminal panicles 10–40 cm long; each flower is small and white with five petals 5–10 mm long, with a mild sweet odour suggestive of lily of the valley. The mangoes will grow bigger and plumper, and eventually they will start to change colour. How long that takes depends on your climate. The fruit takes three to six months to ripen. The hotter the weather the faster the mangoes ripen. Usually your mangoes will be ready by the beginning of the wet season (late spring/early summer). The ripe fruit is variable in size and color. Cultivars are variously yellow, orange, red or green and carry a single flat, oblong pit that can be fibrous or hairy on the surface and which does not separate easily from the pulp. Ripe, unpeeled fruit gives off a distinctive resinous, sweet smell. Inside the pit 1–2 mm thick is a thin lining covering a single seed, 4–7 mm long. The seed contains the plant embryo. The mango tree is long-lived, as some specimens still fruit after 300 years. In deep soil the taproot descends to a depth of 6 m (20 ft) and the profuse, wide-spreading feeder roots also send down many anchor roots, which penetrate several feet of soil.

Current size: 1.6m high (North West tree); 1.6m high (West tree); 1.4m high (South tree); 3.5m high, 2m wide (East tree)

Maturity size: Mango trees grow 35–40 m tall, crown radius of 10 m. Dwarf Mango trees avg 8m tall, 6m wide.

Ideal location/conditions: Mangoes are a strictly tropical fruit. They love the tropics. The best climate to grow mangoes is frost free, with cool, dry winters and steamy, hot summers. Mangoes like growing in light and free draining soils, they don't need rich soil. You actually get the best crops on soils of somewhat lower fertility. They need full sun.

Current location/conditions: North West tree: This tree is within the current chicken coop, close to the dripline of the acerola cherry in good sunny position. West tree: This tree is just outside the chicken coop. It is close to the Amberella, the Carambola and the neighbour's trees. South tree: This tree is within the dripline of a Persimmon, Santol and Cashew Nut (some of which may be recommended for removal). East tree: In full sun and the most established of the mango trees on the property. Has room to reach full maturity size, however, fully grown will shade the productive North East corner of the house.

Summary: The North West tree is too close to the more established Acerola Cherry and Amberella while the West tree is too close to the Amberella, the Carambola and the neighbour's trees to reach full maturity size so these 2 trees will be removed. The South tree is quite young so it will be removed for the concept design. Initially I thought I would transplant the East tree to open up the North East corner for intensive vegetable beds. However, there is very little room to replant it so it will be sold. Apparently it is quite easy to transplant mango trees. First, give it a hard prune back to 3 or 4 main branches. Then dig a trench about 500mm right around the trunk to about 300mm (that cuts off the surface spreading roots). Then use a crow bar (maybe a long handled spade will do in loose enough soil) working it into the soil from the trench to beneath the tree; breaking the downward roots and freeing the soil ball. Next lift the soil ball & tree and move it to the hole it will be planted in. The hole should have been filled with water 24hrs before so that a good penetration of moisture into the surrounding ground has occurred. Some seaweed liquid fertiliser into the hole when the water was put in plus over the tree after the transplant will lessen the shock.



Pecan Nut (*Carya illinoensis*)



Description: The pecan tree is a tall, massive, deciduous tree, ideal for large spaces. It is a dual-purpose tree, grown both as a shade tree and for its delicious nuts. This majestic tree is the largest of the hickories with a symmetrical, broadly oval crown. The compound deciduous leaves are dark green and bear 11 to 17 leaflets. The trees are long lived and unlike other commercial crops don't have to be replaced in the short to mid term. Although most varieties are self pollinating, planting 2 varieties one from each group will ensure optimum cross pollination. Pecan cultivars differ in the order male and female flowers mature. When pollen is shed early, before the female flowers are receptive, the cultivar is called protandrous, when pollen is shed late the cultivar is called protogynous. The flowers are wind-pollinated, and monoecious, with staminate and pistillate catkins on the same tree; the male catkins are pendulous, up to 18 cm long; the female catkins are small, with three to six flowers clustered together. Besides producing the delicious pecan nut, pecan wood is used in agricultural implements, baseball bats, hammer handles, furniture, wall panelling, flooring, carvings, and firewood. A pecan, like the fruit of all other members of the hickory genus, is not truly a nut, but is technically a drupe, a fruit with a single stone or pit, surrounded by a husk. The husks are produced from the exocarp tissue of the flower while the part known as the nut develops from the endocarp and contains the seed. The nut itself is dark brown, oval to oblong, 2.6–6 cm long and 1.5–3 cm broad. The outer husk is 3–4 mm thick, starts out green and turns brown at maturity, at which time it splits off in four sections to release the thin-shelled nut. The nuts of the pecan are edible, with a rich, buttery flavour. They can be eaten fresh or used in cooking, particularly in sweet desserts but also in some savoury dishes. Pecan trees may live and bear edible nuts for more than three hundred years. They are mostly self-incompatible, because most cultivars, being clones derived from wild trees, show incomplete dichogamy. Generally, two or more trees of different cultivars must be present to pollinate each other.

Current size: 0.8m high

Maturity size: 20–40m in height, rarely to 44m, taller trees to 50–55m have been claimed but not verified. It typically has a spread of 12–23m with a trunk up to 2m diameter. A 10-year-old sapling will stand about 5m tall.

Ideal location/conditions: Alluvial river flats are best, with a good deep top soil. A climate which has over 220 frost-free days and plenty of those above 30 degrees celsius is ideal. Pecans also need a good winter chilling, however, summer heat is a priority. Optimum conditions for the highest production are a long, warm growing season, without much of a temperature drop at night.

Current location/conditions: North West position close to neighbour's fence with pool on the other side.

Summary: The Pecan tree will grow to be too large for this property given the number of other trees already there. Given that generally two or more trees of different cultivars must be present to pollinate each other, there is not enough room to plant another pecan tree so this one must be removed. Lastly, the location, being near to the neighbour's fence with a pool on the other side is not ideal.

Amberella



Description: A relative of Mango, this exotic fruit is hard to find. Dwarf variety bears fruit easily in containers. Green fruits have crisp flesh and aromatic juice, a favourite in pickles. Ripe yellow fruits tastes more like mango, but more intense in acidity. Eat it the same as mango, green or ripe. Young leaves are eaten fresh in Southeast Asia. It is fast growing, prolific.

Current size: 5m high

Maturity size: 5m height, 5m width

Ideal location/conditions: Unknown – difficult to find information.

Current location/conditions: West, full sun.

Summary: This tree is well established and healthy. If the neighbouring trees (Pecan, Dwarf Mango and Macadamia) are removed it will not have any competition. It will stay for the concept plan.



Carambola (*Averrhoa carambola*)



Description: Also called starfruit and five-finger. They are evergreen, symmetrical trees with single or multiple trunks and a bushy, broad crown. They fruit very prolifically. They are commonly eaten fresh, in salads, as garnishes and in drinks. The fruit have a sweet citrus like flavour that is both delicious and refreshing. The fruit texture is like an apple and tartness can vary among varieties. They are sweeter fully ripe. Once the edges are fully yellow/orange (depending on variety), the fruit is then perfect for eating. They hold very well in a bowl for several days or can be chilled before serving. Refrigerated carambola turns brown quickly but retains its flavours. The fruit is waxy to the touch but has no coating. A light rinse in water is all that is needed before eating. The winter crop is heaviest. The leaves are delicate and attractive as well. Flowers are in great masses of tiny purple blooms. They smell sweet and are very attractive. Carambolas produce what seems like 1,000 flowers for every one fruit set. Some flowers are produced off stems off the trunk and heavier woody branches far from the tips with leaves. The tree will begin to produce fruit within 10 to 14 months after planting and will be mature 60 - 75 days after flowering.

Current size: 4m high, 4m wide

Maturity size: Avg. Height x Width: 4.5 x 4.5m however, have read it can be 6 to 9 m in height with a spread of 6 to 7.5m in diameter.

Ideal location/conditions: Plant in full sun with a thin stake for a few months while the main stem is thin. They grow fast but mature trees are often less than 6m in height. Expect fruit in two years after planting. A maturing tree will produce great amounts of delightful fruit.

Current location/conditions: In full sun on West side of property. It is well established, fruits well and healthy.

Summary: This tree will remain on the concept design.

Kepel Apple (*Stelechocarpus burahol*)



Description: A guanabana (soursop), Biriba, and Ylang Ylang relative, Burahol (kepel fruit, or keppel apple) is a rare and endangered member of the Anonaceae family, originating in southeast Asia, more specifically Indonesia where, it is said, cultivation is unfortunately becoming less and less common. The tree has been introduced into Honduras and Florida. In Indonesia the fruit is the object of investigation for eventual use as a perfume. It is a large erect evergreen tree. The fruit is born on the trunk of the tree. They take a while to ripen. You know it's ready to harvest when you peel away some skin with your nail and it is orange underneath (rather than green). The tree grows up to 20 meters tall, with a straight trunk, brilliant foliage, spectacular bright pink leaves that flush out all at once over the entire tree. Pinkish cream coloured flowers bloom in abundance directly out of the trunk and develop into fruits the size of a small orange. The fruit has a brown, leathery skin and contains numerous, long, oval seeds in a creamy, light orange flesh. Kepel fruit is said to be of a very agreeable flavour, aromatic, with undertones of coconut. Others say it has a sweet mango like taste. It is said that the consumption of this fruit will perfume ones excretions (such as urine or sweat) with the smell of violets. The Kepel tree is considered to be one of the most beautiful of all tropical ornamental/fruit trees. Leaves elliptic-oblong to ovate-lanceolate, 12-27 cmx5-9 cm, dark green glabrous. Thin, leathery; petiole upto 1.5 cm long. Flowers unisexual, green turning whitish, fascicled on tubercles; male flowers on upper trunk and older branches, 8-16 together, upto 1 cm in diameter; female flowers only on the lower part of the trunk upto 3 cm in diameter. Fruit brown, 62-105 g, with 1-13 berry-like carpels; fruit stalk upto 8 cm long; ripe carpels almost globose, brownish, 5-6 cm wide; pulp orange, juicy and edible. Seeds ellipsoid, 4-6, upto 3 cm long. Ripe fruits are eaten fresh. The trees take 6-9 years for coming into bearing.

Current size: 0.3m high

Maturity size: The tree grows up to 20-25 meters tall and the trunk can reach 40 cm in diameter.

Ideal location/conditions: Kepel fruit grows in a hot, humid climate and can be planted at sea level, up to 300 m. It is propagated from seed, which typically germinate quickly, but can take up to 12 months to develop the seedling shoot. The tree will begin to bear fruit in around eight years and produces year round. Generally, the kepel is hardy to just above freezing when it is a few years old. Always protect from wind when growing in a marginal climate. New foliage is very tender; needs a sheltered location. Intolerant of both drought and salt. Soil/Nutrition: Fertile slightly acidic and well drained. Light: Part shade to full sun (when older). Juvenile trees prefer filtered sunlight / dappled shade.

Current location/conditions: West position, quite shaded.

Summary: I would like to keep this tree since it is rare and endangered, however, the location behind the established Carambola and beneath the neighbour's trees means it is in constant shade. It will be replanted on the concept design.



Yellow Mangosteen (*Garcinia xanthochymus*)



Description: Yellow Mangosteen is a round fruit with very tart yellow segments. The high acidity makes it ideal for jams and jellies but removing the seed and skin can be time consuming. It is much easier to grow in the subtropics than the purple mangosteen, but the flavour is altogether different. The fruit has a curved pointed end which makes it look like an inverted tear-drop. Like the common mangosteen, one can find persistent sepals and staminal bundles even on a mature, ripe fruit of *Garcinia xanthochymus*. Fruits produced by *Garcinia xanthochymus* are green when young and they turn bright yellow when ripe. They look extremely tempting and are often reported to have a juicy pulp with a pleasant acid flavour and can be eaten out of hand. It is used as a tamarind substitute in cooking. The tree is very attractive, with large drooping leaves and a layered form. The fruit can reach 8-10 cm in length and looks highly ornamental when in the tree. Golden yellow berry fruit, 3-4" in diameter with a yellow, juicy, and acidic pulp usually containing two seeds. Flavour is quite tasty, and a bit sour. Trees are fairly hardy. The *Garcinia* species is rather bushy and adopts a rather attractive, pyramidal growth habit that can be likened to a Christmas tree. Its large leaves are linear in shape, dark green, thick and leathery in texture and they hang down from the stiff branches that extend outwards in all directions from the main trunk. It is a slow-growing tree like many other *Garcinia* species. Like other species in the same genus, male and female flowers usually occur on separate plants. *Garcinia xanthochymus* is observed to produce both male flowers and bisexual (hermaphrodite) flowers in clusters. The latter can be distinguished by their longer longer axils. The bisexual flowers apparently self-pollinate so that fruits can form.

Current size: 0.5m high

Maturity size: Can attain a height of 8-15m and spread of 7m

Ideal location/conditions: The tree grows well in full sun and shade. It will tolerate and continue to fruit heavily in drought conditions. It is relatively easy to grow. Like many other *Garcinia* species, young individuals should be given shade when young. Plants should be given ample amounts of water during the hot and dry season. When established, this tree grows very vigorously and can adapt to a variety of soil types. It usually starts to produce fruits about 5 years after seed-sowing.

Current location/conditions: Currently sandwiched between 2 established trees (Carambola and Mandarin) in a West position, it will have no room to grow to full maturity size.

Summary: Because it is currently sandwiched between 2 established trees (Carambola and Mandarin) it will have no room to grow to full maturity size. However, since it grows well in shade, it could be replanted behind the Carambola and Mandarin to give more room and keep the 'food forest'.

Mandarin (*Citrus reticulata*)



Description: The Mandarin orange, also known as the mandarin or mandarine, is a small citrus tree (*Citrus reticulata*) with fruit resembling other oranges. The fruit is oblate rather than spherical. Mandarin oranges are usually eaten plain or in fruit salads. Specifically reddish-orange mandarin cultivars can be marketed as tangerines, but this is not a botanical classification. The tree is more drought-tolerant than the fruit. The mandarin is tender, and is damaged easily by cold. It can be grown in tropical and subtropical areas. The mandarin is easily peeled with the fingers, starting at the thick rind covering the depression at the top of the fruit, and can be easily split into even segments without squirting juice. This makes it convenient to eat, as utensils are not required to peel or cut the fruit. Citrus fruits are usually self-fertile (needing only a bee to move pollen within the same flower) or parthenocarpic (not needing pollination and therefore seedless, such as the satsuma). Citrus are native to Asia and are attractive, evergreen trees with fragrant blossoms. They are one of the most popular trees in the home garden but unfortunately unhealthy looking specimens are common, as their needs are not always understood. Citrus need regular feeding and attention paid to preventing pests and diseases.

Current size: 4m high, 3m wide

Maturity size: 7m height, 7m width

Ideal location/conditions: Choose an open, sunny position, preferably north to northeast facing, with shelter from strong winds. Wind can distort the shape of leaves with the damage becoming apparent months later. A fertile, well-drained soil with a pH between 6-8 is best. Citrus are vulnerable to root-rot so care must be taken to avoid badly drained areas. Ideally, prepare the soil several months ahead by digging over an area 1m in diameter and at least 30 cm deep. Add compost (half a barrow load), 2 kg of gypsum to the m² if the soil is heavy and 300-400 g of lime to the m² if the soil is acid (ph below 6.5). Mulch heavily and leave to decompose. If the drainage is poor it may be necessary to create a mound to plant on. Citrus trees are very hungry feeders with high requirements for trace elements. A regular spray with a seaweed fertiliser will supply trace elements. Fertilise citrus trees in April/May; always water the tree well after fertilising. Never place fertiliser close to the trunk or in heaps, spread it as evenly as possible to just past the drip-line of the tree. Compost or animal manures can be used starting with about 4 kg for a 1-year-old tree to 20 kg for a mature 8-year-old tree. In November/December apply lime or dolomite if necessary to correct the pH. Blood and bone contains mainly nitrogen and phosphorus, boost it into a more 'complete' fertiliser by adding a ¼ cup of sulphate of potash to every kilo of blood and bone. Citrus need regular watering from flower bud formation through to fruit set to retain a good crop. As they are relatively shallow-rooted, trees need even moisture throughout their root zone, water in the early morning or at night, especially during summer. Grass and weeds compete with your tree for water and nutrients, if left to grow long and rank under the tree they also encourage Collar Rot. Wet newspaper, at least 10 sheets thick, can be used to kill weeds and grass under the tree and then topped with mulch regularly to prevent weeds returning. Always mulch past the drip-line of the tree as this is the area where most of the feeder roots are found. Only ever pick dry fruit. Use secateurs to cut citrus from the tree and trim close to the 'button' as leaving a sharp stalk causes damage to the skins of nearby fruit in storage, causing rot.

Current location/conditions: It is in an open, sunny position on the West side of the property (but gets North/North East sunlight). It is well established and produces in abundance so the soil must be suitable.

Summary: It will stay as is for the concept design.



Finger Lemon (*Citrus medica* var. *Sarcodactylis*)



Description: Buddha's hand (also known as bushukan (*Japanese*) or fingered citron) (*Citrus medica* var. *sarcodactylis*) is an evergreen, fragrant citron variety whose fruit is segmented into finger-like sections. The citron grows on a shrub or small tree with long, irregular branches covered in thorns. Its large, oblong leaves are pale green and grow about four to six inches. Its white flowers are tinted purplish from the outside and grow in fragrant clusters. The fruit has a thick peel and only a small amount of acidic flesh (if any) and is juiceless and sometimes seedless. It is very fragrant and is used predominantly by the Chinese and Japanese for perfuming rooms and personal items, such as clothing. The peel of the fruit can be candied into succade. In Western cooking, it is often used for its zest. The inner white pith is not bitter as is usually the case with citrus, so the fingers may be cut off and then longitudinally sliced, peel, pith, and all, and used in salads or scattered over cooked foods such as fish. The fruit may be given as a religious offering in Buddhist temples. According to tradition, Buddha prefers the "fingers" of the fruit to be in a position where they resemble a closed rather than open hand, as closed hands symbolize to Buddha the act of prayer. The origin of Buddha's hand is traced back to Northeastern India or China. The tree itself is sensitive to frost, as well as intense heat and drought. It grows best in temperate conditions. Areas such as the coast of Southern California as well as inland valleys are considered ideal for its planting. Trees can be grown from cuttings taken from branches two to four years old. It is very commonly grafted onto sufficient rootstock

Current size: 1.4m high

Maturity size: The tree is shrubby and open in growth, to about 7m tall and 6m in spread.

Ideal location/conditions: Grow outdoors during warm weather and bring indoors during winter months because citrons can't take freezing temperatures. The crowning glory is the winter fruit. Average Water Needs; Water regularly; do not overwater. Prefers well drained soil in full sun. Protect plants in frost prone areas. Fertilise during the growing season.

Current location/conditions: West in full sun very close to the Mandarin tree.

Summary: The fruit from this tree is not particularly good for eating and the tree is not in a great location, being too close to the Mandarin tree. While it could be moved to a more appropriate location I think it is an opportunity to remove a tree from the property (since it already has too many trees).

Brazilian Custard Apple (*Rollinia deliciosa* or *R. mucos*)



Description: Also known as biriba or rollinia. A vigorous growing tree suited to tropical to coastal subtropical climates. Creamy fleshed fruit and eaten fresh. Fruits have soft spine pattern, smooth dark brown seeds and sweet aromatic creamy flesh. Pick when fruit slightly soft. Best eaten straight from tree. Flavour taints after 12-24hrs. *R. mucosa* is more frost tolerant and a heavier cropper than *R. deliciosa*. This fruit is a taste sensation with the fruit tasting of creamy lemon sherbet and lemon meringue pie. The large yellow fruit has a bumpy surface and soft spines; has brown, hairy twigs and alternate, deciduous, oblong-elliptic or ovate-oblong leaves, pointed at the apex, rounded at the base, 10-25 cm long, thin but somewhat leathery and hairy on the underside. The flowers, borne 1 to 3 or occasionally more together in the leaf axils, are hermaphroditic, 3/4 to 23.5 cm wide; triangular, with 3 hairy sepals, 3 large, fleshy outer petals with upturned or horizontal wings, and 3 rudimentary inner petals. The fruit is conical to heart-shaped, or oblate; to 15 cm in diameter; the rind yellow and composed of more or less hexagonal, conical segments, each tipped with a wart-like protrusion; nearly 3 mm thick, leathery, tough and indehiscent. The pulp is white, mucilaginous, translucent, juicy, subacid to sweet. There is a slender, opaque-white core and numerous dark-brown, elliptic or obovate seeds about 2 cm long. The wood of the tree is yellow, hard, heavy, strong and is used for ribs for canoes, boat masts, boards and boxes. Trees can bear in 3-4 years. Cooling the fruit after harvest will extend the shelf life by up to a week, but with significant loss of attractiveness, the skin going black, while the flesh inside remains palatable. Fruit are very soft and vulnerable to bruising - Their own weight often damaging the flesh when left resting on a hard surface.

Current size: 1.3m high

Maturity size: Large spreading tree. Spacing at 8 meters usually necessary. Biriba is a fast-growing tropical tree, reaching a height of 4-15 m. Average height of 7.5m and width of 6m.

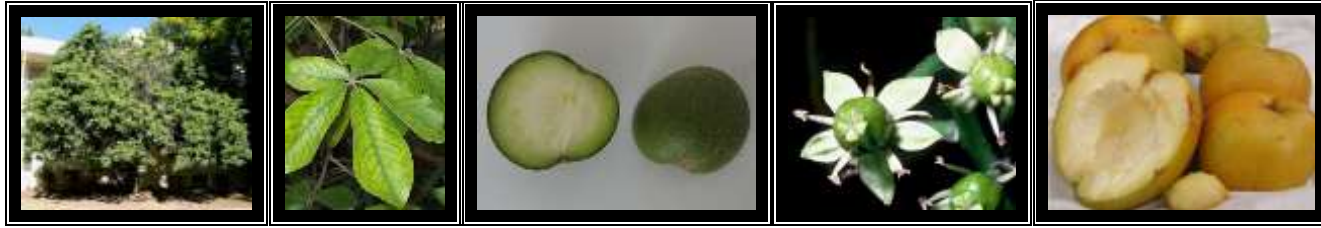
Ideal location/conditions: Suited to rich fertile preferably sandy loam soils in a sunny site in sub/tropical climates. Tolerates light frosts once established. For best results enrich soil with rich compost, mulch well and fertilise regularly during growing season. Water by deep soaking. Lightly prune to an open vase shape in Spring. High humidity is necessary for pollination and regular water is essential during flowering and fruit set to avoid premature ripening of the fruits. (Water stress causes premature ripening of fruit, so irrigation may be necessary during flowering, fruit set and early maturation) *Rollinia* trees are shallow rooted so they will need protection from strong winds. Root rot and collar rot appears easily contracted when roots are exposed or damaged by soil movement or excessive tree vibration.

Current location/conditions: In the South West corner of the property it is shaded by the Mandarin and neighbour's trees.

Summary: This is a delicious fruit and will contribute nicely to the 'food forest' if put in the correct position. Therefore, it will be replanted in to the South West corner once the neighbouring White Sapote and Jackfruit trees are removed.



White Sapote (*Casimiroa edulis*)



Description: The Casimiroa or white sapote as it is also known is native to the Mexican highlands and Central America. It is a pleasurable tasting fruit reminiscent of vanilla custard mixed with creamy banana and peaches. Although often called a white sapote it is not a member of the sapote family. The yellowy-green skinned fruit has white flesh and is used primarily as a dessert fruit. The trees have a very appealing drooping habit with long branches that can almost touch the ground. They are fast growing with two main spurts, once in early spring and again in early autumn. Casimiroa trees fruit prolifically and a healthy mature tree can produce 1000 fruit per year. They are also long lived and can crop for 100 years or more. Fruits should be picked when they are just beginning to soften and change colour from green to yellow, if picked too soon they are astringent. Do not plant close to paths or buildings as they can have troublesome root systems. The trees are evergreen. The leaves are alternate, palmately compound with 3-5 leaflets, the leaflets 6-13 cm long and 2.5-5 cm broad with an entire margin, and the leaf petiole 10-15 cm long. The tree is deciduous under drought and other stress. The tree casts a dense shade. Growth is rapid, in flushes. It is densely branching, drooping at maturity. Young trees tend toward a single, limber stem for first 2 years often requiring staking. White sapotes have a taproot and other fibrous roots that are wandering and greedy like citrus. The odourless flowers, small and greenish-yellow, are 4- or 5-parted, and born in terminal and auxiliary panicles. They are hermaphrodite and occasionally unisexual because of aborted stigmas. They follow growth flush and often rebloom again several months later. The flowers are attractive to bees, hoverflies and ants. The pollination tendencies or requirements of various cultivars have not yet been fully determined. The fruit is an ovoid drupe, 5-10 cm in diameter, with a thin, inedible skin turning from green to yellow when ripe, and an edible pulp, which can range in flavour from bland to banana-like to peach to pear to vanilla flan. The pulp can be creamy-white in green skin varieties or a beige-yellow in yellow skin varieties. It contains from one to five seeds that are said to have narcotic properties. The fruit ripens six to nine months from bloom. Some cultivars are alternate bearing. White sapotes bear within 10 years from seed, or 2 - 8 years from graft.

Current size: 6m high, 4m wide

Maturity size: Mature trees range from 5-16 m tall and wide.

Ideal location/conditions: The white sapote is successful wherever oranges can be grown. Before planting, consider the mess made by unpicked fruit. Planting over a patio can be a big mistake. The ultimate size of the tree should also be kept in mind. They prefer full sun. White sapotes prefer a well-drained soil with a pH between 5.5 and 7.5, but the tree will grow in almost any soil as long as it is well-drained. They are drought tolerant but produce better fruit with regular, deep watering. Deep watering is also necessary to keep greedy roots deep in the ground. Shallow watering can encourage surface roots that will break pavement or ruin lawns. Drip irrigation is suitable for young trees. They will tolerate some salts, but gradually decline. White sapotes are often most productive following wet winters. Fertilizer formulas should vary with the nature of the soil, but, in general, the grower is advised to follow procedures suitable for citrus trees. Many white sapote trees have received little or no care and yet have been long-lived.

Current location/conditions: South West corner of the property, in full sun. It is a healthy tree and seems to like its position, soil, etc.

Summary: Like the Jackfruit and Black Sapote - Even though it is a beautiful tree it will simply grow too large for this property given the other trees that have already been planted. To remove the least possible trees and keep the greatest diversity for a food forest, this tree will be removed for the concept design.

Jackfruit (*Artocarpus heterophyllus*)



Description: The jackfruit (*Artocarpus heterophyllus* or *A. heterophylla*) is a species of tree in the mulberry family (Moraceae), which is native to parts of Southern and Southeast Asia. It is the national fruit of Bangladesh. Jackfruit is also found in Africa e.g. in Uganda. It is well suited to tropical lowlands. Its fruit is the largest tree-borne fruit in the world, reaching 36 kg in weight and up to 90 cm long and 50 cm in diameter. The flesh of the jackfruit is starchy, fibrous and is a source of dietary fiber. The flavour is similar to a tart banana. Varieties of jackfruit are distinguished according to the characteristics of the fruits' flesh. In Brazil, three varieties are recognized. These are: *jaca-dura*, or "hard" variety, which has firm flesh and the largest fruits that can weigh between 15 and 40 kilograms each; *jaca-mole*, or "soft" variety, which bears smaller fruits, with softer and sweeter flesh; and *jaca-manteiga*, or "butter" variety, which bears sweet fruits, whose flesh has a consistency intermediate between the "hard" and "soft" varieties. Jackfruit is commonly used in South and Southeast Asian cuisines. It can be eaten unripe or ripe, and cooked or uncooked. Immature fruit can be cut up, and used as a vegetable, or pickled, or canned in brine. Ripe fruit is eaten fresh or can be made into chutney, jam, jelly, or preserved as candies by drying and mixing with sugar, honey or syrup. The pulp is also used to flavour ice cream and beverages. The edible seeds can also be used in certain recipes. It is an evergreen tree. The leaves are alternately arranged, elliptical, 5-25 cm long and 3-12 cm broad, often lobed on young trees but entire on mature trees. The flowers are produced in dense inflorescences 3-7 cm long and 1-2.5 cm broad; the male and female flowers produced on separate inflorescences, the female inflorescences commonly borne on thick branches or the trunk of the tree (cauliflory). The quick growing tree should bear fruit within three years. Main harvest time is around winter but may bear throughout the year. The fruit is mature when there is a change in colour, from pale green to brownish-yellow. Although one plant grown alone will produce fruit, grow a few together to increase yields via cross pollination. The wood of the tree is used for the production of musical instruments. Jackfruit wood is widely used in the manufacture of furniture, doors and windows, and in roof construction. The heartwood of the jackfruit tree is used by Buddhist forest monastics in Southeast Asia as a dye, giving the robes of the monks in those traditions their distinctive light brown colour.

Current size: 4.5 m high, 1.5m wide

Maturity size: Height 10-17m, spread to 10m - not suitable for small yards

Ideal location/conditions: Full sun to part shade in well drained soil. Wind, drought and somewhat frost tolerant once established, but water well to increase growth and fruit yield.

Current location/conditions: In a full sun position in South West corner of the property. Looks healthy.

Summary: Like the White Sapote and Black Sapote - Even though it is a beautiful tree it will simply grow too large for this property given the other trees that have already been planted. To remove the least possible trees and keep the greatest diversity for a food forest, this tree will be removed for the concept design.



Black Sapote (*Diospyros digyna*)



Description: Black Sapote or Black Persimmon (*Diospyros digyna*) is a species of persimmon that is native to eastern Mexico and Central America south to Colombia. Other names include Chocolate Pudding Fruit and (in Spanish) *Zapote Prieto*. In south Florida it is also sometimes confused with the Coco Fruit, a toxic relative that can cause insanity. It is unrelated to the mamey sapote (Sapotaceae), and the white sapote (Rutaceae). The tree is evergreen and frost sensitive. The leaves are elliptic-oblong, tapered at both ends, glossy, and 10–30 cm (3.9–12 in) long. Black Sapote fruit are tomato-like and measure 5–10 cm (2.0–3.9 in) in diameter, with an inedible skin that turns from olive to a deep yellow-green when ripe and an edible pulp that turns from white when unripe to a flavour, colour and texture often likened to chocolate pudding when ripe. Harvest in Autumn-Winter. Pick the fruit when it is hard and green. Fruit begins to soften and go brown within 3-6 days after picking. This is the ripe stage - you should be able to press the skin with your fingers and leave an indent. Start harvesting when all the local birds move into the area and start to feed on the fruit. Three years until first crop.

Current size: 2m width, 2.1m height

Maturity size: Mature trees can grow to over 25 m in height but the average is 9m height and width

Ideal location/conditions: Adaptable to a wide range of tropical and sub-tropical climates. Young trees need protection from cold wind and frost. Trees can be frost sensitive. Trees are not too particular about soil and nutrient support, provided drainage is good. Fruits ripen in winter but depending on the tree may fruit a few months earlier or later. Fruits are best picked and eaten when fully ripe, the pulp becomes soft and pudding like at this stage.

Current location/conditions: In a full sun position in South West corner of the property. Looks healthy.

Summary: Like the White Sapote and Jackfruit - Even though it is a beautiful tree it will simply grow too large for this property given the other trees that have already been planted. To remove the least possible trees and keep the greatest diversity for a food forest, this tree will be removed for the concept design. Also, it would not be my choice of fruit for eating.

Pomelo (*Citrus maxima* or *Citrus grandis*)



Description: The pomelo (*Citrus maxima* or *Citrus grandis*) is a citrus fruit native to Southeast Asia. It is usually pale green to yellow when ripe, with sweet white (or, more rarely, pink or red) flesh and very thick pudgy rind. It is the largest citrus fruit, 15–25 cm in diameter, and usually weighing 1–2 kg. The pomelo tastes like a sweet, mild grapefruit, though the typical pomelo is much larger in size than the grapefruit. It has very little, or none, of the common grapefruit's bitterness, but the enveloping membranous material around the segments is bitter, considered inedible, and thus usually discarded. The peel is sometimes used to make marmalade, or candied, then (sometimes) dipped in chocolate. The peel of the pomelo is also used in Chinese cooking. In general, citrus peel is often used in southern Chinese cuisine for flavouring, especially in sweet soup desserts.

Current size: 1.6m high, 1.5m wide

Maturity size: 5-15m height, 6-7m width

Ideal location/conditions: It is fond of warm and humid weather, fear cold. Thus, temperature is the determinant factor for the distribution and growth of pomelo trees. The most agreeable temperature: annual average temperature 16.6-21.3°C. Most suitable temperature for sprout is 12.5°C. Most suitable temperature for growth is 23-30°C. Temperature exceeding 37°C inhibits the growth. Among all the citrus fruit trees, pomelo is relatively shade resistant. But to have high output with high quality, it still needs preferable sunshine condition. With adequate sunshine, the leaves are dense and green. Due to more accumulation of photosynthesis, there are more sugar and less acid in the fruit which improves the fruit quality and its storability and reduce the plant diseases. If hide and reduce sunshine, the fruit quality would apparently be inferior. But pomelo should avoid direct strong sunshine. It has wide adaptability on soil categories and soil PH value. Pomelo tree can survive and grow on all the kinds of soils, such as Red soil and yellow soil which are developed from granite, limestone, sandstone or argillite, laterit soil which is developed from basalt, purple soil which is developed from purple shale, alluvium soil on delta-marginal plain, paddy soil. Pomelo trees can be planted in all places like mountain, sloping field, paddy, river banks, neighbourhood of house and villages etc. It completes its systematic growth in the circumstances with high temperature and humidity. Thus, abundant water is necessary during its growth. Breeze and light wind promote pollination, boost the air flow in the orchard which is good for adjusting the temperature and the humidity in the orchard, accelerate roots absorbance, raise photosynthesis and reduce the spreading of plant diseases.

Current location/conditions: In full position in South West corner of the property.

Summary: If the Kepel Apple and Brazilian Custard Apple are moved to the South West corner, there is not enough room for the Pomelo also. Additionally, it would not be a fruit I would choose to eat. Therefore, it will be removed from the concept design.



Cashew Nut (*Anacardium occidentale*)



Description: The cashew (*Anacardium occidentale*; syn. *Anacardium curatellifolium* A.St.-Hil.) is a tree in the flowering plant family Anacardiaceae. The plant is native to northeastern Brazil. Its English name derives from the Portuguese name for the fruit of the cashew tree, *caju*, which in turn derives from the indigenous Tupi name, *acajú*. It is now widely grown in tropical climates for its cashew nuts and cashew apples. The tree is evergreen, with a short, often irregularly shaped trunk. The leaves are spirally arranged, leathery textured, elliptic to obovate, 4 to 22 cm long and 2 to 15 cm broad, with a smooth margin. The flowers are produced in a panicle or corymb up to 26 cm long, each flower small, pale green at first then turning reddish, with five slender, acute petals 7 to 15 mm long. Flowering for the cashew tree is similar to the close relative mango tree: both male and perfect flowers are born in the same inflorescence (polygamous). Individual flowers are 1/4" across, with crimson petals, often striped longitudinally and reflexed. They are borne terminally on panicles, generally at the beginning of the dry season. Flowering may occur over several weeks, and it is not uncommon to have ripening fruit and flowers on the tree at the same time. What appears to be the fruit of the cashew tree is an oval or pear-shaped accessory fruit (sometimes called a pseudocarp or false fruit) that develops from the receptacle of the cashew flower. Called the cashew apple, better known in Central America as "marañón", it ripens into a yellow and/or red structure about 5–11 cm long. It is edible, and has a strong "sweet" smell and a sweet taste. The pulp of the cashew apple is very juicy, but the skin is fragile, making it unsuitable for transport. The true fruit of the cashew tree is a kidney or boxing-glove shaped drupe that grows at the end of the accessory fruit. The drupe develops first on the tree, and then the peduncle expands into the cashew apple. Within the true fruit is a single seed, the cashew nut. Although a nut in the culinary sense, in the botanical sense the nut of the cashew is a seed. Trees are at least partially self-fruitful, as lone trees can bear many fruit. One study of pollination biology showed no difference in pollen tube growth between self and cross pollinated flowers, yet final yield was higher when cross pollinated. In practice, cashews are often grown from seed, and cross pollination in orchards must occur to a high degree. Another study showed no indication of self-incompatibility, but a low percentage of fruit set (1-18%). Fruit set is highest in flowers that open first, and suggests some type of apical dominance with respect to fruit set, as found in the close relative the pistachio. Fruit set is similar for female and perfect flowers. Various insects, even flies and ants provide pollination.

Current size: 0.8m high

Maturity size: growing to 10-12m tall and the same in width

Ideal location/conditions: You can grow cashew trees anywhere in the wet/dry tropics. Day temperatures for growing cashews should not drop below 10°C, and cashew trees handle temperatures above 40°C well. An average day temperature of around 25°C is ideal. As long as they have some water cashew trees grow like weeds. They are fairly draught resistant and grow well even on marginal soils where other fruit trees would fail. The best soils for growing cashews are sandy soils, but sandy soils don't hold much water and are generally not very fertile. The trees will still do fine without additional attention. However, if a good crop is important to you then you need to supply your cashew trees with additional water and fertilizer. Irrigate during dry periods, and fertilize the trees when they actively grow, as well as during flowering and nut development. Cashew trees will not grow in poorly-drained soils.

Current location/conditions: South side of the property.

Summary: Cashew nut trees are not known to produce very well in Brisbane. It is a very large tree for a property already full of trees and while they can self pollinate, yield is higher when they can cross pollinate. Therefore, this tree will be removed from the concept design.

Santol (*Sandoricum koetjape*)



Description: The santol (sandorica) (*Sandoricum koetjape*, syn. *S. indicum* and *S. nervosum*) is a tropical fruit grown in southeast Asia. The Santol is believed native to former Indochina and Peninsular Malaysia, and to have been introduced into India, Borneo, Indonesia, the Moluccas, Mauritius, and the Philippines where it has become naturalized. It is commonly cultivated throughout these regions and the fruits are seasonally abundant in the local markets. There are two varieties of santol fruit, previously considered two different species, the yellow variety and the red. Both types have a skin that may be a thin peel to a thicker rind. It is edible and contains a milky juice. The white, translucent, juicy pulp (aril) is sweet, subacid or sour. It surrounds the 3 to 5 brown, inedible seeds which are up to 2 cm long, tightly clinging or sometimes free from the pulp. The fruit (technically a capsule) is globose or oblate, with wrinkles extending a short distance from the base; 4-7.5 cm wide; yellowish to golden, sometimes blushed with pink. It bears ribbed leaves and pink or yellow-green flowers about 1 centimeter long. The evergreen, or very briefly deciduous, spirally-arranged leaves are compound, with 3 leaflets, elliptic to oblong-ovate, 20-25 cm long, blunt at the base and pointed at the apex. The greenish, yellowish, or pinkish-yellow, 5-petaled flowers, about 1 cm long are borne on the young branchlets in loose, stalked panicles 15-30 cm in length. The santol is a very productive tree. A mature tree can produce between 18,000 and 24,000 fruits per year. The santol is a fast-growing, straight-trunked, pale-barked tree, branched close to the ground and buttressed when old. Young branchlets are densely brown-hairy.

Current size: 1.4m high

Maturity size: Distance of planting from each other is approximately 6m. Santol is a very elegant fast growing tree which can attain height from 15-50m.

Ideal location/conditions: It is a tree of humid tropical regions and it grows from sea level of elevation to a height of 3,000 feet above sea level. It grows better in deep and organic grounds, and with great distribution of rainfall throughout the year. However, it tolerates long periods of dry season. It requires fertilization two times a year so it can grow better. Normally, seed trees produce fruit after 5 or 7 years of age, while this on produces in 3 or 4.

Current location/conditions: Directly under the canopy of the neighbour's weeping fig, along the fence which has a building on the other side of it.

Summary: This tree will grow too large for this property if given the chance. It is unlikely though, given it is planted directly beneath the neighbour's weeping fig. This tree will be removed for the concept design, to make room for smaller more appropriate trees.



Soursop (*Annona muricata*)



Description: The soursop (*Annona muricata*) is a small, upright, broadleaf flowering evergreen tree native to Mexico, Central America, the Caribbean and northern South America, Colombia and Brazil. Soursop is also native to sub-Saharan African countries that lie within the tropics. Today, it is also grown in some areas of Southeast Asia. It is in the same genus as the chirimoya and the same family as the pawpaw. Other common names include: *guanábana* (Spanish), *graviola* (Portuguese), Brazilian pawpaw, *corossolier*, *guanavana*, *togebanreisi*, *durian benggala*, *angka blanda*, and *angka londa*. The prickly green fruit is 20–30 cm long and can have a mass of up to 2.5 kg. Its flavour is described as a combination of strawberry and pineapple with sour citrus flavour notes contrasting with an underlying creamy flavour reminiscent of coconut or banana. The flesh of the fruit consists of an edible white pulp and a core of indigestible black seeds. The species is the only member of its genus that is suitable for processing and preservation. The sweet pulp is used to make juice as well as candies, sorbets, and ice cream flavourings. Abundant seeds - the average weight of 1000 fresh seeds is 470 grams and had an average oil content of 24%. When dried for 3 days in 60 °C the average seed weight was 322 grams and were tolerant of the moisture extraction; showing no problems for long-term storage under reasonable conditions. The young branches are hairy. Leaves are oblong to oval, 8cm to 16cm long and 3cm to 7cm wide. Glossy dark green with no hairs above, paler and minutely hairy to no hairs below. The leaf stalks are 4mm to 13mm long and without hairs. Flower stalks (peduncles) are 2mm to 5mm long and woody. They appear opposite from the leaves or as an extra from near the leaf stalk, each with one or two flowers, occasionally a third. Stalks for the individual flowers (pedicels) are stout and woody, minutely hairy to hairless and 15mm to 20mm with small bractlets nearer to the base which are densely hairy. Petals are thick and yellowish. The perishable nature of the fruit is a serious handicap for large scale commercial production. So the tree is commonly planted in home gardens and the fruits can be seen fruit in markets everywhere in tropical countries.

Current size: 4m high, 2m wide

Maturity size: Generally a small-medium tree 4-8m tall and 4.5m wide

Ideal location/conditions: Soursop trees require much warmth and humidity, lots of water, and will be killed by temperatures below 0DegC. In the tropics, soursops are grown from sea level to 1000m, particularly in humid regions where the tree grows particularly well. They cannot tolerate standing water, and its roots are shallow, so it does not require a very deep soil base. Growth and fruiting are hampered severely by cold spells and light frosts kill the tree. A dry season enhances leaf fall and synchronizes extension growth and flowering to some extent. Yields may be higher under these conditions, provided that high humidity prevails during the period of fruit set. The tree basins should be kept free weeds or covered with mulch to avoid dehydration of the shallow roots during the dry season. The trees shed too many leaves if they experience prolonged drought, and in that situation they would benefit from supplementary irrigation. The soursop will reportedly fruit as a container specimen, even in temperate climates, if protected from cool temperatures. Being a small and a precocious tree, this fruit may also be planted as an intercrop between larger fruit trees such as mango. When the main crop requires the space, the soursop trees uprooted.

Current location/conditions: This tree is doing well on the South West corner of the house.

Summary: This tree will be kept for the concept design as it is doing well where it is and has no competition from surrounding plants.

Malabar Chestnut (*Pachira glabra*)



Description: This medium sized fast growing evergreen tree is grown in many parts of the world. It is sometimes known as the Saba Nut, Guiana chestnut, provision tree, Monguba (Brasil), Pumpo (Guatemala) and is commercially sold under the name money tree and money plant. It is grown mainly for its edible seeds; however it also makes a suitable potted indoor plant or outdoor specimen. The large white flowers are very fragrant, another reason to have it in the garden. Overall, this versatile tree is a handsome landscape addition. The seeds can be eaten either raw or roasted. When roasted or fried in oil they taste like chestnuts or cashews, raw they taste like peanuts and keep for months in a cool, dry place. They can also be ground and used as a flour substitute when baking bread. The young leaves and flowers are cooked and delicious eaten as a vegetable. Production starts within a few years. The large, white, self-fertile flowers display spectacular clusters of 10cm cream-white stamens. The fruit is a woody green five-valved pod up to 30cm in length. The capsules that follow burst open when the seeds are ripe. It is a tropical wetland tree native to Central and South America where it grows in swamps. It has shiny green palmate leaves with lanceolate leaflets and smooth green bark. Its showy flowers have long, narrow petals that open like a banana peel to reveal hairlike yellowish orange stamens.

Current size: 3m high, 2m wide

Maturity size: Can grow up to 18 m in height in the wild but generally 7m height and 3m width

Ideal location/conditions: The plant grows well in mild inland parts and coastal areas. The plant will tolerate brief exposure to low temperatures but won't tolerate frost. A frost-free location with some protection from hot, drying winds is the best choice. It will take full sun to partial shade. Malabar chestnuts are not overly fussy about soil as long as it is well drained. It needs plenty of sunlight though it is important to avoid direct sunlight during the summer months as the leaves may get sunburned. It naturally grows near freshwater streams and swamps, so provide ample water when cultivating. Despite its aquatic tendencies, the Malabar Chestnut can survive periods of drought.

Current location/conditions: Beneath the neighbour's weeping fig on the South side of the property. Well established and healthy.

Summary: This tree will be kept in the concept design as it is healthy and seems to like its position, despite being under the fig.



Velvet Apple (*Diospyros blancoi*)



Description: Mabolo, Velvet Apple or (locally) *kamagong* (*Diospyros blancoi*) is a plant of the genus of ebony trees and persimmons, *Diospyros*. Its edible fruit has a skin covered in a fine, velvety fur which is usually reddish-brown, and soft, creamy, pink flesh, with a taste and aroma comparable to fruit cream cheese (the aroma of the fruit itself, however, is unpleasant, comparable to rotten cheese or cat feces; inspiring names like the french "Caca de Chat" in Reunion). The fruits are about 3 inches in diameter. It is native to the Philippines, where *kamagong* usually refers to the entire tree, and *mabolo* is applied to the fruit. Male and female flowers are produced on separate trees. Both flowers are necessary for pollination and fruit set. Fruiting generally occurs during summertime with fruits ripening from 2-4 months after flowering. The white waxy flowers have 4 petals and are 1 cm in diameter when fully open. Most fruits develop without seeds and are flattened-globose in shape. Those that develop seeds, however are elongated and very similar in shape to the apple. The oblong-acute leaves are 10 to 25 cm long, shiny green on the upper surface, and orange pubescent underneath. The main crop of the velvet apple is produced in late summer, but a few fruit can be found on the tree most of the year. The fruit is usually eaten fresh, complete with skin, after the hairy covering is rubbed off. Good varieties are popular as a dessert fruit and for the preparation of various drinks.

Current size: 1.4m high, 1m width

Maturity size: Large tree to 15-30m height.

Ideal location/conditions: Grow in full sun. It needs a good distribution of rainfall through the year - Water regularly. It is a tropical tree that grows well in a diversity of grounds, from the sea level to the 2,400 feet above sea level. Seed trees are normally planted 30 feet from each other. Trees that were planted by seeds could take 6 or 7 years to give out fruit, but trees that were propagated by cuttings produce fruit in 3 or 4 years. It is a very productive tree.

Current location/conditions: This tree is doing well on the South side of the house.

Summary: Despite looking healthy, this fruit is not appealing to me and the mature size of the tree is not appropriate for its current location. Therefore, the concept design will have it removed.

Feijoa-Apollo (*Acca sellowiana*)



Description: This versatile tree, also known as the Pineapple Guava and Guavasteen, is highly ornamental as well as producing a delicious fruit and magnificent flowers. The petals of the flowers have a very sweet taste and are a pretty addition to salads and sweets. *Acca sellowiana* is a species of flowering plant in the myrtle family, Myrtaceae, that is native to the highlands of southern Brazil, Colombia, Uruguay, and northern Argentina. It is an evergreen shrub or small tree. It is widely cultivated as a garden plant and fruiting tree and is a perennial. The fruit, maturing in autumn, is green, ellipsoid, and about the size of a chicken egg. It has a sweet, aromatic flavour. The flesh is juicy and is divided into a clear gelatinous seed pulp and a firmer, slightly gritty, opaque flesh nearer the skin. The fruit drops when ripe and at its fullest flavour, but may be picked from the tree prior to the drop to prevent bruising. The Feijoa pulp is used in some natural cosmetic products as an exfoliant. Feijoa fruit has a distinctive smell. The aroma is due to the ester methyl benzoate and related compounds that exist in the fruit. Flowers: Clusters of exotic white petal-ed blooms, one to two inches wide, are centered with a red tassel of stamens topped with orbs of yellow pollen. Blooms occur in May on mature plants. Whole flowers make an attractive dish garnish. The sweet edible white petals can be used in salads or desserts. Foliage: Evergreen three-inch long oval leaves are dark green above with silvery gray-green undersides to camouflage the fruit from below. Design Tip: Include one or more in a blooming mixed hedgerow or use as an evergreen backdrop to a mixed border. A specimen plant can be groomed into a single-trunk standard. This slow growing evergreen occurs naturally as a multi-stemmed shrub with gracefully curving trunks.

Current size: 1.7m high, 2m wide

Maturity size: Un-pruned shrubs grow 3-7m in height

Ideal location/conditions: It is a warm-temperate to subtropical plant that also will grow in the tropics, but requires some winter chilling to fruit and the plant is frost-tolerant. In the northern hemisphere this species has been cultivated as far north as western Scotland, but under such conditions it does not fruit every year, as winter temperatures below approximately -9°C kill the flower buds. Large quantities of the fruit are grown in New Zealand, where it is a popular garden tree and the fruit commonly is available in season. The New Zealand season runs from March to June. Soil: It will grow in a wide variety of soils, but performs best in a well-drained humus-rich soil. Mature plants become extremely drought tolerant, but best fruit and bloom develops with heavy spring rains or occasional deep irrigation. Light Exposure: Plant in full sun to partial shade.

Current location/conditions: Beneath the neighbour's weeping fig on the South side of the property. Well established and healthy.

Summary: This tree will be kept in the concept design as it is healthy and seems to like its position, despite being under the fig.



Custard Apple (*Annona reticulata*)



Description: Custard Apples are a sub-tropical deciduous tree belonging to the *Annonaceae* family. This family contains over 2000 members spread throughout the world. Of this family, it is the *atemeoya*, a hybrid of the *Annona* genus that Australia's commercial cultivars derive from. Custard Apple trees are large and spreading, shaded by large, green drooping leaves. The tree sets many light yellow trumpet shaped flowers that emit a pungent, sweet smell especially in the late afternoon when the male pollen sacks burst open. Of these flowers, only a small number will set fruit. The Fruit takes between 20 and 25 weeks to reach maturity in sub-tropical climates where the days are not too warm and the nights not too cool. There are two main varieties of Custard Apples, the Pinks Mammoth (or Hillary White) and the African Pride. Both are sweet, juicy and full of flavour. Pinks Mammoth are large super sweet fruit which some growers hand pollinate at flowering to improve fruit shape. These trees can produce fruit weighing as much as 3kg. African Prides are a medium sized, well shaped 500g to 800g fruit that sets well on the tree. Both fruit when mature turn from dark green to a light green or jade colour. Pinks Mammoth can also, when mature, show a yellowing between the fruit carpules. Stems and leaves: The slender leaves are not hairy, straight and pointed at the apex (in some varieties wrinkled), 10 centimetres (3.9 in) to 20 centimetres (7.9 in) long and 2 centimetres (0.79 in) to 7 centimetres (2.8 in) wide. Flowers: The yellow-green flowers are generally in clusters of three or four 2 centimetres (0.79 in) to 3 centimetres (1.2 in) diameter, with three long outer petals and three very small inner ones. Fruits and reproduction: The fruit is variable in shape: heart-shaped or spherical. The size ranges from 7 centimetres (2.8 in) to 1 centimetre (0.39 in), depending on the cultivar. When ripe, the fruit is brown or yellowish, with red highlights and a varying degree of reticulation, depending again on the variety. The flesh varies from juicy and very aromatic to hard with a repulsive taste. The fruits are variable in shape, oblong, or irregular. The size ranges from 7 centimetres (2.8 in) to 12 centimetres (4.7 in). When ripe, the fruit is brown or yellowish, with red highlights and a varying degree of reticulation, depending on variety. The flavour is sweet and pleasant.

Current size: 1.5m high (Outside West end of South garden bed); 1.5m high (Middle of South garden bed); 1.8m height (East inside South garden bed)

Maturity size: reaching 8 - 10 metres tall with an open, irregular crown

Ideal location/conditions: Possibly a native of the Caribbean and Central America, *Annona reticulata* is now pantropical and can be found growing between altitudes of 0 metres to 1,500 metres in areas of Central America that have alternating seasons. Cultivated and naturalized in many parts of the world including Southeast Asia, Taiwan, India, Australia, and West Africa. Prefers low elevations, and a warm, humid climate. Grow in full sun. Water regularly.

Current location/conditions: All of the custard apples are on the South side of the property without access to full sun all year round.

Summary: The Custard Apple outside the West side of the garden bed will remain because it is the healthiest of the 3 on the property and has the least competition from neighbouring trees. The other 2 are very close to the Sweetsop, Yellow Jaboticaba, Grumichama, Abiu and Jaboticaba and both are not growing very well, so they will be removed from the concept design.

Fig, Black Genoa (*Ficus carica* Variety)



Description: Quick growing, self-fertile, deciduous tree bearing masses of red fleshed fruit during Summer. Good jam fig. Fruiting in 3-4 years. Harvest in summer. A medium sized, pear-shaped fruit, purplish skin and red flesh, good for fresh eating but not suitable for drying. Figs often produce two crops annually; the early picking, often in about Dec, is known as the Breba crop (these are frequently big fruit) and the later picking is the Higos or main crop. Traditionally figs for drying were allowed to drop on the ground to ensure absolute ripeness and maximum sugar. We tend to pick when the fig softens and droops. Judging ripeness in the Common fig is a bit of an art. The milky sap which oozes from the stem of unripe or not-quite-ripe figs when picked can be irritating to the skin, so you may want to wear gloves.

Current size: 0.8m high

Maturity size: Grows 3-5m High and 4.5m Wide

Ideal location/conditions: Figs grow best in light well drained neutral soil in full sun. While they prefer a warm, dry climate they appreciate plenty of water while the fruit is developing. Plant in well worked soil (incorporate fertiliser and/or compost), Water in well and keep moist until established. Apply fertiliser, as recommended, annually in Winter. Fig trees usually require little pruning as they naturally form a good shape. However, old trees may require a regenerative prune as the fruit is borne on new wood. The Riverland in South Australia provides the ideal climate. Too high summer temperatures can result in pulpless fruit and cool, damp conditions during ripening give rise to splitting and fungal attack. It doesn't like cold but can survive temperatures of minus 10 degrees C when dormant. Late frosts hurt it badly. It is tolerant of alkaline soils of many textures but will not put up with wet feet or very acid soils (under pH 6). It is somewhat forgiving with respect to salinity accepting water of up to 1000 ppm salts. Figs are not nearly as tough as many people would have you believe, so kid-glove treatment is in order for the first year in the ground particularly but even beyond that time they need plenty of water and fertilizer to be productive. The fig dislikes wind but loves creekside locations and high fertility sites (and is adept at cracking its way into underground sewer pipe systems). However too much Nitrogen can cause excess leaf production and slower ripening of fruit. Its spreading root system is quite shallow and competitive, giving nearby trees a fairly hard time. It doesn't appreciate having its roots torn up by cultivation. Prune the tree up on a single trunk of at least 75cm and don't allow sucker growth or you'll end up with an unpickable thicket. Generally annual pruning for form is all that is required. Bear in mind that the fruit is borne new wood.

Current location/conditions: South side of property within dripline of neighbour's weeping fig.

Summary: Even though this tree is not in an ideal position it appears to be growing well. I will leave it in the concept design since it is already there, does not interfere with any other trees currently around it and will not grow to be very big.



Cherimoya (*Annona cherimola*)



Description: The cherimoya (*Annona cherimola*) is a species of *Annona* native to the Andean-highland valleys of Bolivia, Chile, Colombia, Ecuador and Peru. It is a deciduous or semi-evergreen shrub or small tree. The leaves are alternate, simple, oblong-lanceolate, 7–15 cm long and 6–10 cm broad. The flowers are produced in small clusters, each flower 2–3 cm across, with six petals, yellow-brown, often spotted purple at the base. The fruit is oval, often slightly oblique, 10–20 cm long and 7–10 cm diameter, with a smooth or slightly tuberculated skin. The fruit flesh is white, and has numerous seeds embedded in it. The fruit is fleshy and soft, sweet, white in colour, with a sherbet-like texture, which gives it its secondary name, custard apple. Some characterize the flavour as a blend of banana, pineapple, papaya, peach, and strawberry. Others describe it as tasting like commercial bubblegum. Similar in size to a grapefruit, it has large, glossy, dark seeds that are easily removed. The seeds are poisonous if crushed open and can be used as an insecticide. An extractive of the bark can induce paralysis if injected. When ripe the skin is green and gives slightly to pressure, similar to the avocado. When shopping, one should look for large fruit which are uniformly green. Avoid fruit with cracks or mostly browned skin. Ripe fruit may be kept in the refrigerator, but it is best to let immature cherimoyas ripen at room temperature, until they yield to gentle pressure. The flowers are hermaphroditic, but have a mechanism to avoid self pollination. The short-lived flowers open as female, then progress to a later, male stage in a matter of hours (36 hours for each stage). This requires a separate pollinator that not only can collect the pollen from flowers in the male stage, but also deposit it in flowers in the female stage. It is acknowledged that there must be such a natural pollinator, and while so far studies of insects in the cherimoya's native region have been inconclusive, some form of beetle is suspected. Quite often, the female flower is receptive in the early part of the first day, but pollen is not produced in the male stage until the late afternoon of the second day. Honey bees are not good pollinators, for example, because their bodies are too large to fit between the fleshy petals of the female flower. Female flowers have the petals only partially separated, and the petals separate wide when they become male flowers. So the bees pick up pollen from the male flowers, but are unable to transfer this pollen to the female flowers. The small beetles which pollinate cherimoya in its land of origin are much smaller than bees. For fruit production outside the cherimoya's native region, cultivators must either rely upon the wind to spread pollen in dense orchards or else pollinate flowers by hand. Complicating matters is the notoriously short lifespan of cherimoya pollen. The name originates from the Quechua word *chirimuya*, which means "cold seeds," because the plant grows at high altitudes and the seeds will germinate at higher altitudes.

Current size: 3m high, 2m wide

Maturity size: reaching 7 m tall, 6m wide

Ideal location/conditions: The cherimoya is subtropical. Young trees are susceptible to frost. Trees do not like intense heat or desert conditions. In cool climates, branches will defoliate for a few months in winter. Cherimoya's like cool summers and cool nights. Very hot or cold weather and cold or hot winds can be damaging. Water frequently when the plant is putting out new growth, infrequently when the plant is dormant. Fertilize every three months for best growth. The tree thrives throughout the tropics at altitudes of 1,300 to 2,600 m. Though sensitive to frost, it must have periods of cool temperatures or the tree will gradually go dormant. The indigenous inhabitants of the Andes say that although the cherimoya cannot stand snow, it does like to see it in the distance.

Current location/conditions: Western end of the South garden bed.

Summary: The flowers are hermaphroditic but have a mechanism to avoid self pollination. Therefore, it would be unlikely to fruit unless pollinated by hand. Despite this, I will recommend to keep this tree in the concept design since it is so healthy, well established and the fruit delicious.

Wampi (*Clausena lansium*)



Description: *Clausena lansium*, also known as a wampee (*Clausena wampi*), is a species of strongly scented evergreen trees in the family Rutaceae, native to southeast Asia. Handsome foliage evergreen tree grown for Summer ripe fruit with grape like flesh. Large lobed, bright green foliage which is aromatic when crushed forms a tall slender tree. Sprays of white flowers become loose clusters of brownish fruit. Thin crisp skins split easily and the grape-like greenish flesh can be eaten directly seeds and all. This tree is a relative of the citrus family, thus its ability to grow in coastal Australia as far south as Melbourne and inland where the frosts are not too severe. The fruits are highly aromatic and can be sweet to tangy to almost sour depending on the variety and ripeness. Straight from the tree, Wampee are very refreshing, thirst quenching and cleansing to the palate. They grow in clusters from a few up to eighty in one bunch. The fruits turn yellow when ripe and have a thin, sometimes brittle skin, somewhat like paper. They generally have only 1-2 seeds in each fruit and are best left to ripen on the tree for as long as possible. They are a very attractive looking tree with beautiful dark green ruffled compound leaves. They have a dense growth habit making them an ideal shade tree. The crop is borne solely on the tips of branches, so the less pruning the better. Very few problems have been observed with pest and diseases other than occasional infestations of aphids. Mature trees can produce up to 50kg of fruit each year. Like its close relative the citrus it is full of vitamin C, approximately 28mg per 100g. This fruit can be used for making jams, jellies, pies, and drinks but best eaten fresh, straight from the tree. If you want them to keep a bit longer you can try leaving the stalks on them.

Current size: 3m high, 1.7m wide

Maturity size: Small tree, rarely above 6m but can grow up to 8 meters tall

Ideal location/conditions: Suited to fertile, free draining moist soils in full sun. For warm to tropical climates. Can recover from light frost damage but is susceptible to cold. Minimum of -20°C. Coastal gardens. For best results: Enrich soil with manure and compost in a thick mulch. Water well. Wampee trees grow well in a wide range of soil but prefer rich loam. Trees enjoy year-round water. Wampee should be treated very much like any of the other citrus trees in regard to cultivation. A sunny, well drained site with plenty of water and organic matter should see these trees thrive.

Current location/conditions: Not in full sun position. On South side of property.

Summary: I will remove the Wampi from the concept design as its fruit is less appealing than others and the location can be freed up for other trees being repositioned.



Abiu (*Pouteria caimito*)



Description: Comes from the Amazon. Round to oval in shape, sometimes pointed, with smooth bright yellow skin. Has creamy sweet, succulent flesh which tastes like Creme Caramel. A real taste treat when eaten slightly chilled. Cut in half and scoop out the flesh with a spoon. Best eaten chilled. Avoid the exuding latex close to the skin. The leaves of the tree range from oblong to elliptic. They can be anywhere from four to eight inches in length and one and a half to two and a half inches in width. The flowers on the tree can come either by themselves or in clusters of two to five flowers. They will come in on the leaf axils on long, thin shoots. The flowers are small and have either four or five petals. The petals are cylindrical and will be white to greenish in colour. The flowers are hermaphroditic, which means they are both sexes. The flowers open in the morning and can stay open for about two days. Two crops a year between January and September. Usually some fruit on trees most of the year. Pick when firm but mature - at least half yellow half green. If picked too green, the milky latex on the skin will stick to your lips when you eat it. 3 years until first crop.

Current size: 1m high, 1m wide

Maturity size: It will grow an average of 10m high, and can grow as high as 35m under good conditions.

Ideal location/conditions: Soils and climate: Abiu is a lowland humid tropical or subtropical tree which thrives well in an environment with a high even temperature and high humidity. A temperature range from 20° to 35°C is desirable. The north Queensland environment is suitable for abiu production however, unusually cool temperatures (<-2°C) experienced during the July/August months in north Queensland can limit the areas where abiu is grown. An evenly distributed rainfall of between 1 000-3 000 mm per annum is also desirable. Abiu can be grown at altitudes up to 500 m and the 20°S latitude being the southern limit. Abiu will grow on a wide range of soils provided it has reasonable water holding capacity and very good drainage. It will not tolerate waterlogged areas or saline soils. It can grow on sandy to clay loams. A slightly acid to alkaline soil in the range of pH 5.5 to 7.5, with high organic matter is preferred. Abiu need full sun from an early stage. Providing abundant soil moisture is available the above ground conditions do not significantly impact on abiu growth. Supplementary irrigation will be necessary during the dry season for good growth and high yields to be obtained. The abiu plant will tolerate very short periods of moisture stress and moisture stressed trees may still crop well initially, but the size of the fruit will decrease and subsequent cropping reduced until the trees recover. Constant water is required during fruit filling otherwise fruit splitting will occur during this period of rapid maturation. Windbreaks: Flowering, pollination and subsequent fruit set can be severely limited by exposure to wind and low humidity. Planting of windbreaks is necessary in the Wet Tropics because of the cold south-easterlies during the cool dry period. The windbreaks however, will provide little protection from strong cyclonic winds. Consult your local DPI for suitable windbreak species for your area.

Current location/conditions: The Abiu is in the South Easterly corner of the property but is protected from winds by a solid South fence and timber slatted East fence. It is still a small plant but looks healthy.

Summary: The Abiu will stay for the concept design as the neighbouring Custard Apples will be removed and therefore there should be enough space for it.

Sweetsop (*Annona squamosa*)



Description: *Annona squamosa* (also called sugar-apple, or sweetsop) is a species of *Annona* native to the tropical Americas, India and Pakistan. Its exact native range is unknown due to extensive cultivation, but thought to be in the Caribbean; the species was described from Jamaica. It is a semi-evergreen shrub or small tree. The leaves are alternate, simple, oblong-lanceolate, 5–17 cm long and 2–5 cm broad. The flowers are produced in clusters of 3-4, each flower 1.5–3 cm across, with three large petals and three minute ones, yellow-green spotted purple at the base. The fruit is usually round, slightly pine cone-like, 6–10 cm diameter and weighing 100–230 g, with a scaly or lumpy skin. There are variations in shape and size. The fruit flesh is sweet, white to light yellow, and resembles and tastes like custard. The edible portion coats the seeds generously; a bit like the gooey portion of a tomato seed. Sugar-apple has a very distinct, sweet-smelling fragrance. The texture of the flesh that coats the seeds is a bit like the centre of a very ripe guava (excluding the seeds). It is slightly grainy, a bit slippery, very sweet and very soft. The seeds are scattered through the fruit flesh; the seed coats are blackish-brown, 12–18 mm long, and hard and shiny. There are also new varieties being developed in Taiwan. There is a pineapple sugar-apple, which is similar in sweetness but has a very different taste. Like the name suggests, it tastes like pineapple. The arrangement of seeds is in spaced rows, with the fruit's flesh filling most of the fruit and making grooves for the seeds, instead of the flesh only occurring around the seeds. It is quite a prolific bearer and will produce fruit in as little as two to three years. A tree five years old may produce as many as 50 sugar-apples. Poor fruit production has been reported in Florida because there are few natural pollinators (honeybees have a difficult time penetrating the tightly closed female flowers); however hand pollination with a natural fibre brush is effective in increasing yield.

Current size: 1.5m high

Maturity size: 4.5m in width and reaching 6–8 meters in height

Ideal location/conditions: Like most species of *Annona*, it requires a tropical or subtropical climate with summer temperatures from 25 °C to 41 °C, and mean winter temperatures above 15 °C. It is sensitive to cold and frost, being defoliated below 10 °C and killed by temperatures of a few degrees below freezing. It is only moderately drought-tolerant, requiring rainfall above 700 mm, and not producing fruit well during droughts.. Vulnerable to wind due to shallow root system, and frost sensitive. Roots are also easily effected by fungi when damaged or waterlogged. Prune back long branches and thin centre. Feed regularly.

Current location/conditions: In the South garden bed it gets sun in the mornings.

Summary: The Sweetsop and Abiu are too close to reach full maturity size. Therefore, the Sweetsop will get repositioned for the concept design – possibly to replace the Wampi.



Yellow Jaboticaba (*Plinia glomerata*)



Description: Slow growing, small bushy tree with its ornamental golden-green pendulous branches, making a highly ornamental landscape or container plant. The yellow fruit which are produced directly on the branches, have a distinctive sweet tangy flavour. Yellow fruiting species with a distinctive sweet tangy flavour reminiscent of pineapple. We consider this tree a showpiece. Its lime green leaves have an unusual soft, almost powdery appearance and its beautiful golden green pendulous branches make it a worthy feature in the garden for its highly ornamental nature. It produces fruit in as little as 3 years. While the fruits have some similarities to the Black Jaboticaba, they are quite different in appearance, having a slightly furry yellow skin instead of the smooth shiny black skin. The fruit contains a gelatinous whitish pulp which has a pleasant, slightly acid flavour. A single tree will produce fruit, but cross pollination has shown to increase productivity. Note: the following latin synonyms for Yellow Jaboticaba/Cabelluda - *Eugenia cabelluda*, *Eugenia tomentosa*, *Myrciaria glomerata*, *Paramyrciaria glomerata* - may be taxonomically incorrect, although in some sources excepted. Small white flowers are perfect and occur in axillary clusters.

Current size: 1.4m high, 2m wide

Maturity size: It is a small bushy tree, usually growing to 3-4m in the subtropics of Australia, however has been seen in Brazil (its place of origin), with a couple of young boys perched high in the branches. These trees must have reached 9-10 m tall.

Ideal location/conditions: The tree has a moderate cold tolerance but is best protected from frost. It is a suitable container grown tree in those areas that do receive frost and can be moved to a sheltered position during the cooler months. They are happy in full sun or part shade and are generally small enough to find a place in most gardens. They are relatively wind tolerant but will not enjoy salt spray. They particularly enjoy deep rich soil pH 5.5 to 6.5 but with regular nutrient application can be grown in most soil types. When planting a jaboticaba, the crown (uppermost) roots should be 2 to 3 inches higher than the surrounding soil levels to provide water runoff. Peat, compost or rotted manure may be mixed with the soil from the planting hole to improve it. The soil should be a well-aerated mixture.

Current location/conditions: Along the South fence approaching the East corner. It appears to be healthy and enjoying its location.

Summary: This will be retained in the concept design. The Custard Apples and Sweetsop will be removed and moved to ensure it can reach its mature size.

Grumichama (*Eugenia brasiliensis*)



Description: Also known as Brazil cherry, Spanish cherry. The Grumichama is a small hardy evergreen tree that is often grown for its excellent fruit. A member of the Myrtaceae, which is native to Brazil, it is a highly ornamental tree that is slender and erect. It is amenable to pruning, and can make an effective fruiting hedge. Grows well in all tropical, sub-tropical and temperate climates including Sydney and the Perth Hills area. One of the truly remarkable things about the Grumichama is the incredibly short period from flowering to fruiting. It can take as little as 30 days for the fruits to develop, and they ripen very quickly over a few days. Individual trees tend to vary considerably with regards fruiting time, so if you have a few you can extend the season appreciably. The fruit is borne on singly on the stems with a thin skin, and a dark-red juice. The red, or white, pulp is juicy and tastes a little like a sweet cherry with an aromatic or acidic finish. There are usually 1-2 seeds per fruit. The fruit can be eaten raw but can also be made into jams, jellies, pies or wines. Its wood is used in carpentry, woodworking and turnery.

Current size: 1.4m high, 1.5m width

Maturity size: capable of growing to 5-10m tall, approximately 6m in width

Ideal location/conditions: The plant grows slowly when young, though seems to enjoy a good loamy free-draining soil slightly on the acidic side. It is drought sensitive so watering during the summer months is important. Plants begin to fruit when approx. 4-5 years old.

Current location/conditions: South East corner of the property. Gets morning sun and sheltered by fences.

Summary: This will be retained in the concept design. The plant already fruits so it is evidently at least 4 years old and well established. Also, once the nearby Custard Apple has been removed, it will have enough space.



Jaboticaba



Description: The Jaboticaba (also called Brazilian Grape Tree, Jaboticaba, Jabotica, Guaperu, Guapuru, Hivapuru, Sabará and Ybapuru) is a fruit-bearing tree native to Brazil, Argentina, Paraguay, and Bolivia. The fruit is purplish black, with a white pulp; it can be eaten raw or be used to make jellies and drinks (plain juice or wine). The fruit tree (named *jaboticabeira* in Portuguese) has salmon-coloured leaves when they are young, turning green posteriorly. It is a very slow growing tree. Its flowers are white and grow directly from its trunk in a cauliflorous habit. Naturally the tree may flower and fruit only once or twice a year, but when continuously irrigated it flowers frequently, and fresh fruit can be available year round in tropical regions. The fruit is 3-4 cm in diameter with one to four large seeds, borne directly on the main trunks and branches of the plant, lending a distinctive appearance to the fruiting tree. It has a thick, purple, astringent skin that covers a sweet, white, or rosy pink gelatinous flesh. Fresh fruit may begin to ferment 3 to 4 days after harvest, so they are often used to make jams, tarts, strong wines, and liqueurs. Classified as a large shrub or small multibranched evergreen tree, the jaboticaba has dense foliage and is quite ornamental although slow growing. Up to four times a year (often after heavy rain) small yellow-white flowers followed by the fruit dramatically emerge directly from the trunks, limbs and large branches. It is this quality which makes the jaboticaba very useful as an exotic edible hedge in small yards - as it can be pruned to shape with no loss of fruit. Jaboticabas may begin to bear fruit anytime from 4 to 10 years old. Only one plant is needed to grow fruit, but a few close by enhance crop yield via cross pollination.

Current size: 3.5m high, 3m wide

Maturity size: 5m height, 3m width

Ideal location/conditions: Full sun to part shade. Generally tropical but frost tolerant to -3C when established but protect from frost when young. Water well to encourage maximum crop yield. Do not over fertilise, although a small amount of slow release/organic fertiliser or organic matter such as compost mulch is fine. Drought hardy. Adapts to both clay and sandy soils. High water need. Prefers acid soils, however it is widely adaptable, and grows satisfactorily even on alkaline beach-sand type soils, so long as they are tended and irrigated.

Current location/conditions: Along East fence of the property. Gets morning sun and sheltered by fence. Is well established and healthy looking.

Summary: This will be retained in the concept design and with the surrounding trees create a food forest.

Grapefruit (Citrus × paradise)



Description: The grapefruit (*Citrus × paradise*), is a subtropical citrus tree known for its bitter fruit, an 18th-century hybrid first bred in Barbados. When found it was named the "forbidden fruit"; it has also been misidentified with the pomelo or shaddock (*C. maxima*), one of the parents of this hybrid, the other being sweet orange (*C. × sinensis*). These evergreen trees have leaves which are dark green, long (up to 150 mm, or 6 inches) and thin. It produces 5 cm (2 in) white four-petaled flowers. The fruit is yellow-orange skinned and largely an oblate spheroid; it ranges in diameter from 10–15 cm. The flesh is segmented and acidic, varying in color depending on the cultivars, which include white, pink and red pulps of varying sweetness. The 1929 US Ruby Red (of the Redblush variety) has the first grapefruit patent.

Current size: 1.6m high, 3m wide

Maturity size: Usually found at around 5–6 metres tall, although they can reach 13–15 metres

Ideal location/conditions: Climate: Grapefruit achieves its best quality under conditions of hot days and warm to hot nights, which results in higher sugars and lower acids than grapefruit produced in the cooler night temperatures. It grows well in both tropical and subtropical climates of the world, but it is a little less cold hardy than oranges. Mature, healthy grapefruit trees that are well-hardened by previous cool to cold weather can probably tolerate cooler temperatures without leaf or twig damage. Humidity contributes to thinness of peel, while in arid climates the peel is thicker and rougher and, as might be expected, the juice content is lower. Low winter temperatures also result in thicker peel the following year and even affect the fruit shape. Ideal rainfall for grapefruit is 91.4-111.7 cm rather evenly distributed the year around. Soils and site selection: Grapefruit trees on sour orange rootstock are well-adapted to deep, well-drained soils. Loamy soils are preferred while heavy clays and poorly-drained soils will result in poor growth and production as well as shorter life. For maximum cold protection, grapefruit in the home landscape should be planted on the north or northeast side of the house. Distance from the house or other buildings and driveways or walkways should be at least 12 feet to allow adequate room for the tree to grow to its mature size. While large, overhanging shade trees will provide some cold protection, grapefruit grows and produces best in full sun.

Current location/conditions: East side of the property in full sun.

Summary: This Grapefruit tree is well established, healthy and is a very productive plant. It will stay for the concept design.



Star Apple (*Chrysophyllum cainito*)



Description: *Chrysophyllum cainito* is a tropical tree of the family Sapotaceae, native to the lowlands of Central America and the West Indies. It grows rapidly. It has numerous common names including cainito, caimito, star apple, golden leaf tree, abiaba, pomme du lait, estrella, milk fruit and aguay. It is also known by the synonym *Achras cainito*. In Vietnam, it is called vú sữa (literally: milk-breast). The leaves are evergreen, alternate, simple oval, entire, 5–15 cm long; the underside shines with a golden colour when seen from a distance. The tiny flowers are purplish white and have a sweet fragrant smell. They are small, inconspicuous flowers, clustered in the leaf axils; are greenish-yellow, yellow, or purplish-white with tubular, 5-lobed corolla and 5 or 6 sepals. The tree is also hermaphroditic (self-fertile). It has round, purple-skinned fruit that is often green around the calyx, with a star pattern in the pulp. Sometimes there is a greenish-white variety of the fruit. The skin is rich in latex, and both it and the rind are not edible. The flattened seeds are light brown and hard. It bears fruit year around after it reaches about seven years of age. The fruit, round, oblate, ellipsoid or somewhat pear-shaped, 5-10 cm in diameter, may be red-purple, dark-purple, or pale-green. It feels in the hand like a rubber ball. The glossy, smooth, thin, leathery skin adheres tightly to the inner rind which, in purple fruits, is dark-purple and 6-12.5 mm thick; in green fruits, white and 3-5 mm thick. Both have soft, white, milky, sweet pulp surrounding the 6 to 11 gelatinous, somewhat rubbery, seed cells in the centre which, when cut through transversely, are seen to radiate from the central core like an asterisk or many-pointed star, giving the fruit its common English name. The fruit may have up to 10 flattened, nearly oval, pointed, hard seeds, 2 cm. long, nearly 1.25 cm wide, and up to 6 mm thick, but usually several of the cells are not occupied and the best fruits have as few as 3 seeds. They appear black at first, with a light area on the ventral side, but they dry to a light-brown. The fruits are delicious as a fresh dessert fruit; it is sweet and best served chilled. Infusions of the leaves have been used against diabetes and articular rheumatism. The bark is considered a tonic and stimulant, and a bark decoction is used as an antitussive. A traditional food plant in Africa, this little-known fruit has potential to improve nutrition, boost food security, foster rural development and support sustainable landcare.

Current size: 5m high, 3m wide

Maturity size: reaches 20 m in height, with a short trunk to 1m thick

Ideal location/conditions: Climate: The star apple tree is a tropical or near-tropical species ranging only up to 1,400 ft (425 m) elevation in Jamaica. It does well only in the warmest locations of southern Florida and on the Florida Keys. Mature trees are seriously injured by temperatures below -2.22°C and recover slowly. Young trees may be killed by even short exposure to -0.56°C . Soil: The tree is not particular as to soil, growing well in deep, rich earth, clayey loam, sand, or limestone, but it needs perfect drainage.

Current location/conditions: East side of the property in full sun.

Summary: This Star Apple is well established and healthy. At full maturity, its size could impose on the neighbouring Grapefruit, Jaboticaba, Persimmon and Longan trees. However, since it is quite large and the Longan is currently very small it will remain for the concept design.

Longan



Description: The longan is an evergreen, tropical tree native to South and Southeast Asia known for its edible fruit. The longan ("dragon eyes") is so named (from its transliteration from Amoy) [liong-gan] because its fruit, when it is shelled, resembles an eyeball (the black seed shows through the translucent flesh like a pupil/iris). The seed is small, round and hard, and of an enamel-like, lacquered black. The fully ripened, freshly harvested shell is bark-like, thin, and firm, making the fruit easy to shell by squeezing the fruit out as if one is "cracking" a sunflower seed. When the shell has more moisture content and is more tender (due to either premature harvest, variety, weather conditions, or transport/storage conditions), the fruit becomes less convenient to shell. It has pale yellow flowers on upright terminal panicles. It has alternate leaves with 4 to 10 opposite leaflets. The shape is elliptical or lanceolate and blunt-tipped. Leaves are 10-20 cm long and 3.5-5 cm wide. They are leathery with a glossy-green colour on the upper surface and grayish-green on the lower surface. New leaf growth has a wine-colour.

Current size: 0.8m high

Maturity size: The tree can grow up to 67 metres in height, but mostly around 12-20m. It's crown can be up to 14m and the trunk up to 1m in diameter. Longan trees require sandy soil and temperatures that do not typically go below 4.5 degrees Celsius (40.1 degrees Fahrenheit).

Ideal location/conditions: The plant is very sensitive to frost. It is a subtropical tree but it grows well in the tropics. It needs a prominent change of seasons for satisfactory flowering. A cool season of 2-3 months results in abundant flowering. Prefers rich sandy loam or moderately acid, somewhat organic, sand. The tree requires ample soil moisture during the period between fruit set and maturity. Optimum annual rain should be from 1500-2000 mm.

Current location/conditions: East side of the property in full sun. Soil is not sandy.

Summary: This tree is currently very small, not in an ideal location given the soil is not sandy and will grow too large for the space it is currently in. Also, in Brisbane Longan's are not good producers. Therefore it will be removed for the concept design.



Avocado (*Persea Americana*)



Description: The avocado (*Persea americana*) is a tree native to the Caribbean, Mexico, South America and Central America, classified in the flowering plant family Lauraceae. Avocado or avocado pear also refers to the fruit (technically a large berry that contains a large seed) of the tree, which may be pear-shaped, egg-shaped or spherical. Avocados are a commercially valuable fruit and are cultivated in tropical climates throughout the world (and some temperate ones, such as California), producing a green-skinned, pear-shaped fruit that ripens after harvesting. Trees are partially self-pollinating and often are propagated through grafting to maintain a predictable quality and quantity of the fruit. It has alternately arranged leaves 12 – 25 cm long. The flowers are inconspicuous, greenish-yellow, 5 – 10 mm wide. The pear-shaped fruit is 7 – 20 cm long, weighs between 100 – 1,000 grams, and has a large central seed, 5 – 6.4 cm long. An average avocado tree produces about 1200 avocados annually. Biennial bearing can be a problem, with heavy crops in one year being followed by poor yields the next. The avocado is a climacteric fruit (the banana is another), which means that it matures on the tree but ripens off the tree. Avocados used in commerce are picked hard and green and kept in coolers at 3.3 to 5.6°C until they reach their final destination. Avocados must be mature to ripen properly. Avocados that fall off the tree ripen on the ground. Generally, the fruit is picked once it reaches maturity. Once picked, avocados ripen in a few days at room temperature (faster if stored with other fruits such as apples or bananas, because of the influence of ethylene gas). Premium supermarkets sell pre-ripened avocados treated with synthetic ethylene to hasten the ripening process. In some cases, avocados can be left on the tree for several months, which is an advantage to commercial growers who seek the greatest return for their crop; if the fruit remains unpicked for too long, however, it falls to the ground. The species is only partially able to self-pollinate because of dichogamy in its flowering. This limitation, added to the long juvenile period, makes the species difficult to breed. The avocado is unusual in that the timing of the male and female flower phases differs among cultivars. There are two flowering types, "A" and "B". "A" cultivar flowers open as female on the morning of the first day and close in late morning or early afternoon. Then they open as male in the afternoon of the second day. "B" varieties open as female on the afternoon of the first day, close in late afternoon and reopen as male the following morning. ("A" cultivars: Hass, Gwen, Lamb Hass, Pinkerton, Reed/"B" cultivars: Fuerte, Sharwil, Zutano, Bacon, Ettinger, Sir Prize, Walter Hole).

Current size: 1m high, 1.5m wide

Maturity size: The tree grows to 20m.

Ideal location/conditions: Avocados are very fussy about their soil conditions and will not tolerate wet feet or heavy soils, it is essential to prepare the ground for an avocado well before planting. Young trees are susceptible to sunburn and damage from frost so a small shelter while they establish is a very good idea. The subtropical species needs a climate without frost and with little wind. High winds reduce the humidity, dehydrate the flowers, and affect pollination. When even a mild frost occurs, premature fruit drop may occur, although the Hass cultivar can tolerate temperatures down to -1°C. The trees also need well-aerated soils, ideally more than 1 m deep. Yield is reduced when the irrigation water is highly saline. The avocado tree does not tolerate freezing temperatures, and can be grown only in subtropical or tropical climates.

Current location/conditions: East side of property in full sun. Currently a small tree.

Summary: Avocados generally grow well in this region and are much sought after. Therefore, initially I wanted to keep this tree in the concept design and plant another one or cross pollination. Throughout the concept design process I decided to remove this tree to ensure the North East Corner was completely open for intensive vegetable beds.

Lychee (*Litchi chinensis*)



Description: The lychee (*Litchi chinensis*, and commonly called litchi, laichi, lichu) is the sole member of the genus *Litchi* in the soapberry family, Sapindaceae. It is a tropical and subtropical fruit tree native to China, and now cultivated in many parts of the world. The fresh fruit has a "delicate, whitish pulp" with a "perfume" flavour that is lost in canning, so the fruit is mostly eaten fresh. Lychee is an evergreen tree, bearing fleshy fruits that are up to 5 cm long and 4 cm wide. The outside of the fruit is covered by a pink-red, roughly-textured rind that is inedible but easily removed to expose a layer of sweet, translucent white flesh. Lychees are eaten in many different dessert dishes, and are especially popular in China, throughout South-East Asia, along with India, Bangladesh, and Pakistan. The bark is grey-black, the branches a brownish-red. Leaves are 10 to 25 cm or longer, with leaflets in 2-4 pairs. Flowers grow on a terminal inflorescence with many panicles on the current season's growth. The panicles grow in clusters of ten or more, reaching 10 to 40 cm or longer, holding hundreds of small white, yellow, or green flowers that are distinctively fragrant. Fruits mature in 80-112 days, depending on climate, location, and cultivar. Fruits reach up to 5 cm long and 4 cm wide, varying in shape from round, to ovoid, to heart-shaped. The thin, tough inedible skin is green when immature, ripening to red or pink-red, and is smooth or covered with small sharp protuberances. The skin turns brown and dry when left out after harvesting. The fleshy, edible portion of the fruit is an aril, surrounding one dark brown inedible seed that is 1 to 3.3 cm long and .6 to 1.2 cm wide. Some cultivars produce a high percentage of fruits with shrivelled aborted seeds known as 'chicken tongues'. These fruit typically have a higher price, due to having more edible flesh.

Current size: 1.4m high, 2m width

Maturity size: reaching 10–20 m tall

Ideal location/conditions: They require a warm subtropical to tropical climate that is cool but also frost-free or with only very slight winter frosts not below -4°C, and with high summer heat, rainfall, and humidity. Growth is best on well-drained, slightly acidic soils rich in organic matter. A wide range of cultivars is available, with early and late maturing forms suited to warmer and cooler climates respectively. .

Current location/conditions: Full sun on East side of the property.

Summary: This plant is currently well established and healthy. Additionally, it is a fruit I love eating and would add nicely to the food forest. I wanted to keep it for the concept design, however to ensure maximum production in the North East corner, it has had to be removed.



Loquat (*Eriobotrya japonica*)



Description: The loquat (*Eriobotrya japonica*) is a fruit tree in the family Rosaceae, indigenous to southeastern China. It was formerly thought to be closely related to the genus *Mespilus*, and is still sometimes known as the Japanese medlar or Japanese Plum. It is an evergreen large shrub or small tree, with a rounded crown, short trunk and woolly new twigs. The leaves are alternate, simple, 10–25 cm long, dark green, tough and leathery in texture, with a serrated margin, and densely velvety-hairy below with thick yellow-brown pubescence; the young leaves are also densely pubescent above, but this soon rubs off. Loquats are unusual among fruit trees in that the flowers appear in the autumn or early winter, and the fruits are ripe in late winter or early spring. The flowers are 2 cm diameter, white, with five petals, and produced in stiff panicles of three to ten flowers. The flowers have a sweet, heady aroma that can be smelled from a distance. Loquat fruits, growing in clusters, are oval, rounded or pear-shaped, 3–5 cm long, with a smooth or downy, yellow or orange, sometimes red-blushed skin. The succulent, tangy flesh is white, yellow or orange and sweet to subacid or acid, depending on the cultivar. Each fruit contains five ovules, of which one to five mature into large brown seeds. The skin, though thin, can be peeled off manually if the fruit is ripe. The fruits are the sweetest when soft and orange.

Current size: 3.5m high, 1.5m wide

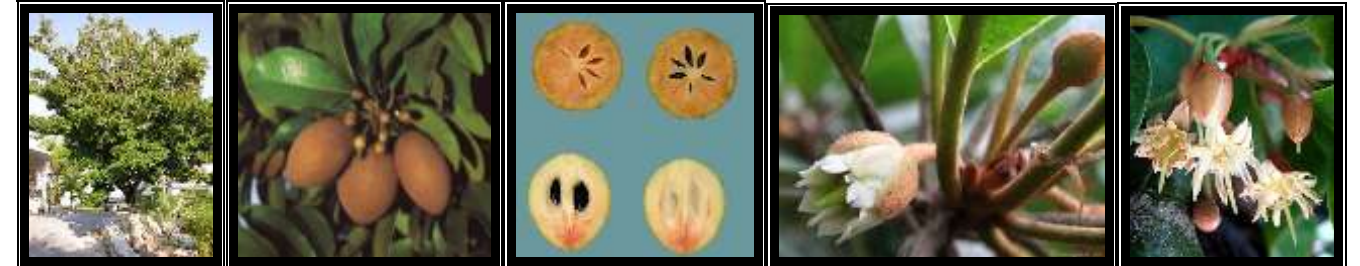
Maturity size: The tree can grow to 5–10 m tall, but is often smaller, about 3–4 m. Avg. Height X Width: 4.5m x 4.5m.

Ideal location/conditions: The Loquat is easy to grow in subtropical to mild temperate climates where it is often grown as an ornamental tree, and second for its delicious fruit. Most soils are suitable for Loquats, and either shade or sunshine permit good growth. A sunny site with rich soil may be best. Though drought-tolerant, it does better if given some summer watering. Pest and disease problems are minor. Pruning to thin the crown is advisable. Severe winter cold is the limiting factor. Freezing is a terrible shock to them. It zaps their flowers or young fruit, can turn the leaves brown, or even kill the shoot tips.

Current location/conditions: This tree is currently thriving in its location in full sun on the East side of the property.

Summary: I would have liked to keep this tree in the concept design, however, it is not suitable in its current position given the shade it will give to the North East corner of the property which is for intensive vegetable gardens. This is currently a healthy tree, will survive in shade and is drought tolerant so it could be moved to the south side of the property to add to the food forest/orchard.

Sapodilla (*Manilkara Zapota*)



Description: *Manilkara zapota*, commonly known as the Sapodilla, is a long-lived, slow growing, attractive, upright, evergreen tree native to southern Mexico, Central America and the Caribbean. It is grown in huge quantities in India, Pakistan, Mexico and was introduced to the Philippines during Spanish colonisation. It is distinctly pyramidal when young, with age the tree may develop a crown that is dense and rounded or sometimes open and somewhat irregular in shape. It is wind-resistant and the bark is rich in a white, gummy latex called chicle. The ornamental leaves are medium green and glossy. They are alternate, elliptic to ovate, 7–15 cm long, with an entire margin. The white flowers are inconspicuous and bell-like, with a six-lobed corolla. They are borne on slender stalks in the axil of the leaves. There are several flushes of flowers throughout the year. The fruit is a large ellipsoid berry, 4–8 cm in diameter, very much resembling a smooth-skinned potato and containing 2–5 seeds. Inside, its flesh ranges from a pale yellow to an earthy brown colour with a grainy texture akin to that of a well-ripened pear. The seeds are black and resemble beans, with a hook at one end that can catch in the throat if swallowed. The fruit has a high latex content and does not ripen until picked. The fruit has an exceptionally sweet malty flavour. Many believe the flavour bears a striking resemblance to caramel. The unripe fruit is hard to the touch and contains high amounts of saponin, which has astringent properties similar to tannin, drying out the mouth.

Current size: 1.4m high, 1.5m wide

Maturity size: Sapodilla grows to 18 – 30 m tall.

Ideal location/conditions: Location: The sapodilla prefers a sunny, warm, preferably frost free location. They are highly wind tolerant and can take salt spray. Soil: Sapodillas are well adapted to many types of soil. It thrives in very poor soils but flourishes also in deep, loose, organic soil, as well as light clay, sand or lateritic gravel. Good drainage is essential, the tree doing poorly in low, wet locations. It is highly drought resistant and approaches the date palm in its tolerance of soil salinity. Irrigation: The tree tolerates dry conditions remarkably well. Most mature sapodilla trees receive no watering, but irrigation in dry season will increase productivity. Fertilization: Newly planted trees need small and frequent feedings to become established. Fertilizers that contain 6-8% nitrogen, 2-4% available phosphoric acid and 6-8% potash give satisfactory results. First year applications should be made every two to three months beginning with 1/4 pound and gradually increasing to one pound. Thereafter, two to three applications per year are sufficient, in amounts proportionate to the increasing size of the tree. Pruning: Sapodillas require very little pruning. Frost Protection: Although mature sapodilla trees will take several degrees of frost, it is prudent to provide them with overhead protection if possible and plant them on the south side of a wall or building. Plants can also be covered with sheeting and such when significant frost is likely.

Current location/conditions: On North East corner of the property.

Summary: Such a large evergreen tree in the North East corner may cause solar access issues for vegetable beds in that area. Therefore, it will be removed from the concept design.



Geisha Girl (*Duranta erecta*)



Description: *Duranta erecta* is a species of flowering shrub in the verbena family, Verbenaceae, that is native to Central and South America and the Caribbean. It is widely cultivated as an ornamental plant in tropical and subtropical gardens throughout the world, and has become naturalized in many places. It is considered an invasive species in Australia, China, South Africa and on several Pacific Islands. Common names include Golden Dewdrop, Pigeon Berry, Skyflower and Aussie Gold. It is a sprawling shrub or (infrequently) a small tree. Mature specimens possess axillary thorns, which are often absent on younger specimens. Leaves are light green, elliptic to ovate, opposite, and grow up to 8 cm long. Showy light-blue or lavender flowers are in tight clusters located on terminal and axillary stems, blooming almost all year long. The fruits are small yellow berries (from which the name is derived), approximately 1 cm in diameter. The leaves and berries of the plant are toxic, and are confirmed to have killed children, dogs and cats. However, songbirds eat the fruit without ill effects.

Current size: 2.1m high, 2m wide

Maturity size: Will attain a height of about 1.5 - 2 metres. It can grow to 5.5 m tall and can spread to an equal width.

Ideal location/conditions: For best results, plant in well-drained soil in full sun (although tolerates partial shade). All that needs to be done as far as maintenance is concerned is a good prune after flowering is finished and an application of fertiliser. Needs moderate watering, regularly.

Current location/conditions: Eastern side of property against the house.

Summary: This will be removed from the concept design as it is invasive, non-productive and the space can be used for other, productive, plants.

Ceylon Hill Gooseberry (*Rhodomyrtus tomentosa*)



Description: *Rhodomyrtus tomentosa* is a flowering plant in the family Myrtaceae, native to southern and southeastern Asia, from India, east to southern China, Taiwan and the Philippines, and south to Malaysia and Sulawesi. It grows in coasts, natural forest, riparian zones, wetlands, moist and wet forests, bog margins, from sea level up to 2400 m elevation. It is an attractive ornamental evergreen shrub. The leaves are opposite, leathery, 5-7 cm long and 2-3.5 cm broad, three-veined from the base, oval, obtuse to sharp pointed at the tip, glossy green above, densely grey or rarely yellowish-hairy beneath, with a wide petiole and an entire margin. The flowers are solitary or in clusters of two or three, 2.5-3 cm diameter, with five petals which are tinged white outside with purplish-pink or all pink. The fruit is edible, 10-15 mm long, purple, round, three or four-celled, capped with persistent calyx lobes, soft, with 40-45 seeds in a double row in each cell; seed dispersal is by frugivorous birds and mammals. Seed production and germination rates are high. They are similar in taste to blueberries and raspberries but they have thicker, richer juice. Synonyms include *Myrtus canescens* Lour., *Myrtus tomentosa* Aiton, *Rhodomyrtus parviflora* Alston, and *Rhodomyrtus tomentosa* (Aiton) Wight. Common names include Ceylon hill gooseberry (English), Downy myrtle (English-Florida), Downy rose myrtle (English-Florida), Feijoa (French), Hill gooseberry (English), Hill guava (English), Isenberg bush (English-Hawaii), Myrte-groseille (French), and Rose myrtle (English-Florida). Useful as an informal ornamental hedge; fruit can be eaten raw and is particularly good made into jam; use fruit in pies, tarts and fruit salads; gardens or borders. Showy bright pink Spring flowers and masses of sweet green/purple fruit in late Autumn. In cool climates some fruit may remain through Winter and ripen in Spring. The bush is very frost hardy and will fruit as far south as Melbourne. It is often seen grown as a highly decorative hedge. Interestingly the shrub is also adapted to fire and will re-shoot vigorously if it is burnt.

Current size: various

Maturity size: growing up to 4 m

Ideal location/conditions: Suited to fertile soils in a sunny site. Tolerant of heavier poorly drained soil and highly adapted to frost. For best results enrich soil with well rotted compost included in a thick mulch layer.

Current location/conditions: North side of property in partial shade. South side of property receives sun in summer.

Summary: Both bushes will remain for the concept design as they appear to be healthy, flowering and fruiting well.



Dragonfruit (*Hylocereus undatus*)



Description: Also known as Pitahaya, Pitaya and Strawberry Pear. Round, often red coloured fruit with prominent scales. The thin rind encloses the large mass of sweetly flavoured white or red pulp and small black seeds. Some varieties are pinkish or yellow. A vining, terrestrial or epiphytic cactus, with fleshy stems reaching from a few inches up to 20ft long (in mature plants). The plant may grow out of, and over the ground or climb onto trees using aerial roots. Flowers are ornate and beautiful, and many related species are propagated as ornamentals. They bloom only at night, and usually last just one night where pollination is necessary to set fruit. In full production, pitahaya plants can have up to 4-6 fruiting cycles per year. It is thought to have come from South America. The French are believed to have brought the dragon fruit to Vietnam over a hundred years ago. Dragon fruits were grown there to be eaten by royalty and very wealthy families. It is an extremely beautiful fruit that has dazzling flowers, called as "Queen of the Night". The flowers of the dragon fruit plant only bloom at night and usually only live for one night. Pollination happens at this time to allow the fruit to emerge. The flowers of the dragon fruit give out a very beautiful scent, and the smell can fill the night air wherever the plant grows.

Current size: various

Maturity size: fleshy stems reaching from a few inches up to 20ft long (in mature plants)

Ideal location/conditions: Will tolerate temperatures to 104F, and short periods of frost, but prolonged cold will damage or kill the plant. Dragon Fruit grows best in dry, tropical or subtropical climates where annual rainfall ranges from 20-50" per year. In wet, tropical zones, plants may grow well but sometimes have problems setting fruit reliably. The plants aren't usually too picky as to soil type, but because of their epiphytic nature, it is recommended to grow them in soil that is supplemented with high amounts of organic material. The plant has been grown successfully in sandy soils. Shade is sometimes provided in hot climates. Can be grown in semi-shade or full sun. Extra light in the early spring will stimulate budding.

Current location/conditions: All of the Dragonfruit plants on the property are grown in semi-shade. Some fruit occasionally.

Summary: They will remain on the concept design as they are for the time being as they take up no room along the fences of the property. If production is observed to be low over time, they should be moved to more suitable locations.

Bird of Paradise (*Strelitzia reginae*)



Description: *Strelitzia reginae* is a monocotyledonous flowering plant indigenous to South Africa. Common names include Strelitzia, Crane Flower or Bird of Paradise, though these names are also collectively applied to other species in the genus *Strelitzia*. Its scientific name commemorates Charlotte of Mecklenburg-Strelitz, queen consort of King George III. The plant grows to 2 m tall, with large, strong leaves 25–70 cm long and 10–30 cm broad, produced on petioles up to 1 m long. The leaves are evergreen and arranged in two ranks, making a fan-shaped crown. The flowers stand above the foliage at the tips of long stalks. The hard, beak-like sheath from which the flower emerges is termed the *spathe*. This is placed perpendicular to the stem, which gives it the appearance of a bird's head and beak; it makes a durable perch for holding the sunbirds which pollinate the flowers. The flowers, which emerge one at a time from the spathe, consist of three brilliant orange sepals and three purplish-blue petals. Two of the blue petals are joined together to form an arrow-like nectary. When the sunbirds sit to drink the nectar, the petals open to cover their feet in pollen. It is propagated by division or from seeds. *S. reginae* is slow-growing and will not bloom until three to five years have passed since germination (though it can exceptionally flower at two years). It flowers only when properly established and division of the plant may affect flowering patterns. The flowers are, however, quite long-lasting once they appear. Peak flowering is in the winter and early spring. There is a yellow-flowered cultivar of this plant known as Mandela's Gold Strelitzia.

Current size: Both plants are approximately 2m in diameter and 1.5m tall.

Maturity size: The plant grows to 2 m tall.

Ideal location/conditions: It is a low-maintenance plant that is easy to grow in the garden; it is fairly tolerant of soil conditions and needs little water once established. If cared for well, they will flower several times in a year. They will thrive in rich loamy soil, especially when they get plenty of water throughout the year. They do well in full sun to semi-shade and respond well to regular feeding with a controlled release fertiliser and compost. They are sensitive to cold and need to be sheltered from frost, as it can damage the flowers and leaves.

Current location/conditions: North East corner.

Summary: Both plants are very healthy and beautiful. It would be a shame to remove them without a good reason, therefore they will remain on the concept design.



Concept Plan – Brief Description

Banana Circle

A Banana Circle will be located in the North West Corner. The bananas will be planted on mounds around a mulch pit which will be used to compost scraps (feeding the bananas simultaneously) and accommodate excess runoff (this is where water flows off the property). Surrounding the bananas will be crops like sweet potato or potatoes.

Orchard/Food Forest

The orchard/food forest already essentially existed on the property. Some trees have been removed for the concept design, for reasons explained within the Base Plan Analysis (mostly the number and size of trees planted). Since there are large designated areas for growing vegetables in the North East corner of the property, the orchard's ground covers and understory (also known as guilds) will be planted with crops useful for chicken food. This will include: Corn, amaranth, tagasaste, lucerne, sunflowers, pigeon pea, comfrey, clovers, chicory, oxalis and dandelions.

Chickens will be let in to the orchard areas to eat these plants, but will be contained to an area at a time, using a click-together style fence (stored behind the 10 000L water tank).

Where room permits, some large tuber style plants will be grown, such as ginger, arrowroot and cassava.

2 additional Mulberry Trees have been added to the concept plan, within the chicken straw yard.

Crops like lucerne will also be used as green manure – it will be cut and returned to the soil to improve the soil texture and structure, whilst also providing nutrients.

The concept design does not show any pioneer plants in the orchard, however, this may be done in the gaps between the trees that are still young with acacias and leucaena. They will prepare the soil for the other trees through their nitrogen-fixing properties.

Plucking Beds and Clipping Beds

There are 4 plucking beds in the concept design. These beds are designed to be close to the house and will consist of fast-growing plants that are frequently harvested without pulling out the entire plant. They will be planted seasonally and crop rotated with vegetables like broccoli, silverbeet, chard, celery, kale, spinach, zucchini, capsicum and non-hearting lettuce.

The 2 plucking beds on the West side of the property will receive the required hours of sunlight, be an extension of the herb spiral and give quick access to salad items from the kitchen.

The 2 plucking beds on the Northern side of the property are designed so that when walking to the letter box you walk between them to collect anything needed for dinner that night. These plucking beds are bordered by clipping beds of plants like chives, sorrel, corn salad, dandelion, salad burnet, mustard greens, nasturtiums and shallots.

Crop rotations will be Legume crop -> Leafy vegetables -> Fruiting plants -> Root plants and back to the Legume crop.

Sometimes the chickens will be used as a chicken tractor on a bed instead of planting a legume crop. This will be done using a click-together style fence (stored behind the 10 000L water tank).

Herb Spiral

The design contains a Herb Spiral positioned close to the back of the house for ease of access from the kitchen. It will contain, but not be limited to, watercress, sage, spearmint, oregano, chamomile, parsley, chives, tarragon, rosemary, coriander and thyme. It will be planted with sun loving herbs requiring good drainage at the top of the spiral and in a more Northerly facing position down to water loving herbs surviving in shade on the Southern, lower levels.

Propagation Area

The propagation area will simply be a trellis with a vine growing up the Western side, to protect the seedlings from the harsh afternoon sun. It will also be an area to house a worm farm and the compost bin. Its location is ideal, next to the rain water tank, within close access to under the house to get tools, etc. and containing the compost needed for potting.

Grey Water

The bathroom and laundry are on the South West corner of the house, making it convenient to redirect this water to the orchard via a flexible hose. It will have diversion to storm water for when there is sufficient rain.

Shade Tolerant Beds

The shaded garden bed against the south side of the house will be planted up with asparagus, turmeric, QLD arrowroot, ginger, galangal and raspberries to ensure this space is not wasted.

Broad Beds and Narrow Beds

The design has the capacity for 3 broad beds at any one time. Broad beds are used for vegetables that take a longer time to ripen and are only harvested once. They are slower growing and don't need much attention. All are on the East side of the house. 2 are on the southern side of the front path to the house. These will always be broad beds as they receive enough sunlight and are areas less frequently visited. They will be planted seasonally and be crop rotated with plants like potatoes, sweet potato, corn, onions, melons and pumpkins.

There are 4 garden beds in the North East corner of the property. These will be used for planting seasonally and crop rotated with plants like beans, peas, carrots, radishes, cauliflower, asparagus, okra, eggplant, potatoes, cabbage, leeks, sweet potato, corn, beets and turnips. Sometimes they will be narrow beds, meaning they are used for plants that grow vertically or have high light requirements and are aligned North-South to receive morning and afternoon sun. Sometimes it will be necessary to treat one of these beds as a broad bed to enable enough room for crops like sweet potato, potatoes or corn.

Crop rotations will be Legume crop -> Leafy vegetables -> Fruiting plants -> Root plants and back to the Legume crop.

Sometimes the chickens will be used as a chicken tractor on a bed instead of planting a legume crop. This will be done using a click-together style fence (stored behind the 10 000L water tank).

All narrow beds will be interplanted with pigeon pea for fixing Nitrogen and companion plants for pest and disease control.



Climbing Frames/Vines

Along the North and East garden beds that are situated against the house are climbing frames for growing plants like peas and beans behind other plants.

One section of the front fence (East side) will be used as a trellis for a passionfruit vine. The other section will be used as a trellis for cucumbers, pumpkin or kiwi fruit. For heavy fruit like pumpkins, they will be able to sprawl beneath the food forest/orchard.

Chickens

The chicken straw yard will have a medicinal border on the North and East sides of oxalis, mugwort, wormwood and garlic for the chickens to self medicate from. The chickens will not spend all their time within the straw yard. Sometimes they will be used as a chicken tractor on a bed instead of planting a legume crop or be put in to the orchard to eat fresh food (any shallow rooted trees such as citrus will need to be protected with mesh and mulch first to ensure their roots aren't damaged from the chicken's scratching). This will be done using a click-together style fence (stored behind the 10 000L water tank).

Mulch

Lemongrass and comfrey borders have been designed around the larger garden beds as a source of mulch. The comfrey is also planted for its properties as a dynamic accumulator, as an excellent source of potassium and to be used as an activator in compost. This barrier is also used as a barrier to weeds and pests.

Clumping bamboo has been planted in the South West corner as a mulch source also.

Concrete Garden Beds

The design has not included removal of any of the existing concrete garden beds. Rather than expend energy in removing them, they have been utilised as garden beds or ways to maintain mulch around trees.

Bees

Bee hives have been located along the South fence which is solid, providing a necessary windbreak for the bees.

Bamboo

Bamboo has been incorporated in to the design in the South West corner. Currently, from the house, looking in this direction is a view straight in to the neighbour's yard. The bamboo will create a privacy screen while the Kepel Apple is growing but also provide a source of mulch be useful as a material for construction, stakes, etc.

Energy

Solar panels and a solar hot water system will be installed on the North face of the roof for maximum sunlight throughout the day. Insulation will also be installed in the ceiling as currently the house gets very hot in summer.

