

Living Stream Lite

A decision support tool for tree planting on Water Corporation drainage assets.



NatureLink Perth

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Purpose of Guide

This guide is a decision support tool for local government and Water Corporation staff tree planting on Water Corporation drainage assets. This tool helps to identify the lowest risk methodology for choosing the right tree, to be planted in the right place, with the right maintenance considerations. The use of this tool will help to identify the suitability and intern additional resources required for local governments that look to Water Corporation drainage sites as part of their solution to tree canopy improvements.

Trees are an essential part of Perth's urban fabric and provide significant social, economic, and environmental benefits to the community. Furthermore, the impacts of climate change have driven the increased importance of planning for improved green spaces in our communities. Local governments have asked how they can increase their urban tree canopy in Water Corporation drainage systems, and this decision support tool helps facilitate that response. The Corporation is now working with stakeholders to facilitate tree planting on Water Corporation land. In considering proposals from local governments, the Corporation strongly supports the need to adapt to our changing climate, but at the same time needs to ensure the efficient and effective management of drainage services.



Figures. Before and after Melaleuca tree planting in Stan Twilight Reserve, Rockingham. Followed by an image taken in Forrestdale showing a desirable outcome of tree planting, creating shade, amenity and habitat.

The following information sets out the responsibilities and processes involved in guiding local governments to plant Melaleuca tree species along Water Corporation drains. The tool does not replace any existing standards including DS66 and legal requirements and has been developed in the spirit of supporting an increase in urban tree canopy.

This support tool is for use where tree planting and ultimately canopy is the primary focus, and living streams are not a viable option. It is recommended that local governments discuss their proposed approach with the Liveable Communities team at the Water Corporation. The team can be contacted at: liveable.communities@watercorporation.com.au

Responsibilities of Local Government and Water Corporation

Local Government

- Fund supply, installation, and maintenance of all trees.
- Develop a Memorandum of Understanding (MOU) covering the maintenance of any trees installed over their lifespan.
- Develop an appropriate inspection and maintenance program for the trees (expected to be equivalent to the council's verge tree program).
- Ensure appropriate insurance and liability cover is in place for all trees.
- Ensure all fire and security matters are considered as part of the proposed location of tree planting.
- Document safe working requirements for the installation and maintenance of trees, as well as working within the drainage corridor.
- Remove all trees and tree matter at End of Life (EOL) (where tree is in senescence and is considered unsafe).
- Comply with other local, state, or federal approvals as required by regulation and laws.
- Has the capacity and capability to partner in the program.
- Whilst reasonable efforts would be made by the Water Corporation to maintain the trees, the Local Government agrees that trees may be removed by Water Corporation for future asset works.
- Contact the Liveable Communities team at the Water Corporation.
- Submit an [Asset Protection Risk Assessment \(APRA\)](#) and [Clearance to Work \(CTW\)](#).

Water Corporation

- Review the prospective installation locations.
- Review the Asset Protection Risk Assessment (APRA) and Clearance to Work (CTW) applications for approval.
- Ensure any trees installed are not removed by Water Corporation, except where required for safety, asset operability or upgrade, or fire management purposes.
- Report any maintenance issues to the relevant Local Government.
- Project sites are housed under a single agreement with the Water Corporation, rather than creating a new application for each individual site.

Planting Approval and Clearance to Work

- Read the information required in the tool and undertake necessary desktop analysis and site visits to understand the most suited locations.
- Undertake a dial before you dig and apply for all other normative activities for street tree planting in your local government.
- Undertake community engagement if required.
- Collate site photos, project safety plan and the latter grading systems.
- Apply for approval to work near Water Corporation assets.
- If approved, the permit will identify the requirements before and during tree planting.

Considerations by Local Government to Reduce Risk

1. Maintain Function of Drain

The design purpose of stormwater drainage systems is to protect housing and infrastructure up to the 1:10 year storm event (*note*. local governments are responsible for protection above this level and sometimes this is achieved through the same drainage corridor). The planting of trees should not compromise the flood protection provided, nor should the trees impact the short or long-term function of the drainage system.

2. Maintain Safe and Efficient Serviceability

To ensure stormwater systems can function to their full capacity when required, the Water Corporation requires access to maintain the hydraulic capacity. The planting of trees should not compromise the ability for this maintenance work to be carried out safely and efficiently.

3. Manage Land Agreements and Insurance Risk

The Water Corporations land portfolio is composed of Crown land, freehold land, and land owned by other agencies with easement rights provided. The appropriate access arrangements are therefore required to allow local government access to sites for planting and ongoing maintenance requirements. Access agreements for planting and maintenance, as well as risk and insurance responsibilities, should be clearly defined prior to the planting of trees.

The likely level of effort required to negotiate land matters in the context of this initiative, may be categorised as follows:

Low – Land with which the local government already has access.

Medium – Land that is currently owned by Water Corporation (freehold)

High – Crown land with which the local government has no current access rights. Requiring approval through Department of Planning, Lands and Heritage, with a processing time of 12-24 months.

4. Engage Community

Local governments are closest to their communities and are therefore best placed to make decisions on socially acceptable locations for tree planting. Wherever possible, tree planting should take into consideration the concerns and requirements of the local community and adjacent land holders.

5. Protect Existing Assets

The Water Corporation owns and maintains both below and above ground assets that provide critical services to the local community, including drinking water, wastewater removal, and stormwater conveyance. Tree planting should not compromise the structure or function of any existing asset, nor impede the safe and efficient replacement of these assets at End of Life.

6. Manage Safety

The existing risk profile of the drain should be maintained to ensure the safety of existing assets and the local community. This includes consideration of the fire risk within the system, Bushfire Attack Level (BAL) rating implications for neighbouring infrastructure, and Crime Prevention Through Environmental Design (CPTED) requirements. The planting of trees should not alter the risk profile of Water Corporation owned or managed land, and trees should be maintained to preserve the risk profile over time.

7. Maintain Trees

Trees have maintenance requirements to mitigate safety risks and ensure their establishment and longevity. The location of trees, once planted, should be the responsibility of local government.

Site Suitability Criteria for consideration by Local Government

The local government should use the criteria below to identify site suitability for cost effective tree planting. The total number of criteria marked with a tick (primary and secondary) categorises the site as simple, moderate, or complex. All primary criteria must be addressed to proceed. Once the suitability has been assessed, the Water Corporations Liveable Communities team must be contacted.

Following site suitability assessment and discussions with the Liveable Communities team, the local government should consider if the site provides a suitable value proposition for tree planting.

Primary: Drain Functions and Maintenance

- There is a safe location to plant the trees above the 1:10 year modelled drain level at the prospective site. Note: the preference is to be above 1:100.
- There are no current sediment or hydraulic capacity challenges with the prospective drain.
- Vehicle/Excavator access through the prospective site can be maintained along one side of the drain following tree planting, and this access is clearly defined.
- The size and shape of the prospective site is such that pedestrian access can be maintained following tree planting.
- The prospective site is of sufficient width that tree planting can be carried out as per spacing guidelines to prevent infrastructure interaction.

Secondary: Safety

- The land of the prospective site is not categorised as bush fire prone (as per DFAS [Map of Bush Fire Prone Areas \(slip.wa.gov.au\)](http://slip.wa.gov.au))
- There is no significant ground cover or understorey vegetation present at the prospective site → OR, if present, ground cover/ understorey vegetation is well maintained.
- Planting can be carried out as per spacing guidelines of the Crime Prevention Through Environmental Design (CPTED) requirements.

Simple	Moderate	Complex
Drains that possess no or few elements of complexity, that require no additional planning or consideration. These drains can be considered directly suitable for this program.	Drains that possess some elements of complexity and require some additional planning or consideration. These drains can be considered suitable for this program where additional issues are addressed.	Drains that possess many elements of complexity, that require much additional planning and consideration. These drains would not be considered suitable for this program.
10	6-9	≤5

Examples of suitable site locations


SIMPLE



SIMPLE



LEGEND

B = Baseline flow level 1:10 = 1:10 year storm event water level 1:100 = 1:100 year storm event water level  = Planting location

MODERATE



COMPLEX



Tree planting requirements

Planting considerations by Local Government

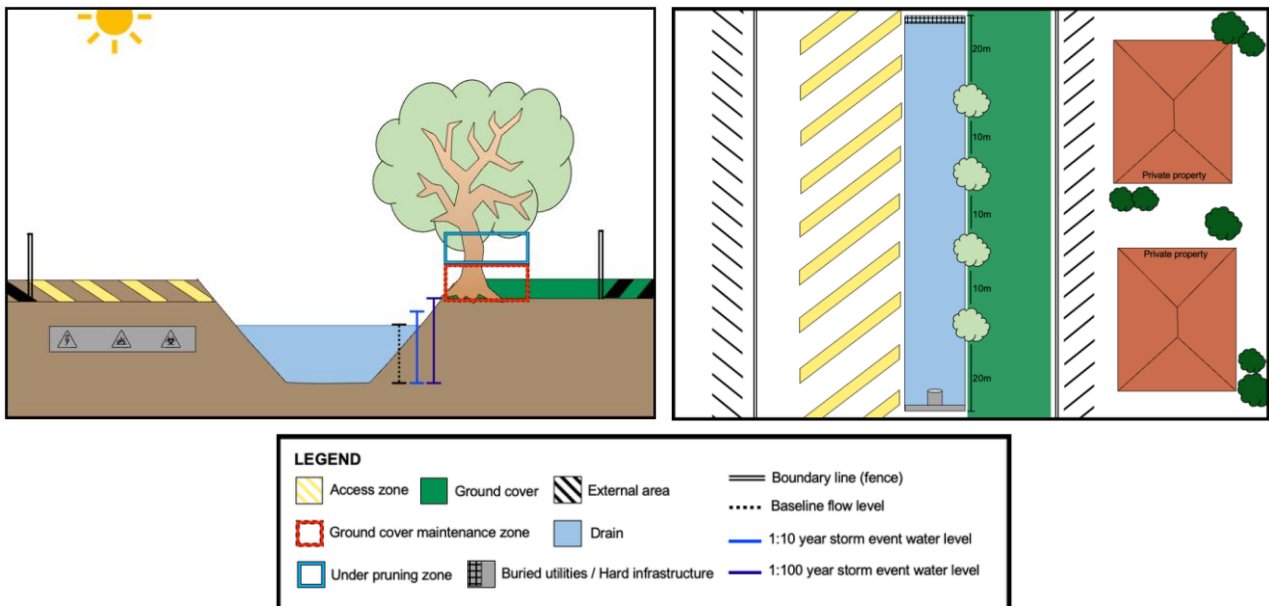
- Limited to a single side of the drain (to provide a side for drainage maintenance)
- Not to occur on any side where there is buried infrastructure (e.g., sewerage pipes)
- Minimum setback of 15 metres from any underground Water Corporation infrastructure.
- Minimum 15 metre offset from any above ground Water Corporation hard infrastructure, including pipes, inlets, outlets, drop structures, and buildings.
- Above the 1:10-year storm event water level, with a preference above the 1:100-year storm event level (noting the flood event is the responsibility of the local government).
- Minimum spacing intervals of 10 metres between trees
- Appropriate size when planted (e.g., >140mm pots, not tube stock), marked with guards and/or staked as required.
- Adequate firebreaks within tree planting corridors based on local risks.

Visual Guide

Below is a vertical cross-section and aerial view of a typical Living Stream Lite design.

Key areas to note are:

- How to identify preferred tree planting and drainage access sides of drain.
- Planting of trees above 1:10 year storm event water levels.
- Spacing of tree in relation to site features.



Ongoing maintenance by Local Government

- Weed control around the trunk base and beneath the canopy should be carried out for the first three years after installation, or until the tree has grown taller than 2 metres.
- Tree pruning should be conducted as required, where branches block maintenance access, overhang property or obstruct the waterway.
- Tree pruning and maintenance must be undertaken as soon as practically possible on request by the Water Corporation.
- Under pruning of trees should be carried out as required, to maintain fire safety and Crime Prevention Through Environmental Design standards (CPTED).
- Removal may be required if risk mitigation cannot be achieved.

Why Paperbark species has been selected for this program.

Melaleuca raphiophylla

Southwest Western Australia's endemic *Melaleuca raphiophylla* (Noongar: Bibool Boorn, Yowarl, or Yiembark) has been carefully selected for the Living Stream Lite program. The species provides wide-ranging ecological values and ideal properties including a non-invasive root system, flood tolerance, and salinity tolerance. Its shallow roots reduce erosion, stabilise soils and trap sediments, and reduce damage to Water Corporation hard assets.

Melaleuca raphiophylla, commonly called freshwater or swamp paperbark, is a tree or shrub which typically grows in salt marshes, swamps and along watercourses. The species is part of the Myrtle family and can be identified by its pin-needle leaves, peeling bark, and spikes of white or yellowish flowers in spring and summer months. It is an important species that provides critical food and habitat for native fauna.



Figures. Images taken by Water Corporation staff at Christison Way Reserve and Stan Twilight Reserve, Rockingham, as well as Sandon Park, Waterford.

Benefits of planting Paperbark along Water Corporation drainage assets

Ecological

- Increases biodiversity and rebuilds connectivity between urban green spaces, facilitating the movement and survival of local flora and fauna.
- Provides refuge, habitat and resources for native aquatic and terrestrial species.
- Contributes to nutrient cycling and promotes soil biodiversity and health through increasing available organic matter.
- Reduces growth of weed species via shading of stream bank and watercourse.

Environmental

- Increases capacity for carbon sequestration and contributes to filtration of air pollutants.
- Increases urban cooling effects through shading of water and ground surfaces and transpiration (reducing water, surface, and above ground air temperatures).
- Increases infiltration and canopy interception of precipitation to promote a slower, more natural hydrological cycle, reducing impact of extreme events, erosion and improving water quality.
- Contributes to improving water quality of stormwater runoff through trapping or removing pollutants.

Community

- Improves community health and wellbeing through people's interaction with nature and proximity to green space.
- Buffers local urban climate change impacts (especially reduced heat) to reduce negative health outcomes in the community.
- Improves aesthetics of urban spaces.

Logistic

- Provide erosion control and bank stabilisation.
- Reduce weed infestations that limit drain operability.

Asset protection

- The species provide the best balance between biodiversity outcomes and growth habitat that damage assets.
- Characteristics that protect assets include lower invasiveness of roots, limb drops, size and rate of growth.