Planning, climate change and the value of trees

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THE VITAL ROLE OF TREES IN COPING WITH CLIMATE CHANGE

During the summer of 2019-20 bushfires, cities experienced very high levels of particulate matter (PM) pollution from smoke

- Many Australians were surprised that cities (Sydney, Melbourne, Canberra) had for days the world's poorest air quality
- Trees are important in filtering chemical and PM pollution
- Deciduous and evergreen species make their contributions

How often does the much-criticised London plane (*Platanus x acerfolia*) get recognition for its removal of PM from urban air? It can cause irritation, usually for short periods of time, but is this cost justified in terms of the benefits that the species provides?

COVID-19 LESSONS FOR CLIMATE CHANGE

- Fascinating to watch the use of public open space during the Covid-19 lockdowns.
- This was the time when importance of treed public open space for:
  - for human mental and physical health
  - general well-being
  - coping with the stressful situation in which many found themselves
  - coping with the increased risks of self harm and domestic violence
  - the learning environments for students
  - the potential development issues for pre-schoolers

gained major public attention

COVID-19 LESSONS FOR CLIMATE CHANGE

- With active recreation postponed, passive recreation became the physical activity with local parks and walking tracks packed.
- Not every suburb or every region is well served by treed open space.
- The most impoverished sectors of societies are the most disadvantaged in their access to and use of treed open space
- This links to obesity, poor physical/ mental health and social disadvantage
- During covid-19 lockdowns, it is likely that the most disadvantaged members of the community were further disadvantaged and subjected to higher levels of stress, because of a lack of accessible treed open space.
- There is evidence that greater health benefits accrue to disadvantaged communities from the provision and use of treed open space and that its provision can be a mechanism for addressing social inequality

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COVID-19 LESSONS FOR CLIMATE CHANGE

- Treed open space meets human physical, mental and psychological health needs
- These originate in the impact of locomotion on human evolutionary development
- Going through large, connected greenspace engages many senses – sight, hearing, smell, and perhaps taste and touch – at once
- This activates parts of the brain and hones spatial problem solving skills
- Finding your way requires purpose, planning and patience as well as a knowledge of the space and perhaps memory if you have travelled there before
- This is multi-tasking *par excellence,* but requires large, biologically complex space

COVID-19 LESSONS FOR CLIMATE CHANGE

- This is multi-tasking *par excellence,* but requires large, treed biologically complex space
- these experiences facilitate full human development from infant to adult
- Activities that place high demand on people stimulate the brain's many dopamine secreting neurones impacting on motivation, attention and persistence

COVID-19 LESSONS FOR CLIMATE CHANGE

- The lockdowns began in autumn, but what happens if they had occurred during summer (or continued into summer of 2020-1)?
- The importance of trees and shade would have been greater
- Is there sufficient cover and shade in parks, linear reserves and urban streets?
- Anything which leads to a reduction in canopy cover may come at a price:
  - greater risks of skin cancer and melanoma
  - a reduction in recreational activity
  - an increase in associated health risks

What this reveals is the need to have thorough, realistic cost:benefit analysis in terms or retaining and increasing canopy cover and factors driving its reduction

COVID-19 LESSONS FOR CLIMATE CHANGE

- Public open spaces served their purpose admirably during Covid-19
- Given the opportunity and with proper planning they will do so again in enabling cities to cope with climate change
- If cities and suburbs keep losing green space and canopy cover then their capacity will be limit and society will be the loser

There is concern that in tight economic circumstances following Covid-19, one of the first areas subjected to expenditure reduction will be parks, gardens and greenspace

The reason for voicing such a fear is because there is a history of such cuts in the past by those who do not understand the value of green infrastructure. By raising an alert now, perhaps such a short-sighted outcome can be avoided

THE VITAL ROLE OF TREES IN COPING WITH CLIMATE CHANGE

- As it gets hotter, there will be an increase in extremely hot days; a doubling in days above 40°C in some cities
- Air conditioners will be increasingly used to make homes liveable
- Increased electricity consumption, and greater carbon footprint
- With electricity prices soaring, it adds to family fuel bills

Two medium-sized trees (8-10m tall) placed to the north and/or north-west of you home can reduce the temperature inside your home by several degrees and save you in excess of AUD$200 per year

They also sequester carbon and extend the life of paint on your walls

Economic value of trees in providing outdoor shade for schools, universities and other public buildings.

	Shade sail Replacement Option
Cost of shade sail (50m^2 and support poles) AUD$	5000.00
Number of shade sails required	1
Useful life of shade Sail (Years)	10
Value of shade provided by tree over 10 years AUD$	5000,00
Value of shade provided by tree per annum AUD$	500.00

Economic value of trees in stabilizing a house site from landslip.

	Piling Replacement	**Amortisation of Value from 5 trees over 50 years**
Number of trees	5	5
Cost of Piling (AUD$)	50,000.00	50,000.00
Total value of 5 trees	50,000.00	1000.00 per annum
Value per tree per annum	1000.00	200.00

Economic value of shade for an urban street lined by 100 trees prolonging the life of bitumen.

Approximations used	**Value**
Estimated length of street (m)	**500**
Width of road surface (m)	**7**
Area of Bitumen road surface (m^2)	**3500**
50 trees on each side of the street so total number of trees	**100**
Shade from an individual tree canopy (m^2)	**75**
Area of bitumen shaded by tree canopy, estimated at 33% of total (m^2)	**37.3**
Total area of bitumen shaded by tree population of 100 trees (m^2)	**3,730**
Cost of resurfacing bitumen per m^2 (AUD$)	**450.00**
Total value of extending the life of the shaded bitumen from 20 to 30 years due to the 33% shade from 100 trees (AUD$)	**1,678,500**

Gross Annual Benefits from an Adelaide Street Tree

BENEFIT CATEGORY	Value	
Energy Savings	$64.00	
Air Quality		
CO2 (reduced power output)		$1.00
Air Pollution		$34.50
Storm Water		$6.50
Aesthetics/others		$65.00
Repaving Savings	?	
Estimated Gross Benefits	$171.00	

These estimates were made in 2002.

A more recent estimate in 2009 put the value at $424.00.

The estimate has more than doubled in 7 Years

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Carbon lost and its value for pruning 100 mature urban trees canopies.

Approximations used	**Single Tree**	**100 Trees**
Average weight of whole tree (above and below ground components (t)	**100**	
Amount of carbon sequestered in each tree (t)	**13**	
Amount of carbon sequestered in the canopy of each tree (t)	**6.5**	
Amount of carbon lost if 30% of canopy pruned from each tree (t)	**1.95**	**195**
Amount of carbon lost if 20% of canopy pruned from each tree (t)	**1.30**	**130**
Amount of carbon lost if 10% of canopy pruned from each tree (t)	**0.65**	**65**
Value of 1tonne of carbon $AUD	**23**	**23**
Value of carbon pruned from 100 trees when 30% pruned (AUD$)	**44.85**	**4485.00**
Value of carbon pruned from 100 trees when 20% pruned (AUD$)	**29.90**	**2990.00**
Value of carbon pruned from 100 trees when 10% pruned (AUD$)	**14.95**	**1495.00**

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It is not just the above ground parts of the trees that provide benefits and services

Roots and mycorrhizae:

- Sequester large amounts of carbon
- Consolidate soil and reduce soil erosion
- Reduce risks of landslides

Roots have an economic value just as stems and branches do

Is 30% an arboricultural magic number?

For those looking for a simple message in numbers, 30% tree canopy cover seems to hold some special magic:

- A forest is defined by a tree canopy cover of or greater than **30%.**
- To maximise the benefits that canopy can cover in terms of environmental services a canopy cover of or greater than **30%** is required.
- When people visit a suburban block there is an increase in property value when trees are present, until the cover is **30%** or greater and cover higher than 30% sees a decrease in value of the property.
- The target canopy cover for urban cities in Australia, under current climate change scenarios should not be less than **30%.**

There is a recurring pattern in this declining canopy cover across Australia.

- cover on public land is relatively stable and
- local governments have policies seeking to increase their tree canopy cover
- despite this, overall canopy cover is falling.
- In some instances virtually every available space in public open space for tree planting is occupied
- due to tree losses in urban and suburban private open space (in-fill development, along roads and in heavily urbanised districts)
- the number of trees and their canopy cover declines

Tree Removal Request data:

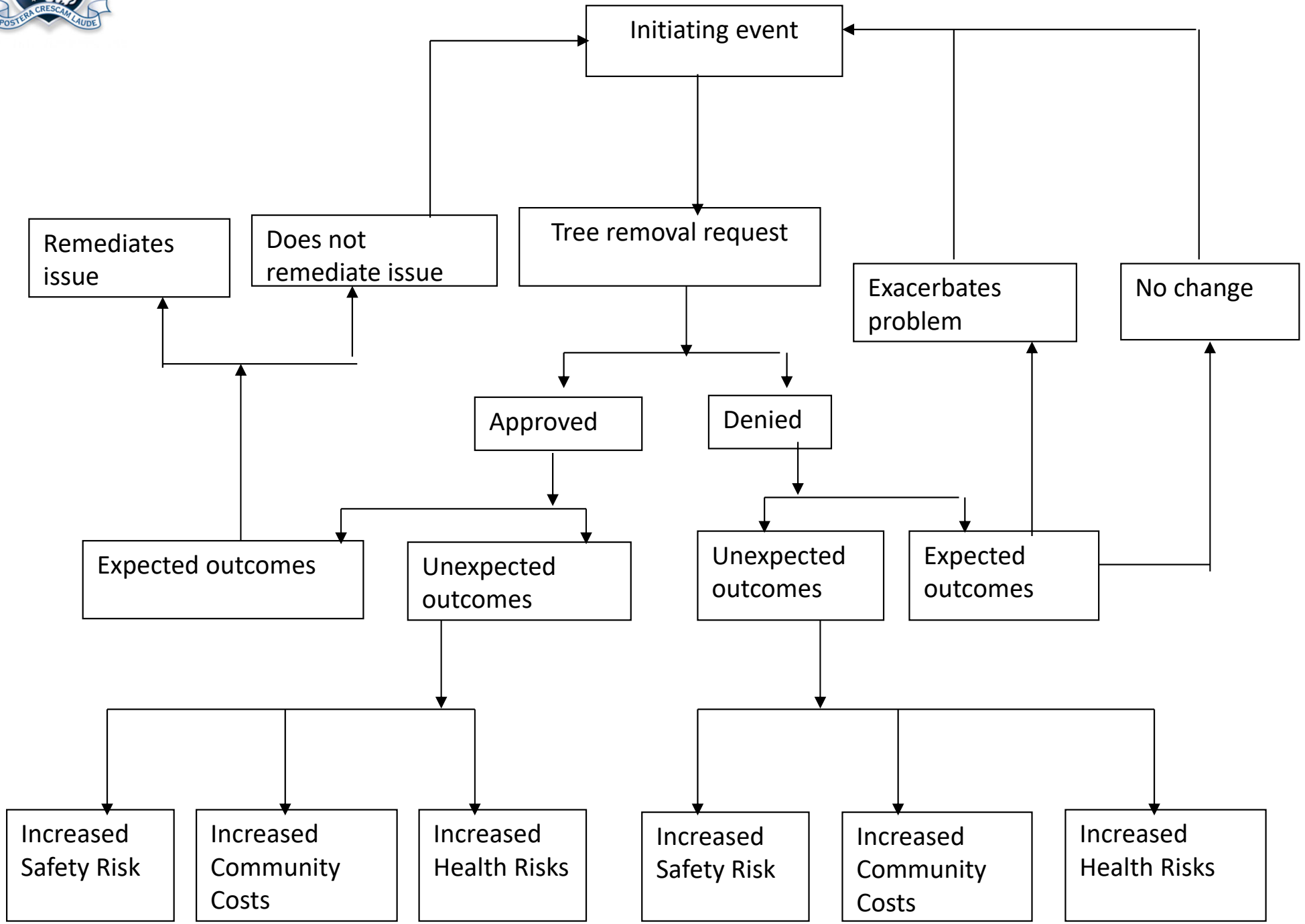
- On a national basis 97% of the requests made to local governments are approved. Not necessarily at the first request, but eventually.

- For Victoria, the data are better, 95% of tree removal requests made to local councils are approved.

- The commonly voiced assertion that local councils prevent citizens/owners from removing trees is not supported by the data.

- Many people assume that they will be denied a tree removal permit and simply don't apply. They then claim that they have not been able to remove a tree.

Decision making protocol in response to a tree removal request, showing possible expected and unexpected outcomes



An all too common Tree versus Development scenario:

- An all too familiar scenario unfolds when a significant tree is threatened with removal for urban development
- or is poorly managed during such development
- The local community objects.
- However, if the tree is not protected by inclusion under a planning overlay or other relevant city ordinance, there is little that can be done to protect the tree
- Even if local government is supportive of such action.
- A planning overlay is the first step in legal protection and without it other and higher legal redress is usually unavailable.
- An appeal to VCAT will normally fail, because the tribunal will adjudicate on whether procedure has been followed
- VCAT will not rule on the merits of protecting the tree
- Attempting to protect a tree after development has been approved usually fails

Protecting trees and managing urban development:

- The legal framework that affects trees during urban development has changed several (many) times over the past 30 years

- Heritage Victoria legislation affords good protection to trees that are listed, but there are only a small number of trees protected in this way (about a dozen, nominations but some have many trees such as Avenues of Honour)

- The National Trust Register of Significant Trees provides moral but not legal protection

- Local government registers only protect trees when they are included in planning codes and overlays

- Today the best way of protecting trees is to protect them by inclusion on council planning overlays

- Although data are hard to come by, parts of greater Melbourne are losing about 1-1.5% canopy cover per annum

- Most of this loss of trees is from private open space (front and back yards) rather than public open space, such as parks, gardens and streets

- About 95% or tree removal requests are ultimately approved in Victoria

Ignorance → Inaction → Negligence?


POSTERA CRESCAM LAUDE

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Total number of registered entries	**1194**		
Total number of trees	**22500**		
Number of entries on Public (Crown) land	**400**	**Parks and Gardens**	**102**
		Botanic Gardens	**86**
		Forests and Bush reserves	**49**
		National Parks	**10**
		Schools	**8**
		Avenues of Honour	**18**
		Cemeteries	**18**
		Creek/River reserves	**45**
		Highway/Road reserves	**50**
		Local Government reserves	**10**
		Railway reserves	**4**
Number of entries on Private land	**794**		
Number of entries removed due to tree death	**97**	**Known Natural Cause**	**38 (39.2%)**
		Property Development	**7 (7.2%**
		Cause of death unknown	**52 (53.6%)**
State level of classification	**471**	**Level of classification as %**	**44.5**
Regional level of classification	**587**	**Level of classification as %**	**55.5**

Drawing the Battle lines:

In Victoria, there is legislation that affords protection to native vegetation that is growing in undisturbed regional and rural landscapes. The legislation may apply to some peri-urban development.

There is no specific legislation that protects trees in urban areas (Common law and Property law may be applied)

In the absence of specific State legislation, protection can only be provided by local government agencies. This is usually done under the auspices of Planning Schemes and Planning Overlays

Protecting trees and managing urban development:

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The Role of the National Trust's Register of Significant Trees

The National Trust of Australia (Victoria) launched the Register of Significant Trees in 1981, with the following purposes:

- to record significant trees in a logical and systematic manner
- to establish an inventory of such specimens with the aim of
    - improving their management,
    - protecting them
    - and, where possible, extending their life spans.

- Criteria for the inclusion of trees were established
- Trees can be classified at different levels of significance - local, regional, state or national.
- In practice the Register of Significant Trees has only classified trees on the basis of their state or regional significance within Victoria.

The chair of the Committee of the Register of Significant Trees has on several occasions over the past decade written to the Mayor and Chief Executive Officer of every local government in the State of Victoria advising them of the significant trees growing within their jurisdictions.

In these letters, a request has been made that significant trees should be protected under the planning instruments that are available to local government – in the State of Victoria these are by planning overlays. Such overlays provide a significant level of protection for listed trees under the State's legal system.

Sadly very few councils protect trees in this way

- In Victoria, there is no legal protection afforded by the tree being classified by the National Trust

- Lists are regularly sent to relevant authorities such as those dealing with roads and services such as water, gas, electricity and communication.

- This affords some level of protection against inadvertent damage by those undertaking works, who may not be aware of the significance of the trees.

- Furthermore, once classified there is a level of political protection and moral persuasion that sees significant protection given to many specimens.

The large scale tree removal scenarios in Victoria

- Tree clearances for roadworks.
- Utility company tree removals and pruning for service access and provision.
- Tree removal under the guise of “fire protection “ even it the trees are growing in situations where there is no real fire risk.
- Urban development and subdivision for housing and facilities.
- Trees removed because of an insurance based obsession about risk and hazard, rather than a real assessment of risk

Some of the major sites of urban tree battles

Threatened Trees	Outcomes
Punt Road Trees (1980s)	50 out of 55 trees preserved
Bacchus Marsh AoH (several occasions since 1980, mainly road works	Root damage but most trees preserved
Flinders Park	Most trees lost
Albert Park (Grand Prix)	Many Trees lost; some in poor condition
Ballarat AoH Intersection work (at least two occasions for road works)	Most Trees preserved
Flinders Park for tennis centre	Many trees lost
City Link Tunnel, Yarra banks	Trees lifted and then re-planted
VicRoads, Statewide road works	Many trees lost; a few saved
Suburban development	Most trees lost, some fines applied
Freeway construction	Many trees lost

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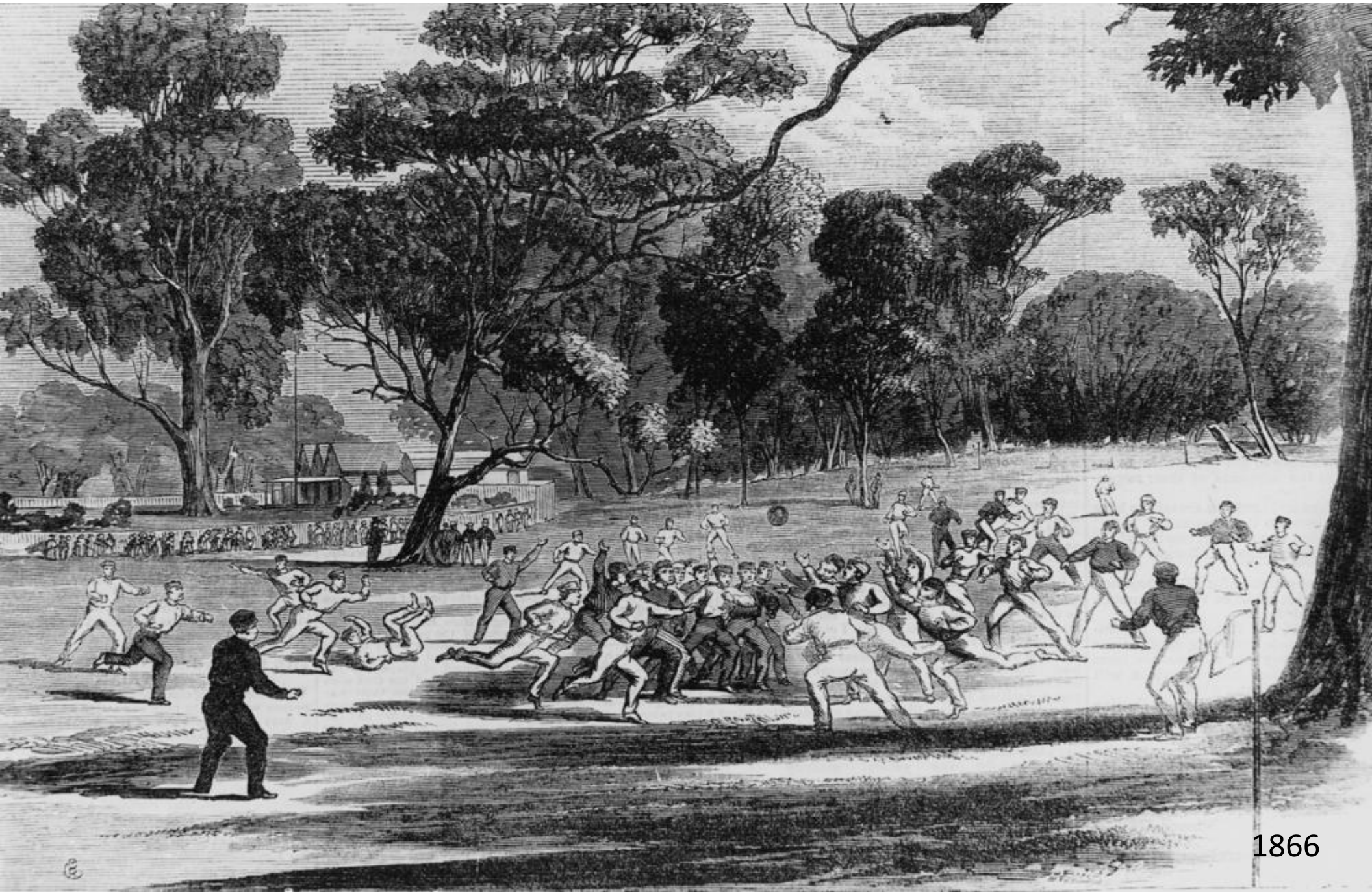

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CITYLINK:

- The Citylink tunnels under the Yarra involved a cut a fill component, which would see a number of trees along the Yarra bank, particularly near Olympic Park, removed
- Because of the protest and political hassles related to the Grand Prix and Albert Park, the government decided to minimise the tree losses
- On the Olympic Park side, 7 mature elms were lifted and stored in Olympic Park and later planted back along the River. They are still there.
- On the south side, a slight relocation of the tunnel allowed the preservation of one of the mature eucalypts.
- Fifty young trees were also planted in the vicinity of Gosch's paddock as insurance in case the relocated trees did not survive.

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NATIONAL TENNIS CENTRE:

- Flinders Park was largely lost as a result of the development of the National Tennis Centre

- A large number of trees have been lost from the site since its initial development

- Not all losses were intentional. The elms in front of the main stadium were intended to be part of the architect's design for the entrance of the centre, but were lost during construction.

- Birrarung Mar was to be some compensation for the loss of parkland and is a potentially fine piece of public open space, but the treatment of the riverside elms during and after construction has left many unnecessarily stressed and damaged.

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NATIONAL TENNIS CENTRE:

- Birrarung Mar was to be some compensation for the loss of parkland and is a potentially fine piece of public open space,

- The treatment of the riverside elms during and after construction has left many unnecessarily stressed and damaged.

- Even the current situation only happened after the intervention of MCC staff with arboricultural and horticultural expertise – the trees could have been in a much worse situation