

PLANNING FOR TREES IN URBAN ENVIRONMENTS

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Introduction

Trees should be an essential, rather than merely a desirable part of our cities. Street trees provide the city with a wide range of benefits, with large, mature trees maximising those benefits (Geiger 2004). The city, however, comprises an extremely hostile environment in which trees must survive and grow, and the challenges of life in the city are often exacerbated by unsustainable planning and design practices (Spirn 1984). Two key challenges for street tree managers are: providing the conditions to grow healthy, long lived trees; and minimising conflicts between trees and the surrounding urban infrastructure (Harris, Clark et al. 2004). Planning for trees in cities should be based on a sound understanding of the attitudes, perceptions and practices of those involved in the planning and design of urban environments. In 2009 a study was undertaken of the attitudes and practices of urban tree managers in the Adelaide metropolitan region. The study was part of a wider doctoral research project aimed at developing a more sustainable paradigm for urban tree planting, known as Tree Sensitive Urban Design.

Methodology

Traditionally research into the urban forest has had a quantitative focus. Quantitative research, such as survey research, is characterised by the use of pre-determined instruments of data collection, with closed-ended questions, producing numerical, statistical data. Sampling is a key consideration where the aim is to predict the responses of a larger population from the responses of a smaller group (Groat and Wang 2002).

An alternative research strategy to quantitative research is qualitative research, which has its origins in the social sciences, but has more recently been adopted by a wide range of disciplines (Miles and Huberman 1994). Qualitative methods allow researchers to explore an issue in greater depth, or to discover the meaning of a phenomenon (Creswell and Plano Clark 2007). Qualitative research tends to approach the field of research without a pre-determined hypothesis, with the focus on developing understanding and potentially creating new knowledge. Qualitative methods include in-depth interviews using open-ended questions, producing data in the form of words, transcripts and quotations, rather than numbers. Qualitative analysis may involve the progressive categorisation of data into meaningful patterns. A recent paper noted the absence of qualitative research in the urban forestry literature, and the potential for its use in examining a range of urban forestry issues (McLean, Jensen et al. 2007). It was concluded that quantitative research could provide deeper understanding in the four main themes identified in recent urban forestry literature: economic costs and benefits; ecological and environmental benefits; social benefits and perceptions; and urban forestry policy.

In this study, in-depth interviews were conducted with street tree managers and related professionals, from nineteen Councils in the Adelaide metropolitan region (Table 1). Councils were categorised into eastern, western and outer suburban sub-regions having broadly similar physical settings and patterns of urban development.

Table 1: Organisations interviewed

Councils		
Eastern suburban	Western suburban	Outer suburban
Adelaide Hills	Charles Sturt	Gawler
Burnside	Holdfast Bay	Mount Barker
Campbelltown	Marion	Onkaparinga
Mitcham	Port Adelaide Enfield	Playford
Norwood Payneham St. Peters	Prospect	Salisbury
Unley	West Torrens	Tea Tree Gully
Walkerville		

Participants occupied a variety of formal positions within each Council (Table 2). Structured in-depth interviews were conducted in the workplace, using a set of fixed questions, but with open-ended

responses. Interviews were taped and transcribed for approval by each participant. Interviews were also conducted on the basis of anonymity and confidentiality.

Table 2: Position of participant

Participant position	Number
Parks, gardens, open space managers	4
Landscape architect, urban designers	4
Operations, infrastructure managers	3
Arborist, horticulturist, tree manager	6
Natural resource manager	2

The following sections provide a summary of key findings related to: street tree benefits and issues; constraints on, and future threats to urban street tree planting; 'best practices' which should be adopted; and factors that may limit the adoption of those practices. Selected verbatim quotations of participants are also included where appropriate. Emerging themes from the data included categorisation of data as either: physical and design factors; human factors; or organisational factors.

Street tree benefits

Question: What do you see as the main benefits of street trees?

Table 3: Perceived street tree benefits

Benefit categories	
Visual	Urban amenity
	Visual character
	Suburb desirability
	Streetscape appeal
	Identity, legibility
Environmental	Many
	Climatic-shade
	Air quality
	Water-runoff
Ecological	Biodiversity, corridors
	Location factors
Economic	Real estate values
	Other quantifiable
Social	Human well-being
	Cultural, heritage

Source: compiled from participant interviews.

'Tree planting is a relatively cheap way of improving the amenity and character of an area. Trees provide shade. They soften the line of the road and infrastructure, and create light and shade.' E2

The economic, environmental and human benefits of street trees are well recognised by tree managers, however the benefit most emphasised is their mainly visual role in creating character and amenity in urban streets and suburbs. Street trees provide amenity, visual character and streetscape appeal. In established urban areas, the presence of mature street trees make certain streets and suburbs more desirable places to live, and their benefits are often reflected in higher real estate values. In such areas there may be strong local resident support for retaining existing trees.

'When a person drives down the street, the biggest impact is the tree. And the leafiest suburbs, that's why the value of the houses are higher than elsewhere, because it's usually the leafy streets, or leafy suburbs.' O1

In developing outer suburban areas street tree planting also plays a significant role in creating local character and identity.

There is a long list of environmental benefits including impacts on urban climate, air quality and stormwater management. However the most frequently mentioned factor is shade, with its multiple benefits for pedestrians, vehicles, and the urban heat island effect. According to one participant:

"Number one is shade, and obviously you can go on about that forever." O5

The ecological benefits of street trees are less emphasised and depend more on location, being of greater significance as biodiversity corridors in outer urban areas. Perceived economic benefits relate mainly to property values. There is an awareness of the relationship between urban greening and human well-being, however this is less tangible and more difficult to communicate to the public than the more obvious visual benefits. In the words of one participant:

'The most important benefit, they maintain quality of life and community. A lot of people don't see that.' E4

Street tree issues

Question: What do you see as the main issues or problems associated with street trees?

Table 4: Perceived street tree issues.

Issue categories	
Physical	
Urban development	Urban infill New subdivision
Lack of space	Verge widths Authority constraints
Infrastructure	Conflicts Hardscape-damage, liability Services-conflicts, ETSA pruning
Water	Restrictions-drought, climate change Loss of alternative sources Mature trees
Tree species	Past decisions Selection criteria
Human	
Resident attitudes	Nuisance-ageing population Property damage-liability Vandalism, removal
Organisational	
Attitudes	Engineers, planners etc.
Source: compiled from participant interviews.	

'The other problem I have, this will sound strange, is the residents. Residents like trees, but they seem to have a passion for disliking the tree that's in front of their house. Because things drop leaves you see. And every tree has got problem, or a fault, or a branch that's fallen, or something like that. And it always seems to be the tree in front of their house, never the neighbour's tree. And trying to keep them happy.' E7

There are a number of street tree issues that must be dealt with by urban tree managers. The major issue emphasised is the human dimension of negative community attitudes to street trees. Residents are thought to be less tolerant of nuisance factors, especially leaf litter, and this can be linked to the ageing of the population, with older residents less tolerant of 'mess', and their ability to deal with it. Related factors include perceived property damage and associated liability issues.

'If you look at the complaints coming through the city here, it's that older generation that are house proud, and tidying up the trees mess has got beyond them' O4

Other key issues include tree-infrastructure conflicts, especially with hardscape and underground services, exacerbated in areas with narrow verges and constraints on space. According to one inner suburban participant:

'Probably the main area is the conflicts with infrastructure. We're very tight, we're inner suburban, we're dealing with narrow footpaths in the context of people who want a canopy tree. And it's not always possible' E6

And an outer suburban Council noted:

'The lack of physical space to plant trees, particularly in the verges is probably the biggest issue.' O2

ETSA pruning practices are a major concern, especially in bushfire prone areas.

'ETSA are a problem and they have always been a problem. Their disregard of correct pruning techniques, hiding behind the claim they must provide power to customers, at the expense of street trees, is false and irresponsible.' W5

Water availability is also an issue, in terms of the impacts of water restrictions, drought and climate change.

'I've found the biggest strain with the tree network, over the last 8 years, has been the climatic conditions. It's had a hell of an impact on streetscapes.' W6

Water restrictions have impacted on mature trees as well as tree establishment practices, seen partly as a consequence of past inappropriate (but unforeseen) species selection. A particular concern for street trees has been the loss of a supplementary water source from suburban front gardens.

'People used to water nature strips, and the grass areas their side of the fence. I think that moisture in a lot of instances got to the trees. Well that's been excluded from the equation and the trees are suffering.' W6

Constraints on street tree planting

Question: What do you see as the main constraints to successful street tree planting and establishment?

Table 5: Perceived constraints on street tree planting.

Constraint categories	
Physical	
Local conditions	Climate, soils etc. Character, urban form
Lack of space	Verge widths Authority constraints
Water	Restrictions-drought, climate change Species choice
Organisational	
Attitudes	Engineers, planners
Resources	Funding-budgets, best practices Staff-levels, training
Source: compiled from participant interviews.	

Different Councils experience different constraints depending on locational factors such as physical setting (soils, climate, coastal etc.) or local urban character. However, according to one participant the main constraint comprises:

'Resources, and knowledge, and standards.' O6

Some of the main constraints on street tree planting relate to internal organisational factors, in terms of internal resourcing. However staffing resources are seen as more of an issue than funding and budgets.

'Internal resources. Just the maintenance requirements. We are trying to play catch up to understand what we have out there and need to maintain and look after, and therefore in the future replace or plan for replacement.' W3

Staffing issues include staffing levels (especially for establishment and maintenance), staff skills and knowledge, and the adherence to appropriate standards and specifications.

'Most people planting a tree have some idea, but best practices are not always followed.' O6

Some participants expressed a preference to cut back on the number of trees planted in order to more successfully manage the existing tree stock.

Another perceived constraint comprises water restrictions associated with drought and climate change.

'The obvious one is water.' E1

An increasing lack of space for tree planting is also a constraint, due to narrowing verge widths and the constraints imposed by various authorities.

'The lack of space in verges for planting is a particular problem.' O2

And according to one Council:

'The trees don't have a chance-if we follow the letter of the law. Which we obviously don't, because if we did the tree wouldn't exist.' E7

Future threats to street trees

Question: What do you see as the main threats to the future of street trees in urban areas?

Table 6: Perceived threats to future street tree planting.

Threat categories	
Physical	
Urban development	General-space, hard surfaces
Urban infill	Street tree loss
	Driveways, services, reduced frontages
	Planning process
	Urban greening implications
New subdivisions	Verge widths
	Tree damage
Water	Restrictions-drought, climate change
	Mature trees
	Species selection
Human	
Resident attitudes	Nuisance, damage, vandalism
Organisational	
Planning and management	Priorities, funding etc.
Source: compiled from participant interviews.	

Two major factors were identified as future threats to urban street tree planting: water restrictions and urban development.

'Probably the biggest threat as I see it is the water restriction issue. Finding supplementary water for trees.' E6

Water restrictions, as a consequence of drought or climate change, and loss of supplementary water sources for street trees, are seen as a current and future threat to both new tree plantings and to established mature trees. Future climatic change is also seen as impacting on species selection.

'And the climatic conditions you have to take into account. The selection of trees to install is quite limited if the future trends are taken into account.' O4

The effects of climate change could also be more widespread.

'Increase in global temperatures - we've seen the effects of that already. If that is going to continue it will be even more difficult to establish our urban forest.' W5

The other main threat is seen as the nature of urban development: infill development in established inner urban areas, and new land division in the outer developing suburbs.

'Infill is probably going to be the biggest threat.' O1

Urban infill (or consolidation) is characterised by 'two for one' subdivision of existing allotments, reducing private tree cover, but also impacting on street trees. More and wider crossovers, additional service connections and reduced frontages result in the loss of existing trees, and a reduction in opportunities for future street tree planting.

'I find the amount of development is increasing, and so we are dealing with street trees being lost, and also limiting the number of trees in front of properties as they are being subdivided. And peoples preference for double driveways or crossovers, 6m crossovers.' W1

Issues associated with urban infill are seen as a consequence of the planning approval process in which individual street trees are lost, without consideration of their role and value in contributing to the wider urban forest, and pressures for increased rate revenue in Councils.

'I think there is an issue with the subdivision of blocks. There's no doubt about it, it's usually the tree that will suffer in something like this. That to me would be the number one issue for street trees. They are under pressure to get that through planning. It's more rates.' W4

The wider implications of this urban infill process were also raised. Urban infill leads to smaller allotments, with less private open space, and less vegetation and tree cover. This will place more pressure on Councils for the provision of open space and urban greening in the public realm, including streets. But at the same time, existing street trees are being threatened, and it is becoming increasingly difficult to plant large trees in streets. The problem is exacerbated by an un-coordinated approach to urban consolidation that fails to provide additional public greening to compensate for the loss of private greening. Instead urban infill occurs in an incremental fashion which does not consider the cumulative effects of individual decisions on the urban forest. For urban densification needs to occur it should be accompanied by a coordinated program of urban greening.

'And it's part of the government's 20/20 strategy to increase population through urban infill. So we've got that conflict coming in and we're trying to say, with the street tree, and they want big leafy green streets, how do you do that when you've got urban infill and you've got narrow footpaths.' W2

One participant summed up the situation as:

'Space and population: as the population becomes more dense we need more greenery for those benefits. But as the population gets more dense there's more pressure on space, more difficult to grow trees.' E4

In the developing outer urban areas the main threat is seen in the design and construction of new subdivisions. In these areas streetscape design and street tree planting are often undertaken by the developer rather than the Council. Developers are seen as being driven primarily by economic forces and may seek smaller allotments and reduced road widths to increase lot yields.

'With increasing urban development comes small blocks with narrow verges to get maximum block yield for the developers.' O2

Often the verge width will suffer under these pressures, with the needs of trees being given a low priority. This can result in reduced opportunities for tree planting, especially planting of larger tree species. Trees must also compete with the other services being squeezed into the available verge space.

'And the width of the verge itself has reduced. The road space now is seen as being a minimal thing. Developers try to maximise the size of the lots and squash the road and try and condense everything into a smaller footprint. Then trying to install the required range of infrastructure, from a developer's point of view, or from a provision point of view, stormwater, power, sewer, electricity, everything else, in a new subdivision tends to be underground, as

well as a footpath on top of the ground. It doesn't leave much opportunity in a verge width of approximately 2m, and that's it.' O4

Instances were also cited in which developers have prepared initial concepts which include extensive tree planting, but the trees and original intention become lost in compromises in the long and drawn out development process, where competing demands for space or budgets result in reduced provision for trees.

'Not just in Council, within the development industry too, trees are seen as a necessary evil in some instances. A cost for developers. You need to watch out you don't get them trying to cut costs at that end. Trees are still the afterthought, they're not front of mind.' O6

A related issue in new subdivisions involves damage to trees after installation. Developers often plant street trees at the same time as other street infrastructure is installed, to assist in the marketing of allotments. However, during the subsequent housing construction process trees are damaged, with builders and contractors using the verge as a de-facto work site.

'I believe the trouble often is that street trees are installed just after the road and civil works is completed, and before the houses are even finished, so they tend to get trashed during construction.' O2

And:

'The contractors see the verge as theirs, and if there is a tree in the road, then it's not big so it doesn't matter.' O4

Some Council's are interested in pursuing a tree bonding option, subject to legal approval.

Most viable practices

Question: What practices do you consider to be most viable to grow healthier trees in urban streets, or to reduce tree/infrastructure conflicts?

Table 7: Perceived best practices

Best practice categories	
General	Combination of things
	Getting the basics right
Planning and design practices	
Streetscape design	Increased space
	Opportunities-narrower roads, wider verges
	Long term costs-benefits
Tree pits	Increased rooting space
	Best arboricultural. practices-soil, mulch etc.
	Technical-trenching, root directors, guards etc.
Infrastructure	Priorities to trees
	ABC, CST
Water management	Mulching, additives, water-wells etc.
WSUD	Stormwater harvesting
	Permeable paving
	Subdivision design
Species selection	Matching tree and site
	Selection criteria
Planting & establishment practices	
Tree stock	Quality
	Size
Aftercare	Establishment
	Watering regime
	Formative pruning
Source: compiled from participant interviews.	

To many Council's there is no single best practice, but rather a combination of many factors, which:

'Would involve the accommodation of a lot of things.' W3

To others it is mainly a focus on getting the basics right, in terms of tree planting and establishment practices, rather than elaborate technical solutions.

'So just doing the right planting.' E3

Many Councils therefore focus on best practices in terms of tree stock selection, planting practices and aftercare. Improving the quality of planting stock is seen as requiring a more critical approach to what is accepted, and building long term relationships with growers and suppliers.

'Selection, first and foremost. That's where we are falling down at the moment. I'm saying to blokes, don't just take delivery, go and pick them up, go and have a good look.' E7

Aftercare is also considered critical.

'Again planting I think can make a lot of gains just in getting the right process. It's like children- the first formative years are important. You get it right and from then on the tree will be a good tree.' E7

The two key aftercare concerns are water management and formative pruning:

'And again a proper maintenance regime particularly with water requirements.' O3

'Formative pruning's the other one. Just getting it right for the early stage. That early, timely formative pruning will save you dollars down the track.' E7

In terms of design practices, the major concern is to provide trees with more space in the design of the street. There is a need to provide realistic space based on the future size of the tree to minimise future conflicts.

'We try and give the tree as much room as we can. That's the key. Not trying to put a square peg in a round hole.' E3

Particular attention needs to be given to the provision of adequate space around the base of the tree.

'The ideal would be to create more growing space around the trunk.' E6

One option with potential is the creation of wider verges by narrowing traffic lane widths.

'I think, narrower streets with wider verges.' E7

Trees should also be afforded equal priority with other street infrastructure in the planning process.

'As long as they give us the space to grow trees. It's the trouble we seem to have, when you put your sewer, gas, electricity and everything else in. There should be an ideal design where they can put all that stuff out in the road, and give us room to plant our trees. They should plant the tree first and then put everything else around it somehow.' O1

Allocating more space is also seen as an investment in terms of reducing long term costs.

'Recognition that if you plant a tree you get a certain level of management, maintenance costs associated with it. But if you can't get a tree in there and give it enough room, you will get issues with it.' E2

Provision of adequate space also extends below ground, in terms of providing adequate root volumes, appropriate soil preparation and using best arboricultural planting practices. Mulching and the use of additives such as Terra-cottem are also mentioned. Technologies such as root directors, structural soils and tree guards can also play a role in more confined urban settings.

'For me it would be the below ground space, opportunities. You can consider everything at surface level. But it's that whole below ground infrastructure you have to look at. The tree needs to establish a root network to support itself structurally, but also health wise. If we can try and provide something in that sense to develop a root base that is healthy, the tree will survive and cause less impacts into its environment, where the built form doesn't give much space for tree installations.' O4

There is also a high level of interest in the possible application of Water Sensitive Urban Design (WSUD) techniques, particularly the use of practices which can provide trees with additional water sources in the face of the stresses imposed by water restrictions, drought and climate change. Two approaches of interest are stormwater harvesting and the use of permeable paving. Techniques need to be developed to divert road runoff to tree pits.

'Ideally get all that water running off roads and doing something more productive and efficient is essential.' W5

More extensive use of permeable paving can also dramatically increase infiltration into the sub-soil.

'Ideally - have a surface that is permeable so that more water is absorbed by the tree stock.' W2

Factors preventing the adoption of best practices

Question: What factors do you consider may prevent or limit the adoption of these practices?

Table 8: Perceived factors preventing adoption of best practices.

Limiting factor categories	
Organisational	
Resources	
Lack of funding	Budgets Costs- of maintenance, best practices But will still plant trees
Staff	Skills Turnover
Knowledge	
Lack of knowledge	Knowledge of best practices Knowledge of engineers etc.
Lack of awareness of benefits	Strategic level, elected members Engineers, planners Asset managers Community
Management practices	Priorities Change resistance Lack of forward planning
Externalities	Role of developers Role of service authorities Future liability
Source: compiled from participant interviews.	

According to one inner suburban Council:

'I think it's a testing time over the next 5-10 years for the urban forest' E6

The main obstacles to the adoption of best practices are seen as relating to internal Council organisation. The two key factors identified were: a lack of resources to implement best practices; and a lack of knowledge and awareness by others who may influence the tree planting process. Council resource issues cover two broad areas: funding resources and staff resources. Funding includes consideration of costs, budgets, maintenance and the cost of implementing improved practices. However cost is not always seen as a factor which would realistically prevent future tree planting.

'At the end of the day, it would probably go down to costing. Cost is always a factor. But I don't think it's going to limit us.' E3

And:

'Money? It's not that - if the organisation thinks it is important it will find the money, move it from other budget areas.' E2

Staff issues are considered significant, including a lack of adequate training, staff turnover, continuity and the role of contractors.

'I've tried training at the depot. It's a cultural thing as is often the case these days. It's a matter of getting to them to actually understand.' E7

'It's difficult because the minute you get someone on the right track they leave. It's a never ending battle.' E7

To many tree managers, lack of education and knowledge by others is seen as the key obstacle to improved practices. This includes the need to educate other professions, such as engineers and planners, about basic tree requirements.

'And educate the engineers too about how they can modify a few areas of their design to accommodate your design. And here they are open to different ideas.' E1

And also awareness of what does constitute latest 'best practices' particularly through sharing of knowledge between Councils.

'How it all works: are there other Councils undertaking these practices that you can get information from?' E1

Another key factor is the widespread lack of education regarding the benefits delivered by street trees. This includes at the strategic level of directors and elected members, and at the operational level of planners, engineers, and asset managers.

'Education ... Information needs to be consistent and directed at the engineers and managers together with our elected members. If you have them on board you have a better understanding and a more sympathetic ear.' W5

Education of street tree benefits also needs to be directed to the wider community, to offset perceived negative attitudes to trees. One suggested answer is the use of demonstration projects.

'Maybe the answer is committing to one particular project and showing that as an example, you set the trend from that point on. It never ceases to amaze me how people have differing views on trees.' E7

Other limiting factors relate to Council organisation and priorities:

'From a Council perspective, only ourselves prevent or limit the adoption of the practices.' E5

Obstacles include engineering driven priorities in which trees are an afterthought, a dominant civil design culture, lack of flexibility and an asset management focus.

'People treating trees as an afterthought and not getting any professional advice on how to do it properly.' O6

'We are like most Councils: the priority has been on the engineering focus. Trying to flip that around: it's the big challenge that we face.' E6

'There's a huge push in local government for asset management plans at present. That's about maintaining your assets. It's fundamentally hard infrastructure related. I'm not sure trees even have to be looked at as part of the asset management plan. So there you are almost

going against what the arborists and horticulturists want, which is that priority given to trees.'
E6

A related issue includes organisational resistance to change.

'Conservative nature of local government-in terms of what ifs and finances. Legitimate concerns, need data.' E4

To some, street tree requirements need to be mandatory (as is the case for other types of infrastructure), rather than merely optional.

'It's got to be mandatory - in the specifications.' O6

Finally there are also some other limiting factors outside of the Council organisation which are less directly managed. One of these is the role of service authorities.

'However we always seem to fight with the service suppliers, the Origin's, ETSA's, Telstra's, the kerb and gutter guy.' That sort of thing that can undo so much good work.' E5

Another externality is that of dealing with developers whose main focus may be on costs.

'I think cost is often the biggest one. The lot yield of areas by developers who want to maximise their yield. Because they are responsible for putting in the infrastructure, there's a huge cost of developing land. So that's the biggest issue, the financials.' O2

Conclusions

Street trees are seen as providing the city with a wide range of environmental benefits, especially shade. However, from the point of view of residents, the most obvious benefits are visual, in terms of creating attractive and appealing streets and suburbs. On the other hand, street trees can be associated with a number of problems, especially negative community attitudes to 'mess' and related issues, especially amongst the ageing population. Street trees are also involved in conflicts with urban infrastructure, both hardscape and services, both above and below ground (notably with electricity service providers).

A key constraint on street tree planting relates to Council resources, not just funding, but importantly human resources. Some Council's cite a need to cut back on planting levels to focus on more effective management of their existing tree stock. Lack of space in urban streets, both above and below ground, is also a constraint, with narrower verges and competition for space with a range of other authorities. Water restrictions, as a consequence of drought or climate change, are also a constraint on tree planting and on the survival of mature trees. Lack of water is also seen as a potential threat to the future of the urban forest. The other main threat is urban development itself, both urban infill and new subdivisions. Infill development results in loss of existing trees and loss of opportunities for future street tree planting. In new subdivisions there may be a reduction in space available for street tree planting, especially larger trees, and damage to trees planted at the same time that other street infrastructure is installed. A more coordinated approach is required to ensure that urban greening occurs alongside urban densification.

Best practices which should be adopted would include a combination of many factors, rather than one 'silver bullet', as well as the need to 'get the basics right'. Better planting and establishment practices include the selection of better quality tree stock, and appropriate aftercare including watering regimes and formative pruning. Urban streets also need to be designed to provide more space for trees. And trees should be given at least equal priority to other forms of street infrastructure. Considerable scope is also seen for the more widespread adoption of WSUD practices, especially the diversion of urban stormwater to street tree pits, and increased use of permeable paving. Many of the factors which may limit or prevent the adoption of these practices are seen as being part of internal Council organisation, in two key areas: resources and knowledge. Funding is a constraint, but few Council's envisage that lack of funding would limit or prevent future tree planting, if trees remain a priority with the community. Lack of knowledge by others is a key factor, both of the requirements of trees, and the benefits they deliver. This includes elected members, staff such as engineers, planners and asset managers, and the wider community.

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