REPORT

ON THE SUSTAINABLE

RE-USE OF TIMBER

FROM FELLED URBAN TREES

IN THE ACT

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Disclosure: Since undertaking and preparing the initial draft report for the Commissioner for Sustainability and the Environment, Ian McArthur [1]of Farm Forestry Consulting has been approached by a company who have expressed an interest in sourcing woody bio-mass for production of bio-energy and bio-char.

The recommendations were made previous to this approach, and the approach has not altered the recommendations in this report.

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1. Introduction

1.1 Brief for the report. To provide advice to the Commissioner for Sustainability and the Environment for the Investigation into the ACT Government's tree management practices, and the renewal of Canberra's urban forest in relation to the sustainable re-use of timber from felled trees.

1.2 Definition of sustainable timber re-uses. The re-use of timber and other material from felled trees varies considerably across jurisdictions. The ACT is different from other jurisdictions in that the ACT Government has the responsibility for the management of trees on public land in the urban environment, while elsewhere in Australia it is mainly a local government management issue. It is therefore possible for the ACT to develop a good policy for the sustainable re-use of material from urban trees across the entire city compared to other jurisdictions in Australia.

Sustainable re-use of felled urban trees should consider the best possible environmental, economic and social outcomes for the ACT. This includes an examination of what currently occurs in the ACT and other jurisdictions, and possible new usages.

Thus a definition of sustainable re-use of felled trees could be: *"The sustainable re-use of trees is defined as the use of material from those trees which provides the best environmental, economic and social outcomes, including the minimum possible carbon footprint."*

Following from this, there should be some guiding principles on the re-use of felled trees, which take into account the environmental, economic and social outcomes. These principles could include:

- Re-use of material from urban trees locally, where possible to minimise handling and transport costs;
- maximise long term use of suitable timber;
- recover some of the financial cost of tree maintenance and management where possible;
- improve ecological condition of the local area:
- minimise carbon footprint; and
- maintain visual amenity when considering the re-use of urban trees.

1.3 Overview of uses, past, current and proposed. From what can be ascertained, there has never been a co-ordinated approach in the ACT to seek the best possible re-use of timber from felled trees. Past approaches have been to try and market some of the more specialised high value trees, and Jim Laity (personnel communication) has indicated that 25 years ago, City Parks set aside some high value desirable trees,

sealed the ends to prevent splitting and then could not find any interested parties to use them.

During the 1990s, when the Haig Park removals and replanting commenced, some high grade *Pinus radiata* sawlogs were harvested and sent to Penrose Pine Products, a regional pine mill.

In the recent past, some wood chip that has been mulched has been sent to Visy Industries in Tumut for use as boiler fuel in the pulp mill. However, this operation has involved a considerable cost to the ACT, with Visy paying $20 per tonne at the pulp mill, with the cost of harvesting, chipping and transport being approximately $120 per tonne. There is still a lot of waste wood transported to Visy Industries from Sydney, mainly to avoid this product going into landfill, which is often incorporated with wood from building demolition.

Other jurisdictions in major Australian cities mainly utilise felled urban trees for mulch, and sometimes still as landfill. The City of Perth has commissioned some high value furniture from suitable felled street trees, but this is a minor use.

Current practice in the ACT is to mulch most of the trees that have been felled, with mulch being spread on beds as close as possible to where the trees have been removed. Some large tree trunks are either blocked and left in situ for a few days, or the trunk left in situ, so that anyone interested in firewood might remove them. At present, tree surgery contractors may also dispose of material as trees are felled, and this is usually through casual enquiries. (Territory and Municipal Services). However, discussions with the Environment Protection Authority suggest that this practice could be in contravention of the EPA Act. If not removed for firewood, they are then mulched.

The use of felled trees for mulch and firewood is current custom and practice, and is not guided by any policy. Also, according to staff from Territories and Municipal Services, this firewood use is at a small scale. The argument that removal for firewood could be in contravention of the EPA Act relates to the proper licensing of firewood merchants who abide by a Firewood Code of Practice, and are required to sell correctly seasoned firewood.

There is some use by wood turners who can access high value species, but this is ad hoc and involves no payment. Some of this high value wood is also donated to charities and schools. Allowing wood turners access to high value wood could have positive social benefits, and is an avenue that should be further explored.

1.4 Community Consultation. The sustainable re-use of felled trees in the ACT might have the potential to cause conflict within the community. Canberra has long cherished its street trees, and recent removals have created some anxiety within the

community. At issue here is a better consultation process identifying the process in which trees are to be removed, along with the reasons for tree removal.

The sustainable re-use of felled trees could in all probability lead to an increase in community anxiety, as many may see this as a commercial use of street and other amenity trees. The community would require re-assurance that the sustainable re-use of felled trees is not for commercial purposes, but in response to safety issues and the fact that some trees are at the end of their life cycle.

If one of the possible re-uses is identified as firewood, and depending on the marketing strategies used, it would be necessary to consider the impacts on existing firewood merchants and EPA requirements.

2. Background

2.1 Background of forest industry. The forest industry in Australia directly employs 77,000 people, and has a turnover over 421 billion, accounting for 0.6% of GDP. Despite this, Australia still has a trade deficit in timber and other wood fibre products of $2 billion per annum.

2.2 Forest resource, plantations and native forests. As at 2010, Australia has 2 million hectares of plantations, of which 50% are fast growing eucalypts for woodchip production and 50% softwood plantations. Over the past 10 years, the softwood plantation area has remained static, and the hardwood plantation area has expanded. There is an estimated 11 million hectares of native forest managed for timber production.

2.3 Decline of native forest resource. The amount of native forest managed for timber production is in decline, mainly due to conversion to national parks and other reserves. The NSW Government has just created a further 107,000 hectares of national park in a river red gum forest that was managed for timber production.

2.4 Specialty timber from native forests. Virtually all specialty timber for furniture manufacture, feature timber flooring and other similar uses, has come from native forests. Most plantations do not produce the highly coloured and prized specialty timbers.

2.5 Imports and illegal logging. A large quantity of timber, particularly specialty timber, is sourced from illegal logging operations in Indonesia, Malaysia, New Guinea and other south-east Asian countries.

2.6 Wood fibre for bio-energy and bio-char. There is a slow but increasing awareness of the potential for the use of wood fibre for the production of bio-energy, and for the production of bio-char which can be used in horticulture and agriculture. Australia is

lagging behind some overseas countries, especially Scandinavia, in exploring the potential of this fuel source.

These facts then present some opportunities for felled trees from urban forests, which to date has been a largely ignored resource. However, this will not be without difficulty. The community must be made aware that the urban tree resource is not the same as a plantation resource, and that it is not advocated that the urban forest resource be treated as such.

3. The resource related to Canberra and the ACT

3.1 Nature of the resource. Canberra has 630,000 trees in the urban environment that are managed by Territory and Municipal Services, both as street and park trees. This number does not take into account trees on other land, such as school grounds, and trees in Canberra households. It would be a reasonable estimate that the total number of trees in the urban area would be between 1.2 million and 1.5 million.

There are also tree removals in the nature parks close to the urban edge, mainly for fire prevention but at times for public safety. The nature of planting and the proximity to residences will always ensure that harvesting costs are high.

The often wide spaced planting means that street trees will grow with wide spreading crowns, and often very short main trunks, which has implications for sawlog quality and desirability. Trees are often used to post notices, and nails and other foreign objects will be found in some trees, which could be a factor in determining the most sustainable re-use of felled trees.

3.2 Management objectives. Canberra's urban trees provide a broad range of benefits to the community. These include visual amenity, habitat, shade, particulate capture and woody bio-mass when they reach the end of their life span. Canberra's urban tree landscape creates a special environment for the community, and management objectives reflect this (Territory and Municipal Services).

3.3 Management techniques. The management objective is for a range of benefits, including visual amenity, and this necessitates management techniques to achieve this. The major management technique is tree pruning, which is carried out to maintain a healthy crown.

The method of tree pruning used for street and park trees may mean that the tree form is not sufficiently good for production of high quality logs to produce sawn timber.

3.4 How the urban tree resource differs from traditional forest resource. The urban street and park tree resource differs from a traditional forest resource in a number of ways. Firstly, trees in the urban environment are usually planted on a wide spacing to allow for large wide spreading crown development, whereas trees in both plantation

forests and native forests have a closer spacing to develop straight trunks and then are thinned out to allow for diameter increase.

Secondly, the management techniques to maintain wide spreading healthy crowns will limit the usefulness of urban trees for high quality timber products, although some trees will certainly be useful for these high quality products.

Thirdly, the large number of different species differ from a forestry resource. A forest plantation is usually a monoculture, and all but a few native forests have a relatively small range of tree species in any limited geographical area. This contrasts to the urban street tree and park plantings, which may contain hundreds of species.

3.5 Wide range of differing species. There are 300 different tree species planted in the streets and parks of Canberra (Territory and Municipal Services advice, and Pryor and Banks, Street Trees of Canberra). While some have the potential to produce high quality timber, many are unsuited to this use, and their value as solid firewood would even be questionable, although this might be a suitable re-use in pellet form. Wood pellets used in higher efficiency wood heaters are an emerging technology with virtually no particulate emissions.

3.6 Trees in decline. Of the 630,000 trees in Canberra's streets and parks, approximately 400,000 are estimated to be in some stage of decline over the next 20 years. ACT Government Territory and Municipal Services staff are unable to place a figure on how many of these trees will be removed during this time frame, but do note the scale of works that may be required when the ANU estimated that two-thirds of Canberra's urban forest will age and decline over the coming 20-30 years (Territory and Municipal Services). The level of tree removal will depend on budget constraints, safety issues and what level of expenditure is considered to try and save some trees in decline through tree surgery. These figures have been verified in discussion with consultants undertaking street tree assessments.

The Department of Territory and Municipal Services has removed 30,000 trees over the past six years of which 18,500 were removed using tree surgery contractors, and 2,100 trees have been identified for removal in 2010/2011 (Territory and Municipal services). A further unknown quantity of trees have been removed in nature parks for fire protection and safety management. Any co-ordinated approach to sustainable re-use of felled trees will need to include an assessment of these tree numbers.

Territory and Municipal services staff acknowledge that they will need to plan for the increasing rate of decline estimated in the ANU research.

4. Measurement and calculation of volume

4.1 How volume is calculated in forestry. Tree volume is calculated by multiplying tree basal area (which is the cross sectional area of the trunk) at 1.3 metre height, times the height of the tree times a taper factor. This gives the volume of the stem (or trunk). For total volume, a further 50% is added for branches, and there is a further volume underground in the roots of the tree.

4.2 Why volume calculation for street trees will vary. Volume calculation for street trees will vary considerably. The form of street trees is significantly different in that the length of trunk is shorter, and there is a far larger crown, which means that the branch to stem ratio in street trees is far higher than forest trees. This lessens the potential high value sawlogs that can be obtained from street and other open grown trees as opposed to trees growing in a commercial forest environment.

4.3 Problems in how to measure and calculate volumes. This also presents a problem in how to estimate volumes of wood available from urban trees. As the form is different, normal forestry volume tables will not be appropriate to calculate volumes. The other problems with volume calculation is the vast number of different tree species. Plantations are usually monocultures, and native forests usually only have a few different species. Contrast this to the ACTs urban trees where there are over 300 tree species present.

A sampling technique to determine the tree material volume would be when trees of certain species are felled, the diameter, length of suitable trunk, height and total weight of tree is measured, then the total wood volume of dry wood can be calculated and entered into a data-base for long term calculations of weight of wood from felled street trees. This Updating estimates through field data will be more accurate than calculation methods, but will be a long and ongoing process, which is desirable so that accurate forecasts of available timber, or potential wood, can be made.

5. Potential products

5.1 Sawlogs. In the forestry industry, sawlogs and veneer logs are the high value product for the grower. However, as a high value product sawlogs come with a high grade specification as regards to species, diameter, length, sweep (which is the deviation of the side of the log from a straight line) and branch size.

Sawn timber from sawlogs is used for structural purposes (house frames and roof trusses), furniture manufacture, flooring and other feature uses. Many of the tree species in the ACT would be unsuitable for sawlogs, and many of the street trees in particular would contain a sawlog that is too short for structural timber. However, some of the species would be desirable for high grade feature timber, especially for specialty uses such as furniture manufacture.

Among the suitable species would be the durable eucalypts, oaks and most of the conifers. However, due to the potential problems of metal contamination within tree trunks mentioned in 3.1, and the potential of this contamination to cause serious damage to saws and possible injury, then any sawlogs would need to be scanned by metal detectors before sale or the price offered by purchasers would reflect the risk of metal contamination.

5.2 Posts. There is a market for posts in the rural sector, and posts are a valuable commodity. There are very few species that can be utilised for this market without treatment by creosote or copper chrome arsenate, these being *eucalyptus melliodora* (yellow box), *Eucalyptus polyanthemos* (red box), *Eucalyptus blakelyi* (Blakely's red gum) and *Eucalyptus sideroxylon)* (red ironbark).

5.3 Specialty products. This includes wood for turning and craft manufacture. However the market for these products would be very minor. From time to time, there may be some markets available from the demise of iconic trees that could have some interest. An example of this was the marketing of products from the Lone Pine *(Pinus halepensis)* at the Australian War Memorial when a large branch broke off. The iconic value of this tree was such that the products were in high demand.

5.4 Firewood. There is a very large market for firewood in the Canberra region. A firewood forum conducted by the Institute of Foresters of Australia in 1983 identified Canberra's firewood usage at between 80,000 and 100,000 tonnes per annum. A subsequent Masters degree study by Alison Treweek in 1992 further confirmed this figure. Although usage may have declined recently, it would still be reasonable to assume that firewood usage in Canberra would exceed 60,000 tonnes per annum (Terry Scorgie, firewood merchant).

Discussions with firewood merchants report that approximately 80% to 90% of the firewood consumed in Canberra is trucked from distances of up to 400 kilometres, and is sourced from dead standing paddock trees. There are three problems with this. Firstly, the firewood is being cut from a non renewable resource, as the dead paddock trees are not being replaced. Secondly, these dead standing paddock trees are an extremely valuable habitat resource, and yet they are not protected in any way, although in NSW this may change in the near future (NSW Department of Environment, Climate Change and Water), and thirdly, for each tonne of firewood delivered 400 kilometres to Canberra, approximately 9 litres of diesel fuel is used. These three factors clearly indicate that the current firewood use in Canberra is not sustainable.

The other problem with the firewood market in Canberra is that the market is very fussy, demanding boxes, red gum and ironbark, although these species could also be the main types locally available. There is a mis-conception that slow combustion heaters require this class of wood, and that the use of pine, for example, generates

high levels of resins which clogs up chimneys. This is false, and the New Zealand firewood market relies almost exclusively on Monterey Pine (*Pinus radiata).* Retailers of slow combustion heaters the early 1980s in fact used to state that using pine would void the warranty on the heater (personal experience).

All wood generates almost the same calorific value per kilograms of wood burnt. The problem arises because of the differing wood densities. Red Ironbark (*Eucalyptus sideroxylon)* has a density of 1,100 kilograms per cubic metre, while Monterey Pine has a density of 450 kilograms per cubic metre. Thus 2.4 times the volume of Monterey Pine would be required to achieve the same thermal output as Red Ironbark.

In the late 1990s, Woodstock Firewood (a local Canberra company) used to purchase rejected pine logs from the local sawmills, and mix these 50% with box, and market this as "Eco-wood". This was a reasonably successful strategy and they were building up a steady clientele until the fires of 2003.

Some wood species will not burn satisfactorily. Among these are Apple Box (*Eucalyptus bridgesiana)* and many of the poplars and willows. Firewood currently retails for $180 to $220 per tonne in the ACT, so the industry is worth over $10 million per annum.

Firewood from renewable sources has a very low carbon foot print. Electricity emits 1.0 kgs of carbon dioxide per kilowatt hour, natural gas 0.31 kgs of carbon dioxide per kilowatt hour, and wood 0.11 to -0.17 kgs of carbon dioxide per kilowatt hour, depending on the initial source (Paul et al, 2003).

Wood can also be pelletised for both domestic heating and power generation. This process, combined with specialist heaters to use pellets, allows a higher thermal efficiency, hence uses a lower volume of wood (Australian Agroforestry, summer 2010).

5.5 Bio-energy. Bio-energy is a potential high-volume use of low grade wood. The Australian Government is yet to grasp the benefits of bio-energy, and this form of energy generation does not appear to rate highly in future renewable energy plans (c. 2005). At one stage ActewAGL were investigating entering into a joint venture arrangement with the Integrated Forest Products sawmill at Hume to establish a bio-energy plant utilising sawmill waste, but this fell through when the sawmill went into receivership (Peter Davies, Director, Real Power Systems).

Most of the alternative renewable energy strategies developed to date are not reliable and capable of providing base load electricity. Wind and solar power rely on the elements (wind and sun), yet wood fired generators are capable of providing a reliable source of base power. Wood can substitute for coal in existing power stations, or can be used in small regional power generators.

With current technology, 1½ tonnes of dry wood are required to generate 1 megawatt hour of electricity. Thus a 1 megawatt bio-energy generator operating 12 hours per day every day of the year will require 6,800 tonnes of wood. Some European countries use bio-energy on a large scale, and Sweden obtains 40% of energy production from burning woody bio-mass. Bio-energy can also use waste wood from building demolition, and is also capable of burning other organic waste for energy production.

Current prices for bio-energy are $50 to $80 per megawatt hour, which is less than offered for wind generated power ($110) or the home purchase of solar power (up to $600). Despite this, there are bio-energy plants operating at Narrogin in WA, and one being set up at Marysville in Victoria to utilise burnt and dead forest from the Black Saturday fires of 2009.

The other advantage of small wood fired bio-energy plants is that they are transportable, and so can be moved to the wood supply to lessen transport costs. The Southern Tablelands Farm Forestry Network is currently working with a company developing gasifier plants for bio-energy production to identify regional resources suitable for bio-energy plants.

Providing that felled trees are replaced, then the use of these felled trees is either carbon neutral, or very close to carbon neutral. This is because the felled tree, is not sequestering carbon, while its replacement tree will be actively sequestering carbon.

5.6 Bio-char. Any new protocol for greenhouse gas reduction and carbon trading will include soil carbon. The most likely source of soil carbon will be bio-char, which is produced by burning wood in the presence of a limited air supply (similar to charcoal production).

Bio-char can be produced as a by product of burning woody bio-mass to produce bio-energy (in the same manner that coke was produced as a by product of burning coal in a limited air supply to produce coal gas).

By restricting air flow to woody bio-mass being burnt to produce bio-energy, approximately one tonne of bio-char can be produced for every three tonnes of wood burnt. Thus the 1 megawatt power station using 6,800 tonnes of wood could produce 2,270 tonnes of bio-char which on current markets could be worth between $200 and $1,000 per tonne.

5.7 Mulch. Mulch is the chipping of timber and material from urban trees. Due to a lack of alternate uses this is what most of the felled trees in Canberra are turned into at present. While there is value in reducing evaporation from garden beds with the mulch, thus reducing water usage, as the mulch breaks down it is releasing carbon

dioxide into the atmosphere, and so is not of benefit in any carbon pollution reduction scheme, whereas bio-energy and bio-char are of benefit in any carbon pollution reduction scheme.

5.8 Seed. This is a potentially valuable commodity, depending on species and demand for specific seed. Seed catalogues indicate that most Eucalyptus seed is worth between $500 and $2,000 per kilogram depending on scarcity, and many of the exotic street trees would have desirable seed.

As a word of caution, seed should only be collected from superior specimens, as seed from a poor quality tree will only exhibit poor quality genetics in the off spring. Despite this, should the opportunity arise and there is a demand, the collection of seed from good quality trees should not be overlooked.

5.9 Ecological habitat and restoration. In a native forest managed for production purposes, some over mature trees are deliberately left for their habitat value. As they become aged and senescent, branches break off and hollows are left, providing habitat for birds, possums, gliders and other animals.

However, in the urban environment, to leave trees of this age could be dangerous to the public, hence they might have to be removed before the chance of shedding limbs becomes a problem. Trees which are felled and removed may still be able to provide ecological habitat, by being relocated to areas within nature parks or urban parks, where they could still provide habitat for a number of years. Opportunities for the retention of standing habitat trees are not discussed in this paper.

6. Opportunities and constraints

6.1 Non uniformity of the resource. The biggest problem for marketing of the felled trees for sawlogs will be the non uniformity of the resource and that when many urban trees are removed they are structurally unsound and contain areas of decay. The non-uniformity arises from a number of factors. Firstly, as there are approximately 300 tree species in Canberra, the first problem will be that there will be relatively small volumes of different species. While some species may be highly desirable, such as oaks, ashes, elms, most of the conifers and many eucalypts, there will be many species of no interest to sawmillers for saw logs.

The other variable is the diameter, length and form of many of the potential sawlogs. Sawmillers like long length, small taper and uniform diameter sawlogs (Kim Hayter, sawmiller, personal communication). The urban tree resource will mainly produce short, highly tapered and large diameter logs which are difficult for sawmills to process.

Portable sawmillers would certainly be interested in some of the logs. They do not operate at the same capacity as a sawmill, and can take their time and are set up to cut

short, large diameter logs. The major problem for a portable sawmiller will be contamination of logs from nails and other material that may have been hammered into trees.

Any material used in this manner retains all of the embodied carbon in the sawn product.

6.2 Sale of raw product versus value adding. This relates to value adding, or vertical integration. The question becomes whether the ACT Government wants to become involved in undertaking processing of certain products to add further value, or if it is worthwhile to do so.

Two examples are that a plantation owner who grows Monterey Pine (*Pinus radiata)* for a period of 30 years and receives a return of $20 to $50 per cubic metre, depending on quality and distance to market. The sawmiller, with a capital investment of millions of dollars, recovers approximately 40% of the sawlog as sawn product, and receives a return of $300 to $500, depending on product. The big winner is the retailer, who purchases from the sawmiller at $500 per cubic metre, and with little capital investment, retails the product for $900 per cubic metre.

The second example is firewood. The owner of dead paddock trees might receive $10 per tonne from a firewood cutter, who will then cut and deliver firewood for between $160 and $200 per tonne.

If the ACT Government did decide to undertake value adding on certain products, such as firewood, this would probably create angst for business, and a debate on use of government resources to compete against the private sector.

6.3 Spot, or ad hoc, sales. If a continuity of supply for sawlogs cannot be guaranteed, then the ACT Government could have a number of portable sawmillers who could be offered desirable felled trees when they become available. This would be on the understanding that there would be no guarantee of volumes or continuity of supply.

6.4 Market to selected outlets. This would be similar to 6.3, the only difference being that there would be a contract in place with agreed prices rather than ad hoc sales.

6.5 Tender. Portable sawmillers could be asked to tender for sawlogs. However this would require a detailed assessment of the trees that would be felled over a period of time, including species and volumes that would be available. The tender process could also be used for use of woody bio-mass for bio-energy and bio-char, and for sale of firewood.

The use of the tender process for woody bio-mass for bio-energy and bio-char would not require a detailed assessment of species and tree size, just a reasonable estimation

of the volume that would be available on an annual basis. The use of the tender process for firewood would require a better assessment of tree species for reasons explained in section 5.4.

6.6 Web sites. There are a number of web sites now offering plantations and wood for sale. The web site e-bay has had some listings for plantations, including a 160 hectare Monterey Pine plantation near Braidwood.

Australian Forest Growers have developed a web site MarkeTree for sale of plantations and forest timber products - (www.afg.asn.au). If products such as sawlogs were to be offered for sale, this could be an appropriate selling site.

6.7 Case studies. In Australia, there are few known instances of the sale of felled street and park trees other than for low grade uses such as mulch, or to an outlet such as Visy Industries for their use as boiler fuel.

One known successful case was in Mount Macedon in Victoria. Following the devastating Ash Wednesday fires in 1983 which burnt through Mount Macedon, a small enterprise with a portable sawmill commenced and salvaged dead trees of high sawn timber value from some of the old established gardens in the town. This enterprise then marketed the sawn timber to selected timber merchants in Melbourne, and the sawn timber was of highly desirable species and grades, and attracted a premium price.

In New Zealand in the early 1990s, when the export of Monterey Pine to Japan and Korea was in a boom situation, local sawmills had difficulty in sourcing sawn timber for the domestic market. Desperate sawmillers purchased farm trees of varying quality in an attempt to try and meet local demand. However, since those unprecedented export market prices, the market has not come anywhere close to those levels. Indeed, and sadly, prices offered in 2010 are less than in the early to mid 1990s, even without taking inflation into account.

7. Forest Certification

7.1 Advantages of certification. Forest certification assures buyers of wood products that the products they obtain originate from legally and sustainably managed forests. Certification schemes also ensure that forests are managed in accordance with codes of practice and/or environmental management systems. This process ensures correct management procedures with regard to various management practices, and a chain of custody process. To obtain certification, all herbicide and pesticide usage has to be recorded, and compliant with the appropriate standard, and environmental standards have to be met.

Certification for the ACT urban tree resource would be a first in Australia. Territory and Municipal Services staff probably already undertake most of the requirements for certification.

7.2 Difficulties of certification. Certification is a long process, with a large amount of paperwork, and a requirement for external approval. There would probably be 4 to 6 months work by one official involved in gathering and providing all relevant documents and data, and collating the material.

7.3 Auditing. Once certification has been obtained, there is a requirement for ongoing auditing. The schemes provide for a degree of self auditing and reporting, but an external auditor has to be used at some stage. The cost of this varies on the scale of the operation, but may be $15,000 to $20,000 (Francis Clarke, a private forest owner who undertook the process, personal communication).

7.4 Certification in Australia. There are currently two schemes operating in Australia. The Australian Forestry Standard is aligned with the Programme for Endorsement of Forest Certification, and the other scheme is the Forest stewardship Council. Both schemes are equally acceptable, and both issue chain of custody certificates.

If the ACT Government were to obtain certification, then this would be a first for the certification of an urban forest. However, it would be very desirable if long term sale and supply arrangements were to be entered into.

8. Conclusions and recommendations.

The conclusions and recommendations are based on the guiding principles in the introduction, which are:

- Re-use of material from trees locally, where possible, to minimise handling and transport costs;
- Maximise long term use of suitable timber;
- Recover some of the financial cost of tree maintenance and management where possible;
- Improve ecological condition of the local area;
- Minimise carbon footprint; and
- Maintain visual amenity when considering re-use of urban trees.

Of the potential products mentioned in section 5, sawlogs, firewood, bio-energy (including bio-char), mulch and ecological habitat and restoration appear to be the most likely uses. Of these five, the use of the felled trees for mulch is an activity that is not greenhouse gas neutral, or at least close to being neutral, but provides benefits to the local area where the trees are mulched which is consistent with the guiding principle of re-use of material from trees locally. The use of felled trees for sawlogs,

firewood and bio-energy and bio-char are close to being greenhouse gas neutral in their application.

The use of felled trees for habitat is also consistent with guiding principles in that the trees are used locally and improve the ecological condition of the local area. The use of felled trees for firewood by local residents needs to be carefully considered, as there is the possibility that residents will not properly season firewood, thus potentially creating smoke particulate emissions. This is an area that the ACT Government will have to consider a policy, as the advantage of re-use locally and the minimising of the carbon foot print might be outweighed by particulate pollution.

If the felled tree becomes a sawlog, then the sawn timber produced will retain the carbon that has been sequestered in the final product, eg flooring, or furniture. If firewood is the use, and the average household consumption is four tonnes per annum for heating (Bernie Smillie, firewood merchant sales), then the equivalent use of natural gas would equate to 900 kilograms of greenhouse gas emissions, and for electricity, 3.6 tonnes of greenhouse gas emissions. The greenhouse gas emissions from sustainably sourced firewood are 60 to 120 kilograms. Similar figures would apply to the use of woody bio-mass for power generation, but with the added bonus that 20-33% of the wood burnt could be returned to the soil as bio-char.

This is on the presumption that for every tree that is cut down, at least another tree will be planted. It is assumed that this will happen to maintain or improve the visual amenity of Canberra.

It is difficult to ascertain the rate of tree felling in Canberra over the next 20 years. The current rate of tree felling is approximately 2,000 trees per annum, and TAMS note they will need to plan for the increasing rate of decline estimated in the ANU research (Territory and Municipal Services). There are also an unknown number of trees felled from suburban blocks and from adjacent nature reserves which are felled for fire protection. The number of trees which are felled from these different areas could range from a low of 5,000 trees per annum to a high of 20,000 trees per annum, and there needs to be detailed planning to calculate these numbers.

Detailed estimation of volume or weight is difficult without undertaking a reasonably intensive inventory measurement (see also point 4.3). It would be reasonable to assume every tree would contain approximately 1½ tonnes of woody material in the trunk and branches. Some will have substantially more wood, some less. Based on this, there will be 1,500 tonnes of woody biomass per 1,000 trees felled available for use. A small proportion might be sold to higher-value uses such as sawlogs from desirable species, but most of the resource would be of lower quality.

Based on the figures in points 5.5 and 5.6, every 1,000 trees utilised as woody bio-mass to produce electricity would run a 200 kilowatt power station, and create a

supply of 450 tonnes of bio-char per annum. A 200 kilowatt power station can supply enough electricity for 160 suburban houses. As this would be a direct substitute for coal, this would represent 140 tonnes less coal usage, for a saving of 540 tonnes of greenhouse gas emissions. In addition, a further 450 tonnes of carbon would be sequestered in soils as bio-char.

This is a feasible use for the woody bio-mass that is produced from the felling of urban trees, as there are power plants now in the market place with a capacity as low as 250Kv (quarter of a megawatt). These plants are currently being manufactured by Real Power Systems, and the first is being commissioned near Geelong (Peter Davies, Real Power Systems).

There is also a significant resource within a radius of 100 kilometres from Canberra that could also be used for bio-energy. However, it must be noted that current Australian Government policy does not allow the use of woody bio-mass from any native forest (public or private) to qualify under the Renewable Energy Certificate scheme. This is vastly different to the situation in Scandinavian countries, where sustainable harvesting of native forests is an important part in their overall energy production.

Even if all possible felled trees were to be utilised for the highest possible value end usage, the money (or royalty) received will not cover all the costs of harvesting. In a forestry operation, harvesting has a high level of mechanisation that allows high levels of efficiency. This is not possible in the harvesting of urban street and park trees, and high costs of removal will be a fact of life. At best, the sustainable re-use of felled trees will only be able to partly offset some of the financial costs.

Recommendation 1: That the ACT Government give consideration to calling for tenders or expressions of interest to operate a power station fired by woody bio-mass. The size of the power station will depend on the number of trees to be felled, but 200 kilowatts of electricity can be generated per 1,000 trees felled. The document should specify that the woody bio-mass is to be burnt in such a manner as to produce the maximum quantity of bio-char.

In conjunction with this recommendation, ACT No Waste could investigate the integration of organic household waste with the woody bio-mass as a means of lessening the amount of this material that currently goes into landfill.

Recommendation 2: That the ACT Government forms a list of interested portable sawmillers who would be interested in taking small quantities of high value sawlogs from selected felled trees. The portable sawmillers would require an assurance that all logs be scanned to ensure no metal is present. If this is too expensive, then all material that would have gone to the portable sawmillers should be used as woody bio-mass for power generation.

Recommendation 3: That the ACT Government enters discussions with suitable seed merchants for the sale of seed from selected trees and tree species. Although a minor use, there are some social benefits through employment and the rejuvenation of selected street tree planting. The ACT Government owned Yarralumla Nursery could be user of seed sourced from this recommendation.

Recommendation 4: That the ACT Government consider some minor changes in future tree management, such as pruning techniques to remove lower branches on selected species, that may increase the value of future felled trees without detracting from the visual amenity of the urban forest.

Recommendation 5: That the ACT Government give consideration to obtaining certification for the urban forest. Certification will then provide a guarantee that the urban forest is being managed in a sustainable manner.

9. References

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Personal Communication with:

- Chris Ware, Manager ACT No Waste.
- Fleur Flanery, Manager, Urban Tree Renewal Programme, Territory and Municipal Services.
- Michael Brice, Manager, Urban Tree Management Unit, Territory and Municipal Services
- Cedric Bryant, Horticulturist, panel member Tree Selection Working Group.
- Tony Fearnside, Chairman, Friends of ACT Arboreta.
- Steve Thomas, Committee Member Friends of ACT Arboreta and Southern Tablelands Farm Forestry Network.
- Terry Scorgie, firewood merchant.
- Jim Laity, Botanist, panel member Tree Selection Working Group.
- Kim Hayter, Managing Director, L&M Hayter Sawmills.
- Peter Davies, Managing Director, Real Power Systems.
- Ian Booth, Director, Carbon Innovations.
- George Dashwood, Owner, Yass Nursery.
- Bernie Smillie, Managing Director of Firewood Baron.
- Dennis Pollack, sawmiller and firewood merchant.
- Neil Cooper, Manager, ACT Fire Management Programme.
- James Gray, National Association of Forest Industries.
- Charlie Bell, Senior Forestry Officer, NSW Department of Environment, Climate Change and Water.
- Daniel Walters, Environment Protection Authority

A Management Framework for Important Trees in the ACT

A report prepared for

OFFICE OF THE COMMISSIONER FOR SUSTAINABILITY & THE ENVIRONMENT

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Contents

1 Introduction: Development of a Management Framework for Important Trees in the ACT

This report sets out some possible directions and general planning principles for providing a framework for the management of Important Trees in greenfield sites and existing urban areas of the ACT.

The information contained herein seeks to summarise and provide a synthesis of potential constraints that Important Trees may provide in future urban design as well as the values these trees may have that would warrant their protection (such as habitat and connectivity roles or other environmental values of specific conservation significance), and discusses also the broad range of planning considerations that may affect the ability to retain such trees (such as maintenance responsibilities and issues for ongoing management, provenance, maintaining indigenous species, and visual amenity). This advice also aims to summarise possible consistencies or conflicts with existing policies related to Important Trees.

Advice is also provided in relation to future planning with respect to issues such as succession planning and the provision of offsets for the removal of Important Trees. This report also discusses briefly the importance and role of education and public awareness of the management of Important Trees (such as why some trees should be retained and why some trees must be removed). The report also seeks to provide a set of preliminary management recommendations as part of the conclusions of this report's investigation.

This report responds to the consultancy brief issued by the Office of the Commissioner for Sustainability and the Environment.

Initially, the brief was established in relation to the management of "Remnant" Trees and included a request to establish a definition of what constitutes a Remnant Tree. Given the inherent difficulty in establishing a clear definition of what constitutes a Remnant Tree as discussed in Section 3 of this report, the scope of this investigation has been broadened to include what may be defined as Important Trees in the ACT, such that all trees regarded as important in the context of Canberra's urban landscape and treescapes, be they "Remnant" or otherwise, are included in this assessment.

2 The Importance of Trees in Canberra's Landscape

Trees are an essential part of Canberra's landscape, they provide potential habitat for native fauna, have heritage significance, provide scenic amenity and add to the bushland setting of the Nation's Capital, they may also provide important shading to enable cooler homes, and they also assist with mitigating the effects of climate change through carbon uptake. Examples of early urban tree plantings commencing in about 1910, can be seen in Haig Park, City Hill, Acton, Weston Park, the Parliamentary Triangle, Telopea Park and various inner Canberra suburbs.

It is estimated there are now 210,000 trees in Canberra's residential streets and a further 440,000 trees in urban parks that are managed by Territory and Municipal Services. Native tree species comprise about 40% of this total tree population[1]. However, the total number of natives will be far greater if those in nature parks and on privately leased lands were considered.

Given the importance of maintaining Canberra's unique bushland values, it is imperative that a strategy for managing trees in the ACT be developed to give greater certainty in relation to the requirements to protect existing trees to the greatest extent possible, whilst also giving some direction to land managers as to their options in relation to tree management, including the circumstances under which a tree may be removed. This document aims to provide sufficient background information on the current circumstances (in regards to legal and land use planning issues) in which Important Trees in the ACT, which includes all Remnant trees, are managed and it also provides a preliminary set of recommendations through which the current circumstances may be improved.

[1] Department of Territory and Municipal Services http://www.tams.act.gov.au/play/pcl/parks_reserves_and_open_places/trees_and_forests/trees

3 Definition of Remnant Tree(s)

A comprehensive review of relevant legislation and government policies that might provide a legal or otherwise consistent definition of what constitutes a "Remnant Tree" or may otherwise set out criteria for determining the Remnant status of a tree (eg measurement criteria) has been conducted. The legislation and policies reviewed included:

- *Nature Conservation Act 1980* and *Regulation 1982;*
- *Commissioner for the Environment Act 1993;*
- *Environment Protection Act 1997* and *Regulation 2005;*
- *Tree Protection Act 2005;*
- *ACT Government Action Plan No. 10* – Yellow Box/Red Gum Grassy Woodland: An Endangered Ecological Community (this document has been replaced by the *ACT Lowland Woodland Conservation Strategy* – see below); and,
- *ACT Government Action Plan No. 27* – ACT Lowland Woodland Conservation Strategy.

Throughout these legislative instruments, no single definition has been provided for a Remnant Tree specifically. Some references have been identified that relate to remnant vegetation and remnant woodland communities, but these are not able to be directly applied to individual trees.

Given that only about 40% of the actual trees in urban streets and public urban parks of the ACT are native species and with tree plantings in the ACT dating back to as early as 1910 (informal plantings may be dated as far back as the 1820's, Charles Weston was appointed as the ACT's first Afforestation Officer in 1913, and the first large-scale National Capital plantings commenced around 1917), it is important to have a clear definition that eliminates from the classification criteria, trees that have been planted, regardless of their age, particularly when they are not native trees indigenous to the ACT region.

In reviewing other jurisdictions and their use of the term Remnant Vegetation or Remnant Trees that might be able to be adopted for use here in the ACT, it was found that Queensland provides perhaps the only suitable reference. In Queensland "Remnant Vegetation" is defined specifically under legislation, this being the Queensland *Vegetation Management Act 1999* and the mapping of Remnant Vegetation has been formally determined and set-out in *Methodology for Survey and Mapping*

of Regional Ecosystems and Vegetation Communities in Queensland prepared by the Queensland Herbarium (Neldner et al 2005).

The definition provided by this legislation applies to vegetation communities as opposed to individual trees. Remnant Vegetation under this Act is defined as vegetation where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed ecologically dominant layer of vegetation (which is then used as a reference for applying the above 70/50 rule).

This particular definition is unfortunately of limited use in our ACT exercise in attempting to define Remnant Trees for two reasons. The first is that this definition applies to a vegetation community and not individual trees. The second is that not all of the individual trees within an area of vegetation mapped as Remnant under the Act are included in the mapping process (if the individual tree is less than 75% of the median height of the reference site) and therefore cannot reasonably be regarded as Remnant Trees. This is because according to the Qld Herbarium rules for mapping remnant vegetation, an individual tree that is included in the transect survey count must be 75% of the median height of the reference site). For example, if the median height of vegetation in the undisturbed layer is 20m, then an individual tree must be at least 15m in height to be included in the transect count of vegetation that would be mapped as remnant (QLD Herbarium, 2005).

In addition to the above, remnant vegetation under this Act can also include heaths and shrublands as well as grass/sedge vegetation types (for example, Regional Ecosystems RE12.3.8 described as *Freshwater swamps with Cyperus spp., Schoenoplectus spp. and Eleocharis spp.*; RE1.3.1 Mitchell grass (*Astrebla spp.*) grassland on alluvial plains; RE12.9-10.15 Semi-evergreen vine thicket with *Brachychiton rupestris* on sedimentary rocks; and, RE12.11.15 *Xanthorrhoea johnsonii* (Grass Tree) woodland on serpentinite). None of these Regional Ecosystems contain large trees and clearly, the use of this assessment of remnant vegetation would be inappropriate for the assessment of Remnant Trees.

Notwithstanding the above, no other jurisdictions have a clear legislative or planning definition of remnant vegetation (or Remnant Trees), nor do they provide specific guidelines for the identification and mapping of remnant vegetation, that would otherwise provide a sound basis for application in determining remnant status of individual trees here in the ACT.

New South Wales, the Northern Territory, South Australia and Western Australia have all begun process for identifying and mapping remnant vegetation with maps of remnant vegetation available from the respective government departments, however these maps are not state-

wide (i.e. do not cover the entire state). Additionally, these state and territory governments have not yet developed any policies or legislation to legally enforce remnant vegetation management.

Similarly, Victoria (through the DPI) provides information on the types of remnant vegetation present in the state and their conservation status, but does not have any policy or legislative frameworks detailing the protection or management of remnant vegetation. Notwithstanding this, the City of Whittlesea in Victoria has prepared a River Red Gum Protection Policy although this policy has not yet been brought into any corresponding legislation. Of note in this policy, it refers to mature Red Gum trees that have been estimated to be between 200 – 800 years of age, which may be of some value in determining the status or definition of a Remnant Tree.

Given the lack of a scientifically accepted (published) or otherwise legally defined, definition of what may or may not constitute a Remnant Tree, it has become necessary (for the purposes of this investigation) to attempt to provide a suitable definition of what a Remnant Tree is. In doing this, a number of processes have been undertaken to arrive at a defensible definition and which has included the review of other legislation and policies of other jurisdiction as provided above. Our investigation has also included going back to the literal meaning of the word as defined in the dictionary so that the implied meaning of the word "remnant" is faithfully/correctly applied here.

The Collins English Dictionary defines "remnant" as:

> "remaining, left-over; a part left over after use, processing; a surviving trace or vestige, as of a former era"

The Macquarie Dictionary defines "remnant" as:

> "a part, quantity or number remaining... a trace, vestige; remaining".

Following from this, most references of "Remnant" Tree(s) or vegetation have been in the context of Pre-European settlement. It could therefore be reasonably argued that a "Remnant Tree" is a tree that would be typical of an area prior to European Settlement. As such, a proposed practical definition of Remnant Tree is:

> "a native tree of indigenous origin and which has regenerated from or is a remnant of the original vegetation community prior to urban development."

Ideally, such trees would also contribute to local ecological, landscape or cultural values.

With regard to regenerating vegetation, we consider that it would not be appropriate to identify, for example, an immature tree of about 2m height to be regarded as a "Remnant" tree in and of itself. As such, the above definition has included further criteria to be applied to the nature of the vegetation so that small, immature trees (in isolation) are not covered by this definition.

This has been purposely done in this regard as we consider that whilst such trees should be afforded some protection when found to be part of the original vegetation community, they should not pose a significant constraint to the use of the land in which they occur when they exist as an isolated individual tree. In this regard, smaller immature trees are granted some protective status when found to contribute to or be a part of a mapped vegetation community (eg part of a mapped box gum woodland vegetation community) through the ACT Government Action Plans and federal legislation relating to endangered ecological communities (eg box gum woodland) and hence do not require additional specific identification and protection here.

We believe it appropriate that such (small/young) trees are not afforded the same identification as the larger/older trees when these trees occur in isolation (as an individual tree and not part of a community) as they do not provide the same landscape amenity or ecological (habitat) value as the larger, older trees.

Finally, it is acknowledged that for the purposes of the current exercise which is to provide a framework for managing ACT's trees at the level of the individual tree, the above definition may not be suitable as a number of desirable trees may not meet the proposed definition and therefore receive no formal protection (should a new protection policy be drafted on the basis of protecting the ACT's Remnant Trees). Given this, we propose that the broad definition of Remnant Tree provided above remain for the purposes of having a consistent approach toward a specific terminology, but that also, this current exercise of providing a framework for managing important trees in the ACT be expanded beyond simply those trees which meet the criteria for Remnant Tree, to also include trees of ecological, cultural and historical significance. In doing so, we remove the ambiguity surrounding the term "remnant" and its application, and more importantly, manage to include in the strategy all trees that may be regarded as desirable to manage and protect.

4 Assessment of the existing level of legislation /policy protection afforded to Important Trees in greenfield and brownfield sites, and in existing urban areas and streetscapes

A summary of relevant legislation and policies that (may) provide protection to trees in the ACT (though not specifically Remnant Trees as no such classification and hence provision for protection currently exist in ACT legislation and policy) is provide below.

4.1 Tree Protection Act 2005[2]

The objects of this Act are to primarily protect individual trees in the built up urban area, and mainly on leased lands, that have exceptional qualities because of their natural and cultural heritage values or their contribution to the urban landscape, to protect urban forest values that may be at risk because of unnecessary loss or degradation, to protect urban forest values that contribute to the heritage significance of an area and to ensure that trees of value are protected during periods of construction activity and to promote the incorporation of the value of trees and their protection requirements into the design and planning of development, as well as to promote a broad appreciation of the role of trees in the urban environment and the benefits of good tree management and sound arboricultural practices.

For this Act, protected trees are either a *Registered* tree or a *Regulated* tree. A Registered Tree can be on both Leased and Unleased land in the built-up urban area and receives very strong protection under this Act. *Registered* trees are trees that are registered (or provisionally registered) by the Conservator for Flora and Fauna (Conservator) in accordance with the Criteria determined by the Minister. The criteria for registration (under Schedule 1 of Disallowable Instrument DI2006-56), of a tree located in a built-up urban area, is that it must contribute to one or more of the following values:

- Natural or cultural heritage value (The object of this value is to identify trees that are of particular importance to the community due to their intrinsic heritage values)
- Landscape and aesthetic value (The object of this value is to identify trees that are of particular importance to the community due to their substantial contribution to the surrounding landscape).

[2] *Tree Protection Act 2005*
http://www.legislation.act.gov.au/a/2005-51/default.asp

- Scientific value (The object of this value is to identify trees that are of particular importance to the community due to values associated with their ecological, genetic or botanical significance or ability to substantially contribute to the scientific body of knowledge and understanding).

A *Regulated* tree is a living tree (other than a registered tree or a palm tree) that is on leased land within a Tree Management Precinct and is 12m or more high, or has a trunk with a circumference of 1.5m or more at 1m above natural ground level, or has 2 or more trunks and the total circumference of all the trunks at 1m above natural ground level, is 1.5m or more, or has a canopy 12m or more wide (note: a tree cannot be a regulated tree if it is a pest plant under the *Pest Plants and Animals Act 2005*).

A decision making flowchart of how trees are protected under this legislation including the circumstances under which a tree may be removed is provided at Appendix A.

The criteria for approving an activity that may damage a protected tree, or be prohibited work within the protection zone for a protected tree or within a declared site, are determined by the Minister and are set out in Schedule 1 the Tree Protection (Approval Criteria) Determination 2006 (No2) Disallowable Instrument DI2006-060.

With regards to applications to damage a protected tree, under Section 22 of the Act a person may apply, in writing, to the conservator for approval for an activity that would or may damage a protected tree or be prohibited groundwork in the protection zone for a protected tree or a declared site. This is usually performed through a Tree Damaging Activity Application or through a Tree Management Plan. In reviewing this instrument, it is noted that additional special protection is made for "remnant eucalypts" whereby approvals to damage a regulated tree for the purpose or reason of it being in an inappropriate location due to (potential) size and growth habit or for solar access cannot be given fort remnant eucalypts, although unfortunately the document does not go on to specify exactly what a remnant eucalypt is.

In addition to a direct application to damage a protected tree, an activity which damages a protected tree may also be approved through a Development Application (DA). With regard to a DA that involves an activity that may damage a protected tree, the DA is to be referred to the Conservator for Advice under s148 of the Planning and Development Act 2007. The Chief Planning Executive (CPE) (ACTPLA) may make a decision on a regulated tree that is inconsistent with the Conservator's advice only if satisfied that:

- any applicable guidelines have been considered;
- any realistic alternative has been considered; and,
- the decision is consistent with the objects Territory Plan.

Under Section 81 of the Tree Protection Act 2005, a development approval that is inconsistent with the Conservator's advice in relation to a *Registered* tree must not be given.

A *Tree Management Precinct* is an area declared to be a Tree Management Precinct. The Minister may, in writing, determine criteria for declaring an area of land in a built-up urban area to be a tree management precinct or, the Minister may, in writing, declare a stated area of land in a built-up urban area to be a tree management precinct.

The Minister may declare an area of leased land as a Tree Management Precinct if satisfied that a significant threat to the urban forest values exists or is likely to exist in the near future (for example, due to existing or projected high levels of development activity; or in an area of low or reducing level of tree canopy cover); or if the area is entered on the Heritage Register under the *Heritage Act 2004*; or if the area is a new estate development that is subject to construction activity.

In declaring an area to be a Tree Management Precinct, the Minister may have regard to the broader strategic planning objectives of the Territory Plan and associated urban planning by the ACT Planning and Land Authority. Development within Tree Management Precincts, or that may have an impact on a protected tree, is often accompanied by an approved Tree Management Plan.

The preparation of Tree Management Plans is provided for under Part 4 of this Act. A Tree Management Plan may provide for activities that may be undertaken in relation to a tree and may set out conditions about how the activities are to be undertaken. Anything done in relation to a protected tree in accordance with a tree management plan for the tree is an exception to the offences against s15 (Damaging protected trees—general) and s17 (Doing prohibited groundwork—general). Under this part of the Act, the Conservator may, in writing, determine guidelines for tree management plans, and may, on the Conservator's own initiative, propose a tree management plan for a registered tree.

The land management agency for the land where a registered tree is located may also apply for a tree management plan for the tree as well as anyone else may apply for approval of a tree management plan for any tree on leased land in a built-up urban area. The application must be given to the Conservator for approval and the Conservator may ask the advisory panel for advice on the proposal or application.

If the Conservator approves a tree management plan for a registered tree, the Conservator must include details of the plan in the tree register. The Conservator must also give written notice of the decision on the tree management plan to the applicant (if any) and if approved, the conservator must also give written notice of the decision to—

(a) the lessee of, or land management agency for, the land where the tree is located; and

(b) if the tree is on leased land—the lessee of, or land management agency for, land that—

(i) adjoins the land where the tree is located; and

(ii) is within 50m of the tree; and

(c) if the plan is for a tree that the conservator considers may have heritage significance—the heritage council; and

(d) if the plan is for an Aboriginal heritage tree—each representative Aboriginal organisation.

The Conservator may give written notice of the decision to anyone else the Conservator considers appropriate.

In summarising this piece of legislation as it may apply to the management of trees in the ACT, which includes the management of Important and/or Remnant Trees as well as protected trees, the Act does not provide a specific definition of what constitutes a Remnant Tree, although it does clearly define two classes of trees which are given a relatively strong degree of legislative protection. In particular, a Regulated tree is clearly defined, with dimensional criteria quoted in the Act, for determining exactly what constitutes a Regulated Tree. A Regulated Tree however, can in fact be a planted, non-indigenous species and therefore not constitute a Remnant Tree in so far as this report applies the term/concept. Additionally, the Act only applies to trees in the built-up urban area declared by the Minister. The Minister has declared most of urban Canberra as land in the built-up urban area, although land specifically excluded from the built-up urban area is all land designated in the Territory Plan as broadacre, hills, ridges and buffers, forestry, river corridors, rural and water features (refer to Notifiable Instrument NI2010-414[3] for maps detailing the built-up urban area). As such, any tree located in these areas is not protected under this legislation which may sometimes result in trees that are physically located quite close to urban precincts but are not protected.

[3] Tree Protection (Built-up Urban Areas)
Declaration 2010 (No 1). Notifiable Instrument NI2010-414
http://www.legislation.act.gov.au/ni/2010-414/default.asp

4.2 Nature Conservation Act 1980[4]

The *Nature Conservation Act 1980* establishes the ACT Flora and Fauna Committee which provides advice to the Minister in relation to nature conservation. The committee assesses the status of the ACT's flora and fauna and (amongst other things), advises on Action Plans. The ACT Action Plans that have some relevance to the conservation of trees in the ACT are the *Yellow Box/Red Gum Grassy Woodland: An Endangered Ecological Community* (Action Plan No.10) and the *ACT Lowland Woodland Conservation Strategy* (Action Plan No.27). These are discussed individually below.

The following sections of the *Nature Conservation Act 1980* are of relevance to the protection and management of Important Trees in the ACT:

Section 33 (Special Protection Status) and Section 34 (Declaration of protected and exempt flora and fauna) of this Act provide the legislative power to declare members of a species of native plant to have special protection status if believed on reasonable grounds that the species is endangered or threatened with extinction. None of the species of trees in the ACT that might be considered Remnant Trees (i.e. primarily trees of the genus *Eucalyptus*) are protected species under Disallowable Instrument DI2008-53 which lists the vulnerable and endangered species in the ACT or DI2005-64 which lists the species declared as having Special Protection Status under s33 of the Act. Disallowable Instrument DI2003-6 lists species that have either protected or exempt status under Section 34 of the Act. Of these, only three are tree species, and two of which are very uncommon in the ACT, with the Mountain Swamp Gum (*Eucalyptus camphora*) not recorded in the ACT region at all.

Section 40 of the Act (draft Action Plan) provides the requirement for the Conservator to prepare draft Action Plans for species, communities or threatening processes that are the subject of a declaration. The Action Plans prepared to date that are relevant to the (indirect) protection of trees are discussed individually in the following sections.

Also under this Act, trees in the ACT are given some additional protection under Section 51 (Taking Plants) as it is an offence for a person to take a plant, except in accordance with a licence, that has special protection status, or is a protected native plant, or is a native plant growing on unleased land. However this offence does not apply under particular

[4] *Nature Conservation Act 1980*
http://www.legislation.act.gov.au/a/1980-20/default.asp

circumstances generally relating to cultivated native plants or plants in built up areas.

Section 52 of the Act also provides for the preservation of native timber, and creates an offence whereby a person (with the exemption of Conservation Officer or a contractor acting under a license) shall not, without reasonable excuse fell, or cause to be felled; or damage, or cause to be damaged; standing native timber on unleased land in the built-up area, or leased or unleased land outside the built-up area, except in accordance with a licence.

However this does not apply in relation to felling or damage of native timber on leased land outside the built-up area where the timber was planted by or on behalf of an occupier and felled or damaged by or on behalf of that occupier or a subsequent occupier. As the criteria here relates specifically to planted trees, this particular issue is regarded as being of little relevance to Remnant Trees.

In considering Sections 51 and 52 of the Act, we note that the definition of native plant, which specifically excludes "*native timber*" (being a native tree taller than 2m in height), leads to a situation of ambiguity as native timber, whilst not specifically meaning a "tree", may in fact result in a circumstance whereby native timber may be removed to the extent that the tree is in fact removed altogether. Our assumption is that the *intent* of the Act is to provide protection of trees to the same extent as any other native plant (such as a shrub, grass or forb etc) and as such, the definition of native timber should not automatically be interpreted as a tree in its entirety. Notwithstanding this, both native timber and native plants are given protection under this Act so that "trees" are still afforded some protection. It is recommended that the definitions of both native plants and native timber be amended to specifically comment on what a "tree" is, be it either a native plant or native timber.

In assessing this piece of legislation as it may apply to this report, it does provide a relatively high degree of protection to individual native trees (or plants), regardless of their age/size (i.e. Remnant status), as ALL native plants are provisionally protected, however, this protection does not apply where a person holds a licence to remove a plant and therefore applications can be made to remove plants on leased land, unless it is a protected plant, although a protected plant that has been cultivated, can be removed by the occupier of the land. Similarly, a protected native plant that has been planted is not covered by this Act. Occupiers of land in built up areas may also take protected native plants, or in non built up areas, may take protected native plants for preparing land for primary production under a lease agreement or licence. Since most of the

exemptions relate to planted or cultivated plants, the protections therefore remain quite strong for Remnant Trees.

In summarising the above, this Act provides protection for native plants and native timber (which would include all Remnant Trees as per our definition) on built-up land in the urban areas of the ACT.

4.3 ACT Government Action Plan No. 27 – ACT Lowland Woodland Conservation Strategy[5]

This strategy is targeted primarily toward the identification and management/protection of woodland vegetation communities. Under this Action Plan individual trees or even clumps of trees are not covered and therefore receive no formal protection. Trees are protected in this plan only if they form part of the ecological community as defined by the criteria for mapping the woodland at an ecological community level. Therefore if a specific tree is located at the periphery of mapped woodland, but not within it, it is not covered or protected by Action Plan No. 27 (note: Table 2.3 of this document defines single trees or small clumps of trees as being *Highly Modified*). It therefore provides little/no benefit for the protection of individual isolated trees, and in particular, the strategy provides no protection of individual Important or Remnant Trees in the built-up urban unless they are part of a designated woodland ecological community that is mapped and afforded protection.

The strategy does "promote actions to address maintenance of…isolated paddock trees…" but does not detail exactly how this will be done and through what policy specifically to enforce it. It is therefore useful as a guide only, but not a legislative policy upon which protection of isolated trees can be guaranteed whether Remnant or otherwise Important.

Under Action Plan No. 27 (once approved/endorsed), trees within a mapped woodland community would be relatively well protected with strict rules on the removal of mapped woodland. Generally, mapped woodland cannot be removed unless some form of suitable environmental offset is provided. Possible suitable environmental offsets may come in a variety of forms and could include, amongst other things, financial or monetary contributions (such as towards management of nature reserve areas) commitments towards rehabilitation of degraded areas or the purchase and setting aside from development of existing areas of suitable environmental value.

[5] *ACT Lowland Woodland Conservation Strategy (Action Plan No. 27)* http://www.tams.act.gov.au/play/pcl/conservation_and_ecological_communities/woodlands_strategy

In addition to this document, box gum woodland vegetation in the ACT is also listed as an Endangered Ecological Community under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is therefore currently subject to protection under existing legislative instruments.

In regards to distinctions between greenfield and brownfield sites, there are some, but ultimately few, areas of mapped woodlands within the urban area. The total extent of this woodland within the urban area is not currently known as the mapped distribution of woodland has not been overlaid onto the current Territory Plan at a sufficient level of detail to enable accurate reporting of woodland within the urban area. The extent of occurrence and the patchiness of the distribution of mapped woodland within the urban area make it hard to assess how much woodland is actually situated within the urban zones and to then assess how much of this may be at threat of removal.

4.4 ACT Natural Resource Management Plan 2004–2014[6]

This plan seeks to make Canberra a leading example of a major urban centre in the Murray-Darling Basin where ecosystems are managed in balance with social and economic development.

Whilst being a comprehensive document on natural resource management issues and providing a clear set of management targets and management actions to achieve those targets, the plan does not at any point deal explicitly with targets or methods to enable the protection of individual Remnant Trees. It does however seek to continue with and improve upon the preparation of Land Management Agreements (LMAs) which indirectly may form a basis for identifying, managing and protecting individual Important or Remnant Trees (on leased rural land – see below for further information on LMA's). This is however simply a management action that in effect defaults to the *Nature Conservation Act 1980* which already provides the legislative provisions for this to occur as stated above. It is possible that conditions within an LMA may in fact allow for the removal of native trees on leased rural land, so the level of protection this affords to Remnant Trees is not overly strong, although keeping in mind the fact that the Conservator must be a signatory to the agreement and therefore must consider and approve any (possible future) proposals to clear vegetation. What it does do is give some clarity and confidence to rural lessees as to what they may and may not be able

[6] *ACT Natural Resource Management Plan 2004-2014* http://www.tams.act.gov.au/__data/assets/pdf_file/0011/13340/actnaturalresourcemanagementplan2004.pdf

to do in respect of tree clearing over a given period of time and without always requiring individual or separate approvals for each activity that a rural lessee undertakes in the course of managing a property. With this being the case, the success of LMA's will depend largely on their monitoring and enforcement of conditions. These issues are beyond the scope of this paper.

Within leased urban areas and other unleased land within urban areas, such as parks and streetscapes, the ACT Natural Resource Management Plan provides very little guidance or policy in relation to individual tree protection either directly or indirectly.

Land Management Agreements

Land Management Agreements (LMAs) are enacted by Section 283 of the *Planning and Development Act 2007*. LMAs are for rural leases only and the agreement is held between the lessee and the Territory. All agreements must be signed by the Conservator of Flora and Fauna (and the lessee).

Given the requirement of the Conservator to sign the agreement, the preparation of LMA's and the subsequent agreement they provide between the land manager/lessee and the ACT Government therefore automatically require advice from the Conservator. Once a LMA has been entered into, any provisions for the felling of trees that the individual LMA provides, does not require the subsequent approval from the Conservator.

As LMA's are for rural leases only, the Tree Protection Act therefore does not apply as rural land is outside the declared built-up urban area for which the Act exists. Nevertheless, it is still possible to have a tree protected to the equivalent extent of a Registered tree, which could be identified and enforced through the LMA process. Furthermore, important rural trees can be also identified and afforded protection in the LMA without necessarily needing to be individually identified, particularly those that are an important component of a woodland vegetation community (see below).

5 Advice on the roles of the Conservator of Flora and Fauna and the Chief Planning Executive in relation to a development application that affects Important Trees in both greenfield and brownfield sites, and in existing urban areas

A flow chart of the decision making process and how the *Tree Protection Act 2005* (discussed in Section 4.1 of this report) apply to the retention or removal of vegetation in the ACT has been prepared and is included at Appendix A of this document.

5.1 Role of the Conservator

The position of the Conservator of Flora and Fauna is established under Section 7 of the *Nature Conservation Act 1980*.

Under the Act, the role of the Conservator includes (but is not limited to):

- preparation of a (draft) Nature Conservation Strategy;
- declare members of a species to be Protected or Exempt flora or fauna or to have Special Protection Status;
- preparation of (draft) Action Plans in relation to vulnerable or endangered species or ecological communities; and,
- issue licences (to take etc).

This Act and the powers of the Conservator established under this Act have relatively strong levels of protection of individual trees in the ACT if listed as protected or otherwise regarded as important (eg native timber which (may) include Remnant Trees).

The role of the Conservator under the *Tree Protection Act 2005* includes (but is not limited to):

- keeping a register of trees to include all registered trees whether provisionally or fully registered;
- determining guidelines for Tree Management Plans; and
- making decisions on applications for approval of a Tree Damaging Activity or a Tree Management Plan;
- giving advice under s82 of the Act to the Planning Authority on Development Applications (as per provisions under s149 of the *Planning and Development Act 2007*).

The Conservator may also propose a Tree Management Plan for a Registered tree.

Under this Act, the Conservator has relatively strong powers for enabling the protection of an Important Tree (assuming the tree is a protected tree under the Act that requires approval for any work that may damage the tree). As previously stated, the Conservator of Flora and Fauna may also declare a tree to be a Registered Tree under the provisions of the *Tree Protection Act 2005*. Registered Trees receive relatively high levels of protection, whereas regulated trees can often be removed through application, and in particular, can be removed through development approval granted by the planning authority even if the Conservator has recommended its protection.

In summarising this, if the Conservator wants to protect an individual tree of concern, the tree must be Registered under the Tree Protection Act. For land outside of the built-up urban area, this poses a difficulty as the Tree Act does not apply and therefore the Conservator under Section 47(2) can only (provisionally) register a tree if it satisfies the registration criteria, which includes the tree being located in the built-up urban area. Nevertheless, the Conservator may, under the Nature Conservation Act or in signing (entering into on behalf of the ACT Government) a Land Management Agreement, control the removal of protected species, as well as the removal of native timber including trees.

Further to the above, the Conservator may make representations on a particular development proposal through the Public Notification process. In doing this, the Conservator may then have the legal right to appeal any decision made in relation to that particular proposal.

5.2 Role of the Chief Planning Executive

The role of the Chief Planning Executive, specifically in relation to the protection of trees, is restricted to only those circumstances where a Development Application (DA) is made to the Planning Authority under Part 7 of the *Planning and Development Act 2007*. The process by which an assessment and subsequent decision is made in relation to protected trees in an area subject to a proposed Development Application is set out below.

Section148 of the *Planning and Development Act* 2007 requires that a development application must be referred to an entity prescribed by regulation. Under Section 26 of the *Planning and Development Regulation 2008*, the list of entities for which a development must be referred includes the Conservator of Flora and Fauna for developments in the Impact Track (i.e. where the requirement for an EIS to be prepared is

triggered). For Merit Track assessments however, the development application need only be referred to the Conservator when the development site is in the built-up urban area as declared by the Minister.

Section 119 of the Act requires that development approval must not be given for a development proposal in the merit track if the approval would be inconsistent with any advice given by an entity unless satisfied that:

- Any applicable guidelines have been considered;
- Any realistic alternative has been considered; and,
- The decision is consistent with the objects Territory Plan.

The authority may approve a development that will affect a *Regulated* tree, despite the advice of the Conservator. The Authority must not however, approve a development that will affect a *Registered* tree if the approval is inconsistent with the advice of Conservator. These conditions are also very similar to those provided for developments in the Impact track.

5.3 Advice on how this framework translates into the actual retention of Important Trees in both greenfield and brownfield sites, and existing urban areas

5.3.1 Greenfield Sites

New subdivisions are undertaken through Estate Development Plans (EDP). Under Section 94 of the Act, an EDP is to include, amongst other things, a Tree Management Plan. An EDP must also be consistent with the *Guidelines for Estate Development Plans – Greenfield Land Subdivision* (September 2007) which sets out the type of information likely to be required to be submitted with the EDP application. A draft EDP is then prepared based on these guidelines and is lodged with ACTPLA who will then circulate the draft EDP for agency comment, at which point in time, certain specific details may be requested to be included in the final EDP DA.

The final (or revised) EDP is then lodged as a DA and assessed in accordance with the requirements of the *Planning and Development Act 2007* and the Territory Plan. The DA is circulated to agencies (including the Conservator) for comment, unless the agency has provided endorsement for the proposal as lodged, and that endorsement is less than 6 months old.

The EDP guidelines require that a Tree Management Plan be prepared in accordance with the *Tree Protection Act 2005* and TaMS *How to Prepare a*

Tree Management Plan Guidelines. Tree Management Plans include management actions for tree removals, tree impacts, impact mitigation measures, tree retention and protection. As stated in the section regarding the *Tree Protection Act 2005*, above, a Tree Management Plan may be proposed by the Conservator for a registered tree, or the land management agency for the land where a registered tree is located may apply for a tree management plan for the tree. Anyone else may also apply for approval of a tree management plan for any tree on leased land in a built-up urban area. There is however no specific trigger set-out in the Act that automatically requires the preparation of a Tree Management Plan.

If there are individual trees that warrant preservation (such as Remnant Trees) they can or should be *Registered* by the Conservator of Flora and Fauna under the provisions of the *Tree Protection Act 2005* (Note: the urban area of the ACT, including Future Urban Areas in the Territory Plan and which includes the majority, if not all, potential greenfield sites, is already included in the "built-up urban area" declared by the Minister and shown in **Notifiable Instrument NI2010-414** of the Act). If this does not occur, the Conservator can recommend the trees are kept, however, taking into consideration appropriate planning arguments, the Authority may make a decision that is inconsistent with the Conservator's decision and allow the trees to be removed (for Merit Track applications). This is appropriate because Important/Remnant Trees, while worthy additions to local parks and open space areas, may become very problematic on private leased land in the built-up urban area for a variety of reasons. The main conflicts that can arise include situations where the orderly design for a new subdivision (including location of roads, services etc) provides a conflict between numerous trees, not all of which can be retained, and the ideal planning outcome (including density, yield, and provisions of services etc), in which case the CPO requires the decision-making powers to be able to approve the tree removal if the best practice planning design warrants that removal.

The retention of large trees on leased land, particularly smaller residential blocks, can also give rise to adversarial situations where they devalue one or more blocks through building constraints and overshadowing, while adding amenity to other surrounding blocks. This may then lead to great friction between neighbours. Large and very old trees may also provide serious safety concerns through the threat of large limb falls or possibly even the entire tree falling onto persons and/or property (though in this latter case, a protected tree may be allowed to be removed on application if supported by the advice from a qualified arborist that the tree poses a serious safety threat).

Furthermore, the current market for residential blocks has been increasingly moving toward smaller blocks (typically between 400-600m^2). Within such blocks, there is simply no scope to provide for the retention of a large, mature tree in a safe and sustainable manner.

Whilst it may seem appropriate to simply change the subdivision design, the actual design of a new subdivision is an often difficult process as there are numerous planning constraints to manage beyond simply the retention of trees (such as solar orientation of blocks, requirements for sewer and other services to be located in specific areas to tie-into the mains which in many cases has already been built, often by the Government (through ActewAGL)), such that for a good planning outcome to be achieved the final decision must lie with the Planning Authority.

Further to the above, the issue of densification must not be ignored in the decision making process and in the case of protecting individual trees, it is seen as a better outcome to increase density through smaller blocks and the like which can have a negative influence on tree protection but which in turn helps to alleviate urban sprawl and thus has a positive influence on overall tree retention in the outer areas of Canberra's urban footprint. In this scenario, it is regarded as a far better outcome both in terms of town planning as well as the region's ecology, to sacrifice (or at least avoid the scenario of) individual and isolated trees within private residential blocks for the greater good of retaining larger intact communities of vegetation with greater ecological connectivity to the Mountains and Bushland zones as well as the hills and ridges within the urban footprint. To further clarify this statement, the retention of important patches of trees or clumps of trees as forest remnants, need not be restricted to the areas at the outer edge of residential areas. Forest remnants and groups or clumps of trees in general may, and where feasible, should, be retained *within* (new) suburbs through the appropriate location of open space places such as urban parks and other public open space areas.

It is noted that other policies such as the City of Whittlesea's *River Red Gum Protection Policy* recommends the establishment of larger (residential) blocks to retain individual trees. This approach is not supported by our advice for the reasons described above in relation to densification and limiting urban sprawl. It is also noted that the City of Whittlesea is well outside Melbourne city, has a rural township "feel" and as such, the town planning considerations are different than for a major capital city. The policy makes note that trees independently assessed as presenting a danger to people and property can be removed which is supported by this review.

In considering the above, whilst it is appropriate that the Conservator be included in referrals to provide advice on the values of trees and the relative importance of keeping them, it is otherwise considered appropriate that for DA's, the final decision be made by the Planning Authority as this office is the only office with the responsibility to assess the merits of an application holistically (i.e. taking everything into consideration).

It should be noted however that the above discussion is in relation to a DA only. If there is no DA, then it is simply the Conservator's decision on a Tree Management Plan or an application for a Tree Damaging Activity.

An important final note on the issue of tree retention within greenfield sites is that since the development of the ACT Lowland Woodland Conservation Strategy which informs the zones in the Territory Plan, and hence protects the vast majority of Important/Remnant trees that have been retained within areas of remnant woodland communities in the Territory, the need to focus on individual trees is greatly diminished. The real strength of this document in respect of tree retention (for ecological purposes – i.e. non-social/cultural) is that for a relatively small amount of effort we can achieve greater outcomes in tree retention than focusing lots of attention (time and money resources) on individual trees. The flow–on from this in respect of maintaining biodiversity values and ecological values as habitat and wildlife corridors is that through this strategy, better quality wildlife habitats are identified and managed/protected as opposed to attempts to maintain smaller, fragmented trees with lower ecological value.

The outcome of the Woodland Strategy document and its affect on land zoning in the ACT is that land is (generally) not re-zoned for urban development if it is of high ecological value (i.e. mapped as unmodified or largely unmodified woodland). This however can only occur if the mapping that supports the Woodland Strategy is of high quality and kept up to date.

The Policy Guideline for woodland conservation involves a *Comprehensive*, *Adequate* and *Representative* Reserve System (CAR Approach) whereby sufficient woodland is formally protected in nature parks and other reserve systems such that the total extent of protected woodland is comprehensive (i.e. the inclusion in the Reserve system of examples of regional-scale ecosystems in each bioregion), is adequate (i.e. there is a sufficient amount of woodland to ensure longer term conservation) and is representative (i.e. the inclusion of areas at a finer scale, to encompass the variability of habitat within ecosystems). Through this approach, there will be sufficient amounts of woodland formally protected in the reserve system so that the conservation of

smaller areas of woodland within the urban fabric, whilst still desirable, is not specifically required to ensure the longer term conservation of the woodland community. Nevertheless, it is still necessary to consider Remnant Trees, retained in parks and open space, as addressing the need for corridors and connectivity.

Finally, if development is to be undertaken that may have an effect on the woodland community, then a form of biodiversity offset should be provided (it is noted that the provision of an offset is likely to be required by the Department of the Environment, Water, Heritage and the Arts (DEWHA) in any event if it involves a potential significant impact on part of a Box-Gum woodland). It is not within the scope of this investigation to prescribed what form an offset should take, but a suitable biodiversity offset strategy may or at least should, include proposals to contribute towards the rehabilitation of existing parks and/or nature reserves to increase their biodiversity conservation values or the purchase and setting aside of existing woodland areas to be protected from further future development impact.

5.3.2 Brownfield Sites and Existing Urban Areas

For brownfield sites (these being defined as sites that have already been developed for urban purposes), the roles of the Conservator and the Chief Planning Executive are not significantly different from the roles described above for greenfield Sites.

In particular, a proposal to remove a tree in the urban area can be made either through an application for a Tree Damaging Activity or a Tree Management Plan which requires the approval of the Conservator or it can be made through a Development Application to the Planning Authority which is then referred to the Conservator for advice. As for greenfield sites, if the tree in question is a *Regulated* tree, then the Chief Planning Executive makes the final decision (having regard to the advice of the Conservator) and if the tree is a *Registered* tree then it cannot be removed.

Given the above, there is no significant difference between greenfield and brownfield sites in the legislative protection afforded to trees under the legislation.

Our summation of this existing policy framework is that it is essentially a workable process however we are unaware of any guidelines in existence that ACTPLA may use in considering the advice of the Conservator and whether or not to approve a development that results in the removal of a regulated tree.

6 Summary Points of this Review

- Important trees in the ACT are currently relatively well protected by existing legislation, regulations, policies, strategies and guidelines, although the interpretation and implementation may result in mixed outcomes that do not meet everyone's expectations within the community. Individual trees in the built-up urban area are well protected under the *Tree Protection Act 2005*, and native trees outside the built-up urban area are protected by the Woodland Conservation Strategy (as well as by commonwealth legislation) where they are a component of a woodland community. Individual trees outside the built-up urban area are protected as "native timber" under the *Nature Conservation Act 1980*.

- The preservation of trees on private leased land in the built-up urban area and Future Urban Areas is not believed to be an ideal planning outcome under all circumstances, particularly for individual trees on small to medium sized residential blocks. If trees are to be preserved, the focus should be on protecting trees within urban open spaces and the like. This ideally should (and would) be determined at the concept planning/EDP (Estate Development Plan) stage of development.

- The desirable key features of Open Space areas where important trees have been designed to be retained should include an area of sufficient size such that a number of trees may be retained and sufficient ecological connectivity to ensure that the desired habitat values can in fact be realised. In order to achieve desirable open space areas, a design code or other similar policy document should be prepared to give urban designers and others greater clarity as to what the desirable features are and how they are to be managed (this could be in the form of a Statement of Planning Intent made by the Minister, though it need not necessarily be limited to this function/ process). The requirement for better made design codes or other planning policies and/or statements pertaining to tree protection is particularly evident in the confusion that often arises whereby a design feature of a park/open space area has certain features which may be desirable from an ecological perspective, but are not desirable from a TaMS

perspective in terms of the cost relating to ongoing management and maintenance once the land is transferred to TaMS custodianship, or possibly from a CPTED (Crime Prevention Through Environmental Design) principle.

- The retention of trees on unleased land may create conflicts between the protection and management of trees and the roles of other government agencies such as Emergency Services, ACTEW's roles under the Utilities Act and TaMS (Roads ACT) management roles. For example, Roads Act (under TaMS) have the main responsibility for the management of verges and traffic safety and issues related to road safety surpass those of the protection of ecological or landscape values of street trees. Roads ACT typically may remove street trees or trees in verges if the retention of trees conflicts with their ongoing management roles. Under such circumstances, trees may be removed without the approval from Conservator (as per the exemptions discussed previously under Section 19 of the *Tree Protection Act 2005*). The conflicts are becoming more prevalent as road widths are becoming narrower (although this is dependent on traffic volume assessment). Good planning should NOT be moving away from this as cities, including Canberra, should be looking toward greater density of residential planning. Greater densities allow for increased public transport facilities, shorter travel routes and limiting urban sprawl into surrounding greenfield sites which generally have higher ecological values than urban areas, and thus should be a greater target for protection than individual trees within the urban fabric.

- All Remnant trees are worthy of protection and are considered to be important in the context of maintaining Canberra's unique environmental character. Therefore, all reasonable efforts should be made to retain them to the greatest extent possible. However, this report does not seek to prescribe differences between Remnant Trees where one should be retained and another removed. This must be done on a case-by-case basis and based on holistic planning assessments.

7 Recommendations

- Issues or conflicts regarding the protection and management of Important Trees are often a result of perception or expectations. A greater level of understanding and education is therefore required in relation to the planning conflicts that arise with respect to retaining trees within urban areas, particularly residential subdivisions, and would help reduce conflicts or other problems that arise in regards to decisions to retain or remove Important Trees. A recent example of this conflict would be the case of some trees in Corroboree Park in Ainslie whereby an assessment was made that trees needed to be removed for public safety reasons (given the declining health of the trees); however, there was some local community disagreement with the decision to remove the trees.

  As was noted previously in this report, the safety of the general public and property must be paramount in all decisions on tree management and trees that are independently assessed as being potentially dangerous should have clear and easy opportunities made available for their removal.

- A more strategic approach to Important/Remnant Tree management is recommended. This should include investing more resources to ensure the mapping that underpins Action Plan 27 is accurate and up to date, rather than focusing on individual trees. Any new natural heritage mapping undertaken in the ACT (either by the ACT Government or consultants) should be required to be incorporated into a consolidated data set. This data set could then be relied upon for strategic planning decisions, informing the protection or development of open space or greenfield areas. A relatively small amount of effort could result in much greater ecological outcomes.

- Greater clarity needs to be given to the criteria that either formally protects or allows for removal of Important Trees. This would include, but may not be limited to, any applicable guidelines that ACTPLA might have to inform their decision making, particularly in relation to when they make a decision that is inconsistent with the advice of the Conservator, as discussed

previously in relation to S119 of the *Planning and Development Act 2007*.

(Note: There are no applicable guidelines under s119(2)(a)(i). ACTPLA has documented its Standard Operating Procedures that require any possible decision to act inconsistently with the Conservator's advice to be elevated to ACTPLA's Major Projects Review Group. Feasible alternative design options are the key considerations in whether or not to act inconsistently with the Conservator's advice.)

- New subdivisions may sometimes provide circumstances whereby trees are retained within larger (private) urban blocks. This situation is not recommended as it may result in conflict between future owners' safety and their legal ability to remove the tree. The tree will eventually fall, and when it does, may provide a major safety issue. We believe that the ideal scenario is to avoid this situation altogether. If a tree is of sufficient value, it should be retained in an urban park; however "Pocket Parks" are not seen as desirable outcomes for many reasons (including TaMS management implications, CPTED principles, and the actual ecological value of trees in small parks with typically limited ecological connectivity etc). Additionally, the creation of larger blocks reduces density and ultimately leads to increased urban sprawl. This is at odds with the latest environmental planning principles whereby increased density is seen as a major planning focus.

- Within urban settings, a clear distinction needs to be made between planted (street) trees and Important or Remnant Trees. In reality, it may only be desirable to retain Important or Remnant Trees in parks and to move away from seeking to retain them in verges or within private blocks (for safety and densification issues previously discussed). If it is important to retain or promote the bushland and garden setting of the ACT within the residential urban fabric, greater consideration should be given to planted trees.

- The ACT consists of wooded hills and ridges, tree lined streets and large areas of public open space that provide the vast majority of the values we relate to the sense of the ACT's urban forests. Tree-lined streets are predominantly not made up of Remnant

Trees but planted specimens, often not native/indigenous to the local area. The ongoing maintenance of urban forest values within residential and other urban developed precincts therefore does not require a strong commitment towards retaining/protecting Remnant Trees, but more so creating a landscape of relatively high tree cover from either native or introduced trees. The maintenance of habitat values of the ACT's urban forests should focus on interconnected open spaces more so than individual trees in verges and private lots.

- Where individual Important or Remnant Trees are removed as a consequence of development, there should be a focus towards a greater use of environmental offsets whereby removal of trees is offset or compensated for by increased attention given to rehabilitation of urban forests or other suitable urban open space.

- The retention of trees in future urban areas, specifically within residential blocks and other private leases, should not come at a cost of reduced density (such as by creating larger blocks to retain only a small number of trees). We consider that it is a far better outcome from a sustainability (ecological, economic and social) perspective to increase density and hence decrease the speed and extent of urban sprawl. This in turn then serves to better protect the existing woodland communities outside of the built-up urban area where the ecological values are far greater than those provided by a few scattered trees in backyards and road verges. Isolated trees in private leases have continuously diminishing ecological values as a consequence of the interaction with the human environment (which includes but is not limited to the effects of traffic, noise, night-time lighting, fragmented connectivity, loss of important understorey habitat values, and the presence of domestic animals, all of which provide a deterrence to native fauna).

  It would be a much more efficient use of resources to focus on saving the majority of trees in non-urban land rather than the few scattered trees in the urban area which are of lower ecological value.

  Ecological values might be re-introduced to urban areas post-development via provenance planting (within appropriate locations that provide adequate connectivity etc), including a focus on restoring the native understorey component as well as

through exploring other measures such as the installation of nest boxes. It is noted that these introduced values may take some time to develop and as such, there is likely to be a lag between when the original value is removed and when it is adequately replaced. For these reasons, the focus should remain in subdivision designs on identifying appropriate areas for open space which already support ecological values, or the provision of larger environmental offset areas outside of the subdivision.

- Preparation of design guidelines or other similar policy document to give urban designers and others greater clarity as to what the desirable features are and how they are to be managed. At present, it is not clearly known what the design aspects of urban open spaces are in relation to TaMS management principles once the area has been handed over to PCL for ongoing management. Issues that should be resolved are in relation to:
    - understorey vegetation (including the ability or requirement for a mower/slasher to maintain the area);
    - potentially dangerous trees with large limbs or structural faults in the tree (including TaMS legal responsibility to provide safe parks);
    - tree density/spacing (including the ability for a mower/slasher to navigate between trunks); and
    - overhanging limbs from open space areas into private blocks (including the legal recourse for lessees of private blocks to prune).

- The Subdivision Code should be revised to provide clear guidance as to how to manage and protect existing Important or Remnant Trees in new subdivisions. At present, the management principles may not be known until an EDP/DA has been submitted and comments received from the agency referral process. It would be desirable to have better information during the design phase prior to submission. At present, the Subdivision Code gives only limited guidance, largely in relation to specifications on types of trees to be planted from a TaMS-approved list. Unfortunately though, there appears to be little guidance as to how to manage/protect existing "Remnant Trees" in new subdivisions.

- Following on from the previous point, there should be a review of the existing controls as presented in the Subdivision Code to look at areas for improvement, particularly in respect of a more holistic approach to subdivision design, such that all issues (such as tree protection rules and criteria) are given due consideration. Such design concepts may include (but not be limited to):

  (i) Bundling of services within a single easement that incorporates all utility service connections. Ideally, these could be located in easy to access places such as under footpaths or along road verges etc. The idea behind this is to minimise the overall area of land under easements and to reduce the width of easements so as to limit the extent of conflict between service easements and the retention of (Important) Trees. Services should not however be vertically stacked as a fault in one line may then require interference with all service lines within that easement. Common trenching for ties might also provide more space along the length of the road.

  (ii) A move away from the current design philosophy of locating services in open space areas, and for open space areas to have greater focus toward landscape amenity and ecological values rather than simply a place to put a service utility connection/easement.

  (iii) A review of other possible methods for retaining trees in built areas that ensures longer term health/viability, such as use of semi-permeable hardstands.

  (iv) More specific design controls to limit impact on/increase protection of tree roots

  (v) Tree easements to dedicate a specific space for trees where available/appropriate.

- It would be desirable to undertake detailed mapping of individual Important Trees within existing urban areas and open spaces not just the more recent mapping that occurs as a consequence of a Development Application. In practical terms however this may be very hard to achieve in entirety, as it may be a time-consuming and costly exercise. This should be in accordance with the provisions of the *Tree Protection Act 2005* to populate the tree register and to make the register a more robust management tool for tree protection.

- The licensing and enforcement/policing of activities that damage protected trees may need to be reviewed to give greater certainty to tree protection. At present, unless a local resident or similar notifies the Government of an illegal activity, then the government may well be unaware of any unapproved tree damaging activities that occur.

- All (Important) trees in greenfield sites should be entered on to the Tree Register, if they meet the criteria for registration. The registration may take place simultaneously with the assessment of the application and Notice of Decision.

- ACTPLA should prepare a set of guidelines that clearly define the circumstances under which the Chief Planning Executive may make a decision that is inconsistent with the Conservator's advice on a referral. Currently, no such guidelines are known to exist and it is therefore not known the circumstances or criteria by which the Chief Planning Executive makes their decision. The guidelines should be developed in conjunction with the conservator and approved by both the conservator and the Chief Planning Executive.

- TaMS should prepare a Street Tree Guidelines document to give planners and designers greater information in preparing subdivisions or to provide consultancy advice to clients for already developed blocks. The current "DESIGN STANDARDS for URBAN INFRASTRUCTURE - 4 - ROAD VERGES" provides some information for designing new subdivisions, but provides little information for existing urban areas.

- There should be consideration of a further range of ways to protect Important Trees, including:

    - amendment to the definition of Native Plant and Native Timber under the *Nature Conservation Act 1980* to remove the ambiguity in relation to tree protection. Currently the Conservator is required to give licences for removal of native trees and native timber on both leased and unleased land and both within and outside the urban area, so that in effect there is good protection of trees, but the confusion

still remains as to whether a "tree" is "native timber" or a "native plant"; and

- changing planning guidelines so that tree management plans are mandatory for greenfield subdivisions.

- The Conservator should have appeal rights to decisions on EDP development applications if the advice of the Conservator is overridden (although these may already exist to some extent, but only when a decision on a DA has been made). This would give the Conservator greater powers of enforcement to enable tree protection.

- It is recommended that Joint Agreements be established between ACTPLA, TaMS and the Conservator. This should be undertaken so that a clear mandate can be derived to enable greater transparency and understanding between the various government departments on the issues relating to the retention of urban trees.

  Currently, there are no published guidelines on exactly how and why decisions are made, particularly by the Chief Planning Executive in circumstances where the advice of the Conservator to retain a protected (regulated) tree is not followed. As such, there is little certainty that decisions are made in a consistent fashion.

  Given this lack of certainty, it is recommended that Joint Agreements be made between the various departments with the content or direction of such agreements to ideally include:

  - A review of the existing guidelines (if any in fact exist) to determine their suitability in regards to the roles/objectives of the Chief Planning Executive, the Conservator for Flora and Fauna and TaMS (PCL) management.
  - Agreement on the content for revised guidelines to give greater certainty in relation to decisions on tree management such that all relevant Departments are satisfied with the final decision. Ideally, the guidelines should be of sufficient detail such that any of the Departments would arrive at the same decision on a particular tree protection issue. This would relate to Development Applications as well as standard TaMS management issues in which tree management matters are involved.

- A review of existing codes/policies that relate to tree protection (i.e. subdivision codes and the like) to ensure that any agreement is not in conflict with the objectives or rules and criteria of such codes.
- A clear understanding and acceptance of which Department is responsible for the decision on a particular tree.

Finally, it is recommended that the outcome of such agreements (i.e. the agreed guidelines) is made publicly available.

8 References

ACT Government Website: Territory and Municipal Services (TaMS); Parks Conservation and Lands – Maintaining Canberra's Public Treescape. http://www.tams.act.gov.au/play/pcl/parks_reserves_and_open_places/trees_and_forests/trees

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Tree Investigation

Solar Access

Investigation into the Government's tree management practices and the renewal of Canberra's urban forest.

October 2010

Appendix I

PURDON
PLANNING SUSTAINABLE FUTURES

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1 Introduction

1.1 Purpose

This report has been prepared by Purdon Associates Pty Ltd for the Office of the Commissioner for Sustainability and the Environment as a discussion paper regarding the issue of tree management and solar access across Canberra.

The report will provide discussion on several Terms of Reference (TOR) of the 'Investigation into the Government's tree management practices and the renewal of Canberra's urban forest', especially TOR 4: 'the priority given in tree management decisions to environmental values, solar access and the retention of communities of trees in parks'.

Whilst the focus of the discussion is on solar access for domestic scale electricity generation and solar heating it is recognised that trees in Canberra are one of its principal defining characteristics, both as native bush land and as street trees and household landscaping. Trees have important properties in terms of aesthetic appeal, as well as their role in influencing macro and micro climatic conditions, reducing heat islands, cooling and reduced energy consumption.

1.2 Scope

This paper explores the relationship between tree management; overshadowing and roof mounted solar panels for heating and electricity generation in residential areas in the ACT. It also considers the important issue of passive solar access for housing and its relationship to energy demands.

At the bigger scale there is growing public debate about demand on energy and alternative sources of supply. Some large scale initiatives such as wind farms and solar farms are being actively discussed and implemented in some parts of Australia although nothing has been built as yet in the ACT. At a more local scale, there has been considerable uptake in the number of solar applications across suburban Canberra, where roof space has been used for solar hot water panels and increasingly used as a platform for small scale electricity generation for either domestic use or feedback into the grid.

The discussion is focused on single residential development as this is the most likely area of conflict between competing government policies and consumer practice relating to the issues under review. Multi-unit high-rise residential developments also have potential for roof-based solar generation but are less likely to be in conflict with overshadowing because of building scale.

There is unlikely to be any significant conflict between these issues in commercial or industrial areas given the pattern of development, and scope for use of roofs without interference from tree shade.

At a residential scale the potential problems arise between use of roof space for solar panels (mainly domestic hot water and heating as well as generation of electricity for the grid) and overshadowing from trees on streets, adjacent properties and within private property. There is also potential for overshadowing of single storey dwellings from construction of new two storey buildings in residential zones, although this matter is generally well addressed by existing town planning assessment of development applications.

At this point in time there does not appear to be any substantial level of public concern about overshadowing and solar access that is focusing community or political attention. However, there is emerging concern about overshadowing and solar access, and it is therefore prudent to identify potential problem situations and consider ways of addressing these problems before they become substantial or widespread.

The Government has multiple objectives in this arena, and has policies and programs covering the following:

- Reduced demand for energy consumption at the household level
- Encourage solar passive building and subdivision design
- Encourage use of solar hot water systems
- Encourage solar electricity generation
- Utilise trees for ecosystem services, providing solar protection, cooling, shelter, storm water control, pollution mitigation, climate change initiative and carbon sequestration, as well as amenity and aesthetic appeal.

1.3 Canberra – Garden Image

Canberra is renowned as the premier Garden City of Australia. Extensive public tree plantings throughout Australia's National Capital as well as the active encouragement by residential property owners have contributed to its 'bush capital' image.[1]

The importance of trees within this landscape has been a prominent defining feature of this city since its construction in 1913. Trees are an essential part of Canberra's landscape, provide havens for wildlife, have heritage significance, add tremendously to the aesthetic appeal of the nation's capital and increase property values.

The importance of maintaining and enhancing the landscape character of Canberra and the Territory as the setting for the National Capital is of high concern to residents and visitors alike. It should be noted however that much of the local landscape character in Canberra (eg street trees) represent "manufactured" landscape outcomes as a result of deliberate government policy over time. Changing attitudes to climate change, energy demand and utilisation, urban redevelopment and related matters may require a different approach to tree planting over time that respects the need for new approaches to solar access at the residential scale.

[1] *Refer TAMS at: http://www.tams.act.gov.au/play/pcl/parks_reserves_and_open_places/trees_and_forests/trees*

1.4 The Role of Government

Australia has the highest average solar radiation of any continent in the world, with an annual average of approximately 58 million petajoules (PJ), which is approximately 10,000 times Australia's annual energy consumption.[2]

Canberra receives an annual average of 7.5 sunlight hours a day.

However, current statistics show that solar energy within Australia is a largely untapped resource. At the end of July 2009, approximately 41,000 homes across Australia had solar photovoltaic cells installed and only 7% of Australian households used solar energy for heating water.[3]

In order to encourage the use of renewable energy systems the Federal and Territory Governments have recently announced significant funding and tariff systems for the ACT.

As part of the Federal Government's commitment to the Renewable Energy Target of 20% renewable energy by 2020 announced in February 2010, households, small businesses and community groups are now eligible for an upfront $40 rebate (per year over 20 years) for each Renewable Energy Certificate (RECs) created by small-scale technologies like solar panels and solar water heaters.

This means a typical household that installs a 1.5 kilowatt solar panel system in 2011 could benefit from an upfront subsidy of $6,200 through RECs. If the same household decides to install a typical solar water heater they could receive RECs worth $1,200.[4]

Additionally, the ACT Government's Electricity Feed-in Renewable Energy Generation scheme has also been introduced as a way of rewarding households and businesses for installing renewable energy generation technology.

Implemented as a gross feed-in system, customers are paid the applicable premium rate for every metered unit of electricity their system generates. For systems up to 30kW, 47.5 cents per kWh generated is paid. The scheme is currently limited to installations of 30kW capacity, about 180 average sized PV panels, however, the Government is still considering the possibility of expanding the scheme to include larger scale generation.[5]

As at 30 June 2010, there were more than 2,700 photovoltaic systems in the ACT feeding into the grid through the Feed-in Tariff. This shows a substantial percentage increase in the amount of solar installations on Canberra roofs since the feed-in tariff legislation was enacted in March 2009.

Canberra's solar market is expected to grow significantly in the coming decade as a result of these expanded financial incentives for solar energy systems. As more homes and businesses install solar energy systems and local governments pursue renewable energy solutions, the need for solar access principles will become more significant.

[2] *Australian Energy Resource Assessment. http://www.abare.gov.au/publications_html/energy/energy_10/ch_10.pdf*

[3] *As of 30/6/2010, 2486 in ACT (Source DECCEW - Alice D'Costa), 2010.*

[4] *Calculations of RECs are set out by the Office of the Renewable Energy Regulator http://www.orer.gov.au/publications/pubs/photovoltaic-0309.pdf according to the formula: Zone Rating (the ACT zone rating is 3) X Rated power output (kW) of solar (photovoltaic) system = Annual REC Entitlement. This is an estimate.*

[5] *ACT Government Media Release, Simon Corbell MLA. 20/08/10*

1.5 Solar Energy

Solar is used in two main ways throughout Australia and Canberra: passive solar and solar energy production through thermal solar collection and photovoltaic cells (PV).

1.5.1 Passive solar

Passive solar is used as a method of natural heating especially during the winter months. Development controls and solar access principles are currently in place in the Territory to ensure all dwellings have access to sufficient numbers of sunlight hours in order to reduce the need for artificial heating and cooling systems (eg air-conditioning systems). This matter is discussed further below.

However, too much solar access in summer can significantly increase the temperature inside dwellings and increases the use of air-conditioning systems. Good urban design and landscaping can maximise the potential benefits of passive solar throughout Canberra, thus reducing the need for additional demands on energy.

Appropriate species of deciduous trees and careful choice of locations for planting on the northern side of living spaces can contribute significantly to summer household heat reduction by shading, and provide passive solar access for winter warmth, thus reducing household energy needs.

1.5.2 Energy Production

The two main types of solar energy production in Australia are thermal solar and photovoltaic cells. Each system uses the sun to produce energy and therefore require similar amounts of solar access and orientation. However, each system uses the solar energy for very different things.

- **Thermal solar** collects the heat of the sun and transfers it for later use. Solar water and space heating are good examples. Water passed over solar collectors absorbs the heat from the sun and is stored for later use. Solar water heaters can supply up to 80% of annual hot water energy needs, even in cooler parts of Australia. Almost all houses should have a suitable roof area for collectors – minimum 8m².
- **Photovoltaic cells (PV)** are used to make electricity from sunlight. Photovoltaic cells use a chemical reaction to produce energy. While these cells cannot produce electricity all the time, they do generate electricity when it is needed most – during peak demand hours of the day. In a single day in Canberra an average house can produce approximately 3.97 kilowatt hours (kWh) from a 1 kilowatt (kW) solar electric power system.

Both solar energy systems require a north facing position with maximum sun exposure, ideally in full sun at least from 9am to 3pm. Full or partial shading caused by adjacent vegetation and or houses during these peak hours will limit the amount of solar energy produced by these systems, however shading outside these peak hours will have little effect.

2 Existing Solar Access Policies and Practices (ACT)

2.1 Solar Orientation

All new developments or redevelopments of existing dwellings are currently required under the Territory Plan to provide a minimum level of solar access and orientation. These requirements are outlined below.

2.1.1 Single Dwelling Housing

The Single Dwelling Housing Development Code[6], January 2010, states that all development is to be sited and designed to promote energy efficiency and maximise solar access to private open space and living areas of dwellings.

As a mandatory requirement development must be sited to allow a minimum of three (3) hours of direct sunlight onto the floor or internal wall of the main daytime living area of the dwelling between the hours of 9:00am and 3:00pm on 21 June (winter solstice).

Development must also be sited to allow the main daytime living areas and private open space of the dwelling to have a northerly orientation, optimising solar access to living areas and the private open space.

Private open spaces must not, as a mandatory requirement, be located to the south, south-east or south-west of the dwelling and must maintain a minimum of three hours sunlight onto 50% of the ground between the hours of 9:00am and 3:00pm on 21 June (winter solstice).

Deciduous trees can improve winter and summer amenity in these spaces and positively influence demand for energy needs within the house.

Solar roof space is not addressed in the Code.

2.1.2 Multi Unit Housing

The Multi Unit Housing Development Code[7], January 2010, states that all development must be sited and designed to maximise solar access to private open space and living areas of dwellings.

As a mandatory requirement development must be sited to allow a minimum of three (3) hours of direct sunlight onto the floor or internal wall of the main daytime living area of the dwelling between the hours of 9:00am and 3:00pm on 21 June (winter solstice).

In order to ensure building envelopes and dwelling layouts optimise day lighting of dwellings, buildings opposite a window to a habitable room must not exceed the height created by a plane projected at 60 degrees above horizontal from 750mm above the floor level at the window for a lateral distance defined by a 60 degree arc from the centre of the window.

In order to ensure building envelopes and dwelling layouts optimise energy efficiency, north-facing windows to main living areas are setback from any building on the same block so that the building is sited within a plane projected at 30 degrees above horizontal from 750mm above floor level at the window for a lateral distance of up to 30 degrees east and west of north, or set back at least 3m from any boundary to the north.

[6] http://www.legislation.act.gov.au/ni/2008-27/copy/56654/pdf/2008-27.pdf

[7] http://www.legislation.act.gov.au/ni/2008-27/

In order to ensure optimum winter sunlight to north-facing windows of living areas and private open spaces is achieved, development must be sited to allow a minimum of three (3) hours of direct sunlight onto the floor wall of the internal primary living space of any dwelling within the development and any dwelling/s adjacent to the subject site, between the hours of 9:00am and 3:00pm on 21 June (winter solstice).

To ensure optimum winter sunlight is provided to west-facing windows of living areas and appropriate shading is provided in summer, windows located on west facing facades must have integrated external shading as part of the building design to protect windows from direct sunlight in summer. Other energy saving measures such as new glass technology must be included in addition to external shade protection.

Private open spaces must, as a mandatory requirement, not be located to the south, south-east or south-west of the dwelling and must maintain a minimum of three hours sunlight onto 50% of the ground between the hours of 9:00am and 3:00pm on 21 June (winter solstice).

Generally higher building forms (3 storeys and above) in multi unit housing facilitate use of solar devices on roofs because of less interference with street trees, but there is no data on the use of this type of accommodation for solar devices.

2.2 Street Tree Plantings

The Department of Territory & Municipal Services (Parks, Conservation and Lands – PCL) is responsible for the management and maintenance of street trees and urban parks in Canberra.

There are over 300 different species of trees used in Canberra's plantings, in addition to native plants in nature reserves. These plantings significantly contribute to the aesthetics and amenity of Canberra, and have direct economic value and environmental benefits.[8]

Most of Canberra's trees were planted in one of the two main plantings. Pre 1930, deciduous and evergreen trees were planted and are generally found in the older parts of Canberra now. Between 1955 and 1975, mainly Eucalypt and natives were planted during a time of rapid growth for the city.[9]

Many of these trees are ageing and showing signs of drought related stress. They also need greater levels of maintenance to minimize risk to community and property.[10]

It is understood the Government is reviewing its options for replacement/replanting of street trees in many established suburbs and could consider solar access as one of the criteria for selection of tree species.

[8] *Canberra Urban Forest Renewal, Renewing Canberra's Urban Forest fact sheet. http://www.tams.act.gov.au/__data/assets/pdf_file/0007/156427/fact_sheet_urban_forests_rev7_3_12_08.pdf*

[9] *Canberra Urban Forest Renewal, Renewing Canberra's Urban Forest fact sheet.*

[10] *Canberra Urban Forest Renewal, Renewing Canberra's Urban Forest fact sheet.*

The final species selection of urban tree species for use in urban street planting undertaken by PCL should take into account the need for passive solar access for all dwellings and should allow sufficient numbers of sunlight hours for north facing roofs to allow for future solar energy system installations.

2.3 Shading

Shading of solar collectors, particularly between 9am and 3pm, can significantly reduce the system performance.[11] Shading can be caused by adjacent existing buildings as well as mature trees.

Overshadowing issues in relation to development assessment of buildings are covered in planning and development controls where these affect habitable rooms and private outdoor space, but there is currently no legislation in place in the ACT or other parts of Australia to protect solar access for energy systems on private land.

At present the Commissioner for Sustainability and the Environment (OCSE) can and does act as the independent umpire through addressing complaints regarding solar access issues relating to the impact of overshadowing of public trees on adjacent properties. If policy is introduced these cases would not need to be referred to the OCSE.

2.3.1 Public Land

Overshadowing of private residential dwellings by street trees does occur in many places in Canberra, particularly the older established suburbs, where trees have reached maturity and or are of an ever-green species

Application can be made by the private lessee to PCL to consider removal for solar access but experience to date suggests this creates other concerns including impact on public realm; consideration of impact on general streetscape quality; and microclimate shade and heat island effects.

Street tree planting programs in new suburbs have the opportunity to ensure that appropriate species are used to avoid overshadowing on adjacent private properties. The design of new streets and verges can be used to control tree growth to limit future overshadowing if deemed desirable.

2.3.2 Private Land

Shading caused by an adjacent tree contained wholly within a neighbour's property can affect solar access. In this case the only option for the affected party is to contact the neighbour directly and request that something be done about the shading, but there is no legal requirement for the adjacent party to remove the tree.

Tree or shrub branches which overhang the owner's property can be trimmed to the property boundary but impacts on the health of the tree have to be considered and, in some cases, trimming of branches might constitute a 'tree damaging activity' under the Tree Protection Act.

[11] *Solar radiation and positioning of collectors – installer and user manual. http://www.solarindustries.org.nz/documents/Technical%20Publications/AustralianBusinessCouncil_Installation%20and%20User%20Manual/Chapter2_SolarRadiation.pdf*

2.4 Development Approval Process

The Australian Capital Territory has regulations administered by ActewAGL that ensure all domestic solar panels are installed safely and to best-practice industry standards.[12]

All solar photovoltaic systems in the ACT must be installed by a licensed electrician. Before panels can be connected to the electricity network the system is required to be inspected and approved by ACTPLA (building control). Once the installation has been approved by ACTPLA, ActewAGL make the final electrical connection to the network.

There is the opportunity to lodge an objection as part of a Development Application process if an adjacent development (building) has the potential to overshadow the affected property.

There are no statutory provisions that require mandatory assessment of the impacts of adjacent vegetation on overshadowing of solar devices on roofs.

2.5 Installation

Installation of solar systems in the ACT requires approval from ActewAGL and ACTPLA (building control) but not a Development Application provided the facility meets the above criteria.

Many industry associations including the Clean Energy Council promote companies who are registered accredited installers and suggest all solar energy systems are designed and installed by these companies.

2.5.1 Thermal Solar

Thermal solar installation should include an assessment of the best place on the roof for such equipment, and an assessment of adjacent trees/shade impact both at the time of installation and as an assessment of future conditions. However, this does not appear to be a mandatory condition of approval by relevant authorities and is left to the lessee/installer to decide what will work in the particular application.

Final commissioning and checks are carried out by ActewAGL before the system can be used, but by this stage the installation is in place and would be costly to relocate if there was a recognised shading problem.

[12] *Source: ACTPLA at http://www.actpla.act.gov.au/customer_information/industry/solar_panel_installation refers to rules and regulations which are essentially the Technical standards and information set by ACTEW/AGL at http://www.actewagl.com.au/publications/electricity/ServiceInstallationRules1.pdf*

2.5.2 *Photovoltaic Cells (PV)*

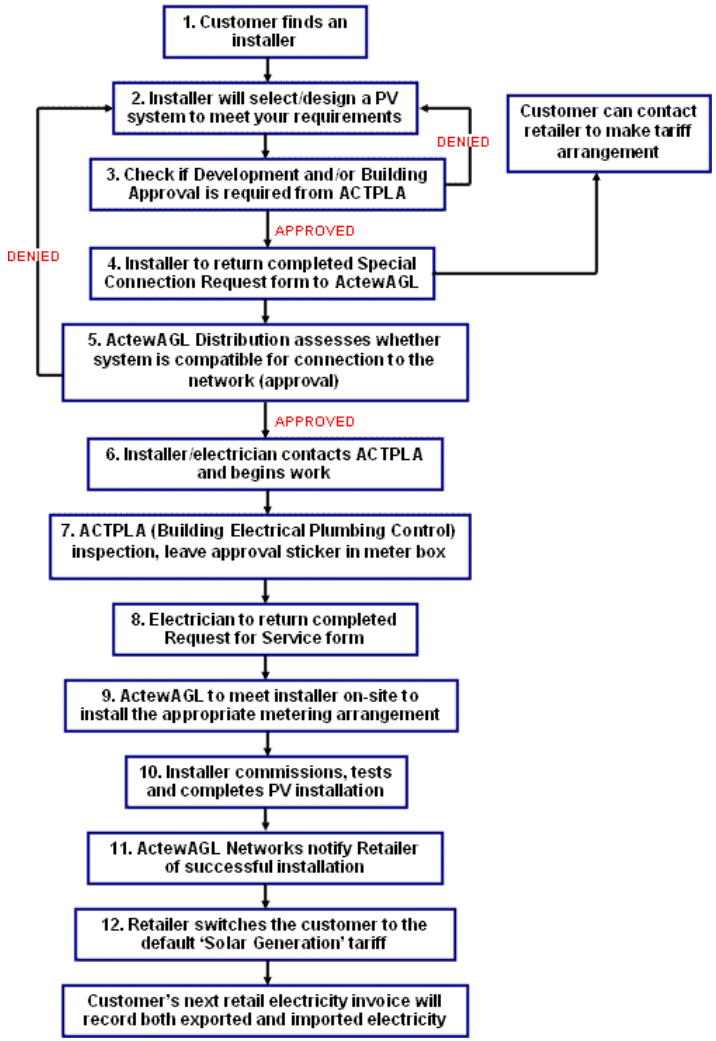
An accredited installer is required for PV applications and is required to:

- Determine the configuration and number of solar modules
- Select an appropriate inverter
- Determine whether the PV modules will fit on the roof or structure
- Determine constraints caused by shading – there do not seem to be any clear guidelines on the effectiveness of this part of the assessment, given the potential for changes in tree growth or placement over time. In the first instance however, the technician should be able to identify existing impacts of shade trees and advise the client accordingly of the impact on solar efficiency. More industry training on shading impacts/tree growth could assist in this matter.

All external photovoltaic cells in the ACT must be installed by a licensed electrician. Before the panels can be connected to the electrical grid the electrician is required to contact ACTPLA (building control). Once the installation has been approved by ACTPLA they forward the approval to ActewAGL who can then make the final electrical connection to the grid.

Whilst ActewAGL has published a flow chart (refer Fig 2-1) for the installation and approval of solar systems, there appears to be no provision for assessment of the impact of adjacent vegetation on the performance of this installation in the flow chart.

Figure 2-1: Solar Electricity Approval Process



Source: ActewAGL

3 Leading Solar Access Practices Worldwide

3.1 General

Preliminary investigations indicate that there are very few examples world-wide of legislative arrangements to protect solar access rights, although there are many examples including overseas and in Australia and Canberra where urban planning and landscape design policies have required solar access to be addressed in subdivision layout and house design.

3.2 California's Solar Rights Act

California has been a leader in promoting solar energy since 1976, when it began to provide financial incentives for investment in solar energy technologies. One legacy of California's early interest in solar energy is a series of laws designed to protect a consumer's right to install and operate solar energy technology on a home or business, including access to sunlight, or solar access.

The Solar Rights Act was enacted in 1978, the legislation sought to balance the needs of individual solar energy system owners with other property owners by developing solar access rights. There are six key provisions of the Act that remain in California law today:

1. *Limits on Covenants, Conditions, and Restrictions to Restrict Solar Installations* – The Act prohibits covenants, conditions and restrictions, like those enforced by homeowner associations, which would unreasonably restrict use or installation of solar energy systems.
2. Solar Easements – The Act establishes the legal right to a solar easement, which protects access to sunlight across adjacent properties. It also describes the minimum requirements needed to create a solar easement.
3. Definition of Solar Energy System – The Act defines which solar energy systems are covered by its provisions, including active solar devices and passive solar design strategies.
4. Limits to Local Government Restrictions on Solar Installations – The Act discourages local governments from adopting an ordinance that would unreasonably restrict the use of solar energy systems. It also requires local governments to use a non-discretionary permitting process for solar energy systems. Provisions of the Act also require local governments seeking state-sponsored incentives for solar energy systems to demonstrate compliance with certain provisions of the Act.
5. Passive Solar Opportunities in Subdivisions – The Act requires certain subdivisions to provide for future passive and natural heating and cooling opportunities to the extent feasible.
6. Allowance for Requiring Solar Easements – The Act allows cities and counties to require by ordinance the dedication of solar easements in certain subdivision developments as a condition of tentative map approval.

4 Issues

The following issues have been identified as potential problem situations, and as the uptake of domestic solar heating and electricity generation expands in the ACT, will need further consideration by government agencies, regulators, industry suppliers and customers.

4.1 Legislation

There is currently no explicit legislation in the ACT for protection of solar access to roof spaces.

However, with the introduction of guaranteed feed-in tariffs for solar generation on domestic roofs, there is now a mechanism whereby a resident can claim "economic/financial loss" if trees or other structures on neighbouring properties causes adverse effect on the lessee/resident's ability to generate power. This however is not the case in relation to solar hot water.

New legislation could be introduced to protect roof space from overshadowing but other approaches may be as effective and easier to implement. For example, street tree species in new suburbs could be adopted that would not create overshadowing problems in the future on adjacent residential roof spaces. An arbitration mechanism could be established to allow trees to be removed on adjacent public or private land where these are causing adverse impact on solar access to the affected property.

Alternatively, it may be appropriate to consider the establishment of new medium-scale solar energy generation systems on public land that local residents could invest in as a means of participating in creating green power without affecting the tree canopy in their area.

4.2 Established Landscapes

There is a potential clash between the views held by the community about Canberra as a "garden city" and overshadowing of roof space for solar panels by existing trees.

Some households will want solar heating / solar power but may be affected by overshadowing of street trees or neighbours' trees and or their own trees.

Where there are existing large street trees on the northern side of housing in an established suburb that demonstrably overshadow roof space during critical hours, it is possible for lessees to request PCL to remove these trees to provide sun for a solar panel. However, practice to date has suggested that this is unlikely to be favourably supported on the basis that it would disrupt the pattern of street vegetation and have adverse impact on public amenity. The matter can and has in the past been referred to the Commissioner for Sustainability and the Environment as a complaint. If the tree is registered or regulated under the Tree Protection Act 2005 the matter can be referred to the Conservator for consideration.

A similar situation could also apply where a neighbour's large tree exists prior to the installation of adjacent solar panels – current practice suggests that removal is only likely to be supported if there was support from the adjacent lessee.

However, where a lessee installs solar panels prior to tree planting on an adjacent block (or street verge), the latter should have some obligation not to overshadow the adjacent roof space.

4.3 Suburban Structure

4.3.1 Older suburbs

The historical pattern of development in Canberra has resulted in a wide range of street layouts/orientations; block sizes, building setbacks, and urban street plantings:

- The older Inner North and South Canberra suburbs are characterised by large block sizes
- Generous building setbacks to streets and side boundaries
- Wide verge widths
- Large mature street plantings with a mix of deciduous and evergreen species.

Some of these suburbs are now experiencing urban renewal resulting in medium density housing as well as construction of large new single dwellings which has resulted in some clearing of vegetation (including regulated trees) on the subject site.

Whilst it is difficult to generalise without detailed field research, many dwellings in these inner city areas will have roof space available for solar installations that will not be overshadowed by the mature vegetation because of block size and setbacks.

As a case study, the street pattern In ***Yarralumla*** is essentially NS-EW. Street trees are mature but range from low to high specimens as well as deciduous and evergreen. Inspection of recent aerial photos suggest that where redevelopment has occurred, there has been substantial tree loss for the property and construction of large houses with plenty of roof space with scope to provide solar panels without affect from neighbouring trees.

Figure 4-1: Yarralumla Suburb Plan

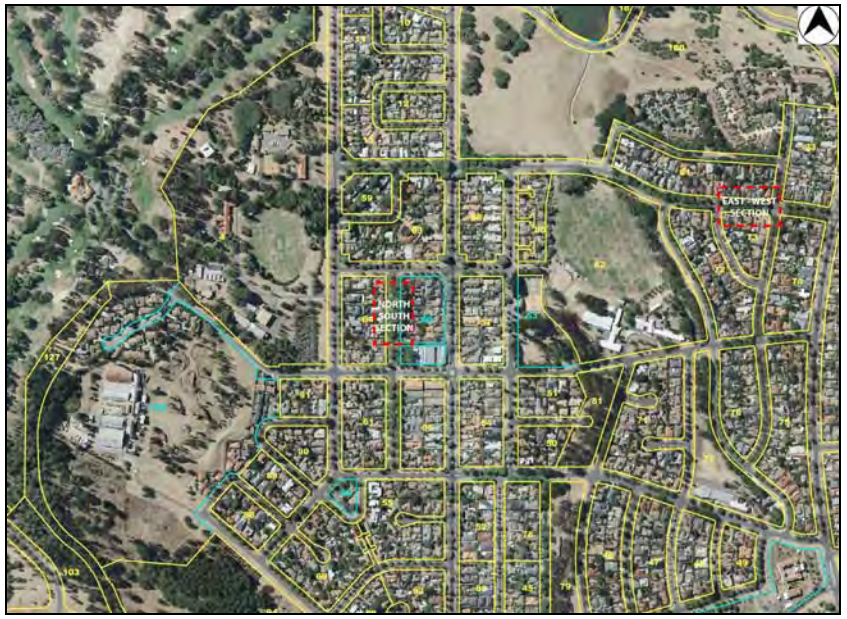


Figure 4-2: Yarralumla North South Section

Figure 4-3: Yarralumla East West Section

4.3.2 Greenfield suburbs

New Greenfield suburbs should have relatively low levels of conflict between overshadowing of trees and solar access for several reasons:

- Block sizes are smaller - thus restricting the possibility of tall tree growth on neighbouring blocks.
- Use of smaller habit street trees
- General land clearing with fewer remnant trees retained in residential blocks.

However, new suburbs throughout Canberra have narrower verges and smaller setbacks than in more established areas which could cause potential problems in the future unless the appropriate street trees are used.

Nicholls in Gungahlin is characterized by larger dwellings on smaller blocks than in older suburbs. There are fewer trees on blocks, and street trees are smaller and less well established than in older areas, but are also of a smaller height variety. The implications for solar access in this type of situation suggest there would be less conflict with adjacent trees than in older suburbs.

Figure 4-6: Nicholls North South Section

Figure 4-4: Nicholls Suburb Plan

Figure 4-5: Nicholls East West Section

4.3.3 Other suburbs

Suburbs where there appears to be greatest potential conflict are those in the “middle ring” where block sizes are of medium area (600-900sqm) and where there is scope for larger trees on verges and on neighbouring blocks. This type of situation covers a substantial geographic area in Belconnen, Woden, Weston Creek and Tuggeranong.

Using **Aranda** as a case study, there appears to be a much higher tree cover on blocks, mainly of native species, than in many other suburbs. This reflects the original character of the suburb when developed and the relatively low level of medium density development and or new large house redevelopment. This type of situation could result in greater conflict between solar access and tree retention.

In these cases, there should be increased attention to the placement of solar installations that avoid tree shadow, or an arbitration mechanism that facilitates tree removal (or pruning) on both public and private land to address future solar access provisions.

Figure 4-7: Aranda Suburb Plan

Figure 4-8: Aranda North South Section

Figure 4-9: Aranda East West Section

4.4 Owners' Responsibility

Lessees seeking to place solar panels on roofs should take into account existing trees on neighbouring properties and public land. This can easily be done either by a trained installer or by observation of location of trees and projected shadow lines at various stages of the year and day.

There is a level of common sense that needs to be exercised by both the home owner and installer during the planning and design stage for solar energy systems in order to locate appropriate roof-top positions for installation. For example, large evergreen street trees immediately north of dwellings will cast a shadow over roofs especially during winter months. Solar hot water needs to be located near to wet areas to avoid long plumbing runs which waste water before hot water arrives.

Government and industry advocates can assist in this process by providing information and education programs for potential solar users.

4.5 Orientation

The strategic orientation and layout of streets, blocks and dwellings across Canberra suburbs can affect solar access potential.

For example streets that run east-west, with large mature evergreen vegetation, are likely to cast more winter shade over southern blocks than streets that have a north-south orientation.

Some house designs are better suited to solar panels on roofs than others because of street orientation and individual siting of dwellings on blocks, as well as basic roof pitch and layout and internal house design.

There is no empirical evidence that house buyers actively seek dwellings that could readily accommodate the siting of solar panels, although the real estate industry could be encouraged to comment on the advantages of this attribute of a dwelling in the selling process.

4.6 Solar Requirements

Solar heating systems have more stringent requirements in terms of daily need for solar access than solar generation solutions because of household needs to maximise the availability of hot water.

4.7 Advice on Plant Species

Solar panel sun access can be compatible with shade trees that provide part of the passive solar design solutions for dwellings, provided the appropriate species selection is made to ensure shade trees are of sufficient height to shade living rooms but not high enough to shade roofs.

Nurseries and designers are able to advise home owners on the growth habits of different plant species, or the homeowner could seek advice from a qualified landscape designer to assist in this matter.

4.8 Tree Removal

Data on requests for tree removal from public lands to support solar roof panels is not readily available; however the number of applications is understood to be not very high. This may warrant further investigation to establish benchmarks/trends.

On leased land, it is presently possible in older areas where properties have evergreen trees on the northern side of living rooms to successfully apply to have these trees removed on grounds of improved solar penetration into houses.

Ideally, support for tree removal in this situation should be accompanied by a condition of approval to plant replacement deciduous trees.

4.9 Easements

Many blocks in older suburbs have rear utility easements. This provides a form of protection from overshadowing of blocks to the south side by ActewAGL restrictions on tree planting under these electricity easements.

4.10 Development Applications

Most forms of two-story redevelopment in residential areas are subject to DA appeal. If a proposed development overshadows an adjacent neighbour to the southern side including roof panels, this would be a legitimate basis for an objection, even if open space was not affected.

4.10.1 Solar System installed after Vegetation

In a typical situation where property lessee A installs a solar photovoltaic system after property lessee B had planted the tree or shrub, property lessee B should not be held responsible and should therefore not be made to trim or cut down any vegetation on their property planted prior to the installation of the solar photovoltaic system. The solar energy system should be appropriately sited in the first place or relocated at the expense of the property lessee or accredited installer (incorrect siting).

4.10.2 Solar System installed before Erection of New Buildings

In a typical situation where a solar system is installed before the Development Application of a new building on adjacent property which may overshadow the original householders' solar energy system, the solar panel owner should have the right to object to the proposal and seek an amendment to design and siting conditions.

4.10.3 Solar System installed after adjacent Development Application is approved

In a typical situation where a solar system is installed after an adjacent Development Application is approved the solar system should be relocated at the expense of the system owner or accredited installer (incorrect sitting).

4.10.4 Solar System installed before Vegetation

In a typical situation where property lessee A installs a solar system prior to adjacent property lessee B planting tree or shrub species which may shade property lessee A's solar energy system in the future, property lessee A should have the right to object and seek action to have the offending vegetation managed to avoid overshadowing.

4.11 Conflict Resolution

Given the statutory responsibilities of various government agencies for tree protection, it may be appropriate for an independent arbitration mechanism to be established to consider applications for tree removal to enhance solar access to individual properties. This would be a matter for discussion between stakeholders as to the most appropriate mechanism. A quick, non-bureaucratic response mechanism would also be required to avoid extended delays in advice to applicants.

4.12 Community solar farms

As an alternative to the use of house tops for solar generation, consideration could be given to a scheme whereby individual property owners could buy into a "community" or private solar farm established on open land within the suburb or district.

This approach would allow residents to have the benefit of being part of an efficient solar energy generation program without the problems associated with individual electricity generation on roof tops. The approach would reduce the potential level of conflict between trees and solar access, and the use of larger solar farms would be a more efficient and cost effective way of generating power.

Implementation of such a scheme would require co-operation from the ACT Government to find suitable land in local areas for "community-based" solar farms and a willingness to be pro-active in encouraging such an experiment. A cost / benefit analysis of this approach would also be required.

5 Conclusions

There is emerging concern in the ACT about the impact of overshadowing on solar access and it is prudent to identify potential problem situations and consider ways of addressing these problems before they become substantial or widespread.

Ideally the ACT should be able to ensure that it can make provision for high levels of solar access whilst maintaining and actively enhancing its reputation as a garden city with substantial tree cover.

There is insufficient evidence of conflict or potential conflict between solar panel provision on rooftops and overshadowing of neighbouring trees or street trees at this stage to warrant the introduction of new legislation.

However, the following actions could be considered for implementation to minimise potential conflicts between trees and solar panels and ensure that this issue does not become a substantial and widespread concern of the community.

- The inclusion of solar access as an issue to be addressed in an over-arching Government policy on tree management, that includes principles in relation to:
    - When to remove trees for solar access, which could be based on the planning principles of what was there first, the tree or the photovoltaic/ solar hot water system; and
    - Planting guidelines for streets that are considerate of future solar access requirements for residences including species selection and tree location.
- Government should work with industry and professional bodies and solar installation companies to ensure adequate training to avoid placement of panels on roofs that could be heavily overshadowed or potentially overshadowed in the future.
- Solar installers should be required to consider some form of landscape assessment as part of the process of placement of panels or hot water system on roofs to consider the location of current trees and their likely growth pattern over the life of the panels or system.
- The ACT street tree planting program in established areas should address overshadowing of adjacent roof spaces, through appropriate species selection.
- Adoption of street tree management and planting programs by PCL that *inter alia* considers the overshadowing effects on adjacent residential properties.
- ACT Government information systems (web page; pamphlets; displays; trade shows; etc) should emphasize the potential compatibility issues with respect to solar power generation systems and tree species/heights.
- Concept plans for new suburban development should decide which native trees and or habitat groups need to be protected from development – which ACTPLA already does – and placed in some form of protective tenure. It may be appropriate for freestanding remnant trees to be removed prior to development so as to provide more design flexibility in the development process, provided the bigger picture habitat conservation policy is endorsed as part of the strategic planning process prior to the onset of development.[13]
- There has been a substantial increase in the amount of solar energy system installations on Canberra roofs since the feed-in tariff legislation was enacted in March 2009. There are currently more than 2700 solar photovoltaic panels on roofs in the ACT, up from just 520 before the scheme begun 18 months ago.

[13] *It is understood that the Office of the Commissioner for Sustainability and the Environment is having a paper prepared on the issue of remnant trees.*

- There is no ready source of information about the number of houses with solar hot water systems, although anecdotal evidence suggests the number of installations has increased and will further increase as a result of the incentives provided by the Territory and Federal Governments. Establishing and monitoring a data base of installations may provide some assistance in gauging the likely extent of future conflict between tree shadow and solar energy systems.
- ACT Government should consider the introduction of community solar farms as an alternative to individual domestic roof solar panels for electricity generation.
- There should be a check in the ACTPLA / ActewAGL approval process for an assessment or consideration of shading from vegetation now or in the future.
- Above all, it should be the responsibility of householders and accredited installers to ensure adequate siting of roof-top solar energy systems in order to enable them to work at maximum capacity and efficiency. Therefore, accredited installers should be given adequate training in appropriate siting for solar panels. This should include training in:
    - Identification of optimal orientation and location
    - Identification of optimal elevation and angle
    - Identification of current and future shading constraints from buildings, vegetation and other structures on the solar panel owners' property
    - Identification of current and future shading constraints from buildings, vegetation and other structures on both private and public land surround the property.

Purdon Associates

October 2010

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Paper: Funding Options for the Protection of the Environment Through Enhanced Management Actions.

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8 December 2010

Contents

Introduction

This paper has been prepared to identify a range of funding options for enhanced environmental management as well as some case studies of funding, how they were established and what are the successful attributes.

The paper has been commissioned by the Commissioner for Sustainability and the Environment to assist particularly on work associated with the Investigation into the Government's tree management practices and the renewal of Canberra's urban forest which included a term of reference to investigate and report on: "... resource implications associated with an enhanced program".

Governments around the world have been attempting to manage their environmental responsibilities in the context of a rapidly changing legislative and policy framework. Given the extent of our environmental impact it is often difficult to set appropriate priorities with limited funds available given competing demands. In addition, we all grapple with the extent to which we 'maintain' current environmental amenity versus how we might continually improve and enhance that amenity.

This paper outlines the results of a review of funding mechanisms adopted by local and state governments around Australia. Traditional funding through rates and taxes is largely spent on environmental management undertaken as part of an organisation's legislative requirement. This is seen as a minimum funding source.

Information was sought from local Councils and state and territory governments around Australia through web searches and telephone conversations. The search included Annual Reports and financial statements to verify funding streams. Local government searches included: Perth City Council (WA), Nedlands (WA), Harvey Bay (WA), Adelaide City Council (SA), Adelaide Hills Council (SA), Barossa Valley Council (SA) Melbourne City Council (VIC), Nillumbik Shire Council (Vic), Blue Mountains Council (NSW), Hornsby Shire Council (NSW), Manly Council (NSW), Wollongong City Council (NSW), Sydney City Council (NSW), Randwick Council (NSW), Warringah Shire Council (NSW), Newcastle Council (NSW), Wingecarribee Shire Council (NSW), Brisbane City Council (QLD) and Sunshine Coast Regional Council (QLD). In addition research was gathered from the Australian Local Government Association and the Department of Local Government NSW. The South Australian government and NSW governments were also trawled for information via the web.

Each government area has specific environmental attributes and values. Most often it is the unique environmental attributes of an area or region that residents value the most. However, the management and maintenance of such attributes is often beyond the means of governments from traditional rate and tax bases.

There is a general reticence by residents to pay any more in rates and taxes than they currently do. Pannell, 2010 asserts that: "the opportunity cost of public money is important to the community". However, for specific projects or to improve the amenity of things they value, such as environmental improvement public expenditure is often seen in a positive light. To prosecute a case for increased funding for environmental management it is important to clearly define which environmental outcomes are most important from an ecological perspective and the most successful funding

programs arise where these outcomes match community values and expectations. The funding request cannot be based solely on a populist view of priority or importance because from an improved environmental amenity perspective this is bound to fail and the money will have been wasted ruining any future chance to of garnering support for additional funds.

Funding Options

It should be pointed out that no one funding stream is the panacea for all shortfalls in funding. Indeed in most organisations the strategy is to seek multiple funding streams for any given project or program. Funds received from one funding stream, for example an environment levy, are then 'leveraged' by the organisation to gain broader sponsorship, grants, in-kind support and so on. Many organisations have identified that 'seed' funding from the environment levy is often, in the end, small in comparison to, say, the in-kind value they received for the whole project from the private or government sector.

That being said the role of project managers in implementing programs needs to encompass not just the technical skills to deliver the project but the relationships, knowledge and networks to continue to recognise the leverage opportunities and the value adding that may attract additional funds from the private and government sector. This is a specific skill set that must be recognised and employed for this leveraging of funds to occur. The Councils most successful at gaining additional funds for enhanced management possess have the ability to 'sell' their projects to a range of audiences and who work hard at understanding the participants in the broader environmental agenda. These individuals are also very good at communicating their success – success breeds success.

Special Rates (Environment Levy)

Due to rate capping and continued devolution of responsibility, local governments throughout Australia have sought a range of mechanisms to increase their funding streams. One option available to Councils is a 'Special Rate'. Several other local government bodies use environment/tree/bushland levies outlined in Table 1.

To effect a special rate in NSW Councils have to meet a number of criteria and the rate can only be approved by the Minister for Local Government. Amongst other things the criteria includes:

- the special rate must be for a specific project or range of projects,
- residents must be consulted about the rate (they don't have to agree to it for it to be approved);
- there must be a sunset clause (the rate must be for a specific period of time); and
- the rate can only be implemented as a percentage of their rates, not as a set amount per ratepayer (which often leads to difficulties in garnering public support for the rate as Councils have difficulty communicating exactly how much the levy will cost each household).

Table 1 Environmental levies in Australia

Council	Levy	Description	Coverage	Rates	Comments
Adelaide City Council (SA)	Natural Resource Management Levy	• The levy funds vital projects that manage, protect and restore the region's water, land, marine, coastal and biodiversity assets.	Rateable properties		The levy raised $857,000 in 2010 and was in addition to the Environment and Sustainable City budget of $1.2 million. The NRM levy is imposed by the South Australian government on all Councils in SA, whereby the Councils collect the revenue from all rateable properties on behalf of 8 regional NRM Boards
Ashfield (NSW)	Environmental Levy	The Environmental Levy as part of a special rate variation provides funding to implement programs in line with the ESD Policy.	residents and businesses – payable by all properties that are charged general rates	The Environmental Levy is charged across all rateable properties as a 50% Base Amount and the remainder as an ad-valorem rate.	The Environmental Levy projects identified for funding include but are not limited to: 1. Environmental Education & Awareness programs for the community, school groups, local business and Council staff; 2. Water conservation projects 3. Energy conservation projects 4. Street Trees 5. Cycleway projects.
Bega Shire Council	Environment Levy		Rateable properties	Approved in 2002/03 at 4.96% of rateable properties	
Blue Mountains Council (NSW)	Environment Levy	Levy funds • weed control • water quality improvements • walking track maintenance • Threatened species conservation • rehabilitation of degraded lands	All rateable properties	Approved in 2005 of 3.65% of general revenue	Levy was introduced in 2005 and raises $1.174 million annually
Brisbane City (QLD)	Bushland Preservation Levy Environment management and compliance levy	Brisbane residents and businesses pay Bushland Preservation Levy as part of rates. Levy goes to: • protection and enhancement of the natural environment • creation of a world-class natural area network for Brisbane • contributes to the Living in Brisbane 2026 vision for a 'clean, green city'.	Brisbane residents and businesses – payable by all properties that are charged general rates	$49.80 –bushland preservation levy $22.76 – home owners, however differential rate depending on zoning	Environmental management and compliance levy covers the protection of waterways from toxins, trash, sediment, effluent discharge and landfill gas control. The charge also includes remediation of landfills to meet Council's obligations under the *Environmental Protection Act 1994.*
Coffs Harbour Council (NSW)	Environmental Levy			$25 per rate payer	Raises around $700 000 per annum for environmental activities within the Shire. This has allowed council to employ a Biodiversity Officer and a Sustainability Officer. Other activities funded include an incentive program for land management, implementation of council's Koala Plan of Management, support of volunteer groups, bushland regeneration projects, and the restoration of coastal reserves and fish habitats.
Crows Nest Shire (QLD)	Environmental levy			$20 per rate payer pa	NRM and biodiversity projects.

Council	Levy	Description	Coverage	Rates	Comments
Eurobodalla Shire Council, (NSW)	Environmental Levy	Used to fund things such as: Dunecare, Estuary Management, Weed control and Foreshores studies	residents and businesses – payable by all properties that are charged general rates	50 is flat rate of $16 and 50% is based on land valuation	
Hornsby Shire Council (NSW)	Environment Levy	Funds: • sediment basins; • artificial wetlands; • gross pollutant traps; • creek remediation works; • environmental education; • water quality monitoring and research; • environmental compliance and management; • industrial auditing.	Rateable properties	5% levy on rateable properties	The levy raises $2.564 annually for catchment management projects
Ku-ring-gai Council (NSW)	Environmental Levy	Used to fund bushland, waterways and urban environment.	Base on land valuation (approx 0.0001 of land valuation) works out at about $60 residential		Commenced 2005 to operate for seven years. Raises over $1.7 m pa. Enables Council to build on existing activities and attract other Government Grant funds to conserve and improve Ku-ring-gai's highly valued natural environment, including urban bushland, parks and reserves.
Lake Macquarie (NSW)	Sustainability & Environment Levy		Rateable properties	$26 per household $91business per assessment. Approved in 2002/03 at 3.28% of general rates	
Liverpool City Council	Environment Levy		Rateable properties	Approved 2002/03 at 4.65% of general rates revenue	
Manly Council	Environment Levy		Rateable properties		
Maroochy Council (QLD)	Environment Levy (introduced in 1997 as Vegetation Conservation Levy)				Recognised the need to protect and conserve the shire's natural assets, introducing in 1997
Newcastle City Council (NSW)	Environment Levy		Rateable properties	Approved 2002/03 at 4.97% of rateable properties	

Council	Levy	Description	Coverage	Rates	Comments
Warringah Shire Council (NSW)	Environment and Stormwater Levy	Raised to fund beach restoration programs, Narrabeen Lagoon restoration works and Bushland program	Rateable properties	6.9% of general revenue	Levy is 6.9% of general revenue raising $1.9 million capital and $3.95 million operating budget
Wingecarribee Shire Council (NSW)	Environmental Levy		Rateable properties		The levy has been in place since 2000. The aim of the current levy is to raise $3m over five years to fund programs that protect the environment. A large benefit of the levy has been attracting matching funds from government agencies and generating volunteer work from the community. To date over 26 bushland projects have been completed with another 20 underway.
Woollahra Municipal Council (NSW)	Environment Levy		Rateable properties	Approved 2002/03 at 7.28%	

In 2002/2003 the Minister for Local Government in NSW was asked to approve 27 Special Rates across NSW. Of those requested nine were either wholly or mostly for environmental initiatives, all of which were approved. Of the remaining 18 requests five were not approved. The rate increases requested for environmental initiatives ranged from 3.28% to 15.14% of general revenue, the Minister approved between 3.28% and 8.52%. The Division of Local Government (part of the Department of Premier and Cabinet) viewed special rate increases for environmental initiatives very positively and strongly encouraged Councils to seek one or as many rates as required. The duration of the special rate ranged from 3 to 15 years.

By 2002/2003 the Department observed that the majority of councils in NSW, over one hundred, had in place a special rate increase for environmental initiatives. The remainder had some form of 'environment fund' from general rates revenue.

Only one Council – Hornsby – has an environment levy in perpetuity as it had approval before the sunset clause was added as a criterion .

The types of levies introduced, whether for example for trees or aquatic systems, is only limited by imagination. Some levies were very generic in title and application while others were quite specific. More recently the trend seems to be to keep the title of the levy as broad as possible and amend specific priority areas and projects as they arise. Most Councils, however, produced a plan of expenditure for the levy for 3-5 years.

Hornsby Shire Council –Catchment Remediation Rate

Hornsby Shire ('the Bushland Shire') is north of Sydney and covers an area of 51,000 Ha of which approximately 67 percent is bushland. Of this bushland 52 percent is managed by the state government (National Parkes and Wildlife Service - NPWS) and 17 percent is managed by Council. The shire also has extensive estuarine areas and recreational waterways. This case study reflects the view of Hornsby that vegetation projects are part of "core" business and the catchment environmental program requires additional funds to address through a special rate or levy mechanism.

The special rate was approved in 1994 with a view to enabling Council to properly manage the Shire's waterways and catchments.

The environment levy is in perpetuity at 5 percent of general revenue and raises (2009) $2.564 million annually. Some of the projects it funds include:

- sediment basins;
- artificial wetlands;
- gross pollutant traps;
- creek remediation works;
- environmental education;
- water quality monitoring and research;
- environmental compliance and management;
- industrial auditing.

Most of the bushland managed by Council is within the Berowra Valley Regional Park and is jointly managed by NPWS, there are many smaller reserves throughout the shire under Councils sole, care and control. Other relevant bushland environment programs are funded through general revenue at Hornsby include:

- Land for wildlife program – this is a voluntary property registration scheme aimed at maintaining and enhancing native flora and fauna on private property and community owned land. The program provides advice, incentives (grants) networking and information to registered landholders. The registration is non-binding.
- Rural lands incentive program – to encourage rural land holders in their conservation efforts and the environmental management of their property – providing technical advice and cash incentives.
- Bushcare program – the Council has over 850 registered bushcare volunteers working on over 130 sites to restore native vegetation.

The Council produces an Annual Report on its Catchment Remediation Program to inform residents where the funds have been spent.

Warringah Shire Council - Environmental Stormwater Special Rate Levy

Warringah Shire Council has significant bushland, magnificent beaches and a major coastal lagoon system within its area. In 1996 the Council introduced the Environmental Stormwater Special Rate (ESSR) Levy of 6.9 percent of general revenue. The 6.9 percent equates to an average $52 per year per household.

The ESSR levy funds water quality improvement works, coastal protection and enhancement, improved floodplain management, the protection and restoration of important bushland areas and ancillary projects that support the community in maintaining Warringah's unique natural environment.

The Council produces an annual report detailing the year's levy expenditure. In 2009/10 the Council raised $1.935 million for capital works and $3.954 million for operation works.

Wollongong City Council – Environment Fund

The Wollongong City Council – Environment Fund provides an interesting case study on the introduction of an environment levy.

In 2003 the Environment Manager asked the Councillors to consider introducing an Environment Levy, it was 18 months from a local election and she wanted approval to begin the consultation with the community on the proposal as required by the department of local government.

Previous community surveys on the environment at both the local and state level had found a consistent high regard for environmental protection and management. The surveys highlighted residents:

- Were more concerned about the environment than any other community across the state (EPA, 2000).
- unanimously supported sustainable projects for Wollongong's future (IRIS, 2002, 1500 respondents).
- wanted more dollars spent on the environment (IRIS, 2002).

- "70% were not against the idea of a levy to fund sustainable projects" (IRIS, 2002).

A survey was conducted in June 2002 to gauge general interest in a levy before the question was put to Councillors. After Councillors agreed to begin the public dialogue about an environment levy a further survey in May 2003 indicated that the response by the community was consistent with the 2002 response including that, although they did not agree with the proposal in its current form, 77% still agreed to an environmental levy.

- June 2002
    - Unanimous support for sustainable projects such as stormwater
    - 42% in favour of an environmental levy
    - 28% were not against the idea of a levy
    - 57% prepared to pay $60 or more a year
    - 75% were prepared to pay at least $12 or more a year extra
- May 2003
    - 90% concerned about the environment
    - 36% in favour of the levy as it is proposed
    - 60% against the proposal at 4%
    - Only 23% not prepared to consider a levy for environmental projects at all.

Following a campaign by a few vocal opponents of the levy the Council introduced an Environment Fund of $1 million per annum from its general revenue. At the same time Kempsey Council introduced a levy, despite widespread community opposition to it. The levy proposed by Wollongong City Council was 2.9% for three years. The levy approved by Kempsey was 9% for five years.

Staff of other Councils at the time told Wollongong Council staff that initial community reaction to the introduction of a levy was negative yet the levy, once implemented, was seen by the community and Councillors as being very successful with widespread community support. Discussions with Department of Local Government officers revealed that, to their knowledge, no community had ever been in favour of the introduction of a levy but all had been supportive once the levy was introduced.

Yet at Wollongong the general public was in favour of the introduction of a levy and prepared to pay as much as $60 per year (the average payment for the 2.9 percent levy was $18).

One of the selling points of the levy was the potential to leverage levy funds to garner state and federal grants and private sponsorship. During the five years of the environment fund Council was able to attract a further $15 million in grants and sponsorship. Therefore the environment funds

were leveraged by a ration of 1:3, for every $1 of ratepayer funds the Council received $3 from the state, federal or private sector for its environmental management program.

An Environment committee was established to administer the environment fund with community representatives from each of the six Wards as well as two Councillors and the Professor of Environmental Science from Wollongong University. A community contract was prepared (refer Appendix A) to provide transparency in the process of spending the funds. An annual report card on the environmental fund projects was available to residents and posted on the web site.

Brisbane City Council – Environmental Management and Compliance Levy and Bushland Preservation Levy

Brisbane City Council is the largest in Australia. The City covers a diverse environment with many unique attributes of high value to its residents. The Council has introduced two levies; the Environmental Management and Compliance Levy and the Bushland Preservation Levy. The first covers the protection of waterways from toxins, trash, sediment, effluent discharge and landfill gas control. The charge also includes remediation of landfills to meet Councils' legislative obligations (Brisbane City Council, 2010).

The Bushland Levy was introduced in 1991 and covers city bushland purchase and protection, including public access facilities. The set charge is reviewed annually (Brisbane City Council, 2010). The levy is used to purchase land that supports the natural resource objectives of the Council and is primarily used to support significant ecosystems, plants and animals through the Bushland Acquisition Program. Once purchased the land is converted into conservation reserves. Over 2,500 Ha have been protected since the program began, including:

- Karawatha Forest;
- Brisbane Koala Bushlands; and
- Tinchi Tamba Wetlands (Brisbane City Council, 2010).

Brisbane residents and businesses pay a Bushland Preservation Levy and an Environment Management and Compliance Levy and as part of their rates. The Bushland Preservation levy funds:

- protection and enhancement of the natural environment
- creation of a world-class natural area network for Brisbane
- the Living in Brisbane 2026 vision for a 'clean, green city'.

The Bushland Preservation levy in 2010 is $49.80 and is payable by Brisbane residents and businesses – all properties that are charged rates.

The Environmental Management and Compliance levy covers the protection of waterways from toxins, trash, sediment, effluent discharge and landfill gas control. The charge also includes remediation of landfills to meet Council's obligations under the *Environmental Protection Act 1994.* The levy in 2010 was $22.76 for home owners and is payable by Brisbane residents and businesses – all properties are charged and it is a differential rate based on zoning.

Brisbane City has a similar private lands program as Hornsby called Land for Wildlife program where interested landholders join the program and receive free advice on protecting and enhancing the environment, Habitat Brisbane which supports volunteer groups, voluntary conservation

agreements and a program that provides free plants for residents. These projects are also funded through the Council's Bushland Preservation Levy (Australian Local Government Association, 2010).

Sunshine Coast Regional Council – Environment Levy

The former shire councils on the Sunshine Coast each introduced levies to manage their unique environmental attributes. The regional Council in its first year of operation 2009-2010 continued that levy regionally and charged each household $60 to continue to implement the environmental program. In 2009 the regional Council introduced an Environment Levy Policy which outlines the levy expenditure over the next five years.

From the website:

Key objectives of the environment policy are:

- protecting environmentally significant land through acquisition, as part of a wider strategy for landscape and habitat protection and rehabilitation
- responding to the region's key environmental challenges and producing on-ground actions
- open, transparent management of Environment Levy revenue
- partnering with a range of stakeholders, community based and government, to improve conservation and sustainability outcomes

Key funded initiatives across the three themes outlined in the endorsed Environment Levy Policy for the next five years include:

Land acquisition

$16.19m towards:

- land acquisitions [PDF 38KB] to build on the existing conservation area network and focus on consolidating larger conservation areas for future generations to enjoy
- establishment costs of acquired land
- planning, surveying and legal costs associated with acquisitions

Major initiatives and catalyst projects

- $7.055m for developing and implementing a waterways and coastal foreshores strategy and on-ground projects
- $317,000 for developing and implementing a regional biodiversity monitoring and reporting framework
- $250,000 towards regional pilots and catalytic projects
- $175,000 for developing an innovative pest management system
- $1.2m towards coastal dune rehabilitation

Grants, incentives and partnerships

- $8.32m for community environment grants, voluntary conservation agreements on private lands and partnership agreements with community groups and non-government organisations to undertake environmental initiatives.

$8.32m for community environment grants, voluntary conservation agreements on private lands and partnership agreements with community groups and non-government organisations to undertake environmental initiatives.

Philanthropy

Whilst the Australian community is not perceived as highly philanthropic this should not be underestimated. During disasters we are one of the most philanthropic societies in the world and we have a very high rate of volunteerism. Philanthropy can take a number of forms but the two most obvious and sought after are cash and in-kind. However, other types of donations can greatly contribute to our collective community assets – for example land was bequeathed to Wollongong City Council for the sole purpose of establishing a Botanical Gardens. These gardens are now one of the best regional Botanic Gardens in Australia and are visited by an estimated 150,000 annually.

The key to any philanthropic program is to clearly define what philanthropy is sought and how it will be spent. For example many Councils that run successful Bushcare programs have Bushcare coordination officers who can recruit volunteers and garner support for particular areas and gradually grow the program with available support. The community is continually informed about the areas the groups are active in and how residents can participate in their local area.

Another successful philanthropic program is run through community street tree plantings. A number of Councils such as Brisbane City ask residents to nominate where plants should be planted and have tree policies in place that encourage landholders to support and supplement the community program. There are further opportunities to develop the street tree concept in the same way memorial plaques around cities are payed for by the community. Funds could be sought through a web-based mechanism to offer trees for plantings with plaques identifying the species and the name of the contributor. The process needs to be simple and cost effective. It is clearly unsustainable to run a program that attracts small amounts but is costly to administer.

Some Councils and state and territory governments have established voluntary land acquisition programs. These could also include philanthropic donations of land that would support natural resource objectives.

To encourage philanthropy the giver needs to know the receiver will value the donation. It is worthwhile to establish a philanthropic strategic action plan that identifies what type of philanthropy is sought and how it can be supported by the organisation and articulated to the community.

Grants and Sponsorship

All of the Councils discussed in the above case studies for environmental levies have sought grant funding from state and federal government. Many have been successful in these applications before they imposed a levy but the introduction greatly increases their success rate as most grant criteria is based around ‘bang for buck’. If the Council can contribute funds to the project it increases the overall value of projects funded by government. In fact some funding is stipulated as 50/50, for example the federal governments’ stormwater reuse grant, matching funds are a mandatory criteria.

There are other grants available outside the government sector, established by philanthropic foundations or business' for example the Ian Potter Foundation is a Melbourne based philanthropic fund that will support a range of programs including environmental enhancement around Australia.

In addition to grants there are sponsorship funds that can be sought through the private sector. The contribution could be cash or in-kind and can contribute significantly to a projects success. For example Brisbane City Council attracted significant land contributions by public and private landholders for its 2 Million Tree program. The land contribution added a significant amount of land that could be used for a range of environmental enhancement.

Community Services Programs

Another "funding" source that works well in conjunction with other funding streams is the community service programs administered through the courts system. The community service orders issued by the courts for various criminal activities require a certain number of hours to be registered; often it is difficult for participants to reach these hours as few agencies host community service programs. Wollongong City Council utilises this "free" labour to perform tasks in the environmental area such as litter removal and tree planting. The Council estimates the work undertaken by this workforce saves the Council approximately $280,000 a year and reduces the cost of these works to the community.

Carbon Offsets

Carbon offsets represent a reduction in atmospheric greenhouse gases through sinks such as forest carbon, relative to a 'business as usual' baseline. Carbon offsets are tradeable and often used to offset all or part of another person or organisations emissions.

In order for domestic offset projects to be eligible under the national standard they must occur within Australia and fit the following criteria:

- be **additional** – greenhouse gas reductions generated by the project must be beyond what is required by legislation and beyond that which would have been normally been carried out by the business;
- be **permanent** – that the carbon stored is sequestered and will not be released into the atmosphere in the future;
- be **measurable** - methodologies for calculating the carbon sequestered must be robust and based on a defensible scientific method;
- be **transparent** – information on the project needs to be publicly available and clarify data sources, exclusions, inclusions and assumptions;
- be **independently audited**; and
- be **registered**.

NSW has a mandatory Greenhouse Gas Scheme (NGAS) now called Energy Savings Scheme. Under the NGAS any reforestation on land within NSW is eligible for credits and therefore the Googong Foreshore area would be eligible. Whether on the mandatory or voluntary markets any additional revegetation is eligible to trade in the carbon market. NSW Forestry currently is an active trader and provides credits for both the mandatory and voluntary markets.

Brisbane City Council estimates the mass plantings of Kholo/Mount Crosby store approximately 6 tonnes of carbon per hectare per year. The total land area at this site is 80 Ha. Therefore the site is generating approximately 480 tonnes of CO_2-e sequestration per year. On the current market that is between $5,280 and $24,000 per annum (Carbon Offset Guide price of $11-$50+ per tonne)

Attributes of Success

The following attributes seem to significantly contribute to the success of funding options for enhanced environmental management.

- It is important to formulate and articulate a clear vision and objectives, a case for the activity needs to be prosecuted once everyone understands the 'what', the 'why' and the 'how' they can then get on board, if the staff aren't convinced no one else will be. What is the overall strategy? The objectives should be measurable, for example "net increase in native plant number and diversity";
- Political support is vital. Even highly unpopular decisions will become popular once the full benefits are realised and communicated. Most Councils did not have community support to implement a levy but all identified significant community support after the levy was operational;
- Transparency: successful programs, whether through additional funds or general revenue, clearly articulated what the funds were to be spent on, why and what was achieved (Habitat rehabilitation, water quality improvements, carbon sequestered and so on). A careful measurement and monitoring program needs to be incorporated into the program activities and costs so that the information can be communicated back to the public. An active consultation program is required to fulfil the requirements of transparency. It is not enough to have the report available it must be actively communicated to the community: web site, forums, workshops, media releases, shopping centre displays etc
- Diversity of funding streams: each successful Council was active in pursuing multiple funding streams and this was one of the key 'selling' points of an environment levy. To attract external grants and sponsorship required a management plan – some strategy that underpins the program of works or project. This relates back to the vision and objectives of the levy
- The most successful organisations in attracting funds had charismatic leaders; people who had technical skills around the environment, for example science, but who also were entrepreneurial in their approach and had developed networks in the public and private sector. They knew what projects had additional benefits for other organisations and knew how to leverage that to attract additional funds and in-kind contributions, these leaders brought the community along with them (e.g Stella Whittaker – Hornsby Council, Skye Rose – Manly Council; Dr Mike Mouritz – Newcastle City Council).
- The more successful environmental levies either had a 'sunset' clause, which was usually five years, or there was annual review of the program. One of the limitations of a levy identified by David Pannell, 2005 was that any inefficiency in spending priorities may be locked in. Therefore a review and/or sunset clause can allow an organisation to better manage a current priority but does not perpetuate the spending once the priority changes.

- The levy did not replace general revenue funding on the environment. This was one of the perceptions for scepticism by the public, environmental legislative requirements usually supported by general revenue and the levy for specific projects that reflect the community values of the environment.
- Successful organisations didn't promise too much initially. Once the levy is in place there is a "gearing up" period where staff are employed and tenders written and awarded before the first sod is turned. Many organisations showed an under expenditure from approved budget in the first couple of years. This needs to be strongly managed and communicated so that the whiff of failure does not begin to surround the program. The public can start to become sceptical as to whether the money was really needed in the first place if it is not spent in a timely way.

This review has highlighted a number of funding streams outside the general taxes and revenues. An environmental levy can be implemented and attract significant funds for environmental programs without causing any long term stress to residents. The levy can then underpin more transitory or volatile funding streams such as grants, sponsorship, philanthropy and carbon trading. However, once a funding stream is secured all other leverage opportunities should be explored to leverage the ratepayer or taxpayer dollar.

It should be noted that introducing an environmental levy requires some political leadership but all of the cases discussed through local Councils or Departments of local government proved popular in the long term with residents. Once residents 'see' the benefits this often aligns with their environmental values.

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Appendix A: Example of a Community Contract and Policy

COMMUNITY CONTRACT

To ensure community participation and Council accountability in the Environment Fund, Council will initiate a Community Contract. The Community Contract will detail a comprehensive program of environmental works, which will focus upon the themes of flood, bushfire, stormwater quality, natural asset protection and education. All these programs will enhance the integrity of our environment and preserve it for future generations.

The Community Contract will report back to the Community on the projects funded by the Environment Fund. This will demonstrate a transparency and full public accountability of all funds spent in the Environment Fund.

All work identified within the Community Contract will be undertaken funded by a dedicated $1m program per year that will reported in the Community Contract. Additionally, any external project grant funds that have been made available from either State or Federal bodies will also be reported in the Community Contract.

The Community Contract will be reported in the Annual Report, Council's website and the State of the Environment Report and periodic communications.

Annually, a report will be brought forward on the State and Federal matching grants which the Fund has attracted, as well as detailed information of the projects to which the moneys have been assigned.

As part of the Community Contract the Environment Fund will be placed on public exhibition for endorsement/comment by the community. The Program is to be reflective of the State of the Environment Report, including indicators.

ENVIRONMENT FUND POLICY

Vision

Wollongong City Council is committed to the protection of the environment, its enhancement and the promotion of environmental sustainability.

Objectives

The Environment Fund is structured within the Environmental Management Program and will incorporate functions across most divisions of Wollongong City Council. The Environment Fund will be co-ordinated by the Environment Fund Governance Committee in the rehabilitation of the environment which has been affected by our community activities.

The Environment Fund will:

- communicate this policy, objectives and targets to the citizens of Wollongong,;
- establish programs and set targets within a dedicated Environmental Management Plan to protect and enhance plants, animal, land and water that may be affected by our activities;
- promote environmental sustainability awareness among the citizens of Wollongong;
- report on performance of the Environment Fund through the periodical ' State of the Environment' Report; and
- through a " Community Contract" conduct periodic audits of the Environment Fund and communicate these to the citizens of Wollongong.

All projects administered by the Environment Fund will give consideration to the care of the plants, animals, air, land and water which may be affected by those activities and give consideration to the long term costs and benefits of these projects in relation to economic, social and environmental impacts.

To fulfil this commitment, the Wollongong City Council will observe the principles of Ecological Sustainable Development within the Environment Fund-Environmental Management Plan

Cr Alex Darling
Lord Mayor
City of Wollongong

Rod Oxley, PSM
General Manager
Wollongong City Council

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Paper: The benefits and draw backs of considering funding for urban tree programs separately to climate change initiatives.

Author: Lisa Miller, BSc

Miller Consulting

14 December 2010

Contents

Introduction

This paper sets out to define the current funding arrangements employed around Australia and elsewhere with respect to tree programs and climate change. Is it the general trend now to incorporate these two programs together and if so why, what are the drawbacks and benefit of this vs separating these programs?

Tree programs have been a traditional environmental initiative of governments around the world particularly in urban and peri-urban landscapes, long before the concept of human induced climate change and the importance of the carbon cycle on climate was proposed. The major principles being adopted around the world in the context of climate change are adaptation and mitigation. These two principles have major structural and behavioural implications for human societies particularly over the next ten years and governments around the world will be expected to respond to climate change by their constituents in a way the benefits the community in the long term.

The paper will start out by defining the importance of tree programs in the context of climate change and the various markets recently established to manage carbon trading both from a voluntary and mandatory perspective. This background and the opportunities it creates will then be further discussed.

The information was gathered via the web and through telephone conversations with various organisations to further enhance information readily available on the web. The local governments investigated include: Perth City Council (WA), Nedlands (WA), Harvey Bay (WA), Adelaide City Council (SA), Adelaide Hills Council (SA), Barossa Valley Council (SA) Melbourne City Council (VIC), Nillumbik Shire Council (Vic), Blue Mountains Council (NSW), Hornsby Shire Council (NSW), Manly Council (NSW), Wollongong City Council (NSW), Sydney City Council (NSW), Randwick Council (NSW), Warringah Shire Council (NSW), Newcastle Council (NSW), Wingecarribee Shire Council (NSW), Brisbane City Council (QLD) and Sunshine Coast Regional Council (QLD). In addition initiatives in Canada were also highlighted as part of the web search.

Background

The carbon cycle

Since the prominence of the concept of human induced climate change through the increased concentrations of carbon in the atmosphere (refer to Figure 1 Carbon Cycle), carbon sequestration has been recognised as a natural store of atmospheric carbon. One of the most recognised forms of sequestration is via the process of photosynthesis, or carbon capture of plants. It is estimated by the Intergovernmental Panel on Climate Change that the world's forests sequester a billion tonnes of carbon dioxide (excluding soil carbon). Deforestation has contributed to as much as 18% of the world's carbon emissions into the atmosphere over the last five years (Stern Review, 2006).

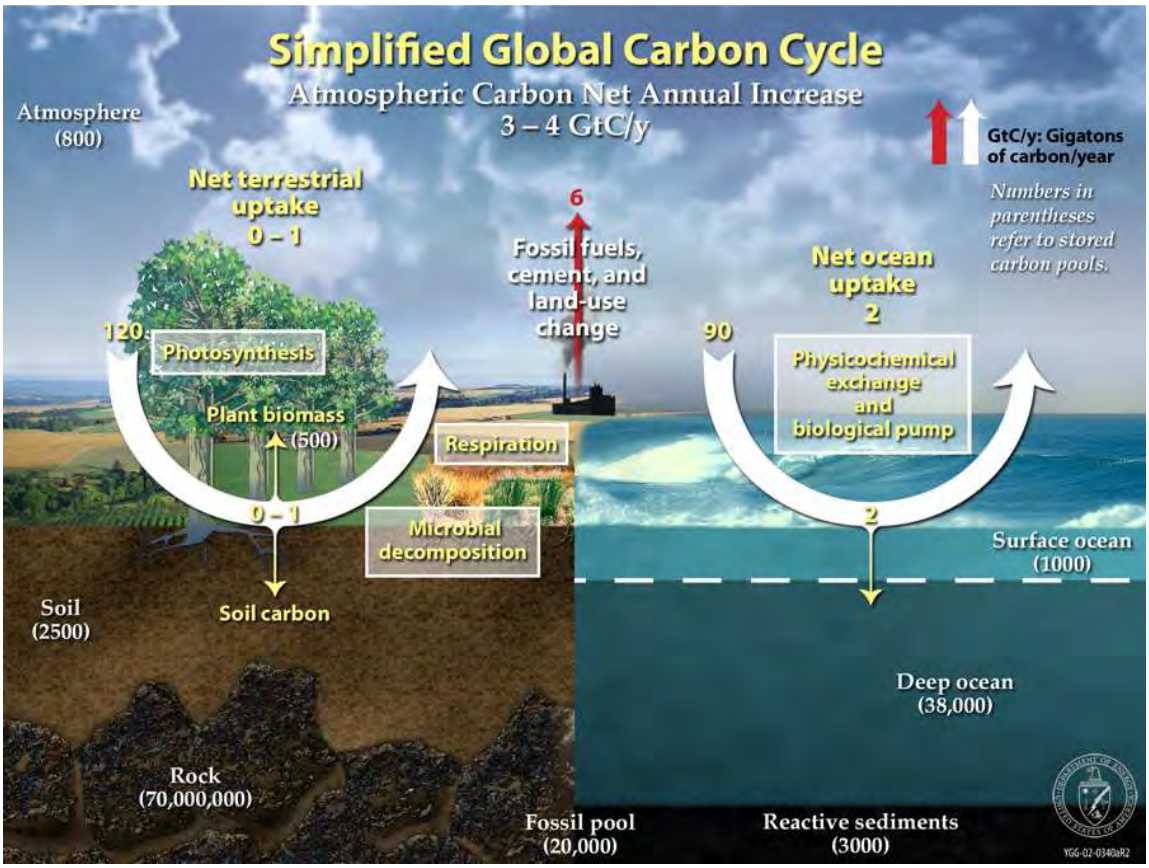

Figure 1 Simplified carbon cycle (from U.S. Department of Energy Office of Science, 2005).

Reforestation projects around the world over the last five years have contributed to reversing the trend of forest emissions. One of the key reasons reforestation projects have recently been successfully implemented is through funds being available for such projects through carbon offsets. Carbon offsets represent a reduction in atmospheric greenhouse gases through sinks such as forest carbon, relative to a 'business as usual' baseline. Carbon offsets are tradeable and often used to offset all or part of another person or organisations emissions. Offset credits can be purchased from an offset scheme provider or generated from your own projects.

Legislative Framework

Kyoto Protocol and Marrakesh Accord

The Kyoto Protocol is an international agreement created in response to the United Nations Framework Convention on Climate Change (UNFCCC) in 1997. It entered into force in 2005 but Australia didn't become a signatory until 2007. The Kyoto Protocol sets binding targets for the reduction of greenhouse gas emissions by developed countries and countries in transition. It includes emissions reduction targets for Countries identified in Annexure 1[1] to be met within the first

[1] Annex I Parties to the Convention: Australia, Austria, Belarus**, Belgium, Bulgaria, Canada, Croatia**, Czech Republic**, Denmark, Estonia, European Union, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy**, Japan, Latvia, Liechtenstein**, Lithuania, Luxembourg, Malta, Monaco**, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation**, Slovakia**, Slovenia**, Spain, Sweden, Switzerland, Turkey**, Ukraine**, United Kingdom of Great Britain and Northern Ireland, United States of America (* Observer State, ** Party for which there is a specific COP and/or CMP decision) at http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php

commitment period 2008-2012. It is the framework under which carbon can be valued and traded around the world. In meeting the targets it establishes the need for countries or corporations to purchase carbon offsets.

Amongst other things the Marrakesh Accord[2] sets the parameters around which carbon sinks should be considered in the context of the Kyoto Protocol, including setting standards for minimum forest size and canopy cover.

National Carbon Offset Standard

The National Carbon Offset Standard has been introduced by the Australian Government in line with the Kyoto Protocol and Marrakesh Accord to ensure that consumers have confidence in the voluntary carbon offset market and the integrity of the products purchased. It articulates the standards by which carbon offsets and carbon footprints are calculated and audited (National Carbon Offset Standard, 2009[3]).

The standard contains provisions which are based on international standards and Australian legislation.

In order for domestic offset projects to be eligible under the national standard they must occur within Australia and fit the following criteria:

- be **additional** – greenhouse gas reductions generated by the project must be beyond what is required by legislation and beyond that which would have been normally been carried out by the business;
- be **permanent** – that the carbon stored is sequestered and will not be released into the atmosphere in the future;
- be **measurable** – methodologies for calculating the carbon sequestered must be robust and based on a defensible scientific method;
- be **transparent** – information on the project needs to be publicly available and clarify data sources, exclusions, inclusions and assumptions;
- be **independently audited**; and
- be **registered**.

National Schemes

Due to the failure of the CPRS to pass through the national parliament there is no national emissions trading scheme. State governments however, endeavoured to meet this challenge and the first to establish a scheme was NSW, the NSW Greenhouse Gas Reduction Scheme (GGAS) which was extended to become a joint Scheme with the Australian Capital Territory joining formally on 1 January 2005. NSW Greenhouse Abatement Certificates (NGACs) could be created for storage and sequestration of carbon. However, the NSW scheme was reviewed with a view to transitioning to a National scheme. This review resulted in the new NSW Energy Savings Scheme (ESS) where energy saving certificates (ESCs) can be created for selected energy savings projects.

[2] Report of the Conference of the Parties on its Seventh Session, held Marrakesh 29 October – 10 November 2001 at http://unfccc.int/resource/docs/cop7/13a01.pdf

[3] Available at http://www.climatechange.gov.au/government/initiatives/~/media/publications/carbon-accounting/revised-NCOS-standard-pdf.ashx

In January 2009 the Victorian government commenced the Victorian Energy Efficiency Target (VEET). This program is primarily designed for the residential sector and aims to encourage the uptake of energy efficiency technology.

The South Australian government introduced the Residential Energy Efficiency Scheme (REES) on 1 January 2009. This scheme is also aimed at the residential sector. Retailers are required to meet individual energy reduction targets.

Mandatory vs Voluntary Offsets

Governments around the world have developed regulated markets for trading greenhouse gas credits (e.g. NSW Greenhouse Gas Reduction Scheme (GGAS)[4] now Energy Savings Scheme, European Union Emissions Trading Scheme and U.S Northeast Regional Greenhouse Gas Initiative and so on) (Carbon Offset Guide). These schemes are designed to support national targets under the Kyoto Protocol or other national targets. They provide for rules around how emissions reductions from outside the sector can qualify as "offsets" in order to provide flexibility in meeting the GHG targets. These are known as mandatory or industrial offsets. These offsets are designed to maximise commercial returns and minimise net costs per tonne of carbon including transaction costs. They are characterised by large plots of one or two commercial species for which robust growth models for the species is readily available to maximise the carbon sequestration potential. The long term ownership of the carbon rights is unambiguously secured.

However, organisations or individuals may wish to be carbon neutral for a whole range of reasons outside a mandatory target. These are known as voluntary offsets or 'charismatic carbon' and these offsets may be purchased as part of a regulated market or outside the regulated market. These voluntary offsets seek to deliver other environmental benefits in addition to sequestration which may include habitat values for endangered species, salinity recharging, water quality improvements and filtering for wetland systems. Investors in the voluntary market may be less concerned with meeting the more demanding certification criteria of the mandatory schemes. The investors may simply rely on third party endorsement about overall environmental benefits. These offsets are often more expensive than those of the mandatory schemes as the environmental values attract a premium and the nature of the programs often attract higher measurement and management costs.

The high biodiversity values will compromise carbon sequestration values by using multiple species including understorey species with different growth rates, where few of these have robust carbon sequestration growth models. Accordingly they are more complex to measure and monitor than a typical forestry plantation using commercial species for which there are well developed growth models.

Climate Exchanges

A number of "climate" exchanges have been established around the world to trade in accredited certificates. The exchanges capitalise on the voluntary trading market. The Chicago Climate Exchange (CCX) has been established for the North American gas abatement scheme.

CCX has developed standardised rules for issuing Carbon Financial Instrument® (CFI™) contracts for forest carbon sequestration. Eligible projects on CCX may exist under all four of the mitigation measures outlined by the Intergovernmental Panel on Climate Change (IPCC):

[4] http://www.greenhousegas.nsw.gov.au/

- Maintaining or increasing forest area: reducing deforestation and degradation
- Maintaining or increasing forest area: afforestation / reforestation
- Forest management to increase stand- and landscape-level carbon density
- Increasing off-site carbon stocks in wood products and enhancing product and fuel substitution (CCX website[5]).

The owners of the CCX – Climate Exchange PLC have subsequently also partnered to establish the European Climate Exchange (ECX)[6]; Montreal Climate Exchange (MCeX)[7]; Tianjin Climate Exchange (TCX)[8]; and the Australian version – Envex[9].

Carbon Offset Schemes

To be eligible to claim abatement certificates under a reduction scheme the project must meet the definition of reforestation that is specified by the United Nations Framework Convention on Climate Change. The reforestation must take place on land predominantly non-forested before 1 January 1990. The trees must be in place for a minimum 100 years. The forest size must also comply with a minimum:

- 0.2 ha land mass;
- 2m tree height; and
- 20 percent canopy cover of land mass.

The forest may be permanent, with no intent to harvest during the 100 years of management or the plot may be an actively harvested but the harvested stand retains a net permanent volume of carbon storage.

There are effectively two types of carbon sequestration projects:

- harvestable forestry projects that maximise harvest potential with carbon standing stocks. These forests tend to be monocultures and tree types are those with the highest timber and carbon sequestration potential – growth and yield model; and
- the other project links carbon sequestration with broader biodiversity objectives and is usually managed by companies who promote forestry projects.

Within both of the types of projects outlined above there are generally two types of forestry managers: those that operate their own carbon offset project with its own carbon footprint calculator and all the responsibilities of registration, management, auditing etc and those that assign their sequestration through another Carbon Pool Manager. In this instance a “Restriction on Use” legal document is entered into between the landowner and the Scheme Administrator.

In a paper by Andrew Campbell (2007) a number of risks in participating in the carbon market were identified:

[5] http://www.chicagoclimatex.com/
[6] https://www.theice.com/productguide/ProductGroupHierarchy.shtml?groupDetail=&group.groupId=19
[7] http://www.mcex.ca/index_en
[8] http://www.tianjinclimateexchange.com/
[9] http://www.envex.com.au/carbon_markets.htm

Financial: where costs of setting up for carbon trading and meeting standards for measurement and certification of compliance are considerable, whilst returns are modest – particularly for environmental mixed species plantings.

Technical: measurement and database management, particularly for mixed species are complex. The two best systems for carbon accounting are Carbon Sequestration Predictor CSP and the National Carbon Accounting Toolbox (NCAT). They both require expert skills in using and largely depend on understanding regional conditions and the types of plantings.

Reputation: If the organisation is encouraging private landholders to participate in the carbon trading market (similar to the Hawkesbury – Nepean Catchment Management Authority) and the market falls there are reputational risks associated.

Resourcing: successful participation in the carbon trading market will require specialist skills and the development of systems for monitoring and securing the carbon for long periods. Overtime there will be significant changes in international and national policy on the issue and there will be significant retraining required for existing staff to keep abreast of these changes.

Policy: Clearly the carbon trading environment is highly volatile and subject to major change. This will continue to create its own risks and issues for those that seek to enter the carbon market.

All of the above risks can be managed but how they are managed and the degree to which an organisation is exposed to the various risks depends on the degree to which an organisation is willing to participate in the carbon market.

There are a number of ways an organisation might participate in the carbon market. The model adopted by the CMAs in NSW generally is to encourage private landholders to participate in the market and provide information on providers and benefits of the scheme (e.g. Hawkesbury-Nepean CMA, Carbon Offset Guide by RMIT and EPA Victoria). This provides some leadership in the community and assists communities to develop strategies for mitigating climate change. However, it does expose the organisation to reputational risk as outlined above if the market begins to fall below which it is financially viable.

A 'quality assurance' role may also be considered, whereby the organisation certifies the environmental value of a specified project. This can be contemplated where an organisation wishes to support projects that fulfil its own biodiversity objectives. Again the organisation may be exposed to reputational risk if the provider fails to deliver on ground projects.

The other role that can be undertaken is that of developing your measurement and monitoring in line with the requirements of a carbon trading scheme without actually participating in the scheme. Brisbane City Council has adopted this model and have partnered with the University of Queensland to establish carbon predictor models for any future participation in a scheme if required. They therefore improve the existing systems of measurement, monitoring and reporting without actually risking low rates of return on investment. The advantage is also that they will be ready when and if they choose to participate.

The next progression is to enter into a partnership or joint venture and become a strategic investor such as Forests NSW with Carbon Planet. The partnership allows the organisation to access specialist

expertise in carbon trading without having to undertake that work itself with all the risks associated with technical capacity and resourcing. Another example is the joint venture between New Forests Pty Ltd and Gwydir- Border Rivers CMA. In that instance whilst the CMA contributed significant funds for the project without any returns on investment itself the joint venture allowed more area to be planted and revegetated, thus improving the long term viability of the project consistent with the CMA's strategic vision.

The final model for participation in the market is to establish the organisation as a provider and set up a legal framework around that. It would require significant investment in expertise in web design, carbon foot printing, monitoring, and measurement accreditation and so on. However, it does deliver a greater proportion of investor contributions. This model does trigger all of the risks outlined above including policy risk as the current policy framework from the federal government is uncertain.

Each of the models outlined above are not mutually exclusive and can be entered into in an greater or lesser degree as has been the case with some of the case studies. For example NSW Forests are a provider as well as supply credits to voluntary market providers.

Providers

A full list of providers is available at www.carbonoffsetguide.com.au

Forests NSW – Forestry Division of the NSW government

Forests NSW was the first entity to complete the NSW GGAS audit process and commence trading as part of the NSW mandatory carbon market. The first trade occurred between Forests NSW and Energy Australia in 2005. They are Carbon Planet's principal supplier of carbon credits. There are 32 individual forests that comprise the accredited carbon pool. The forests comprise 13 hardwood species that occur naturally in NE NSW.

CO2 Australia **(**www.co2australia.com.au**)**

Provides carbon credits under the mandatory market supplying credits to Origin Energy, City of Sydney, Qantas and so on. CO2 was one of the first providers to provide credits under the NSW GGAS program.

CO2 Australia is the:

- first company that reforested cleared land to achieve accreditation as an abatement provider under the New South Wales Government's Greenhouse Gas Abatement Scheme;
- first company to be accredited as a reforestation abatement provider under the Commonwealth Government's voluntary Greenhouse Friendly™ program; and the
- first Australian company registered on the Chicago Climate Exchange (CCX) as an Offset Provider. CCX operates North America's only cap and trade system for all six greenhouse gases, with global affiliates and projects worldwide (Co2 website)

Carbon Planet **(**www.carbonplanet.com**)**

This company was founded in Adelaide in 2000 and began trading in 2005 and is a global carbon management company working in the voluntary market with individuals and business. They provide carbon footprint ting tools and consultancy around energy efficiency and emissions reductions.

Greenfleet **(www.greenfleet.com.au)**
Greenfleet was established in Victoria in 1997 as a not-for-profit providing carbon offsets for vehicles, office energy use, staff air travel and conferences as part of the voluntary market. Currently they sell 1 tonne of CO_2-e for $13.40 (tax deductable). Greenfleet pays landholders for the costs of permanent revegetation up to carbon limits. They prefer sites greater than 10 Ha and they plant native trees in environmental plantings for a range of benefits.

An organisation can establish themselves as a provider as the NSW government did through Forestry NSW. Forestry NSW also supply credits to other providers such as Carbon Planet in the voluntary sector. The voluntary providers traditionally have on their website a carbon calculator for individuals or organisations to calculate their current emissions and offset some or all of these emissions by purchasing carbon offsets in the form of tree plantings. For example one provider would offset an average car use for a year with 17 trees costing $40AUS. The website will also offer landholders the ability to enter into agreements to allow the provider to plant trees on their property. Usually the provider stipulates a minimum area of land for this to be viable.

Case Studies

The above background demonstrates the dynamic funding environment that some organisations have used to supplement their existing tree programs and where organisations have been created simply to meet the demands of climate change under a newly established tree program. Most local governments around Australia however, have continued to fund their tree programs separately to their climate change initiatives. They have continued their existing tree program or may have even enhanced their tree program but by and large it is separate to climate change.

Examples where tree programs are funded under climate change initiatives

Given the new carbon market there are programs that are fully funded under climate change initiatives, they tend to be not-for-profit environmental groups who are occupying the voluntary carbon market, such as Carbon Plant and CO2 Australia. Forests NSW has a component of this within its portfolio but is difficult to categorically say it is only funded under climate change initiatives.

The Ontario Government Urban Tree Planting Program

The Ontario Government in its commitment to fighting climate change has planted 100,000 trees at a cost of $1 million within Ontario's urban green spaces, in partnership with a not-for-profit organisation called Evergreen. The program outlines a range of other benefits such as improved air and water quality, increase energy conservation and provision of habitat for birds and wildlife. The program is also designed to improve social capacity for adaptation to climate change through involvement of volunteers and community groups. The benefits of the program are a clear public message on the commitment to climate change and the link to trees.

Green Streets Canada

The Tree Canada Foundation with endorsement from the Federation of Canadian Municipalities has established a tree planting and tree maintenance program across Canada with goal of encouraging Canadians to plant and care for trees in their municipalities and urban and rural landscape in an effort to reduce the harmful effects of carbon dioxide emissions. The program provides funding of up to $25,000 per municipality for tree planting. The program was established in 1993 and up until

2003 had planted over 650,000 plants across Canada (Alternative Funding Programs and Resources Guide, 2003).

Global Environmental Facility

This program is the largest environmental fund in the world. The GEF is funded solely by governments around the world to tackle climate change and address environmental issues. The group work on a public/private partnership model that currently leverages $1:$8 for programs where for every $1 of government funding they leverage $8 from the private sector. In 2010 Dr Robert K. Dixon CEO announced a doubling of their forest program in an effort to address climate change (Clean Skies News, 2010). The benefits of this program are in articulating and measuring the multiple values and benefits of their programs and the potential to leverage government funds with private investment.

CO2 Australia

As outlined in the providers section CO2 Australia provides carbon credits via tree planting programs in the Mallee country under the mandatory market supplying credits to Origin Energy, City of Sydney, Qantas and so on.

The program benefits from carbon offset funding to enhance the Mallee biodiversity within Australia. The program funding assists in developing strong carbon sequestration models for Mallee species.

Examples where tree programs are not funded under climate change initiatives but have climate change objectives

This category of case studies makes up by far the greatest proportion of local government programs in Australia. As the traditional tree program remains funded through the general revenue base and climate change initiatives are an additional program often funded through a levy mechanism or similar.

Adelaide City Council

The Adelaide City Council case study is typical of Councils around Australia. The Council currently manages a Wirranendi Bush Restoration program. This council initiative engages the community in improving the natural environment of the Adelaide Park Lands. Activities funded include plant propagation, plantings, seed collection, weed control, animal surveys, excursions and more. The Council also partners with the South Australian Government in the Million Trees Program also known as the Urban Forest Biodiversity Program. The Council has committed to planting 100,000 indigenous plants within the Park Lands in conjunction with SA Urban Forest. The objectives of the program are ostensibly biodiversity but also support the vision that Adelaide is recognised as a clean, green city leading in ecological sustainability.

Adelaide's climate change initiatives are encapsulated within the Carbon Neutral Carbon Action Plan 2008-2012. The plan outlines carbon emission reduction actions such as lighting, increasing renewable energy procurement and finally offsetting emissions through procurement of certified carbon credits.

Wollongong City Council

Wollongong Council has operated a range of tree programs like many other Councils around Australia they include such programs as: street tree program; native propagation program for Council land and

residential Green Tree Days; they also run a program at "Greenhouse Park" which is an old Council waste facility that Council is slowly rehabilitating with an active Bushcare program and the area is the focus for National Tree Day activities; and their very successful Bushcare program which coordinates over 40 volunteer groups through the city.

The Council, in partnership with Shellharbour and Kiama Councils, have developed a Sustainability Roadmap 2008. The Roadmap outlines the climate change initiatives for the Councils over the next five years. Whilst carbon sequestration is identified in the roadmap it is seen as additional to the existing tree program. One of the issues raised in relation to amalgamating the tree and climate change programs identified by the Council staff was confusing the message on biodiversity. They felt the tree programs importance within the Council and its funding source might diminish if it was "watered" down into the climate change program and they had built up the "brand" around the existing tree program on the notion of biodiversity.

Examples where tree programs are both funded under tree programs and climate change initiatives

Victoria Naturally Alliance – Habitat 141 – Outback to Ocean (www.victoranatually.org.au)

Victoria Naturally Alliance is a not-for-profit alliance based in Victoria which aims to connect people and nature. The Habitat 141 project aims to connect large habitat areas such as national parks and reserves through restoring native bushland on public and private lands across Victoria. The investments strategy outlined by Victoria Naturally Alliance to replant 255,000 Ha is funding from the state and federal governments supplemented by carbon offsets. They estimate the cost of the project to be $333 million over 30 years with an estimated $176 million received from biocarbon plantings on 150,000 Ha (at a carbon price of $25).

The advantages of the program are delivering:

- climate change and biodiversity improvements simultaneously;
- carbon revenue provides a viable income stream for farmers;
- regional economic activity is diversified with an estimated 37 jobs being created as part of the project;
- the value of multiple unpriced benefits such as ecosystem services like water quality improvements etc.

New Forests Pty Ltd and Gwydir-Border Rivers Catchment Management Authority (CMA)

This was a large scale forestry project on 8,500 Ha of land, purchased by New Forests Pty Ltd on behalf of Cambrium Global Timberland Limited. The project integrated large scale environmental plantings and habitat restoration works on environmental assets that are a high priority for the CMA. A large grant by the CMA combined with carbon trading returns was instrumental in the overall viability of the project.

Brisbane City Council (Tom Caamano)

Brisbane City Council introduced a 1 Million Tree Project in 2007-08 with a view to carbon sequestration trading. The Council partnered with University of Queensland to calculate standing stock and carbon. The study found the financial returns were not enough to justify the project and

there were far more profound benefits of the program than just carbon. The biodiversity and social benefits of the project proved to be far more important. Additional benefits such as outdoor cooling in urban spaces and habitat corridors for Koala were identified as major benefits of the project. The 1 Million Tree Project became the 2 Million Tree Project. The project attracted a lot of in-kind support through land donations and the Council has entered into a number of land arrangements with state and private entities as part of the project.

The urban and peri-urban nature of Brisbane increased the costs of a purely carbon project with smaller discontinuous lots being revegetated, which increased the measurement and monitoring costs associated with a carbon trading project.

The Council is taking a wait and see approach to its carbon strategy and have established databases and monitoring regimes in order to activate the carbon trading component if and when it is politically and financially viable.

City of Sydney (Nik Midlam)

The City of Sydney has a target of being carbon neutral. To meet this objective it purchases carbon credits on the voluntary carbon market through CO2 Australia. Nik Midlam is head of Carbon Strategy at the Council and they have investigated the Council generating its own carbon credits through sequestration. The Council occupies an area of only 26 km^2 and is largely urban. Their carbon sequestration projects are on small lots that are generally discontinuous, thus increasing the costs of monitoring and measuring any "additional" planting within their area of operations. They are interested in the adaptation of a Canadian Carbon Accounting Tool currently being investigated in Melbourne. This tool may decrease the management and administration costs of pooled carbon lots and thus increase the rate of return on such stocks.

They have determined that until the carbon price is higher it is not economically feasible to trade their own revegetation projects. In addition they have noted that carbon sequestration is low on the list of values of importance. One of the key values of urban revegetation projects has been reductions in urban temperature due to shading. Another key focus is green rooves and the carbon sequestration returns on species appropriate for this type of planting is not currently financially viable. They will continue to have a "watching brief" on the market and determine when they might reinvestigate their trading options.

Forest NSW and Catchment Management Authorities in NSW (Nick Cameron)

In 2007 Forest NSW and seven CMAs from NSW conducted a pilot investigation to assess the viability of the CMA becoming "Pool Managers" under the NSW GGAS program and trading carbon on the mandatory market. The study determined that the small allotment nature and the tenure would increase measuring and monitoring required to achieve the natural resource management outcomes the CMAs were after making the trading financially unviable. A previous study by Forest NSW determined that the CMAs in NSW managed approximately $12m in carbon stock. However, the carbon stock consisted of many different species with understorey species included and work would need to be done to develop tested models of carbon predictions. This would add to the trading costs of the carbon and reduce returns. The pilot study found carbon would need to be at around $50/tonne for the returns to be viable.

Drawbacks and Benefits of Considering Funding for Urban Tree Programs separately to Climate Change Initiatives

Traditionally tree programs have been funded by governments throughout the world as a key environmental initiative. Over the last thirty years the emphasis has been towards native, biodiversity benefits and away from ornamental garden type tree plantings although clearly in some areas and contexts they still have their place particularly from a heritage perspective.

With the rise in popularity of Bushcare and Landcare over the last twenty years in Australia the biodiversity aspects have become a key "brand" to attract volunteers and community participation. This is one reason Councils have been slow to incorporate their existing tree programs under the umbrella of climate change. Another reason is the long tradition of this funding and the more recent urgency around climate change. The sector is, by its nature, conservative and there is understandable fear that if climate change imperatives are a fad the tree funding will also be impacted as other more urgent issues are addressed given the never ending competing demands on expenditure.

The counter to the above arguments is the rapidly expanding opportunities and funding sources associated with carbon sequestration and the urgent need to mitigate climate change. Climate change has been asserted as the most pressing moral and social issue of our time and with that comes policy changes and funding streams as federal and local moneys are made available to support the policy framework. The public have, by and large, come to accept the climate change argument and therefore expect governments to take action and communicate those actions. However, there is a strong trend not to confuse the message. Whilst people accept climate change is complex, from a transparency perspective it is always beneficial to keep the story "simple".

Another factor in this debate is the principle of additionality as it relates to carbon offset projects outlined above. To be eligible to claim carbon credits within the market system the work must be additional to a "business as usual" scenario which is often difficult to define. Are Bushcare and Landcare programs or rehabilitation works additional or accepted as "business as usual"? These are not easy questions to answer and perhaps a simple solution is to define "business as usual" as those programs funded from general revenue and additional works as those funded from alternative sources.

Recommendation

To manage the above drawbacks and benefits I recommend the most prudent approach is to adopt the "both" model. "Both" meaning: continue to pursue some tree programs as separate to climate change initiatives but incorporate others into climate change initiatives. In this way where a program has a strong tradition, a strong "brand" within the organisation and long term funding commitment and strong community participation it should continue under that program and be labelled the "business as usual". There is then a clear distinction between the work carried out with particular objectives that are separate to those of climate change, though they may incorporate climate change objects. If the community understand and identify with the exiting reasons for undertaking the activity then it would be confusing to alter the message. The most obvious program is the street tree program. This would generally be perceived by the community as a minimum tree program for any government. Street trees would be the hardest to include in any carbon offset program as the area is often relatively small and the percentage cover of canopy may not comply with the carbon offset

standards. It is therefore difficult to quantify its carbon sequestration value whether an organisation wishes to include it as a carbon credit or simply via its climate change response.

Any other works, however, would benefit from being incorporated into a climate change program because there are multiple environmental benefits associated with any revegetation program including carbon sequestration, biodiversity enhancement, water and air quality improvements, and temperature reductions and so on. Once these multiple values and benefits are communicated to the community the principle of adaptation and community resilience will play a factor in ongoing funding. Linking climate change commitment to trees has helped focus the message on climate change in Canada and enabled the community to participate in "doing something" for climate change increasing the communities long term ability for resilience. Rather than adopting the view that it is all too hard and what can I do to stop climate change from happening.

In addition the concept of multiple benefits increases the chances of leveraging funds through other government and or private mechanisms as the benefits to others are also enhanced. The drawback of not identifying the tree program in the climate change initiatives is that you will be limiting the funding sources for projects and not realising the leveraging potential outlined above. Identifying the project within ones climate change initiatives implies a certain level of measurement and monitoring to identify the exact benefits of the program in relation to climate change. This measurement and monitoring will then assist in prosecuting a case for funding from various sources. Without quantifying the benefits it is difficult to prove value for money.

References

Alternative Funding Programs and Resources Guide, 2003 http://www.sustainablecommunities.fcm.ca/files/Capacity_Building_-_PCP/FCM_funding_guide_FINAL.pdf.

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Andrew Campbell, 2007, 'Options for Catchment Management Authorities in the Carbon Market' Report for Victorian CMAs http://www.triplehelix.com.au/documents/CMAscarbontradingfinal_002.pdf

Clean Skies News (YouTube), 2010, 'The Future of Climate Change Funding' June 10 2010 http://www.youtube.com/watch?v=a7Hm5N--1eY

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Stern Review, 2006 On the Economics of Climate Change. Report to the Prime Minister of the United Kingdom. Annex 7.f Emissions from land-use change and forestry sector.

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A Brief Review of Papers by Dr C Brack and by the Department of Territory and Municipal Services relevant to population modelling of Canberra's Urban Trees.

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INTRODUCTION:

As part of the Reference Panel working under the Commissioner for Sustainability and the Environment (OCSE) investigating the Government's management practices and the renewal of Canberra's urban trees, I was asked to review the papers of Dr C Brack pertinent to Canberra's trees populations. I was also asked to review selected publications by the Department of Territory and Municipal Services (TAMS), Parks Conservation and Lands in relation to suggestions that up to two thirds of Canberra's urban trees would be expected to decline and require replacement over the next 10-25 years.

It should be noted that this is not intended to be a comprehensive scientific review of the papers by Dr Brack which have been though the process of scientific peer review by appropriately qualified reviewers, but rather a search for specific information in relation to the numbers of trees needing replacement in the short to medium term.

In relation to the TAMS publications the intention was to seek the data upon which the predictions of tree replacement were based and to test its validity in relation to the current status of Canberra's urban tree population.

Accordingly, I have reviewed the following publications:

J C Banks, C L Brack and James R N (1999) *Modelling Changes in Dimensions, Health Status and Arboricultural Implications for Urban Trees*. Urban Ecosystems **3**, 35-43

J C G Banks and C L Brack (2003) *Canberra's Urban Forest: Evolution and Planning for Future Landscapes.* Urban Forestry and Urban Greening **1**, 151-90

C L Brack (2006) *Updating Urban Forest Inventories: an Example of the DISMUT Model.* Urban Forestry and Urban Greening **5**, 189-94

I also had access to the following TAMS documents

Anon (2005) *Safe and Sustainable Trees for the Bush Capital. Urban Trees Asset Management Strategy 2005-2022*

Anon (2005/06) *Urban Trees Asset Management Plan 2005-2022.* Parks Conservation and lands

Banks J C G, Brack CL and James R N (2002) *Future Growth and Life Cycle Cost Modelling for Canberra's Public Tree Assets*. Consultancy support report to Canberra Parks and Places

Brack C and Merrit W (2005) *Quantifying the asset, economic, environmental and social values of Canberra's urban forest estate*. Consultancy support report to Canberra Parks and Places

Banks J C G, Brack CL and James R N (1998) *Canberra Urban Tree Management Survey of Urban Tree Assets*. Consultancy support report to Canberra Parks and Places

REVIEW of BRACK PAPERS;

Some of the papers describe a data management system, DISMUT (Decision Information System for Managing Urban Trees), while others simply use Microsoft Access to analyze data collected on Canberra's urban tree population.

The papers seem scientifically sound and are quite upfront about the assumptions used in the methodology and modeling. I would bring the following to your attention:

- the researchers have used a forestry approach to asset management by modifying plantation inventory systems for urban tree population management and future costs
- the papers use data based on groups rather than individual trees so the outcomes cannot be used for the management of a particular specimen. In short, it is not reasonable to apply the group condition to any particular trees
- in many places the authors work to a worse case scenario rather than an average, but is clear that this is the intent. However others may not appreciate that this is the case, and so could draw conclusions based on a worst case scenario rather than upon a real and existing situation
- the research uses data from street trees that is then generalized to park trees. This may be problematic if park trees are bigger or in better health than street trees as you might expect. However, the assumptions are made clear in the paper and do not seem unreasonable to the point where they might bias the results
- the system models height and tree condition and relates these to age
- the most recent paper, (Brack 2006), notes that predicted canopy development for smaller trees was less than models predicted. It also uses only two categories of tree condition - healthy and unhealthy, which is a rather imprecise instrument for categorizing tree condition. However it should be noted that this paper is presented as an update of earlier work and so the simplification of categories is not unreasonable. The description of an unhealthy trees as one …*with at least one prominent dead branch … or hollows or fungal fruiting bodies* …is questionable. It is possible that a healthy tree could contain all three and have a long useful life expectancy. A hollow may have no bearing on the health or safety of a tree, and so defining the heath or otherwise of a trees requires a broader and more relevant range of criteria properly applied by people with appropriate arboricultural expertise
- the Brack(2006) paper also notes that by 2020, *the majority of the trees in Canberra would reach a height in excess of 15 m, which means that crown maintenance work after this date will become more expensive as different machinery would be required.* This may or may not be the case depending on the work being undertaken. It may be the case if all work was based on access by elevated platform. However, it is fair to say that the taller

the tree and the larger its canopy the more expensive most crown maintenance operations are likely to be

- height and age are related to current maintenance costs and this allows predictions of likely future cost trends and the subsequent development of urban tree management strategies
- the papers apply a concept of safe life, which is linked to age. This could be tested to see if the estimates of age and life expectancy have proved accurate. Have the estimates of life expectancy stood over the extended period of below average rainfall? Has the better rainfall over the past few years improved tree condition and perhaps extended the life expectancy predictions?
- none of the papers considers changed management regimes or their impact on tree condition, growth rates or life expectancies. The use of mulch or supplementary irrigation could improve tree condition and extend life expectancy. However, neither is considered in the papers, nor are soil conditions, and the papers do not purport to deal with this aspect of urban trees
- the concept of safe life is widely used but can be debated in terms of what is actually meant. In these papers it is pretty clear that it means safe in a public place in terms of risk hazard and targets

REVIEW of TAMS DOCUMENTS;

Turning attention to the documents that were provided by TAMS, the following were available for review:

Anon (2005) *Safe and Sustainable Trees for the Bush Capital. Urban Trees Asset Management Strategy 2005-2022.* Parks Conservation and Lands, Territory and Municipal Services

Anon (2005/06) *Urban Trees Asset Managemant Plan 2005-2022.* Parks Conservation and Lands, Territory and Municipal Services

Banks J C G, Brack CL and James R N (2002) *Future Growth and Life Cycle Cost Modelling for Canberra's Public Tree Assets*. Consultancy support report to Canberra Parks and Places

Brack C and Merrit W (2005) *Quantifying the asset, economic, environmental and social values of Canberra's urban forest estate*. Consultancy support report to Canberra Parks and Places

Banks J C G, Brack CL and James R N (1998) *Canberra Urban Tree Management Survey of Urban Tree Assets*. Consultancy support report to Canberra Parks and Places

The consultancy reports are cited in the TAMS Asset management plans and are used to support components of the plans. It is to be noted that many of these documents relate to the budget and resource implications of managing an ageing urban tree population. These aspects of tree management are not the concern of this brief report which focuses on tree removal predictions:

- The document, Anon 2005 (Parks, Conservation and Lands), asserts based on an ANU consultancy (Banks J C G, Brack CL and James R N (2002) Future Growth and Life Cycle Cost Modelling for Canberra's Public Tree Assets) *that…large numbers of these*

trees are at the end of their safe life and are in serious decline… (page 4). This is probably a reasonable statement given the nature of the document, but is vague and without substantiating data.

- this document covers some 600,000 trees – 212,000 street trees, 236,000 park trees and 178,000 trees in road reserves and other open spaces (626,000 trees in total). These numbers are based on another consultancy report – Banks J C G, Brack CL and James R N (1998) Canberra Urban Tree Management Survey of Urban Tree Assets (page 5).
- Anon 2005 (Parks, Conservation and Lands) also values the tree population at $1.1 billion or some $3,100 per tree. It also estimates some $15 million of environmental benefits per annum from the tree population based on a third consultancy - Brack C and Merrit W (2005) Quantifying the asset, economic, environmental and social values of Canberra's urban forest estate (page 5). While the $1.1 billion seems a high figure, I think it could be argued that it is a considerable underestimate
- Figure 1 in Anon 2005 (Parks, Conservation and Lands) titled, *The age class distribution of Canberra's ageing trees* is of interest. From the data presented, it may be inferred that some 293,000 trees (of Canberra's 1 million or the 600,000 managed by TAMS) may need to be replaced over a period of 10-20 years. However, this has to be deduced from the figure and there is no interpretation from the Brack reports to support such a deduction. It assumes tree removal based on deteriorating tree condition classes and the increased maintenance costs associated with managing trees as they age and deteriorate in condition
- It is possible that there may be some confusion in the interpretation of data in this document. The Brack reference to 30,000 trees deteriorating in condition class and thus requiring inspection and maintenance does not mean their removal. Indeed, as the author notes, some trees will not require any maintenance and others may require a routine deadwooding. This number may have both management and resource implications, but if done should result in improved tree condition and a delayed need for tree replacement
- Anon (2005/06, Parks, Conservation and Lands) is a very useful and interesting document it contains the same graph (Figure 6) as Figure 1 in the Anon 2005 (Parks, Conservation and Lands) report and the comments made above in relation to this figure are relevant to this document
- The Banks J C G, Brack CL and James R N (2002) report which is a very useful and data rich report, notes that about 30,000 trees per year will deteriorate one condition class if nothing is done to maintain them in better condition.
- This report also models using a safe age of 50 years for native species and 75 for exotic species, which is well explained in the report, but it does not mean that safe ages may be greater than those assumed
- In the latter parts of the report models restricted maintenance and replacement scenarios of between 250 and 1500 trees per year, and notes that it anticipates significant public resistance to the replacement programs
- The report by Brack C and Merrit W (2005) is an economic and asset based document which again has real merit as it places a value on urban vegetation. However it does not directly address the issue of tree replacement in Canberra's urban forest other than to mention a replacement figure of 6,000 trees per annum under the normal forest scenario described in the Banks, Brack and James 2002 report
- The Banks J C G, Brack CL and James R N (1998) while containing some interesting base data does not address tree replacement

DISCUSSION
Brack papers:

It is of interest that in none of the papers by Dr Brack to which I have had access is there a figure about the number of trees that will need to be replaced over a specified time frame. Indeed this is not part of the focus of the papers which are more about growth parameters and future management implications as trees increase in size and age.

Overall I think the papers by Dr Brack are unbiased and useful. It is a reasonable and data-based approach to tree management on a population scale. The papers take an urban forestry rather than arboricultural (see explanatory note at the end of this paper) approach to managing urban tree populations and so the use of modified forestry modeling techniques and methods would seem both reasonable and justified.

TAMS documents:

The two TAMS, Parks, Conservation and Lands, documents are of considerable value in managing an urban tree population. Anon 2005/06 (Parks, Conservation and Lands) has valuable data that is highly relevant to the strategic management of an urban tree population. However, neither of the documents report numbers of trees that need to be replaced over a specific time period. The only way in which I could deduce such a number was by reference to tree age class distributions and only then by inference as mentioned in the discussion of Figure 1 Anon 2005, (Parks, Conservation and lands).

The reports that support the various consultancies are of good quality and are data rich. They would prove very valuable in developing strategic management, however none of them make reference to high tree replacement scenarios. The Anon 2005 (Parks, Conservation and Lands) report notes that tree condition was worse than predicted probably due to the prolonged drought and the Brack papers noted that tree health had been over-estimated when the 2003 data were revisited in an update in 2006. Again the drought was suggested as a possible cause.

In the pursuit of the source of a figure that between one and two thirds of Canberra's urban trees would need replacement over the next 20 years, I could not find any direct reference to such a scenario in any of the documents reviewed. However, I could deduce it from Figure 1 Anon 2005. Such a deduction, however, assumes a worse-case scenario, and that no management action is taken to improve tree condition. The Brack papers make it clear that even simple management interventions, such as pruning and dead branch removal, which are likely to be undertaken as routine would improve tree condition. In short the worst case scenario is unlikely to unfold.

Consequently, I do not think one third or more of Canberra's urban tree population is in need of imminent replacement if it is well managed and appropriate maintenance is carried out following tree assessments.

POSSIBLE REFERENCE PANEL ACTION

If the opportunity arises I would recommend that Dr Brack be asked the following questions:

- Is the TAMS paper a reasonable interpretation of the data?
- Do the estimates related to age, tree condition and tree removal stand the test of time? Often arborists give a 10-20 year estimate of safe life, but 10 years (or even 20 years) later they give the same estimate.
- It may be worth grounding the data by asking Dr Bracks if he is prepared to revisit some of his estimates and subsequent predictions.

EXPLANATORY NOTE

ARBORICULTURE AND URBAN FORESTRY: A MATTER OF SEMANTICS?

It is interesting that at present the phrase *urban forestry* is often used as a synonym for *arboriculture*. However, the terms do have different meanings and while the semantics may not be of interest to urban tree managers, the consequences for tree management and urban tree populations might be. It should be remembered that in Australia arboriculture and urban forestry come from different traditions that are underpinned by different, and sometimes conflicting, philosophies. Urban forestry comes from a forestry tradition of managing groups of trees for their production values, while arboriculture comes from a horticultural tradition that focuses on a tree as a specimen.

Both approaches have value and application in the management of urban trees, however, there is a need for a word of caution about the use of the term “urban forestry” in relation to urban trees. In focusing on the urban forest it is easy for the importance of the individual specimen to be minimized and undervalued, which could see the removal of individual trees as long as the forest is maintained. Clearly neglecting the removal of single trees could see the forest as a whole reduced as a consequence, but the arboricultural focus on the specimen ensures that the forest is undiminished.

While this paper is not the place for a lengthy discussion of the differences in the philosophies supporting *arboriculture* and *urban forestry*, it is worth remembering that they can lead to quite different outcomes in urban tree management. Both have their place and application, and at present they often aspire to the same goals in the face of climate change and urban development. However, the terms should be applied knowledgeably and in the appropriate environmental context.

Extract from:

Moore G M (2009) *Urban Trees: Worth More Than They Cost* Lawry D, J Gardner and S Smith Editors, Proceedings of the Tenth National Street Tree Symposium, 7-14, University of Adelaide/Waite Arboretum, Adelaide, ISBN 978-0-9805572-2-0

Office of the Commissioner for Sustainability and the Environment

Investigation into the Government's tree management practices and the renewal of Canberra's urban forest

Interim report on street and park tree removals undertaken by the Department of Territory and Municipal Services (TAMS) under classification of 'dangerous' and 'hazardous' trees

16 April 2010

Dr Maxine Cooper
Commissioner for Sustainability and the Environment

This Office is independent of, but funded by, the ACT Government.

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Summary of Recommendations

Seven recommendations have been made in this interim report in the *Investigation into the Government's tree management practices and the renewal of Canberra's urban forest*. Recommendations 1 to 5 are recommended for immediate implementation. Recommendations 1, 3, 4 and 5 have been crafted to assist the Department of Territory and Municipal Services (TAMS) progress the tree removal tender called on 6 March 2010 and yet to be finalised.

While Recommendation 2 affects the city wide tree assessment survey / audit, which has recently commenced, the suggested collection of information recommended is valuable and should therefore be captured.

Recommendation 6 and 7 are presented as they are considered important in assisting TAMS better manage trees and these could be implemented while the Tree Investigation continues.

All recommendations are presented as part of this interim report on particular matters and are subject to further consideration and development as part of the final report on the Tree Investigation by the Commissioner for Sustainability and the Environment, due 30 June 2010.

Recommendation 1

It is recommended that a tree replacement policy for streets and parks be developed and adopted by TAMS.

Such a policy could simply be a commitment to replanting when a tree (or group of trees) is removed unless circumstances prohibit. It should be supported by information regarding the timing of replacement planting (this maybe in the next planting season and not necessarily immediately), species selection criteria, maintenance and irrigation regime, opportunities for the involvement of adjoining residents; and the circumstances when a replanting will not be undertaken. These circumstances may include space limitations, solar access, species availability, or objections of the resident(s) that immediately abuts a proposed replanting.

Currently when a tree is removed residents are asked if they want a tree replanted; however, the default position of TAMS should be to plant a tree unless circumstances prohibit.

Recommendation 2

It is recommended that the city wide tree condition audit, currently being undertaken by TAMS, identify opportunities for tree planting where 'gaps' exist and that tree planting occurs in these 'gaps', unless circumstances prohibit.

Recommendation 3

It is recommended that the terms '*dangerous*' *and* '*hazardous*' not be used to describe a category of trees and that there be a focus on distinguishing when a tree needs to be removed under 'urgent circumstances' versus general tree removal.

The term 'dangerous' could be captured under 'Tree Removal (Urgent Circumstances)', with a definition such as *a tree (or group of trees) assessed as presenting an imminent threat to the health or safety of people and / or public or private property. Such a tree (or group of trees) would require removal as a matter of urgency and should be removed within 48 hours or sooner from the time TAMS made the decision to remove it, under normal circumstances.* Normal circumstances would exclude, for example, major storms or fires.

'Hazardous' tree removal could be captured under the general term 'Tree Removal' with the reasons for the removal being stated as part of the communication process.

Recommendation 4

It is recommended that TAMS tree removal technical and administrative policies and procedures be strengthened by the following.

- **TAMS undertaking a sample audit of trees that consultants recommend for removal. This audit should be undertaken on-site by a qualified and experienced tree assessment officer from within TAMS. This audit should be documented.**
- **A senior manager being held accountable for the final decision for non-urgent tree removal of:**
  - **'green'[1] trees;**
  - **trees in heritage precincts;**
  - **dead trees in parks, which are of potential value as a habitat tree;[2] or**
  - **trees on the ACT Tree Register.**
- **Allowing a resident or public member with respect to non-urgent tree removal, the opportunity to request that an Executive Officer undertake an internal reconsideration of a decision. The Executive Officer should give their decision in writing with reasons.** A resident could be given 14 days to lodge a request for reconsideration, following the announcement of the tree removal. The Executive Officer should be given a limited time to respond, this could be 14 days from receipt of the request. The tree should not be removed during this time unless conditions changed and the removal was under urgent circumstances.
- **TAMS undertaking a sample audit of removed trees to validate visual tree assessments and inform future assessments.**
- **Markings on trees for assisting TAMS staff or contractors to locate trees being discrete with information communicating a tree removal occurring via a communication procedure and not by the prominence of a marking.**
- **Publishing the policies and procedures on the TAMS website as soon as possible and keeping them up to date with future changes.**

Recommendation 5

It is recommended that the TAMS tree (or group of trees) removal (and replacement) communication process be strengthened by the following.

- **A tree assessment being made available to a resident or member of the community on request.**
  It is not recommended that such assessments be routinely given to residents as part of the notified process.

[1] A 'green' tree is one that is living.
[2] Dead trees on streets are not considered appropriate for retention as habitat trees due to public safety issues.

- **Adopting as a minimum the following notification.**
  - ***Tree Removal (Urgent-Circumstances) – Street Tree***
    A standard notification letter/card delivered to the closest three residences on both sides of the street before or soon after the removal, i.e. the property adjacent to the verge where the tree will be removed, the two properties either side of this one and the three properties opposite.
  - ***Tree Removal (Urgent-Circumstances) – Park Tree***
    A sign erected in the park before or soon after the removal.
  - ***Tree Removal – Street Tree***
    A standard notification letter/card delivered to the closest three residences on both sides of the street prior to the removal, i.e. the property adjacent to the verge where the tree will be removed, the two properties either side of this one and the three properties opposite.

    If the street tree (or group of trees) has a high-profile (e.g. a large tree that makes a major contribution to the landscape) or if there will be a substantial change due to the removal of several trees, a sign should also be placed on a tree (or group of trees), at the same time the notification letter/card is sent.
  - ***Tree Removal – Park Tree***
    A sign placed on the tree in a position where it will be obvious to park users. In situations where several trees will be removed in a park, it might be necessary to consider placing a sign at the entrance to the park in addition to where the trees to be removed are located.

- **Including in a Tree Notification letter/card or on a Tree Notification sign for trees removed or to be removed, as a minimum information which:**
  - makes it obvious that the letter/card or sign is official;
  - states that the tree assessment was undertaken by a qualified tree assessor;
  - gives the reasons why the tree is to be removed or was removed;
  - states that the policy is for a replacement planting unless circumstances prohibit;
  - provides a contact number where further information can be gained; and,
  - gives the specific and direct website address for the policy and procedures covering the subject tree activities.

In the notification letter/card to the nearest resident, the assistance of the resident in watering a replacement tree should be sought. Consideration could also be given to allowing an individual resident the option that if they do not want a tree replacement they can contact TAMS to give this view. TAMS would then need to assess the situation and make a final decision.

Recommendation 6

It is recommended that TAMS tree assessors have an Australian Qualifications Framework (AQF) Level 5 or Certificate 5 in Arboriculture or Horticulture with 5 years experience or proven equivalent skills.

Recommendation 7

It is recommended that the TAMS tree assessment form be modified to include information relating to:

- retaining a tree, or part of a tree in a park, for habitat; and
- replanting options.

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1 Introduction

On 3 December 2009, Mr Simon Corbell MLA, Minister for the Environment, Climate Change and Water, directed the Commissioner for Sustainability and the Environment, Dr Maxine Cooper to undertake an *Investigation into the Government's tree management practices and the renewal of Canberra's urban forest.*[3] This is referred to as the Tree Investigation. Information for the Tree Investigation has been gathered from public submissions, two community forums, a specialist forum on birds, and consultations with members of the community and organisation with expertise relevant to the topic.

While the Commissioner is due to complete the Tree Investigation by 30 June 2010, on 24 February 2010, Mr Jon Stanhope MLA, ACT Chief Minister, wrote to Dr Cooper requesting "*early advice on the Government's Dead and Hazardous Tree Removal Program.*"[4]

It is understood that during the course of the Tree Investigation the Department of Territory and Municipal Services (TAMS) has been, and will continue, to manage trees in public streets and parks to protect public safety. To this end, TAMS called a tender on 6 March 2010 for a "Panel arrangement for urban tree removal projects on behalf of Territory and Municipal Services."[5] It is understood that this tender is primarily to facilitate the removal of 'dead' and 'hazardous' trees. This interim report is provided in response to the Minister's request and therefore provides recommendations to assist TAMS manage 'dead', 'dangerous' and 'hazardous' trees, including those that will be removed under the tender called on 6 March 2010.

TAMS is the agency responsible for the management of trees in public streets and parks, which are the responsibility of the ACT Government. According to TAMS website[6] "*Parks, Conservation and Lands (PCL) is responsible for the management and maintenance of trees growing on unleased urban Territory Land, including suburban street and major road nature strips and medians, and in parks and landscaped open spaces in Canberra. Well developed maintenance programs for public trees are important for maintaining tree health and ensuring that public safety is not compromised. The objectives of the urban tree management are to enhance the landscape setting for the city, to maintain a safe and sustainable urban forest and to conserve the natural environment. Management responsibility includes:*

- *ensuring trees in high use urban areas are regularly inspected for hazards that could pose a risk to public safety;*
- *ensuring trees are routinely pruned with the aim of protecting public utilities, enhancing public safety and urban amenity, and improving or maintaining tree health;*

[3] Letter from Mr Simon Corbell MLA to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 3/12/2009.
[4] Letter from Mr Jon Stanhope MLA to Dr Maxine Cooper, Commissioner for Sustainability and the Environment, 24/2/2010.
[5] ACT Government Request for Tender No. 11628.110.
[6] Management of trees on public land, website, accessed 25/3/2010, http://www.tams.act.gov.au/play/parks_conservation_and_lands/parks_reserves_and_open_places/trees_and_forests/trees/tree_policy.

- *carrying out major tree surgery work as required*
- *carrying out remedial tree surgery and the removal of fallen or broken timber following storm events;*
- *ensuring dead and dying or 'dangerous' trees are removed and replaced with tree species that give expression to the original landscape design intent; and*
- *ensuring groups of trees, including urban plantations are thinned and pruned to reduce the risk of fire and to improve tree health.*"

The removal of 'dead', 'dangerous' and 'hazardous' trees around Canberra appears to be based on internal TAMS policies and procedures with consideration of the common law, in particular the tort of negligence. These trees are not managed under one piece of legislation that deals specifically with the removal of defined 'dead', 'dangerous' and 'hazardous' trees or for example under risk assessment legislation. This is similar to most other jurisdictions, which rely on policy and procedures developed under their local government act.

The policies and procedures that guide removal of trees on public streets and in public parks appear to have been developed under the Territory governance framework based on the powers of the Territory under the *Australian Capital Territory (Self Government) Act, 1988.*

TAMS policy for removing trees that are assessed as 'dead', 'dangerous' and 'hazardous' is presented in Table 1.

Table 1: TAMS Policy for Removing 'Dangerous' and 'Hazardous' Trees[7]

Category	Risk level	Timing for removal	Removed by (generally)	Identified by
Dangerous	**High concern** Criteria includes: • high use area; • species known to fail without warning; • severe/ structural defects, • size of the tree.	Removed within 48 hours after assessment	In-house	Resident or Tree Operations Teams whilst undertaking routine works.[#]
Dangerous	**Storm event** Criteria includes: • high use area – house, school or near a road • severe/ structural defects, • size of the tree.	Removed within 7 days after assessment depending on numbers. Hazardous pruning and removal to make safe undertaken on a priority basis	In-house	Resident
Hazardous	Medium term action needed. Criteria includes: • Frequently used area. • Failure potential of the species,	Programmed for removal within a period of months (3-6). Condition assessment notes defects, evidence of	Usually Contracted	Resident or Tree Operations Teams whilst undertaking routine

[7] Removal process of dead and hazardous trees, received from Russell Watkinson, Director Parks, Conservation and lands, 25/3/2010.

Category	Risk level	Timing for removal	Removed by (generally)	Identified by
	• Maintenance history (if available) • Risk potential – what might be hit , • Landscape importance • Structural deficiencies • Useful life expectancy.	rot, structural deficiencies, habitat value		works.[#]
Dead	No visible sign of life	Tree may be hazardous, dangerous, or not of immediate risk. The amenity of the area may be compromised by having dead trees.	Contractor or in house depending on the risk the tree poses (as per dangerous/ hazardous.	Resident and/or Tree Operations Teams.[#]

[#] The Office of the Commissioner for Sustainability and the Environment (OCSE) understands that consultants undertaking tree assessments would also identify 'dead', 'dangerous' and 'hazardous' trees.

If a tree (dead or 'green'[8]) is assessed as 'dangerous' (see Table 1), TAMS removes it as a matter of urgency and within 48 hours; and if a tree is considered to be 'hazardous' (see Table 1), it is programmed for removal, the timing of which is dependent on the level of risk it presents. 'Dead' trees may be 'dangerous' or 'hazardous'.

TAMS has been working on implementing changes to its tree removal practices since October 2009 in response to community reaction regarding trees in Captain Cook Crescent, Manuka. Consequently changes have been occurring since the commencement this Tree Investigation in December 2009. Section 3 of this interim report considers the technical, administrative and communication aspects of TAMS processes post-December 2009. The pre-December 2009 process used by TAMS with respect to 'dangerous' (urgent circumstances) trees is in Appendix A; and for 'hazardous' tree removal the process is outlined in Appendix B. A comparison of these processes with the current process used by TAMS indicates that TAMS is changing its practices.

2 Background

2.1 Legal and Policy Framework in Relation to 'Dead', 'Dangerous' and 'Hazardous' Tree Removals

The *Tree Protection Act 2005* and the *Nature Conservation Act 1980* cover, the day to day and the longer-term management of trees within the ACT. However, neither Act has been drafted in language specific to the removal of 'dead', 'dangerous' or 'hazardous' trees on unleased urban territory land. Furthermore, neither Act includes definitions of a 'dead', 'dangerous' or 'hazardous' tree.

[8] A 'green' tree is one that is living.

2.1.1 The Tree Protection Act 2005

Trees on unleased land for example nature strips/verges, plantations, reserves, public parks and land designated for future urban development are generally not covered by the *Tree Protection Act 2005* unless they are so significant that they fall under the definition of a 'registered' tree, that is as an individual tree, registered (by the Conservator of Flora and Fauna) on the ACT Tree Register.

Section 29 of the Act covers approval to undertake a tree damaging activity in relation to a protected tree or undertake groundwork in relation to the protection zone for a protected tree or a declared site, in *urgent circumstances* or for minor work provides that the Conservator may approve the activity if satisfied that the circumstances require the application to be considered urgently and the activity is necessary to protect the health or safety of people or animals, or public or private property.

The *Tree Protection Act 2005* includes provision for the protection of trees of heritage significance in built-up urban areas. For trees of heritage significance, it provides for the ACT Heritage Council to be told about approved activities, tree management plans and provisional registration under that Act. It also provides for the ACT Heritage Council's advice to be taken into account in deciding whether to register a tree of heritage significance under that Act.

2.1.2 The Nature Conservation Act 1980

The *Nature Conservation Act 1980* is an "Act to make provision for the preservation of native animals and native plants and for the reservation of areas for those purposes". Part 8 of the Act covers reserved areas (reserved area is defined as an area of public land reserved under the Territory plan as a wilderness area, national park or nature reserve) this part includes offences of clearing native vegetation in reserved areas. Accordingly this part of the legislation is not relevant to 'dead,' 'dangerous,' or 'hazardous' trees.

While the Act does not define 'dead', 'dangerous' or 'hazardous' trees, section 52 of the *Nature Conservation Act 1980* (preservation of native timber) does include an offence provision in relation to the removal of standing native timber, it reads "A person shall not, without reasonable excuse—(a) fell, or cause to be felled; or (b) damage, or cause to be damaged; standing native timber on unleased land in the built-up area, or leased or unleased land outside the built-up area, except in accordance with a licence." However, section 52 (5) of the NCA provides that subsections 52 (1) and (3) do not apply in relation to the felling, removal or damage of native timber if it is done by a conservation officer, or a public servant, in the exercise of his or her functions. Accordingly, if the public servant is able to prove that removal of 'dead', 'dangerous' and 'hazardous' native trees is in exercise of his or her functions, a licence to do so will not be necessary and nor will an offence be committed. This would include employees of TAMS whose duties include the removal of dead or dying nature strip native trees. Section 52(5) of the *Nature Conservation Act 1980* also exempts the felling, removal or damage of native timber with the authority of the Conservator. This would allow the removal of dead or dying nature strip trees by contractors if authorised by the Conservator. Alternatively, they would need a licence. It is not clear whether PCL has secured authorisation or a licence from the Conservator. This issue will be further considered in the context of the final report.

The definition of built up area under *The Nature Conservation Act 1980* is linked to the definition of built up area under the *Emergencies Act 2004* and the *Emergencies (Built-up Area) Declaration 2006*. This Declaration covers any area which is, within the terms of the *Territory Plan* is subject to a planning policy (rather than a specific planning zone).

2.1.3 Other Legislation

The *Planning and Development Act 2007* covers the management of trees within the Territory's planning and development context.

Other pieces of legislation *The Heritage Act 2004, Roads and Public Places Act 1937, Trespass on Territory Land Act 1932, Utilities Act 2000, Emergencies Act 2004, and Environment Protection and Biodiversity Conservation Act 1998* cover (in part) the management and the removal of trees within the Territory in certain circumstances. Their scope does not include the removal of 'dead' 'dangerous' trees or 'hazardous' trees by TAMS. They include circumstances in which the protection or removal of vegetation including trees, can be undertaken (in specified circumstances) by other agencies, non-government parties, or individuals when directed. They are noted here for the sake of completeness and will be considered further where relevant in the broader context of the Tree Investigation and the Final Report.

2.2 Practices in Other Jurisdictions

2.2.1 Tree Management Practices

Four Councils in Australia were contacted by the Office of the Commissioner for Sustainability and the Environment (OCSE) regarding tree management for 'dead', 'dangerous' and 'hazardous' trees:

- Brisbane City Council;[9]
- City of Sydney;[10]
- City of Melbourne;[11] and
- Hume City Council.[12]

These four councils manage trees according to the size of their tree population and available resources. While management activities vary between different jurisdictions, there are some principles and practices that are common to all Councils.

[9] Phone conversations with Brisbane City Council (Lyndal Plant) – 23/2/2010 and 23/3/2010; emails dated 25/2/2010 and 18/3/2010.
[10] Phone conversations with City of Sydney (Karen Sweeney) – 23/2/2010 and 23/3/2010.
[11] Phone conversation with City of Melbourne (Ian Shears) – 23/3/2010.
[12] Phone conversations with Hume City Council (Jason Summers) – 23/2/2010 and 18/3/2010; email dated 18/3/2010.

2.2.1.1 Number of trees managed/removed

Brisbane City Council estimates that it manages 543,000 street trees along 4,500km of roads and an unknown number of park trees living in 2,000 separate pieces of parkland. In 2008/2009 approximately 3,900 trees (approximately 0.7% of the total trees managed) were removed and it is estimated that 3% of these were immediately dangerous or emergency removals. Brisbane City Council currently receives about 1,500 service requests related to trees per month; Council is committed to meeting its customer service standards, and divides its resources between works which are proactive and those which are reactive to customer requests and unexpected events. Currently 60% of works are reactive with 40% proactive; Council's goal is to be 80% proactive with its maintenance activities.

The City of Sydney manages 28,000 street trees and 20,000 park trees. Approximately 450 street trees and 150 park trees are removed annually (approximately 1.3% of the total trees managed). Between 1000 and 2000 street trees are planted each year (the number of trees planted in parks is not known). City of Sydney inspects and if required prunes 100% of its tree population each year; some high-profile trees are inspected and maintained on a six month cycle.

The City of Melbourne maintains 63,000 trees in streets and parks. Annual tree removals previously averaged approximately 700 per year (approximately 1% of the total trees managed). In recent years this has increased to 2000 per year, which is primarily attributed to the stress associated with the ongoing drought. The City of Melbourne inspects and undertakes required maintenance on 100% of their trees on a one or two year cycle depending on the prominence of the trees.

Hume City Council, located within the northern growth corridor of Melbourne, manages approximately 138,000 trees in streets and parks. Approximately 4,000 trees are removed annually (approximately 3% of the trees managed), with 10-15% of these being emergency/urgent removals or storm damage. Hume City Council currently plant between 3,000 and 5,000 trees per year (they are running out of vacant sites) and receive a further 10,000 trees for developments in new suburbs. The annual recurrent arboriculture budget is increased by $19.20 per new tree, which is the cost of maintaining a tree by this Council. Approximately 400 service requests for trees are received per month, and 25% of Hume City Council trees are inspected annually, which generates proactive works for the service crews.

By comparison, TAMS manages approximately 630,000 urban trees, 430,000 of which are in streets and mown parks[13]. In the last six years, TAMS has removed 18,500 'dead', 'dangerous' and 'hazardous' trees (assuming 3,083 are removed per year this is approximately 0.5% of street and park trees managed by TAMS). The overall total number of trees removed by TAMS is unknown at this time. The TAMS street and park tree management budget of $7M[14] equates to $11.11 per tree (based on a tree population of 630,000). Subsequent to the presentation where the $7M was presented, TAMS has advised that this figure included the recurrent tree management budget and initiative

[13] Presentation by Fleur Flanery (TAMS) at a community meeting organised by the Office of the Commissioner for Sustainability and the Environment, Manuka Oval, Monday 15 February 2010.
[14] Presentation by Fleur Flanery (TAMS) at a community meeting organised by the Office of the Commissioner for Sustainability and the Environment, Manuka Oval, Monday 15 February 2010.

funding from the Urban Forest Renewal Program, and that $2M of the initiative funding has been withheld during the Tree Investigation with some actions not being progressed[15]. Currently TAMS receives approximately 500 service enquires a month relating to trees. TAMS tree management has historically been opportunistic and reactive, as until recently there was no systematic citywide tree survey/audit assessment (what Brisbane City Council refers to as 'proactive'). However, in the last year work has commenced on developing such a system and the tree condition audit is underway and expected to be complete by June 2010.[16]

While comparisons with the four jurisdictions considered are difficult due to different data, it does appear that in terms of total percentage of street and park trees managed that TAMS has removed fewer street and park trees than these jurisdictions.

In terms of street and park tree population Brisbane City Council appears to have the greatest similarity with the ACT.

2.2.1.2 Urgent tree removal

All of the four Councils contacted, immediately remove trees that present an imminent threat to persons or property. While Hume City Council policy allows 7 days for emergency tree removal; in practice they remove the trees the same day and have crews on call for after hours work if required. In all four Councils, where possible, adjacent residents are notified at the time of the removal, if no one is home, a calling card/letter is left to indicate why the tree was removed.

The current process used by TAMS for urgent tree removal is outlined in Section 3. In general, TAMS also immediately removes a dangerous tree which is considered to be an imminent threat to persons or property.

2.2.1.3 Tree removal (non-urgent)

In all the four Councils contacted, trees were removed for a variety of reasons, including when their condition indicated that there was a high risk, when there was potential damage to infrastructure, or to accommodate development. Ms Lyndal Plant from Brisbane City Council indicated that the "key is to communicate and notify people as soon as the decision is made to remove the tree". Brisbane City Council only places a sign on a tree when it is 'highly significant'; otherwise a calling card (Attachment 1) is placed in the letterbox of the adjacent resident, residents on either side of the adjacent resident, and the equivalent properties on the opposite side of the road. The local Councillor is also informed and given a spreadsheet of the trees to be removed, and given three weeks to respond. Letterbox dropping is generally not done for the removal trees in parks; however, a sign (Attachment 2) is placed on the tree and a list of trees to be removed is sent to the local Councillor.

[15] Personal communication, Fleur Flanery, TAMS, 16/4/2010.
[16] Personal communication, Fleur Flanery, TAMS, 15/4/2010.

Brisbane City Council marks a tree to be removed with a small blue 'R' and they have a formalised notification procedure including allowing three weeks for objections. Any objection to a proposed tree removal, or a refused tree removal request, has any escalation process as part of their tree removal and replacement procedure (Attachment 3). If a senior officer thought that a declining tree could be kept longer in a safe, useful form, then the original decision to remove the tree could be reconsidered.

The City of Sydney places a sign on trees to be removed. Standard signs are used in some cases, but often a custom 'temporary' sign is prepared with the wording 'The City of Sydney intends to remove and replace this tree…' and then goes on to list the replacement species, timeframe and photos of the replacement species. For prominent sites the City of Sydney may letterbox drop residences within 25-50m distance of the tree. The removal of significant registered trees would require additional measures including the preparation of an independent report on the tree and letterbox dropping of residences within 100m distance of the tree. The Director is required to approve the removal of healthy trees, that is, those that are not being removed due to poor health or structure. For the removal of trees in parks, a sign is placed on the tree and at the entrance to the park. The City of Sydney tries to remove trees in a contracted job lot prior to commencement of the planting season to reduce the time between removal and replanting. A discreet blue dot is occasionally placed on the base of the tree (never a cross), but in most circumstances the contractors have the GPS location of the tree and a portable computer to locate the tree to be removed.

The City of Melbourne has no minimum notification standards regarding removing trees, but determines communication requirements on a case-by-case basis. Communication methods employed will include on-site signage and letterbox drops. If trees are on the Heritage Register then the Heritage Council is notified.

Hume City Council has a policy that emergency tree works are undertaken in 7 days, high priority works in 4 weeks and normal works in 8 weeks. Where a tree is proposed for removal in the verge at the front of a property, a 'tick-box' calling card is placed in the letterbox. The resident has 5 days in which to respond. Hume City Council argues that the expertise of the arborist making the removal decision should not be questioned assuming that they have a minimum Level 5 certification qualification.

None of the four Councils provided individual tree assessment information to residents, and considered this would be too onerous.

The process used by TAMS for tree removal (non-urgent) is outlined in Section 3.

2.2.1.4 Replacement Tree Planting

Replacement tree planting by Councils is instigated by various practices. Brisbane City Council initiates most replacement planting and the resident is advised via a Street Tree Service Notice (Attachment 1) 2-3 weeks prior to the planting. Residents are provided with general information and specific species are not mentioned. The Local Councillor will be notified 1 month in advance of tree planting. If the adjacent resident objects to the planting, then Council will generally not pursue it. Brisbane City Council aims to achieve 50% shade coverage from trees on its paths.[17]

[17] Personal communication, Lyndal Plant, Brisbane City Council, 8/4/2010.

Brisbane City Council has a funded post-planting tree establishment program; this includes for standard trees a 12-month period with 22 visits for watering, mulching, weed control, pruning or replacement if necessary. A juvenile maintenance visit is undertaken at 3-4 years. For larger plant stock, a 24-month establishment program is used. Residents adjacent to a replacement tree will be asked to assist in watering the tree, if they can.

The City of Sydney uses its list of trees removed to generate a seasonal planting list. When removal notification signs are placed on trees, they will often list the species that the removed tree will be replaced with and indicate the timeframe for the works. The establishment program for City of Sydney is not known at this time.

The City of Melbourne aims to replace each tree removed with another tree. Tree planting in parks is often a matter of trying to find suitable space between the existing tree crowns. For planting replacement trees in residential streets, if the City of Melbourne is satisfied with the location of the tree and the species, then a replacement tree will used to match the existing. If a redesign of the whole street is required then replanting might not occur in the short-term. When redesigning a street the City of Melbourne might send letters (Attachment 4) to all residents asking them to choose from a selection of 3-4 appropriate species, with the majority vote determining the species to be planted.

When Hume City Council assesses a tree for removal they determine if it is appropriate to replace the tree, and if 'yes' then the address will be placed on the planting list for the coming year or when resources become available. Residents can request Council to plant a tree if they agree to water it, or a resident may be encouraged to organise all residents in the street to petition Council to replace all the trees. It is Hume City Council policy to plant a tree in front of every house by 2030. Hume City Council does not have the resources to consult with the residents on planting; letters are sent to residents stating that a tree will be planted and maintained by Council, but requesting residents provide some water if they can.

Hume City Council has a multi-stage post-planting establishment program with different levels of maintenance over 2, 4 and 6 years from planting. During the first two years newly planted trees receive up to 40 irrigations per year, and pruning and mulch as required. The program is designed so that newly planted trees will survive and be successful regardless of whether the residents water them.

There has been very little replacement tree planting by TAMS in the last 6-8 years, and prior to December 2009 trees removed as being 'dangerous' or 'hazardous' were not generally replaced.[18] Existing TAMS tree planting programs result in the planting of approximately 400 trees (or 1460 if capital works and post-fire revegetation is included) annually in streets and parks (not including trees planted by developers)[19]; however, these are not necessarily linked to the removal of 'dead', 'dangerous' or 'hazardous'

[18] On average over the last six years, TAMS has removed 3,083 'dead', 'dangerous' and 'hazardous' trees (see Section 2.2.1.1 on p.6 of this report).
[19] Number of trees planted by or handed over to Parks, Conservation and Lands in each year, email received from Prue Buckley, 13/4/2010.

trees.[20] The post-planting establishment program includes irrigation up to 4 times per year.[21] More information on TAMS tree management practices is included in Section 3.

2.2.1.5 Tree Assessment Surveys

The City of Sydney, the City of Melbourne and Hume City Council have asset management systems that record individual trees, including the location, condition and works undertaken, in an electronic database. Data in the asset systems is updated periodically depending on the prominence of the area and the size of the tree population. In the City of Melbourne trees are inspected and the database updated with required actions one month prior to the work being scheduled. Hume City Council inspects one sixteenth of the trees in the city each calendar quarter, which then the leads to proactive maintenance works. The City of Sydney inspects 100% of its trees annually.

Brisbane City Council is developing an asset management system that is linked to the Council GIS system. Currently it undertakes in-depth surveys at the individual tree level to inform its maintenance programs. High-priority areas, such as busy roads or areas where trees are known to be overhanging buildings, are surveyed first.

Since the mid-1970s, Councils have been moving towards tree asset management systems.[22] However, GPS technology and portable computing in the last 10-15 years has dramatically changed the way in which trees are recorded as assets. In Brisbane, Sydney and Melbourne, Councils undertake tree surveys, which enable them to strategically manage their risk through understanding their tree assets. Furthermore, understanding the tree asset enables planning for the future through the identification of tree replacement and planting opportunities. The term 'green assets' and 'green infrastructure' is starting to become commonly used within urban planning and design fields to describe urban trees and vegetation.[23]

The ACT Government, in TAMS, has a powerful asset database known as the Integrated Asset Management System (IAMS) which is used for recording a range of assets including roads and footpaths. This system has been customised to record tree assets both at the individual tree level and using larger landscape units such as streets. The system has been constructed; it is now necessary to populate it with tree data.[24] It is understood that funding is available to survey trees and thereby provide this tree data. In December 2009 TAMS requested the Commissioner's view concerning continuing tree surveys, while the Tree Investigation was being undertaken. The Commissioner responded that she had no objection to it continuing.[25] It is understood that the tree condition audit will enable a more systematic management of urban trees managed by PCL, which in time should reduce the current reactive nature of the work. [26]

[20] Meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[21] Meeting with Michael Brice, Jane Carder, Maxine Cooper, Julia Pitts and Matthew Parker, 4/3/2010.
[22] Smiley, E.T. & Barker, F.A. 1988, Options in street tree inventories, *Journal of Arboriculture*, 14(2).
[23] What is green infrastructure, website accessed 1 April 2010, http://www.cabe.org.uk/grey-to-green/introduction.
[24] Meeting with James Downing, Russell Watkinson, Fleur Flanery, Maxine Cooper, Ryan Lawrey and Matthew Parker, 24/3/2010.
[25] Email from Matthew Parker to Fleur Flanery, 16/12/2009.
[26] Personal communication, Fleur Flanery, TAMS, 15/4/2010.

2.2.1.6 Tree Assessor Qualifications

The community requires confidence in the tree assessments undertaken. This can be achieved through ensuring tree assessors have the appropriate qualifications and experience.

Brisbane City Council requires staff and contractors assessing trees to have a minimum Australian Qualification Framework (AQF) Level 5 Arboriculture and five years experience. In addition contractors have to submit examples of their reports in order to be considered for membership of a panel of tree assessors.

The City of Sydney requires internal and external assessors to have a minimum AQF 4 Arboriculture; however, if significant trees are to be assessed then AQF 5 in Arboriculture is required. When the City of Sydney policy was written AQF 5 was not common; however, now it is commonly accepted as the standard.

The City of Melbourne requires that the contract manager have a tertiary qualification in horticulture or arboriculture and fifteen years experience. The team supervisors are required to have an AQF 5 Arboriculture qualification and five years experience. Internal staff at City of Melbourne are required to have a minimum tertiary qualification in horticulture or equivalent.

Hume City Council requires a minimum certification of Level 5 Arboriculture for anyone assessing trees.

Currently within the ACT internal TAMS staff who undertake tree assessments usually have a Certificate Level 3 or 4 in arboriculture or horticulture.[27]

2.2.2 Legal Framework

In New South Wales councils appear to develop dangerous tree removal policy and procedures under the NSW *Local Government Act 1993.*

In Victoria councils appear to develop dangerous tree removal policy and procedures under Victorian Local Government Legislation.

In Queensland councils appear to develop dangerous tree removal policy and procedures under Queensland Local Government Legislation. Brisbane City Council introduced a local municipal law known as the *Natural Assets Local Law 1993.* The control of hazardous vegetation is covered within the objects clause, (a clause which lays out the clear intention of the Act). Section 30 covers hazardous vegetation, however the focus is on providing Council power to issue an eradication notice to an owner or occupier of land to take action to do certain things to remove the hazardous vegetation, rather than the Council removing the hazardous vegetation.

[27] Personal communication, John Peri, TAMS, 23/3/2010.

3 TAMS Current Tree Management Practices

This Section presents information concerning TAMS current practices for 'dangerous' (urgent circumstances) and 'hazardous' tree removal. As stated in the Introduction (Section 1) TAMS has been working on implementing changes to its tree removal practices since October 2009. The pre-December 2009 process used by TAMS with respect to 'dangerous' (urgent circumstances) trees is in Appendix A; and for 'hazardous' tree removal the process is outlined in Appendix B.

3.1 TAMS 'Dangerous' (Urgent) Tree Management Practices (Post-December 2009)

A tree (dead or 'green') is removed by TAMS from public streets and parks if an arborist assesses it to be 'dangerous'. A tree is considered 'dangerous' if there is a high chance of immediate failure resulting in damage or injury to persons or property, if the tree is not removed. Accordingly, such a removal is undertaken as a matter of urgency. The following outlines TAMS current process with respect to such trees.

3.1.1 TAMS Technical and Administrative Process for 'Dangerous' (Urgent Circumstances) Tree Removal[28]

- A tree assessment can be triggered in three ways:
  1) from a public enquiry made to the Canberra Connect call centre or from a letter or email to the TAMS Urban Tree Management Unit;
  2) from TAMS Urban Tree Management Unit staff observations while carrying out routine maintenance; or
  3) via a tree assessment or survey undertaken by an experienced arboricultural consultant.
- A team leader or supervisor from the Urban Tree Management Unit undertakes the tree assessment and records this using the TAMS Tree Assessment Form (Attachment 5); photographs are taken as a record. Consultants undertaking tree condition assessment surveys for TAMS use an electronic form that is transferred to the TAMS Integrated Asset Management System (IAMS). It is understood that funding has been allocated to TAMS to move towards this more efficient method of data collection and asset management.
- If the tree is assessed as posing an immediate threat to people or property, then it is considered 'dangerous' and removed within a maximum of 48 hours from the time of the assessment. The tree may have the canopy removed to make it safe, with completion of the removal occurring following day. The stump is normally ground within a month of removal.
- 'Dangerous' trees that are removed immediately are recorded by TAMS staff on a monthly tree removal spreadsheet and sent to the Urban Tree Management Unit management team.[29] Furthermore, public enquires made through the Canberra Connect call centre and logged into IAMS are recorded as being completed.[30]

[28] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[29] Personal communication, John Peri, TAMS, 19/3/2010.
[30] Personal communication, John Peri, TAMS, 19/3/2010.

From discussion with the TAMS staff it is understood that a database is being created for trees that have been removed over approximately the last six years. This database is to form the replanting of some of the trees that have been removed..[31] TAMS plans to monitor new plantings and have funding for four irrigations per year as part of a post-planting establishment program.[32]

3.1.2 TAMS Communication Process for 'Dangerous' (Urgent Circumstances) Tree Removal [33]

- When 'dangerous' trees are being removed from the verge, notification will be given to adjacent residents. In these circumstances a staff member of the Urban Tree Management Unit will knock on the resident's door of the property immediately adjacent to the tree and explain why it requires removal.
- A notification letter (Attachment 6) is to be given to or left for the resident (if the resident isn't home) of the property directly adjacent to the verge where a 'dangerous' tree is being removed; a copy of the Tree Assessment Form for the tree to be removed is to be included with the letter. In the same letter, residents will be informed that if they want a replacement tree they should contact TAMS.
- The communication process for the removal of 'dangerous' trees in parks is still in the process of being defined.

3.2 TAMS 'Hazardous' Tree Management Practices (Post-December 2009)[34]

TAMS considers that a tree (dead or green) is 'hazardous' if it is assessed by an arborist as presenting a potential high risk to a person or property and arboriculture practices cannot address this risk. Such trees require removal in the short- to medium-term, which is generally three to six months. While these trees are considered to need removal they are not considered 'dangerous' and therefore do not warrant being removed as a matter of urgency. Sound trees may be considered for removal if there is a conflict with infrastructure that cannot be remedied with other measures.

A tender for the removal of 1719 'dead' and 'hazardous' trees and 91 stumps was called by TAMS on 6 March 2010 with tenders closing on 25 March 2010.

3.2.1 TAMS Technical and Administrative Process for ''Hazardous' Tree Removal

- A tree assessment can be triggered in three ways:
  1) from a public enquiry made to the Canberra Connect call centre or from a letter or email to the TAMS Urban Tree Management Unit;
  2) from TAMS staff observations while undertaking routine maintenance work; or
  3) via a tree assessment or survey undertaken by an experienced arboricultural consultant.

[31] Meeting with Michael Brice, Jane Carder, Maxine Cooper, Julia Pitts and Matthew Parker, 4/3/2010.
[32] Meeting with Michael Brice, Jane Carder, Maxine Cooper, Julia Pitts and Matthew Parker, 4/3/2010.
[33] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[34] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.

- A team leader or supervisor from the Urban Tree Management Unit undertakes the tree assessment and records this using the TAMS Tree Assessment Form (Attachment 5); photographs are taken as a record. Consultants undertaking assessment surveys for TAMS use an electronic copy of the assessment form, which is transferred to the Department wide Integrated Asset Management System (IAMS). It is understood that funding has been allocated to TAMS to move towards this more efficient method of data collection and asset management.
- The tree is assessed for suitability for retention as habitat according to criteria that considers species, location, hazard and potential targets.[35]
- If the tree is 'dead' but not 'dangerous' or considered to be 'hazardous' with no other remedial tree management options, and not being suitable for retention as habitat, then the tree is marked with a dot or cross of paint in a prominent position and added to the TAMS list to be removed under a panel tender.
- Future processes would see the dot placed on the tree one month before letting the contract (trees for the forthcoming tender have already being marked).
- Five percent of trees on the removal list will be reassessed either by different TAMS staff or consultants to validate the original assessments and confirm that removal was the only option.
- The list of 'dead' and 'hazardous' tree removals is contracted to a panel of arboricultural companies to complete the work. It may take several months to remove all the trees on the list.
- A tree may be removed in stages; with removal of upper branches followed by removal of the trunk 1 or 2 days later, and then stump grinding within a month.

Section 3.1.1 indicated that TAMS is creating a database of past removals to form a basis for starting to replant some of the trees that have been removed. TAMS staff have indicated that replanting will be dependent on available funding[36].

3.2.2 TAMS Communication Process for 'Hazardous' Tree Removal

<u>'Hazardous' Green Trees</u>

- When 'hazardous' green trees are to be removed from the verge, notification will be given to adjacent residents using the Resident Notification Tree Removal Letter (Attachment 6) with the completed Tree Assessment Form (Attachment 5) for the particular tree enclosed. These will be given to the resident in person or placed in an envelope marked 'Tree Removal Notification' and delivered to the letterbox.
- Green trees marked for removal will have a notice/sign placed on them one month prior to removal (Attachment 7).
- Additional signage will be installed where a number of green trees will be removed in streets or parks.
- The Resident Notification Tree Removal Letter will provide contact details for Canberra Connect. If Canberra Connect receives an enquiry from a resident, the query will be directed to the assessing officer for clarification who can explain the reasons for removal.

[35] Canberra urban parks and places: management of urban parkland trees for habitat creation plus tree hazard evaluation form, June 2001 – Section of report supplied by Michael Brice.
[36] Personal communication, Fleur Flanery, TAMS, 6/4/2010.

- In the same letter provided for removal of street trees, a tear-off reply paid slip will be provided which informs residents that if they want a replacement tree they should return the tear-off part to TAMS (Attachment 6). TAMS will not replace species, which are unsuitable for the location and alternative species will be considered. It is understood that resident requests for replacement trees for the current season tree removals will be completed by 2011.[37] TAMS has advised that although the Department want to replant trees, given the budget pressure, it may not be possible to fund all the costs associated with replanting trees that have been removed in that current year.[38]

'Dead' Tree Removals

- Residents will not be notified of 'dead' tree removals. However, if a resident had requested the removal, they will be notified.
- A letter will be placed in the letterboxes of residents during the tree removal process asking if they would like a replacement tree. If the answer is yes, then they are required to complete a tear-off reply paid slip and return it to TAMS in the reply paid envelope.

4 'Dangerous' (Urgent Circumstances) and 'Hazardous' Tree removal during the Tree Investigation

During the course of the Tree Investigation the Government indicated that *"it will not proceed with the Urban Forest Renewal Program until we have considered your report"* and that in *"the interim trees that pose a significant risk to the public will continue to be pruned or removed, however we have also indicated that this should occur with an enhanced process of consultation with affected residents."*[39]

It is understood that TAMS continues to remove 'dangerous' trees as a matter of urgency. However, TAMS criteria for 'hazardous' trees allows some time before removal is considered necessary.

A media release in early March 2010 announced that a tender was to be called for the removal of 1719 'dead' and 'hazardous' trees and 91 stumps with tenders closing on 25 March 2010. The current list of 'dead' and 'hazardous' tree removals has been placed on the TAMS website with information about the program.[40]

[37] Meeting with Michael Brice, Jane Carder, Maxine Cooper, Julia Pitts and Matthew Parker, 4/3/2010.
[38] Personal communication, Jane Carder, TAMS, 1/4/2010 and Fleur Flanery, TAMS, 15/4/2010.
[39] Letter from Simon Corbell MLA to Maxine Cooper (Commissioner for Sustainability and the Environment), 3/12/2009.
[40] Keeping Canberra's Trees Safe, TAMS, website accessed 12/4/2010, http://www.tams.act.gov.au/live/about_our_department/community_engagement/community_engagement_activities_and_events/tree_removal.

While TAMS staff can make a distinction between the terms 'dangerous' and 'hazardous' as they apply to trees, it appears that at least some in the community do not make this distinction. Given this, and the fact that some members of the community thought that the Government had committed to only removing trees if it were urgent, TAMS was asked to clarify matters through the following questions and provided the subsequent answers.[41]

1) Why do trees other than dangerous trees need to be removed prior to the end of the Investigation?

TAMS: "These trees were added to our hazardous trees database by the assessing arborist with the expectation that they be removed before end June. The longer the dead/hazardous trees are left the more risk of a tree failure.

The contract to remove these trees was to be let in January 2010, and the delay has already increased the public risk of limb/major branch drop from dead / hazardous trees. It is necessary to remove these hazardous trees now before they deteriorate into the dangerous category and pose an immediate risk to the public. A reassessment was undertaken of 'green' hazardous trees to confirm their need for removal in the short term. Trees that were not confirmed as hazardous were removed from the list".

2) Which trees on the list need to be removed before the end of June 2010 and on what basis?

TAMS: "All of the trees identified for removal need to be removed before the end of June due to our assessment of high public risk. The delay to the program is already causing PCL concern due to the increased risk to public safety.

In some instances residents who were told that the dead/hazardous tree on their nature strip would be removed have raised concern as to why the tree hasn't yet been removed. In some instances, PCL has re-assessed trees and had to remove dangerous trees in advance of the contract to address immediate safety concerns."

From discussions with TAMS staff[42] it is understood that the following is proposed once the tender has been decided:

- a media release will announce when the works are to commence;
- TAMS will advertise the program in the Community Noticeboard, Canberra Times, for a minimum of two weeks at the commencement of the program; and
- information sessions will be held for journalists, where the reasons for 'hazardous' tree removal will be explained in detail.

[41] Email from Russell Watkinson to Matthew Parker, 11/3/2010.
[42] Personal communication, Jane Carder, TAMS, 1/4/2010.

5 Considerations and Recommendations

While other issues may emerge during the Tree Investigation, at this stage recommendations for improving the management of 'dangerous' (urgent circumstances) and 'hazardous' trees in public streets and parks focus on:

1. replacement tree planting;
2. TAMS technical and administrative, and communication policies and procedures; and
3. tree assessor qualifications/skills.

The recommendations have been informed by:

- information collected for the Tree Investigation, the report of which is to be submitted to the Minister by June 30 2010. This information has been sourced from community consultations that have been undertaken, public submissions, technical meetings and information sourced from other jurisdictions;
- information gained from TAMS; and
- complaints made about trees.

The Tree Investigation Reference Panel[43] provided advice to the Commissioner regarding the following recommendations.

5.1 Replacement Tree Planting

TAMS does not have a policy of replanting a tree when a tree is removed. Information from consultations and submissions indicates that the community expects that when a tree is removed it will be replaced unless there are reasons for this not occurring. TAMS does not currently have tree-planting programs linked with 'dead', 'dangerous' and 'hazardous' tree removal programs and the general practice has been that trees removed have not been replaced.

Other jurisdictions make a commitment to replanting if a tree (or group of trees) is removed, unless circumstances prohibit (refer to section 2.2.1.4). TAMS proposes that if a tree is removed, the most closely affected residents are asked if they want a tree planted. It is recommended that residents be asked to contact TAMS if they **do not** want a tree replaced, and TAMS commits to try and plant a tree, subject to consideration of issues such as space limitations, solar access, and species suitability. When a tree is replanted the nearest resident should be asked to assist with watering.

In terms of replacement tree planting in streets, solar access, particularly in relation to photovoltaic cells, is an emerging issue. Solar access involves considering many issues and is a complex matter, which will be explored in more detail in the final report of the Tree Investigation. However, if replanting is undertaken before the Tree Investigation concludes, it will be important that TAMS considers solar access.

[43] Tree Investigation Reference Panel – Alan Kerlin, Dianne Firth, Don Aitkin, Dorothy Jauncey, Gabrielle Hurley, Geoff Butler, Greg Moore and Lyndal Plant.

Although the detail of a longer-term tree replacement policy will be considered further in the final report on the Tree Investigation it is important that an interim policy be put in place for the autumn 2010 planting time.

Recommendation 1

It is recommended that a tree replacement policy for streets and parks be developed and adopted by TAMS.

Such a policy could simply be a commitment to replanting when a tree (or group of trees) is removed unless circumstances prohibit. It should be supported by information regarding the timing of replacement planting (this maybe in the next planting season and not necessarily immediately), species selection criteria, maintenance and irrigation regime, opportunities for the involvement of adjoining residents; and the circumstances when a replanting will not be undertaken. These circumstances may include space limitations, solar access, species availability, or objections of the resident(s) that immediately abuts a proposed replanting.

Currently when a tree is removed residents are asked if they want a tree replanted; however, the default position of TAMS should be to plant a tree unless circumstances prohibit.

Recently, TAMS has proposed using tree removal lists from previous years to generate a planting program to start replacing trees. Furthermore, a city-wide tree condition audit is also being undertaken by TAMS. While this will identify areas where trees may need to be removed, it will also identify areas where the majority of trees are sound and unlikely to need removal. However, the tree condition audit might also be used to identify 'gaps' which would offer an opportunity for a planting. It might not be appropriate or possible to replant in all 'gaps' identified, however, it is expected that in many circumstances replanting is likely.

Recommendation 2

It is recommended that the city wide tree condition audit, currently being undertaken by TAMS, identify opportunities for tree planting where 'gaps' exist and that tree planting occurs in these 'gaps', unless circumstances prohibit.

5.2 TAMS Technical and Administrative, and Communication Policies and Procedures

From considering practices in other jurisdictions, opportunities for improving TAMS policies and procedures have been identified.

Issues with communication appear to stem from:

- confusion regarding terms, and a lack of easily accessible and understandable information for the public on TAMS tree removal (and replacement) policies and procedures; and
- the process which TAMS has used in communicating directly with local residents and the public.

5.2.1 Terms

Despite TAMS' efforts to provide definitions to describe trees, the current terms 'dangerous' and 'hazardous' are confusing to at least some members of the public. Some people consider the terms to be synonymous and do not therefore make the same distinction between trees in these categories as do staff in TAMS (refer Table 1, pp 2-3). Furthermore, some members of the community find it difficult to understand how a tree considered to be 'hazardous' does not need to be removed immediately. It might be best to use 'urgent circumstances' to convey the need for a tree to be removed immediately and all other non-urgent tree removals could then be treated as part of routine programs with information regarding the timing and reasons for removal being given as part of the communication process.

The ACT *Tree Protection Act 2005* uses the words 'urgent circumstances' for what TAMS refers to as 'dangerous' street and park trees on unleased Territory land. While this Act does not cover leased Territory lands, it is appropriate for similar language to be used with respect to all trees, be they on leased or unleased land. Furthermore, the *Tree Protection Act 2005* defines when it is appropriate to remove a tree; Section 29 (3) (b) states that a tree can be removed when it '*is necessary to protect the health or safety of people or animals, or public or private property*'.

Recommendation 3

It is recommended that the terms *'dangerous' and 'hazardous'* not be used to describe a category of trees and that there be a focus on distinguishing when a tree needs to be removed under 'urgent circumstances' versus general tree removal.

The term 'dangerous' could be captured under 'Tree Removal (Urgent Circumstances)', with a definition such as *a tree (or group of trees) assessed as presenting an imminent threat to the health or safety of people and / or public or private property. Such a tree (or group of trees) would require removal as a matter of urgency and should be removed within 48 hours or sooner from the time TAMS made the decision to remove it, under normal circumstances.* Normal circumstances would exclude, for example, major storms or fires.

'Hazardous' tree removal could be captured under the general term 'Tree Removal' with the reasons for the removal being stated as part of the communication process.

TAMS' procedure for undertaking tree removals is not readily available to the public. There is a need to have the ACT's tree policies and procedures clearly documented in a manner which makes them easily accessible for the public. Other jurisdictions have published comprehensive tree management policies and procedures.

The Tree Investigation will further consider documentation and publication of the ACT's tree policies and procedures, noting that ACT tree management is undertaken by many government agencies. However, given that TAMS proposes to remove 1719 trees in a short period commencing in April 2010, and there is confusion with the current terms, it would be beneficial to use 'Tree Removal' and 'Tree Removal (Urgent Circumstances)' and develop policies and procedures for these, as part of TAMS' overall Tree Management program. These policies and procedures should be published on the TAMS website as soon as possible and be up dated as needed.

5.2.2 Technical and Administrative Improvements

Some members of the community consider that consultation should inform all decisions to remove a tree. This would be inappropriate for tree removal under urgent circumstances, as public safety should not be jeopardised. Following a removal under urgent circumstances, community members may refer a matter concerning the urgent removal to the Commissioner for Sustainability and the Environment for consideration as a complaint.

With respect to non-urgent tree removals there is usually a considerable time between the assessment and removal of a tree. Therefore, for trees other than those removed under circumstances, it would be appropriate to add to the TAMS process an interim provision that allows a resident or public member the opportunity to request an internal reconsideration of a decision.

A reconsideration would not necessarily involve a field reassessment but rather would be a check on the way the issues highlighted in the assessment had been considered. Brisbane City Council has such an escalation process, involving consideration of objections by the Senior Arboricultural Coordinator and a final tier of review by a Community Vegetation Advisory Panel (Attachment 3). The ACT has officers making decisions and the Commissioner for Sustainability and the Environment available for an external review; however, it needs the internal reconsideration process to be available prior to the Commissioner's independent review.

A Canberra resident could be given 14 days to lodge a request for reconsideration, following the announcement of TAMS decision to remove the tree. The internal reconsideration should be undertaken by a TAMS Executive Officer and a written reason for their decision should be provided to the applicant.

To strengthen TAMS tree management process it would be beneficial to:

- Undertake a sample audit of those trees consultants recommend for removal. This audit should be undertaken on-site by a qualified and experienced tree assessment officer from within TAMS;
- Refer to a senior manager, for a final decision in writing with reasons, all tree assessments recommending non-urgent tree removal of:
  - 'green' trees;
  - trees in heritage precincts;
  - dead trees in parks, which are of potential value as a habitat tree[44]; or

[44] Dead trees on streets are not considered appropriate or retention as habitat trees due to public safety issues.

  - trees on the ACT Tree Register.
- Undertake a sample audit of removed trees to validate the visual tree assessments and to inform future assessments and decision-making processes.

Consultations with the community have indicated that painted red spots on the trunk of trees that have been used by TAMS or its contractors creates considerable angst and anger and is not an effective way in which to communicate a potential tree removal. The use of such spots is not generally used in other jurisdictions.[45] As the purpose for these markings is to assist TAMS staff or contractors locate trees rather than being part of the communication process with local residents or the public, a more discrete marking would be appropriate. Ultimately, locating the trees with a GPS should be the goal; however, in the meantime less prominent marking should be used. A small blue 'R', of say no more than 10cm high, could be painted at the base of a tree scheduled for non-urgent removal at the time the decision is made to remove the tree, as is done by the Brisbane City Council.

Recommendation 4

It is recommended that TAMS tree removal technical and administrative policies and procedures be strengthened by the following.

- **TAMS undertaking a sample audit of trees that consultants recommend for removal. This audit should be undertaken on-site by a qualified and experienced tree assessment officer from within TAMS. This audit should be documented.**
- **A senior manager being held accountable for the final decision for non-urgent tree removal of:**
  - **'green'[46] trees;**
  - **trees in heritage precincts;**
  - **dead trees in parks, which are of potential value as a habitat tree;[47] or**
  - **trees on the ACT Tree Register.**
- **Allowing a resident or public member with respect to non-urgent tree removal, the opportunity to request that an Executive Officer undertake an internal reconsideration of a decision. The Executive Officer should give their decision in writing with reasons.**
  A resident could be given 14 days to lodge a request for reconsideration, following the announcement of the tree removal. The Executive Officer should be given a limited time to respond, this could be 14 days from receipt of the request. The tree should not be removed during this time unless conditions changed and the removal was under urgent circumstances.
- **TAMS undertaking a sample audit of removed trees to validate visual tree assessments and inform future assessments.**
- **Markings on trees for assisting TAMS staff or contractors to locate trees being discrete with information communicating a tree removal occurring via**

[45] Phone conversations with Brisbane City Council (Lyndal Plant) – 23/2/2010, 23/3/2010; City of Sydney (Karen Sweeney) – 23/2/2010, 23/3/2010; Hume City Council (Jason Summers) – 23/2/2010, 18/3/2010; and City of Melbourne (Ian Shears) – 23/3/2010.
[46] A 'green' tree is one that is living.
[47] Dead trees on streets are not considered appropriate for retention as habitat trees due to public safety issues.

a communication procedure and not by the prominence of a marking.

- **Publishing the policies and procedures on the TAMS website as soon as possible and keeping them up to date with future changes.**

5.2.3 Communicating Directly with Local Residents and the Community

A minimum notification process should be clearly and succinctly defined by TAMS for removal of a tree, taking into account whether the tree (or groups of trees):

- is being removed under urgent or non-urgent circumstances;
- is on a street or in a park; or
- has special significance or a high-profile.

When the removal of a significant or high-profile tree or group of trees is proposed or where there will be a very noticeable transformational change in the landscape it may be necessary to undertake communication actions, in addition to the minimum recommended, these could include a street letterbox drop or/and a community 'walk and talk' with TAMS staff and their contractors who undertook the assessment. The Commissioner's Office has been verbally briefed on procedures used by TAMS; however, no documented clear succinct procedures suitable for the public were available.

One issue arising from some complaints is whether or not a tree assessment should be routinely given to residents with a notification letter/card. A comparison with other jurisdictions indicates that providing tree assessment details to individual residents is too onerous. Therefore it is not recommended that this occur in the ACT. However, if a person were to request a copy of a tree assessment, it should be made available.

With respect to signs associated with tree removal it is recommended that wording be similar to that used by Brisbane City Council. Some of their signs use unemotional language such as **Tree Notification** (Appendix 2). It may be possible to have one or two standard signs with simple reasons for tree removal and whether or not a tree will be planted. The Notification letter could have tick boxes that could indicate different reasons for removal.

Consultations with the community have indicated that there has been confusion regarding who is responsible for tree removals. This appears to be due to correspondence delivered to residences regarding the tree removal having a contractor's letterhead and details. The proposed notification letter to be used by TAMS (Attachment 6) has a logo 'Urban Forest' and makes reference to a Tree Keepers Program. As the ACT Government has not approved the 'Urban Forest Renewal Program' and the Tree Keepers Program it is recommended that it not be referred to in any correspondence and that only Government logos be used so that the community understand that the correspondence is official.

Recommendation 5

It is recommended that the TAMS tree (or group of trees) removal (and replacement) communication process be strengthened by the following.

- **A tree assessment being made available to a resident or member of the community on request.**
  It is not recommended that such assessments be routinely given to residents as part of the notified process.
- **Adopting as a minimum the following notification.**
  - ***Tree Removal (Urgent-Circumstances) – Street Tree***
    A standard notification letter/card delivered to the closest three residences on both sides of the street before or soon after the removal, i.e. the property adjacent to the verge where the tree will be removed, the two properties either side of this one and the three properties opposite.
  - ***Tree Removal (Urgent-Circumstances) – Park Tree***
    A sign erected in the park before or soon after the removal.
  - ***Tree Removal – Street Tree***
    A standard notification letter/card delivered to the closest three residences on both sides of the street prior to the removal, i.e. the property adjacent to the verge where the tree will be removed, the two properties either side of this one and the three properties opposite.

    If the street tree (or group of trees) has a high-profile (e.g. a large tree that makes a major contribution to the landscape) or if there will be a substantial change due to the removal of several trees, a sign should also be placed on a tree (or group of trees), at the same time the notification letter/card is sent.
  - ***Tree Removal – Park Tree***
    A sign placed on the tree in a position where it will be obvious to park users. In situations where several trees will be removed in a park, it might be necessary to consider placing a sign at the entrance to the park in addition to where the trees to be removed are located.

- **Including in a Tree Notification letter/card or on a Tree Notification sign for trees removed or to be removed, as a minimum information which:**
  - makes it obvious that the letter/card or sign is official;
  - states that the tree assessment was undertaken by a qualified tree assessor;
  - gives the reasons why the tree is to be removed or was removed;
  - states that the policy is for a replacement planting unless circumstances prohibit;
  - provides a contact number where further information can be gained; and,
  - gives the specific and direct website address for the policy and procedures covering the subject tree activities.

In the notification letter/card to the nearest resident, the assistance of the resident in watering a replacement tree should be sought. Consideration could also be given to allowing an individual resident the option that if they do not want a tree replacement they can contact TAMS to give this view. TAMS would then need to assess the situation and make a final decision.

5.3 Tree Assessor Qualifications/Skills

Assessing the condition of trees and making decisions regarding their removal requires specialist knowledge and experience to make judgements related to risk. It is not simply sufficient to identify that a defect is present, but there is a need to be able to determine how likely it is for a tree to fail or become unsafe over time. Brisbane City Council, City of Sydney, City of Melbourne and Hume City Council require that a tree assessor have a minimum level of training of an Australian Qualifications Framework (AQF) Level 5 or Certificate 5 in Arboriculture or Horticulture with 5 years experience or proven equivalent skills. Currently TAMS staff may have a Certificate Level 3 or 4. The Australian Standard, Protection of Trees on Development Sites (AS 4970 – 2009) requires the person carrying out tree assessment to *"be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) Level 5, Diploma of Horticulture (Arboriculture)) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this Standard"*.[48]

It is recommended that TAMS begin to bring all its tree assessors to a minimum level of training of an Australian Qualifications Framework (AQF) Level 5 or Certificate 5 in Arboriculture or Horticulture.

Recommendation 6

It is recommended that TAMS tree assessors have an Australian Qualifications Framework (AQF) Level 5 or Certificate 5 in Arboriculture or Horticulture with 5 years experience or proven equivalent skills.

5.4 Tree assessment form

The TAMS Tree Assessment form is designed to record the condition of a tree and provides for six possible recommended actions, one of which is tree removal. When an assessor is considering the removal of tree in a park, consideration should be given to considering whether part of the tree could be retained for habitat.

While an assessor is on-site, information should be recorded regarding whether a replacement planting is appropriate. Replacement planting options should be recorded on the form.

Recommendation 7

It is recommended that the TAMS tree assessment form be modified to include information relating to:

- retaining a tree, or part of a tree in a park, for habitat; and
- replanting options.

[48] Australian Standard – Protection of trees on development sites (AS 4970-2009), 2009, Standards Australia, Sydney Australia.

Appendix A – TAMS Practices (Pre-December 2009) – 'Dangerous' Trees

The TAMS process for 'dangerous' tree removals from a technical and communication perspective is summarised in the following points.

Technical and Administrative Process[49]

- A tree assessment was triggered in two ways:
  1) from a public enquiry made to the Canberra Connect call centre or from a letter or email to the TAMS Urban Tree Management Unit; or
  2) from TAMS staff observations while undertaking routine maintenance work.
- A team leader or supervisor from the Tree Operation Unit within the Urban Tree Management Unit (would arrange to or has) assessed the tree. The assessment was based on experience of the officer, but no formal documented assessment form was used. TAMS tree assessment staff generally had a Level 3 or 4 certificate qualifications in horticulture or arboriculture.
- If the tree was assessed as posing an immediate threat to public safety or public or private property, and therefore deemed to be 'dangerous' under the definition in Table 1 (p.2), within 48 hours of assessment. If it were not possible to completely remove the tree, it may have had the canopy removed to make it safe prior to removal, with completion of the removal occurring following day. The stump was normally ground within a month of removal.
- 'Dangerous' trees that are removed immediately were recorded by TAMS staff on a monthly tree removal spreadsheet and sent to the Urban Tree Management Unit management team.[50] Furthermore, public enquires made through the Canberra Connect call centre and logged in the Integrated Asset Management System (IAMS) were then recorded as being completed.[51]
- The TAMS tree planting programs, including Million Trees and the Tree Replacement Program, were not systematically linked to 'dangerous' tree removals and generally no replacement replanting was undertaken following the removal of 'dangerous' tree unless a resident requested a tree and agreed to water it.

Communication Process[52]

- When 'dangerous' trees were being removed from the verge, notification was only given to adjacent residents when the tree was 'green', that is still alive. In these circumstances a staff member from the Urban Tree Management Unit would contact the resident in person (knock on the door) or leave a calling card for the property immediately adjacent to the tree and explain why it required removal.
- No notification was provided when the tree was visibly dead; questions about the removal would be answered if TAMS was contacted by a member of the public.

[49] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[50] Personal communication, John Peri, TAMS, 19/3/2010.
[51] Personal communication, John Peri, TAMS, 19/3/2010.
[52] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.

- No notification was provided for tree removals in park land; questions about the removal would be answered if TAMS was contacted by a member of the public.
- The communication process did not involve using notification letters or calling cards to notify residents, placing signs on the trees, or notices in the Canberra Times Community Notice Boards, or park land / local notice boards or using the TAMS website to make information available to the public.

Appendix B – TAMS Practices (Pre-December 2009) – 'Hazardous' Trees

Technical and Administrative Process[53]

- A tree assessment was triggered in two ways:
  1) from a public enquiry made to the Canberra Connect call centre or from a letter or email to the TAMS Urban Tree Management Unit; or
  2) from TAMS staff observations.
- A team leader or supervisor from the Urban Tree Management Unit assessed a tree. The assessment was based on experience of an officer and no formal documented assessment form was used. TAMS tree assessment staff generally had Level 3 or 4 Certificate qualifications in horticulture or arboriculture.
- If the tree was considered to be 'hazardous', and it was unable to be pruned to make it safe while retaining the amenity of the tree, then it was marked with a dot or cross of paint in a prominent position and added to Parks, Conservation and Lands (PCL) list of trees to be removed.
- Trees over a certain height (generally 10m) were placed on a removal list to be offered to tender as it is more efficient to have contractors remove large (>10m) trees than in-house tree crews.
- The colour of paint may vary from year to year (to identify if trees had been missed from previous contracts); the current colour is red/pink. The list of trees to be removed may have been generated over 6-12 months, with the pink dots present on trees for up to 12months.
- The list of 'dead' and 'hazardous' tree removals was tendered out to a panel of contractors. It generally took several months to remove all the trees on the list. The process for each tree may have involved 2 or 3 stages, with removal of upper branches, followed by removal of the trunk 1 or 2 days later, and then stump grinding within a month.
- The dead and hazardous tree removal program focused on risk management and was not linked to any tree replacement programs. Therefore, generally no replacement replanting was undertaken following tree removal unless a resident requested a tree and agreed to water it.

Communication Process[54]

- When 'hazardous' trees were being removed from the verge, notification was only given to adjacent residents when the tree was 'green', that is still alive. In these circumstances a staff member of the Urban Tree Management Unit would knock on the resident's door of the property immediately adjacent to the tree and explain why it required removal.
- If the resident wasn't present at the time, the TAMS officer would leave a calling card with information about the tree and a contact number.[55]

[53] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[54] Unless annotated otherwise information was recorded in meeting with Michael Brice, Jane Carder, Fleur Flanery, Maxine Cooper, Julia Pitts, Larry OLoughlin and Matthew Parker, 23/2/2010.
[55] Personal communication, Fleur Flanery, TAMS, 6/4/2010.

- No notification was provided when the tree was visibly dead; questions would be answered if TAMS was contacted by a member of the public.
- No notification was provided for tree removals in park land; questions would be answered if TAMS was contacted by a member of the public.
- The communication process did not systematically involve using letters or calling cards to notify residents, placing signs on the trees, or notices in community notice boards or using the TAMS website to make information available to the public.
- Media releases were used to communicate the annual dead and hazardous tree removal program was occurring.

Tree Investigation

Appendix M

Street Tree Notice

Brisbane City Council has inspected a street tree(s) near your property in response to a recent request. Our assessment and the type of works to be carried out are outlined in the Street Tree Report Card section of this flyer.

Please read this section to understand what will happen and when the works are scheduled to occur. Keep this notice until all works are completed.

Street trees are important to Brisbane. They add to our subtropical feel, provide shade and help cool the city. Council is committed to the ongoing improvement and enhancement of our city's street trees.

Should you have any questions regarding our assessment, please phone Council on **(07) 3403 8888**.

STREET TREE REPORT CARD

☐ Notification only

Location of tree(s)

_____

Maintenance is scheduled for:
Jan, Feb, Mar, April, May, June, July, August, Sept, Oct, Nov, Dec*

* Subject to weather and traffic constraints.

By refraining from parking your car near the affected tree will assist council to complete the work within the scheduled timeframe.

PRUNING

Reason for action

- ☐ Clearing hazards – e.g. prune to improve access for pedestrians and vehicles, and visibility of traffic signage.
- ☐ Tree canopy management – e.g. dead and redundant growth.
- ☐ Other _____

Reason for no action

- ☐ Tree meets Council's requirements and no action is necessary.
- ☐ Private tree overhang – tree owner is responsible for maintenance.
- ☐ Requests for electricity conductor clearance is the responsibility of Energex – phone 131 253.
- ☐ Other _____

TREE REMOVAL*

Reason for action

- ☐ Tree is in poor health and cannot be restored by pruning or surgery.
- ☐ Tree is dead.
- ☐ Tree is an undesirable species for the local area.
- ☐ Other _____

Trees to be removed will be marked with a blue 'R'. Tree removal is undertaken in two stages. Stage 1 canopy and trunk are removed. Stage 2 stump and logs removed at a later date.

* subject to final authorisation

Reason for no action

- ☐ Tree meets Council's street tree specifications and no action is necessary.
- ☐ Tree is deciduous or semi-deciduous.
- ☐ Other _____

ROOT MANAGEMENT

Reason for action

- ☐ Root pruning of exposed roots for public safety.
- ☐ Topsoil of exposed roots.
- ☐ Other _____

Reason for no action

- ☐ Tree meets Council requirements and no action is necessary.
- ☐ Other _____

NEW PLANTING/REPLACEMENT

Reason for action

- ☐ Location has been inspected and a planting/replacement/full street planting is recommended.

Number of trees to be planted (this frontage): ☐

Species: _____

When: _____
pending stock availability and water restrictions.

Replacement trees are only selected from Council's street tree species list. Selection depends on the dominant species in the street to ensure an avenue effect, correct soil conditions and environmental factors.

Reason for no action

- ☐ Footpath is less than 2.5 metres wide.
- ☐ Overhanging canopies of existing trees.
- ☐ Traffic safety constraints (e.g. too close to driveway crossing corner or bus stop).
- ☐ Too close to existing services such as street light, water meters, electricity poles.

A Council officer visited your property and no one was at home to progress this matter.

Inspector: _____ **Date**: _____

Important
Street Tree Notice

Dedicated to a better Brisbane

BRISBANE CITY

HOW COUNCIL DECIDES WHAT STREET TREE WORKS WILL BE DONE

Removal of street trees

Removal decisions are unique and each tree is assessed against individual circumstance. The following factors determine if a tree will be removed.

- The tree's physical features – form and structure.
- The tree's condition – health and vigour.
- Tree species – growth habit.

Generally tree removal is considered a final resort after all options have been explored.

Street trees will not be removed for views, leaf litter or shading issues.

Pruning street trees

Pruning of established street trees is undertaken to maintain a tree's health while ensuring adequate clearance for vehicles and pedestrians.
Other pruning may include the following.

- Canopy modification to reduce hazards such as removing dead, dying or diseased branches.
- Formative pruning to promote tree health and structure.
- Thinning tree canopies, including dead branches and redundant growth.

Council does not lop or fence-line trees. This practice creates hazardous regrowth and is detrimental to tree health.

When will my request be actioned?
Council has a scheduled program of street tree maintenance, which includes four visits per year to each ward area. The timing for your request is indicated in the red circled section on the other side of this card.

Emergency situations are an exception and given priority and may include the following.

- Emergencies resulting from storms.
- Fallen branches obstructing roads.

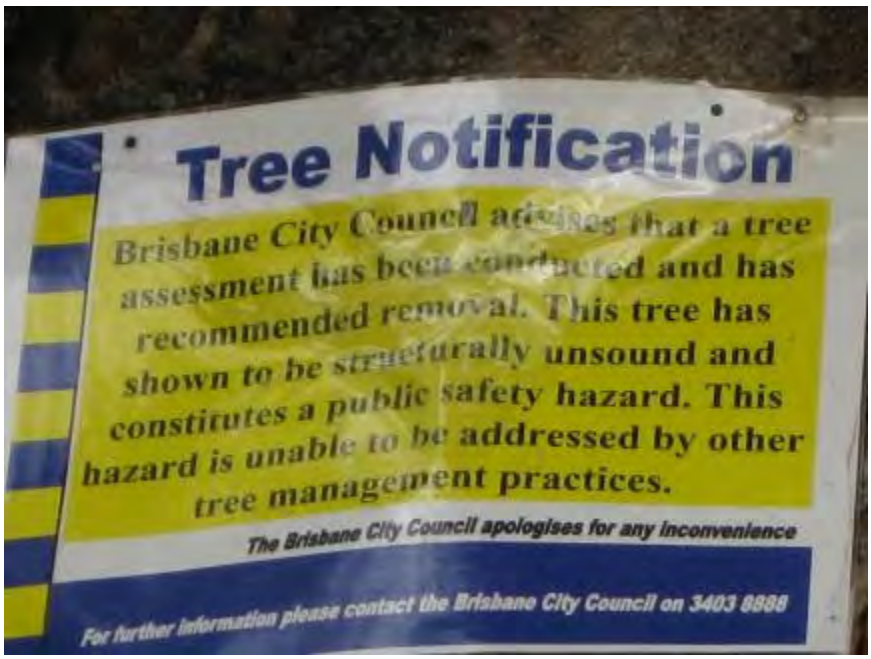
It is an offence to prune, remove or interfere with Council trees above or below the ground. For information on protected trees on private land call Council on (07) 3403 8888.

For more information of the street tree maintenance program visit **www.brisbane.qld.gov.au** or phone Council on **(07) 3403 8888**.

Maintaining our street trees is another way Council is achieving our vision for the city's future.

BRISBANE CITY
Dedicated to a better Brisbane

Tree removal notification sign- Brisbane City Council




TREE RELOCATION
DUE TO THE ROOT SYSTEM DAMAGING COUNCIL'S ASSETS THIS TREE HAS BEEN IDENTIFIED FOR RELOCATION TO A MORE SUITABLE SITE.
THE RELOCATION OF THIS TREE HAS BEEN SCHEDULED FOR
12. OCTOBER. 2005.
For any further information please contact Brisban
Council on Ph 3403 8888
02/08/2006


TREE REMOVAL
IN SPITE OF OUR BEST EFFORTS TO PROLONG THE LIFE OF THIS TREE, BOTH ITS HEALTH AND SOUNDNESS HAS DETERIORATED TO THE POINT WHERE REMOVAL AND REPLACEMENT IS REQUIRED
THE REMOVAL OF THIS TREE HAS BEEN SCHEDULED FOR A MATURE TREE WILL BE PLANTED TO REPLACE THIS TREE
For any further information please contact Brisbane City Council on Ph 3403 8888
02/08/2006


BRISBANE CITY
TREE REMOVAL
THIS TREE HAS BEEN IDENTIFIED AS A HAZARD TO PARK USERS AND HAS BEEN ASSESSED BY COUNCILS ARBORISTS AS DEFECTIVE
THE REMOVAL OF THIS TREE HAS BEEN SCHEDULED FOR
02/08/2006
For any further information please contact Brisbane City Council on Ph 3403 8888

Tree Removal and Replacement Procedure

BRISBANE CITY

Dedicated to a better Brisbane

Tree Removal and Replacement Procedure

1. Purpose

The purpose of this procedure is to provide a step by step process for Council's assessment of requests from residents and others, for tree removal on Council controlled land, including the consultation process that must be followed prior to a tree being removed, and the review/escalation process.

2. Objective

The objective of these procedures is to align operational decision making and practices with Council's Tree Management Guidelines, Open Space Policy and the draft Vegetation Management Procedure EP006.

3. Decision making criteria for Tree Removal

The removal of a tree on Council controlled land is guided by the points outlined in the Tree Management Guidelines. At least one of the following criteria must be met to justify the removal of a tree.

TREE STRUCTURE/ HAZARD /PUBLIC SAFETY
• The structural condition of the tree poses a current or imminent high risk to person or property, as determined by Council's tree risk assessment standards, that cannot be managed by moving the target or accepted/sound arboricultural practices (except in a park where a tree provides nesting habitat refer to Draft Nest Box and Hollow Tree Procedure).

TREE SIGNIFICANCE/VALUE
• The costs of maintaining or remediating the tree to a low risk level, or reasonable life expectancy are greater than the value (determined using Council's Standard for Amenity Tree Valuation) **and** significance of the tree.

TREE HEALTH/ LONGEVITY
• The tree is in irreversible decline, (except in a park where a declining or dead trees may provide nesting habitat refer to Draft Nest Box and Hollow Tree Procedure).

TREE BEHAVIOUR/ NUISANCE/ PROPERTY DAMAGE
• The roots or other parts of the tree are causing nuisance*, measurable damage or safety risk, to a person or property, and cannot be abated or remedied, nor further nuisance or damage be prevented in future through accepted arboricultural treatment, or reasonable redesign.

* An unreasonable interference with another person's right to the use and enjoyment of their property.

BRISBANE CITY

Dedicated to a better Brisbane

TREE SPECIES

• The tree is a species inconsistent with Council approved design intent or
• Is a species which qualifies for removal under the Memorandum of Understanding (MOU) between BCC and Energex in relation to managing trees under powerlines, or
• Is recognised as a Declared Pest Plant species and or approved action under Council's Invasive Species Management Plan, (except for those highly significant street or park trees subject to a site specific Pest Tree Management Plan), or
• A tree or shrub that is not a Council recommended species or not planted in accordance to Council's planting/location standards, and satisfying at least one other criteria for removal ***(Note: planting on footpaths, other than by Council or in accordance with an approved Council plan, is an offence under NALL 2003).***

TRAFFIC/PEDESTRIAN HAZARD

• The tree is blocking sightlines to traffic signage or signals, needed to meet the Manual of Uniform Traffic Control Devices AS1743 Road Signage that cannot be remedied by moving the sign or ongoing maintenance in a cost effective manner.

Where a proposed tree removal doesn't meet any of the above criteria, or the tree is highly significant (by satisfying the definition in Section 6, and/or being listed on Council's register of Highly Significant Council trees), the tree shall be retained, and a monitoring or maintenance plan is to be documented and implemented.

Other Criteria that do **not** justify tree removal.

Improvement of views from private property or
Solar access – where reasonable solar access can be provided by minimal pruning, or better positioning of a solar capture device
Leaf litter in swimming pools where tree pre-existed the pool, or where minimal pruning would avoid genuine nuisance or liability
Views to Advertising billboards where the tree(s) pre-existed the billboard.

4. Tree Replacement requirements

4.1 Replacement of trees that satisfy the above criteria will be one for one using Council standard stock size for that planting function and site, and approved species for that location, and will be planted, at Council's expense, as close as possible to the location of the original tree or at least in the local area.

4.2 Replacement where a tree doesn't meet any of the above removal criteria, but is required to be removed to allow for approved works (such as new driveways, major roads and drainage projects or other exceptional situations) and all other design, construction and relocation alternatives have been exhausted, and all arboricultural management solutions have been exhausted, replacement must achieve no net canopy area loss* within 3 years of the tree removal,
AND
The replacement of tree/trees are to be minimum 45L nursery pot size
AND
All costs associated the original tree/trees removal, new tree/trees replacement and establishment are to be met by the person/company who requested the tree removal
AND be planted as close as possible to the location of the original tree or at least in the local area
Canopy area of the original tree is measured from canopy diameter, halfed to become canopy radius, then used in the equation ∏x radius squared. An original tree of 6 m canopy diameter has a canopy area of 27 square metres, and would require 9 X 45 litre replacement trees (which would be expected to grow to 3 metres canopy area in 3 years) to achieve the no net canopy area loss requirement

Note: where the tree(s) are in an area of regionally significant ecological value, replacement planting must cover three (3) times the area covered by the removed trees and other vegetation, and shall be species endemic to that area, usually of tubestock size.

5. Tree Removal Process

REQUEST or SURVEY
↓
ASSESSMENT ←
↓ ↑
RECOMMENDATION → OBJECTION/ ESCALATION
↓
DECISION& NOTIFICATION
↓
ACTION
↓
RECORD KEEPING

• All trees greater than 500mm trunk diameter measured at 1.4m above ground level (DBH) must be assessed by the Council's Regional Arboricultural Co-ordinator (qualified arborists)

• A tree greater than 500mm DBH that is proposed for removal and not an immediate risk of failure, requires an accompanying tree assessment report from the Regional Arboricultural Co-ordinator is before it can be approved for removal

• Objections to recommended actions will be reassessed by the Senior Technical Arborist, together with all other information. Further objection will be assessed by an independent arborist, and final decision made by the Senior Arboricultural Co-ordinator. A final tier of escalation, if further objection, will be assessment of all relevant information by a Community Vegetation Advisory Panel (established under the Natural Asset Local Law, NALL)

• A tree that has been approved for removal must be marked with a small blue "R"

• Replacement tree (s) stock sizes, number and locations must be determined prior to tree removal

• Community notification must precede approved tree removals. For Highly Significant trees - Signage will be erected 14 days prior to the tree removal informing the general community

• Tree removal actions/works on Council owned or controlled land, in accordance with NALL section 7, can only be undertaken by Council officers, who in the normal course of their work, undertake work on trees. Council can approve its own contractors or others to undertake work on Council's trees.

6. Highly significant tree definition

Highly significant trees are those listed on Council's register of Highly Significant Council trees or satisfying the criteria listed below. They include individual and groups of trees which link to important city cultural and ecological values such as:-

- Heritage value – (trees listed in state Heritage Act and or City Plan- Heritage Place Planning Scheme Policy)
- NALL- VPO, SLT, Waterway vegetation and SNV category trees
- Historical Value – (Memorial trees for lives lost in defence service, documented Ceremonial tree, Trees planted by global leaders, or can be linked to the city's earlier botanical planters or documented local history)
- Botanical Value – (Rare or endangered species)
- Landscape Value- (a local landmark or feature, significance in size/colour or shade)
- Cultural value - (Linked to indigenous culture current or earlier non English speaking lifestyle)
- Habitat value – (Trees that provide habitat to rare and endangered native fauna)

1 April 2009

To The Resident
Simpson Street
EAST MELBOURNE VIC 3002

Dear Resident

STREETSCAPE UPGRADE PROPOSAL FOR SIMPSON STREET, EAST MELBOURNE

The City of Melbourne is progressively upgrading streetscapes through its annual street tree planting program. A number of streetscapes of East Melbourne have been identified as providing an opportunity to greatly enhance the amenity, shading and cooling of the street by planting new trees, such as in the footpaths of Simpson Street .

East Melbourne streetscapes contain a high amount of exposed paved surfaces that reflect and absorb sunlight, significantly contributing to localised 'heat island effects'. Tree shading provides relief from such severe environments by reducing glare, surface and air temperatures and increasing the 'cooling effect' in the immediate area.

Previous strategic plans for East Melbourne streetscapes did not include trees in the footpaths, however due to the current and future climatic trends of extreme hot days and overall longer and hotter summers this has been reviewed. Preliminary discussions with the East Melbourne Group have indicated that they support an increase in tree planting in such locations and hence a detailed plan has been developed for Simpson Street.

In Simpson Street there is sufficient room in the footpaths to introduce trees in great numbers which would provide good scale to the wide streetscape and local area. Footpath trees would also compliment the large Elms in the medians.

It is proposed to plant 111 new trees as indicated on the attached plan. A choice of 4 tree species is offered, all of which are drought tolerant, appropriate to existing and future climatic conditions and will suit East Melbourne's neighbourhood character. These are:

1. White Cedar (*Melia azedarach*)
2. Autumn Blaze Maple (*Acer x freemanii* 'Autumn Blaze')
3. Japanese Elm *(Zelkova serrata)*
4. Maidenhair Tree (*Ginkgo biloba*)

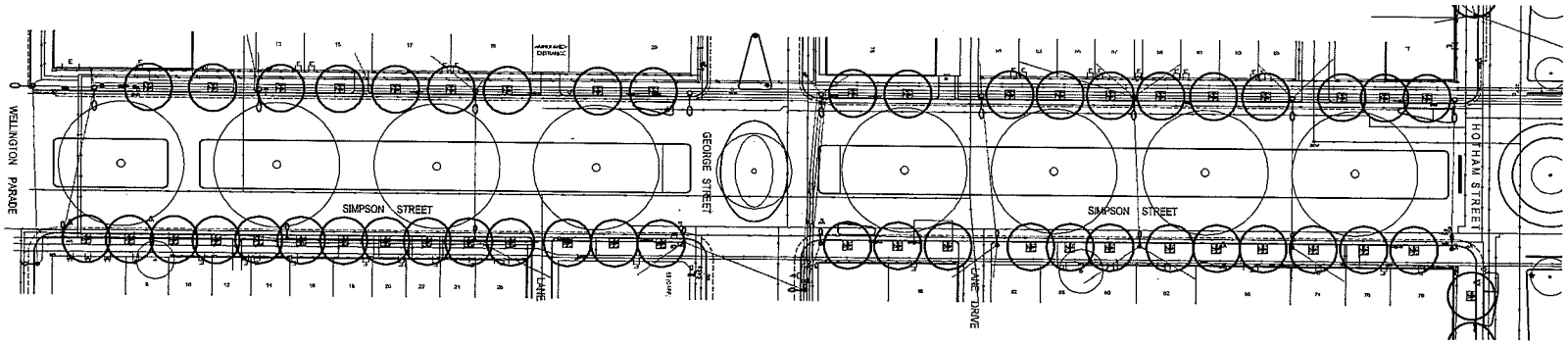
Attached is a Fact Sheet describing each species. The City of Melbourne is interested in obtaining your feedback to this proposal. If you would like to indicate your choice of tree species and/or comment please complete the enclosed postage paid 'response form' and send to Parks and Urban Design by close of business Friday 17th April 2009. The tree species with the majority of votes will be selected for planting this winter.

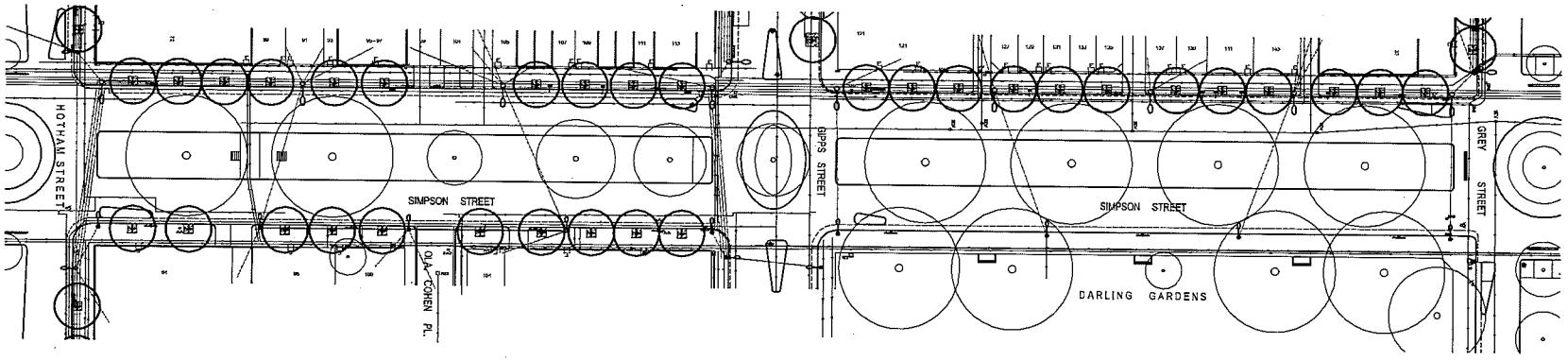
If you have further enquires with regards to this proposal, please contact Oliver Pohls on 9658 9386 or e-mail: olipoh@melbourne.vic.gov.au.

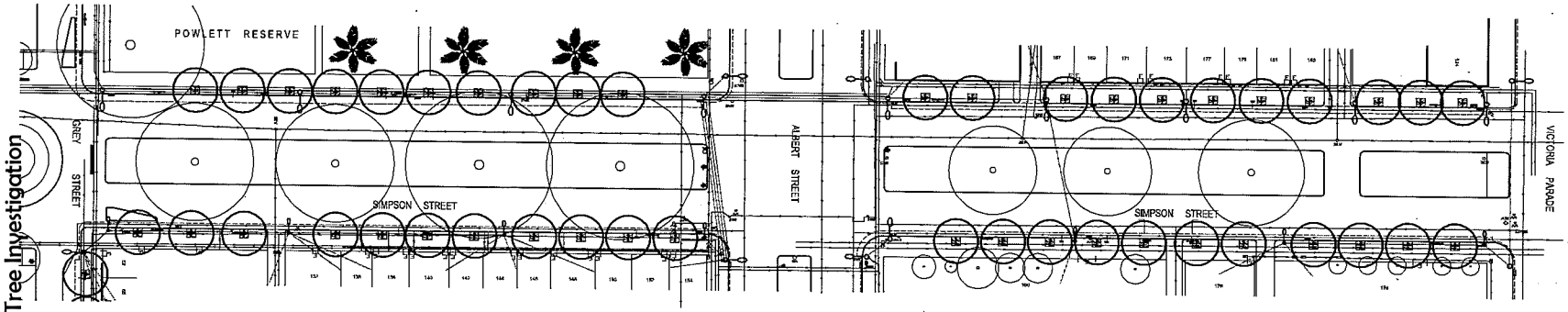
Appendix M

Tree Investigation

DO NOT SCALE - USE WRITTEN DIMENSIONS ONLY







LEGEND

EXISTING TREE TO REMAIN

PROPOSED TREE IN FOOTPATH
Refer table for species.

Planning, Design, Consultancy, Project Management
LANDSCAPE & IRRIGATION SERVICES
ACN 073 379 394
PO BOX 271 SURREY HILLS VICTORIA 3127
Telephone: 9819 7084 Facsimile: 9819 7054
Email: office@landview.com.au

city of Melbourne

Design & Urban Environment
LEVEL 6 / 240 LT COLLINS STREET
MELBOURNE VIC 3000
TELEPHONE: (03) 9658 9658
FACSIMILE: (03) 9658 9646

CLIENT
PARKS URBAN DESIGN

PROJECT
EAST MELBOURNE STREETSCAPES
EAST MELBOURNE
SIMPSON STREET
STREET TREE PLANTING

DRAWING
CONCEPT PLAN

STATUS
PRELIMINARY

PASSED / REVIEWED	APPROVED / AUTH. FOR USE

NORTH POINT	DESIGN	DRAWN
	LJS	BC
	A1 1:400	A3 1:800
	DATE PLOTTED 03 APRIL 09	

PROJ. NO.	DWG NO.	DRN.
90XXX	XXX/LA-01	A

city of Melbourne

STREETSCAPE UPGRADE PROPOSAL – SIMPSON STREET

Name: _____

Address: _____

_____ P/Code: _____

Phone: _____ Email: _____
(optional)

Date: _____

I support the following species for planting:-

- ☐ **White Cedar (*Melia azedarach*)**
- ☐ **Autumn Blaze Maple (*Acer* x *freemanii* 'Jeffersred')**
- ☐ **Japanese Zelkova (*Zelkova serrata*)**
- ☐ **Small-Leafed Linden (*Tilia cordata* 'Greenspire')**

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signed: _____

Due: 15 May 2009

27 November 2009

To The Resident
Simpson Street
EAST MELBOURNE VIC 3002

Dear Resident,

STREETSCAPE UPGRADE PROPOSAL FOR SIMPSON STREET, EAST MELBOURNE

The consultation on the Simpson streetscape upgrade proposal has now been completed. Thank you to all the people who have responded regarding the proposal.

Council is pleased to inform you that there was overwhelming support for the project with the majority of people favouring the planting of the Autumn Blaze Maple (*Acer x freemanii* 'Jeffersred'). On the basis of this support Council will be proceeding with the planting of this tree.

Weather permitting, the marking out of trees plots will begin the first week in June with construction of the tree plots and planting of trees taking place mid June to mid July.

If you have further enquires with regards to these works, please contact Oliver Pohls on 9658 9386 or email: olipoh@melbourne.vic.gov.au.

Yours sincerely

Oliver Pohls
Tree Planner
Telephone 9658 9386
Facsimile 9658 9147
E-mail olipoh@melbourne.vic.gov.au
Website www.melbourne.vic.gov.au
Customer reference Doc#5122533

Department of Territory and Muncipal Services
Tree Condition Assessment Form

F00581

IAMS No		**Form No**	
Suburb		**Block**	**Section**
Location Name & No		**Tree Location**	Street / Open Space
Heritage	No / Nominated / Provisional / Full	**Tree Registration**	No / Provisional / Full
Designated Land	Yes / No	**WAE / Project No**	
Species		**Estimated Age**	

Tree could be considered for heritage or registration protection Yes / No

Diameter at Breast Height (1.3m) cm (Largest stem only – for multiple stems add additional measurements in comments)

Height	Very Large (>20m)		Large (12-20m)		Medium (8-12m)		Small (3-8m)		Very Small (<3m)		Vacant (N/A)
Health	Dead		Very Poor		Poor		Fair-Poor		Fair		Good
Structure	Failed		Very Poor		Poor		Fair-Poor		Fair		Good
ULE (Years)	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100+
Utility Lines	High Voltage		Low Voltage		Domestic / Service		Telco		Aerial Bundle Cable		None
Risk Zone	Prominent		Major		Moderate		Minor		Minimal		N/A
Infrastructure Damage/Conflict	Footpath / Verge Crossing / Road / Kerb & Channel / Utility Lines / Street Furniture / Line-of-Sight / Utility Box / Utility Station / Underground / Private Property										
Identified Defect	Trunk Rot / Branch Rot / Tree Unstable in Ground / Split Crotch / Major Branch Failure / Advanced Decline (pruning cannot repair) / Conflict with Services (excavation has destabilised tree)										

Work Type	Hazard Tree Assessment	Removal	Utility Line Clearance	General Maintenance – Mature	General Maintenance – Juvenile	None
Work Priority	Urgent (48Hrs)	High (2 Weeks)	Medium (3 Months)	Low (6 Months)	Very Low (12 Months	None (N/A)

Comments:

Officer Name:

Signature: Date:

FIELD	DESCRIPTION					
DBH	Diameter of largest stem measured at 1.3m above grade. Estimate to nearest 5cm. Multiple stems record additional stems in comments (up to 5). Branch union at 1.3m – adjust measurement higher or lower.					
Health	**Dead**	**Very Poor**	**Poor**	**Fair-Poor**	**Fair**	**Good**
	Trunk, primary branches and twigs dead; no leaves or dead leaves	Irreversible decline; 30-50% dieback; severe foliage deficiencies; 30-50% foliage density; 30-50% leaf health; severe pests / diseases	Minimal vigour; substantial decline; 20-30% dieback; considerable foliage deficiencies; 50-70% foliage density; 50-70% leaf health; pest / diseases exceed thresholds	Below average vigour; more than average decline; 10-20% dieback; foliage deficiencies; 70-90% foliage density; 70-90% leaf health; pests / disease at thresholds	Average vigour; average decline; <10% dieback; >90% foliage density; >90% leaf health; pests / diseases within thresholds The typical condition of the species	Above average vigour; no decline; 0% dieback; better than average foliage density; better than average leaf health; no pest / diseases An Exceptional specimen
Structure	**Failed**	**Very Poor**	**Poor**	**Fair-Poor**	**Fair**	**Good**
	Failure of root plate, trunk or primary branch; active split between branch unions; severe damage to primary tree structure	Excessive damage or decay to root plate, trunk, primary branches or branch unions; fungal fruiting bodies; excessive decay or hollows compromising structural integrity; unstable in ground; excessive branch end-weight; severe included-bark unions; exceeding thresholds – failure probable	Major damage or decay to root plate, trunk or primary branches; no observable basal flare; acute branch unions starting to include bark; major branch end-weight / over-extension; at or exceeding thresholds	Moderate damage or decay in root plate, trunk or primary branches; minimal basal flare; acute branch unions; past branch failure; moderate branch end-weight / over extension; approaching thresholds	Minor damage or decay to root plate, trunk or primary branches; typically formed branch unions; minor end-weight / over-extension; within thresholds Standard Tree – no observable major defects to suggest that there is an increased likelihood of tree failure	No damage or decay; visible basal flare; stable in ground; well tapered branches with sound open unions An Exceptional specimen
Useful Life Expectancy (ULE)	The length of time that a suitably trained and qualified arborist / tree surgeon assess a tree can be retained with an acceptable level of risk. It is based on the information at the time of assessment, including tree health and surrounding environmental variables, and considers functionality, safety, aesthetics, tree benefits and nuisances. It is not static and can change in response to changes in surrounding conditions.					
Risk Zone	**Prominent**	**Major**	**Moderate**	**Minor**	**Minimal**	**N/A**
	Highway / arterial road; 40km/hr school zones; adjacent to retail premises; shopping centres; 10m buffer from edge of BBQs, seats, shelters, toilet blocks, car parks, picnic tables, cycle ways and paths in UOS	Major collector roads; Category A Maintenance Areas – High Use; Town Park	Minor collector roads; Category A Maintenance Areas – Medium Use; District Park	Access roads; Category A Maintenance Areas – Low Use; Pedestrian Parkland; Laneway; Neighbourhood Park	Category B Maintenance Areas	
Proposed Work Type	**Hazard Tree Assessment**	**Removal**	**Utility Line Clearance**	**General Maintenance – Mature**	**General Maintenance – Juvenile**	**None**
	More detailed assessment required – aerial inspection / probe; unclear evidence of decay, termites, bird damage, etc.	Tree condition cannot be alleviated by contemporary arboricultural practices	Pruning around or over utility lines to create suitable clearance	Mature / large trees – dead wood removal (>50mm/ 2m length); crown thinning; crown lifting; reduction pruning; selective or structural pruning	Young and semi-mature trees – dead wood removal; crown lifting; formative pruning	No obvious works required
Vigour	An assessment of condition and incremental shoot growth; the vigour rating reflects the perceived ability of the tree to maintain growth in good conditions, and to survive stress without going into major decline					
Dieback	The ratio of live to dead branches within the canopy (e.g. dieback <10%)					
Foliage Density	The ratio of leaf area to branch area (excluding epicormic shoots) (e.g. leaf coverage is between 70% and 90% of the expected coverage for a healthy tree)					
Leaf Health	An assessment of leaf size and colour and the presence of leaves showing nutrient deficiencies, such as chlorosis (e.g. >90% of leaves in good health)					

Note: Health and structure descriptions are indicative of a tree in this condition; an individual tree may not exhibit all traits described.

Attachment 6 – TAMS Notification Letter

To the resident
Of address: xx xxxxxxxx xx
xxxxxx xxx
xxxx

Dear Resident

Attention: **Tree Removal Notification**

Parks, Conservation and Lands is the ACT Government agency responsible for the management of trees on natures strips, road medians and urban parkland in Canberra.

An inspection by a tree expert has assessed the tree(s) near your property and identified one or more as potentially hazardous and it/they has been programmed for removal. The tree(s) has been identified with a coloured dot and a notice regarding it s removal will be attached to the trees. Should you require a replacement tree, please fill in the necessary details on the pre-addressed, reply-paid form below; detach, fold shut and send it back to Canberra's Urban Forest.

Attached for your information is a tree condition assessment form that provides details of why the tree has to be removed and a booklet containing common questions and answers.

If you would like further information please contact the inspecting tree officer _____

on telephone _____

Signature _____ Date _____

Yours sincerely
Michael Brice
Program Manager Urban Trees
Parks, Conservation and Lands

COMPLETE, TEAR OFF, FOLD SHUT & SEND

Canberra's Urban Forest

response from resident of

xx xxxxxxxx xx
xxxxxx xxx
xxxx

CANBERRA'S URBAN FOREST

FOLD IN

reply paid response

☐ Yes, I would like a replacement tree planted

☐ I'm interested in finding out more about a a Tree Keepers Program that will teach me more about caring for trees in my neighbourhood

(resident) _____

telephone _____

email address _____

TREES ARE ESSENTIAL TO THE CHARACTER OF CANBERRA

NOTIFICATION OF HAZARDOUS TREE REMOVAL

Enquiries Phone: 132281

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Jon Stanhope MLA

CHIEF MINISTER

MINISTER FOR TRANSPORT MINISTER FOR TERRITORY AND MUNICIPAL SERVICES
MINISTER FOR BUSINESS AND ECONOMIC DEVELOPMENT MINISTER FOR LAND AND PROPERTY SERVICES
MINISTER FOR ABORIGINAL AND TORRES STRAIT ISLANDER AFFAIRS
MINISTER FOR THE ARTS AND HERITAGE

MEMBER FOR GINNINDERRA

Dr Maxine Cooper
Commissioner for Sustainability and the Environment
PO Box 356
DICKSON ACT 2602

Dear Dr Cooper

Thank you for your letter of 16 April 2010 providing an interim report on street and park tree removals undertaken by the Department of Territory and Municipal Services (TAMS), under the classification of 'dangerous' and 'hazardous' trees.

I have noted the seven recommendations included in your report and I agree with each of them. TAMS has commenced implementation of most of the recommendations and I am advised that this is already improving the communication and dialogue with the Canberra community around tree removal. In addition, the Department has organised a series of 'walk and talk' educational sessions where the community is invited to discuss tree removal issues with an arborist in a number of parks.

Attached is a summary of my response to each of your recommendations. I have also attached examples of notices that the Department has used for the current tree removal process, which were developed in anticipation of your report.

I have decided that the interim report should be released as soon as possible as it will provide clarity for the community around the tree removal processes and policies. Please advise my Department of the expected release date to assist with coordination.

Thank you for the interim report and your recommendations. A copy of this letter has also been sent to the Minister for Environment, Climate Change and Water.

Yours sincerely

Jon Stanhope MLA
Minister for Territory and Municipal Services

05 AUG 2010

ACT LEGISLATIVE ASSEMBLY

London Circuit, Canberra ACT 2601 GPO Box 1020, Canberra ACT 2601
Phone (02) 6205 0104 Fax (02) 6205 0433 Email stanhope@act.gov.au

Summary - response to Interim Report on street and park tree removals undertaken by TAMS under classification of 'dangerous' and 'hazardous' trees.

Recommendations:

Item	Activity	Agree	Disagree	Note	Status
1	**It is recommended that a tree replacement policy for streets and parks be developed and adopted by TAMS.**	✓		A Tree Management Policy (TMP) for TAMS which includes policies for tree replacement and removal will be developed by 30 December 2010 and adopted following approval from the Minister for Territory and Municipal Services.	In-progress
2	**It is recommended that the city-wide tree condition audit, currently being undertaken by TAMS, identifies opportunities for tree planting where 'gaps' exist and that tree planting occurs in these 'gaps', unless circumstances prohibit.**	✓		The city-wide tree condition audit will identify gaps where trees can be replaced.	**In-progress** Replacement planting will be conducted in line with TMP, as noted in recommendation 1 (above).
3	**It is recommended that the terms *'dangerous'* and *'hazardous'* not be used to describe a category of trees.** **The communication to focus on distinguishing when a tree needs to be removed under 'urgent circumstances' versus 'general' tree removal.**	✓ ✓		The Tree Management Policy will include references to tree removal under 'urgent circumstances' and planned tree replacement programs	The TMP once approved by the CM will be on the TAMS website www.tams.gov.au

Item	Activity	Agree	Disagree	Note	Status
4	**It is recommended that TAMS tree removal technical and administrative policies and procedures be strengthened by the following:** **4.1 TAMS undertaking a sample audit of trees that consultants recommend for removal. This audit should be undertaken on-site by a qualified and experienced tree assessment officer from within TAMS. This audit should be documented.**	✓		Auditing of 5% (as a sample size) of 'green' trees that have been identified for removal by external contractors is underway. This approach will also be applied to trees that have been assessed by internal staff ie not removed under contract.	**<u>In-progress.</u>** A consistent method has been developed across PCL to determine when removal is required or if other pruning treatments can be used to improve the safety of the tree(s).
	4.2 A senior officer being held accountable for the final decision for non-urgent tree removal of : ○ **'green trees';** ○ **trees in heritage precincts;** ○ **dead trees in parks, which are of potential value as a habitat tree; or** ○ **trees on the ACT Tree Register.**	✓		A senior officer will be made responsible for the final decision of removal of: • green trees • trees in heritage precincts • dead trees in parks – potential habitat value • trees on the ACT Tree Register.	**<u>In progress.</u>** The senior officer in charge of the Urban Tree Unit will be responsible for the final decision of removal of: -green trees -trees in heritage precincts -dead trees in parks – potential habitat value -trees on the ACT Tree Register.
	4.3 Allowing a resident or public member, with respect to <u>non-urgent</u> tree removal, the opportunity to request that an Executive Officer undertake an internal reconsideration of a decision. The Executive Officer should give their decision in writing with reasons.	✓		People seeking a reconsideration of the decision to remove a tree will be directed to Canberra Connect through signage placed on the tree (3 weeks prior to removal) and also through the TAMS website. Canberra Connect will pass the request to a senior officer in the tree team who will contact the community member with information about the tree. If the community member is still unhappy with this decision, they will be directed to the website to lodge a formal request for a reconsideration of the decision. This information will be referred to an Executive Officer to initiate a review of	**<u>In progress.</u>** Formal public notification of this undertaking will be included in the Tree Management Policy on the TAMS website in accordance with Recommendation 1.

Item	Activity	Agree	Disagree	Note	Status
				the decision. A response provided in writing. The community member will need to lodge a formal request for a reconsideration no more than 2 weeks after the date displayed on the sign that is attached to the tree	
	4.4 TAMS undertaking a sample audit of removed trees to validate visual tree assessments and inform future assessments.	✓		A sample audit of removed trees will be undertaken on 5% of green trees with defects. This information will be assessed to inform future assessments. Note: Declining trees such as those that are drought affected or have dieback, will not be included in the audit as the information gathered from those trees will be of limited value.	**In-progress** The sample audit will commence in mid June.
	4.5 Markings on trees for assisting TAMS staff or contractors to locate trees being discrete with information communicating a tree removal occurring via a communication procedure and not by the prominence of a marking.	✓		TAMS will test a new marking system for trees that require removal, away from the prominent dots to a combination of discrete tags attached to the tree and GPS coding. Signs will also be placed on the trees three (3) weeks prior to removal as noted in Recommendation 5	The new process for marking trees will be phased in from August 2010 after the current contract for dead and hazardous tree removal is complete.
	4.6 Publishing the policies and procedures on the TAMS website as soon as possible and keeping them up to date with future changes.	✓		Tree management policies will be developed by 30 December 2010 and made publically available on the TAMS website following approval by the Chief Minister/Minister for Territories and Municipal Services.	**In-progress.** Polices and procedures will be developed and made available on the TAMS website.
5	**It is recommended that the TAMS tree (or group of trees) removal (and replacement) communication process be strengthened by the following:** **5.1 A tree assessment being made available to a resident or member of the community on request.**	✓		This assessment will be available on request for green trees. It is will not automatically be provided as part of the notification process. The current tree assessment process applies to green trees. Individual assessments are not conducted on dead trees unless they are to be retained for habitat.	**In progress** for green and habitat trees. The amended TMP to be made available on the TAMS website.

Item	Activity	Agree	Disagree	Note	Status
	5.2 Adopting as a minimum the following notification **i) *Tree Removal (Urgent Circumstances) - Street Tree*** A standard notification letter/card delivered to the closest three residents adjacent to the verge where the tree will be removed and three properties opposite.	✓		In urgent circumstances a standard notification letter/card will be delivered to the closest three residents adjacent to the verge where the tree will be removed, i.e. the two properties either side of this one and the tree properties opposite. This can potentially be a significant exercise where blocks of units are involved. While the Department will aim to deliver letters where possible, this may not always be practical during storm events.	In progress. **Appendix B** provides a copy of the notice. This letter will be improved to be in card format for ease of distribution.
	ii) *Tree Removal (Urgent Circumstances) - Park Tree* Erect a sign in the park before or soon after the removal	✓		Tree removal in urgent circumstances is normally carried out within 48 hours. While the Department will aim to erect signs where possible, this may not always be practical during storm events.	New arrangements will be implemented from 1st July.
	iii) *Tree Removal- Street Tree* A standard notification letter/card delivered to the closest three residents on both sides of the street prior to removal, i.e the property adjacent to the verge where the tree will be removed, two properties either side of this one and three properties opposite.	✓		The letter in Appendix C has been utilised for the dead and hazardous tree removal program.	**In progress.** Appendix C provides a copy of the notice. This letter will be developed to be a card format for ease of distribution.
	iv) *Tree Removal- Park Tree* A sign placed on the tree in a position where it will be obvious to park users. In situations where several trees will be removed in a park, it might be necessary to consider placing a sign at the entrance to the park in addition to where the trees to be removed are located.	✓		Appendix D provides a copy of the sign that has been used for the April- May 2010 tree removal program in parks	**In progress –** This will be updated based on feedback from the public.
	v) Including in a Tree Notification letter/card or on a Tree Notification sign for trees removed or to be removed, as a minimum information which:			Appendix C provides a copy of the notification that has been in the used since April 2010 for tree removals. This letter will be updated to a card format for ease of distribution.	**In-progress**

Item	Activity	Agree	Disagree	Note	Status
	○ makes it obvious that the letter/card is official; ○ states that the tree assessment was undertaken by a qualified tree assessor; ○ gives the reasons why the tree is to be removed or was removed; ○ states that the policy is for a replacement planting unless circumstances prohibit; ○ provides a contact number where further information can be gained; ○ gives the specific and direct website address for the policy and procedures covering the subject tree activities	✓ ✓ ✓ ✓ ✓		Residents and community members will be directed to a specific page on the TAMS Tree Management Policy on the website once it is developed and agreed.	Expected completion date December 2010. Interim measures will be undertaken prior to the completion and approval of the TMP
6	**It is recommended that TAMS tree assessors have an Australian Qualifications Framework (AQF) Level 5 or Certificate 5 in Arboriculture or Horticulture with 5 years experience or proven equivalent skills.**	✓		Future employment agreements will stipulate minimum qualification levels and/or willingness to obtain these levels. Training will be offered on an on-going basis and included in performance management agreements.	**In-progress.** Assessment of training needs has been undertaken and a Diploma Level Course (AQF level 5) in Horticulture/ Arboriculture is due to commence in July 2010. This will be delivered locally by CIT.
7	**It is recommended that the TAMS tree assessment form be modified to include information relating to :** • **Retaining a tree, or part of a tree in a park, for habitat; and** • **Replanting options.**	✓		The assessment form will be modified to include this information.	**In-progress**