As part of Brisbane City Council’s plan to become a water smart city, Council is encouraging organisations and businesses to consider all options to contribute to sustainable water management. Harvesting the potential of stormwater has been developed by Council to guide the sustainable collection and safe reuse of stormwater in Brisbane.

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What is stormwater harvesting?

Stormwater is generated from rainfall, and includes runoff from hard surfaces such as footpaths, car parks, roads and natural surfaces such as gardens and open space. Although some stormwater soaks into the ground, most stormwater in urban areas falls on hard or impervious surfaces and flows untreated via stormwater drains and pipes to local waterways and eventually into Moreton Bay.

Stormwater harvesting refers to the collection and storage of this runoff for treatment and reuse at a later time. This harvesting usually takes the form of above-ground or below-ground storage to which water is pumped or diverted during periods of rain.

It is important that stormwater is managed effectively as it is a valuable alternative source of water where its use can also reduce the detrimental impacts that urban developments can have on waterways.

How to use this information guide

Stormwater harvesting can be a viable and cost effective alternative to using town water for some uses. To help determine whether it is the best option for your site and needs, follow the four-step process outlined in this guide to examine site suitability, design considerations, concept development and the application process and how to use stormwater responsibly.

Checklists are also provided to help you ensure that all factors are considered in a logical order.

Also included are examples of local and national schemes that have effectively implemented stormwater harvesting facilities using innovative techniques for capture, storage, treatment and reuse.

There are several instances where references for further information are provided. The stormwater harvesting web page on Council’s website also contains additional information and can be used as a resource to support your information search. Visit www.brisbane.qld.gov.au/water for more information.

Dedicated to a better Brisbane
Benefits of stormwater harvesting

A form of water recycling, stormwater harvesting represents a practical way to address some of our long-term water security problems, and to reduce the impacts of urban development on waterway health.

The key benefits of stormwater harvesting are two-fold: enhanced waterway management and an alternative water source. These two benefits complement each other.

Benefits to our waterways

The amount of stormwater pollution generated from a single residential property is not high, but collectively the volume of pollution that runs off urban areas is significant and can harm our local waterways. Too much polluted stormwater reaching waterways can cause disturbance to aquatic habitats, increase bed and bank erosion leading to loss of vegetation, and increase the frequency of flash flooding.

Harvesting excessive amounts of urban stormwater can be detrimental to waterway health. However, when a balance is maintained, stormwater harvesting improves environmental health by:

- re-establishing a more natural water cycle
  - managing the frequency and volume of stormwater runoff and stream flow
  - protecting instream habitats and stabilising banks
- reducing waterway pollution
  - the less polluted stormwater the lower the quantity of pollutants entering our waterways, the Brisbane River and ultimately Moreton Bay
  - pre-treatment processes can trap and filter pollutants, reducing stormwater pollution reaching waterways and groundwater.

Safe and sustainable stormwater harvesting

This guide provides comprehensive information to assist in determining your site’s suitability for stormwater harvesting, concept and detailed design requirements, and the application process. It also supports socially and environmentally responsible use of harvested stormwater.

The design and operation of stormwater harvesting systems are the sole responsibility of the land owner. The owner and operator must accept complete liability for all risks and impacts associated with the system.

Before working through the step-by-step process, it is important to understand the six overall outcomes that stormwater harvesting projects need to consider to ensure sustainable use. These six key outcomes are applicable to all stormwater harvesting schemes and support the compliance and regulatory requirements, as well as principles to guide effective design and implementation.

Key Outcomes of Stormwater Harvesting

**Outcome 1 –** Stormwater harvesting protects public health and safety, and provides an alternative water source fit for compatible end uses.

**Outcome 2 –** Stormwater harvesting reduces the impact of stormwater pollutants on receiving waters (natural or artificial).

**Outcome 3 –** Stormwater harvesting protects the natural water cycle by enhancing and managing environmental flows and maintaining in-stream habitat.

**Outcome 4 –** Stormwater harvesting maintains original flood protection levels or further mitigates flood impacts.

**Outcome 5 –** Stormwater harvesting supports local community values and enhances public amenity and lifestyle values.

**Outcome 6 –** The total life-cycle cost of stormwater harvesting is comparable with alternatives for achieving all outcomes.

Benefits to our water supply

The demand on Brisbane’s water supply is increasing in line with economic growth in industry and commerce, and continued population increases. Prior to water restrictions being introduced, more than 50% of water used in South East Queensland was for outdoor use. Stormwater harvesting provides another alternative water source, particularly for large outdoor applications (including irrigation of sports fields and parks) and other uses that don’t require drinking quality water (e.g. toilet flushing).

Stormwater harvesting can improve the health of aquatic ecosystems.

In addition to providing an alternative source of water, well designed stormwater harvesting systems can result in many positive benefits such as improving stormwater quality, providing habitat, creating recreational opportunities, improving visual amenity and providing educational opportunities.
Stormwater harvesting can provide a sustainable alternative water source for organisations and developments with the potential to capture or temporarily store sufficient volumes of water for use on their premises, and, for those with the capacity to regularly use large volumes of water on their premises.

The groups most likely to benefit from exploring stormwater harvesting include:

- schools, universities and other institutions
- organisations with large sporting fields (e.g. football fields, golf courses)
- property developers of large urban developments
- business and industry with high water needs of non-drinking water quality.

Follow the information in Step 1 to better understand your site’s suitability for stormwater harvesting.

1.1 Determine if your site is suitable

The suitability of stormwater harvesting for irrigation is site-specific and depends on certain characteristics including:

- **slope and drainage**
  - The slope of the site should be assessed to determine likelihood of runoff and ponding. Ideally the slope of the application area should be less than 15 degrees.

- **infiltration and discharge rates**
  - The composition of the soil (i.e. clay or sand) may affect the rate of infiltration and discharge. You can undertake a soil test to confirm the suitability of your site’s soil.

- The depth of the water table below the site may also impact on the feasibility of the stormwater reuse scheme. You can undertake an assessment to establish the depth to the water table.

- **land availability**
  - Cost-effective stormwater harvesting schemes will be located within close proximity to the preferred stormwater capture or harvesting point, and will have sufficient land area to hold any storage tanks, treatment units and distribution infrastructure such as pipes and pumps.

- **vegetation**
  - Stormwater harvesting schemes should be located in areas which do not require any removal or disturbance of any terrestrial or waterway vegetation.

1.2 Prepare a water balance assessment

Unlike other alternative water sources such as recycled wastewater or greywater, stormwater harvesting is runoff-dependent. The viability of stormwater harvesting will be dependent on the level of security or reliability and volume of water required. Use the Water balance calculator on page 4 to guide your assessment.

If rainfall patterns are highly variable, and the intended use is reliant upon a consistent supply (e.g. irrigation needs to take place on a very regular basis), it is recommended that stormwater harvesting be considered as a supplementary supply, rather than the sole supply.
1.3 Identify the risks associated with using stormwater

All recycled water schemes, including stormwater harvesting, need to be appropriately designed and managed to minimise risks. With good design, appropriate management and monitoring, potential public health, public safety and environmental hazards can be minimised. In general terms, the greater the exposure and potential for public contact with the harvested stormwater (treated and untreated), the greater and more comprehensive risk assessment is required.

Stormwater can contain a wide variety of pollutants, including biological (e.g. organic matter such as soil and sediment) and chemical contaminants (e.g. pesticides, heavy metals and hydrocarbons). Such hazards may present risks to the community and the natural environment. The potential risks of each stormwater harvesting project must be identified and assessed during the project’s planning phase. This will enable any potential risks to be managed during the project’s design, rather than being left to the operational phase of a project, where the costs of effective mitigation may be considerably higher.

An important requirement of a stormwater harvesting system is that the operator accepts complete liability for all risks and impacts associated with the system. To fully understand the implications of this liability, a comprehensive risk assessment needs to be undertaken. Legal advice may also need to be sought for complex or large-scale projects.

Risks fall into three main categories - public health and community safety, environmental protection and operations. Information on the types of risks associated with each are listed below. More comprehensive information relating to likely causes and potential impacts of these risks can be found on Council’s website [www.brisbane.qld.gov.au/water](http://www.brisbane.qld.gov.au/water)

**Public health and community safety risks**

Protection of public health must never be compromised. The health risks from stormwater are generally lower than for treated effluent, however stormwater harvesting does carry some health risks which need to be managed appropriately, including:

- stormwater contamination (pathogens, inorganic and organic chemicals)
In order to ensure efficient and cost-effective stormwater management, you will need to think about maintenance and system operation early in the process. Risks associated with operation and maintenance include:

- **stormwater contamination** (from nutrients, pesticides and oils)
- **maintenance of environmental flow** (e.g. overextraction of stormwater)
- **loss of natural habitat and vegetation**.

To manage environmental risks, all stormwater harvesting systems, independent of size and complexity, need adequate design, operation, monitoring and maintenance.

### Case Study

**Brisbane Botanic Gardens (Qld)**

The Brisbane Botanic Gardens at Mt Coot-tha are Queensland’s premier subtropical botanic gardens. These 52 hectare gardens are situated seven kilometres from the City and are a major tourist attraction in Brisbane offering walking trails and school and community education programs. The recent drought conditions have presented significant challenges, with approximately 59 megalitres of water required annually to keep the gardens alive and fit for public enjoyment. The annual cost of having water externally sourced and trucked in is close to $0.5 million.

Brisbane City Council (as owners and operators of the gardens) undertook a feasibility exercise and determined that the water catchment capacity of the gardens is 50 megalitres annually, which is almost sufficient to meet the garden’s required water demand. The existing onsite storage capacity of 12 megalitres (made up of a dam, four shallow ornamental ponds and eight water tanks) is insufficient to service all of the garden’s water needs.

Council developed a strategy that involved the implementation of a stormwater harvesting facility, and a solar powered desalination plant. The stormwater harvesting facility has the capacity to supplement the garden’s water supply with 18 megalitres of water, and will cost approximately $850,000 to build. Runoff will be captured in the pond, and will undergo several stages of treatment: firstly being sedimentary and bio-filtration (natural process in storage pond) and ultimately through ultra violet membrane technology. This will result in high-grade water suitable for irrigation of public gardens.

To ensure the reliability of water supply, Council is also building a solar powered desalination plant to treat bore water for irrigation purposes. The desalinated water will be pumped into the stormwater storage pond, supplementing the capacity by 10 megalitres of water annually.

This type of innovation is a first in Brisbane, and is an example of how stormwater harvesting can provide a great alternative supply of water.
1.4 Investigate the likely costs of harvesting stormwater and funding options

The most significant costs associated with stormwater harvesting usually relate to storage and the level of treatment required to achieve the desired water quality and reliability necessary for the intended use. For this reason, treated stormwater can have a higher unit cost than town water and other alternatives such as recycled wastewater and rainwater tanks.

Stormwater harvesting can be financially attractive when all benefits are combined, and current and future costs are considered. Opportunities for cost savings from a stormwater harvesting scheme include:

- reduction in volume of mains water used and associated metered water charge
- water transport costs may reduce by having an onsite water supply
- land developer capital costs for town water use and replacement of infrastructure
- security of supply in light of water restrictions in the future.

The table on page 15 is provided to help you to prepare a preliminary cost estimate for your proposed stormwater harvesting facility.

Funding sources

To assist the implementation of water efficiency projects by community organisations, a number of grants programs are available from Council, and the State and Federal governments. Further information on initiatives can be found by visiting the websites listed:

Brisbane City Council
www.brisbane.qld.gov.au/water

Department of Natural Resources & Water

Department of Environment and Heritage
www.communitywatergrants.gov.au

Sport and Recreation, Queensland
www.srq.qld.gov.au

Environmental Protection Agency
www.qld.gov.au/grants

1.5 Review statutory requirements

In assessing the suitability of the site, the statutory requirements should also be addressed. View table on page 7 as a starting point.

1.6 Talk to key stakeholders

If you are not the landowner (i.e. you are a lessee or tenant), approval will be required to use the land for stormwater harvesting. This may apply to schools, sporting clubs and community organisations. If this applies to you, any applications for licences or development applications to Council or other regulating bodies (e.g. DNRW) will need to be signed and submitted on your behalf by the landowner.

The landowner needs to be made aware of any new infrastructure (e.g. storage tanks) or modifications to existing infrastructure, and needs to be assured that all risks will be appropriately managed by the lessee, tenant or future land owner. Agreement also needs to be reached on maintenance and system monitoring. There may also be other key stakeholders you might wish to consult including local community groups, adjacent neighbours or product suppliers.

1.7 Proceed to the next step

If you feel confident that the project can address the issues raised above and that stormwater harvesting is likely to be a cost-effective way of sourcing an alternative water supply and improving waterway health, proceed to Step 2: Prepare a concept design.

You may wish to use the table on page 15 as a checklist to confirm that you have covered each of the elements discussed in this step.

If during the preliminary investigations, stormwater harvesting does not appear to be the best solution for your site, there are other ways to help improve waterway health and to access alternative water sources.

There are many types of water recycling schemes in operation across Australia. For example, the collection of roof water in rainwater tanks is popular and easy to install. If larger volumes of water are still required (e.g. for irrigation of sports fields), you may need to consider alternate sources of water.

For more information on alternative water supplies, visit Council’s website www.brisbane.qld.gov.au/water
Stormwater harvesting statutory requirements

<table>
<thead>
<tr>
<th>Statutory requirements (approvals, licences and permits)</th>
<th>Description</th>
<th>Required for</th>
<th>Contacts/further information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brisbane City Plan approval</td>
<td>Brisbane City Council approval for building works involving stormwater infrastructure.</td>
<td>A development application will need to be submitted if you intend to undertake: • excavation works (greater than 1m²) or • work in a waterway corridor.</td>
<td>Brisbane City Council <a href="http://www.brisbane.qld.gov.au">www.brisbane.qld.gov.au</a></td>
</tr>
<tr>
<td>Permit to connect to a Council Stormwater drain</td>
<td>A Council Stormwater drain can be a stormwater gully, table drain, underground, drain or kerb and channel. This permit can be obtained once all other approvals have been granted.</td>
<td>Any connection to the Council stormwater drainage network.</td>
<td></td>
</tr>
<tr>
<td>Licence to access stormwater infrastructure</td>
<td>A legal agreement or contract between Council and the applicant, clarifying the issues of liability for water quality, infrastructure provision and maintenance.</td>
<td>All third party access to the Council stormwater drainage.</td>
<td></td>
</tr>
<tr>
<td>Plumbing approval</td>
<td>Approval by Council’s Plumbing Services.</td>
<td>Any connection to internal fixtures and fittings (e.g. toilet flushing).</td>
<td></td>
</tr>
<tr>
<td>Water extraction licence</td>
<td>Licence from State Government permitting extraction of water from waterways and aquifers.</td>
<td>Any extraction of water from a waterway or underground aquifer.</td>
<td>Department of Natural Resources and Water phone 13 13 04 <a href="http://www.nrw.qld.gov.au">www.nrw.qld.gov.au</a></td>
</tr>
<tr>
<td>Riverine Protection Permit</td>
<td>Permit from State Government to remove waterway vegetation.</td>
<td>Any removal of vegetation in a waterway.</td>
<td>Department of Natural Resources and Water phone 13 13 04 <a href="http://www.nrw.qld.gov.au">www.nrw.qld.gov.au</a></td>
</tr>
</tbody>
</table>

By applying Water Sensitive Urban Design (WSUD), you can achieve removal of many stormwater pollutants. Further treatment may not be necessary for some end uses.
Step 2: Prepare a concept design

2.1 Identify key skills and expertise to help develop a concept design

It is highly recommended that you engage the services of suitably qualified professionals to support the preparation of the concept and detailed design for your project. Depending on the size and scale of the project, you are likely to require support from surveyors, engineers, ecologists, landscape architects and water quality experts. A concept design is required to outline:

- proposed stormwater harvesting site relative to the catchment / stormwater collection area (including any site features such as waterways and drainage paths) and the location of different land uses in the catchment area
- site characteristics such as the slope of the site, soil type and permeability, services (such as electricity, telecommunications, sewage), surrounding infrastructure (such as footpaths, carparks, gardens)
- stormwater collection and storage infrastructure, including details of infrastructure such as pumps, pipes, tanks, their location and general configuration
- process for moving water from storage to end point and preventing backflow (e.g. pumps, pipes and irrigation systems)
- application areas for reused stormwater such as sports fields to be irrigated (including approximate dimensions)
- key infrastructure and processes for maintenance (such as access pits)
- location of legal points of discharge or overflow points
- key landscaping features.

The concept design should also be supported with your water balance assessment (that identifies the various supply and demand requirements) and your initial risk assessment (that details how major identified risks will be addressed).

Concept design approval

If your organisation leases land from Brisbane City Council, you must provide your concept design to Council’s Leasing Unit to obtain interim approval from Council to proceed. The Leasing Unit can be contacted by phoning (07) 3403 8888.

2.2 Plan how you will capture or collect stormwater

The majority of stormwater runoff and overland flow is generated by frequent, small-to-medium intensity rain events, not from the more infrequent and heavy prolonged rainfall. It is therefore important that systems to capture rainfall from smaller events are in place, as this can result in harvesting a significant portion of the total available runoff for reuse. Research suggests that aiming to capture the first 15mm of rainfall will achieve optimal water supply reliability and waterway health benefits. Hydrological models can assist you to calculate this for your specific project.

There are many innovative ways to capture or collect stormwater including:

- redirecting the flow of water over land to a site suitable for collection
- extracting or pumping and storing stormwater for later use
• capturing rainwater tank overflow, and diverting overland stormwater flow into above-ground or below-ground storages
• accessing stormwater from closed systems (piped networks) and pumping the water to above-ground or below-ground storage tanks
• accessing and pumping water from an underground aquifer that is replenished with treated stormwater (also known as aquifer reuse and recovery, or managed aquifer reuse).

• storage duration and the timeframe for using stormwater following its collection
• land availability – consider available space as some storage facilities require more space than others
• public safety – open storages are inviting to children and pets and may require fencing and signage
• public health – stored water that has potential for human or animal contact must be treated to an acceptable standard to avoid serious health issues
• management of water quality in storage facility
• design of storage devices to exclude insect vectors, small mammals and birds, as interaction may pose risks to public health.

2.3 Plan how you will store the collected stormwater

When determining storage options, consideration must be given to potential impacts on the environment and people, as well as what statutory requirements must be met. The design of a stormwater storage is largely dependent on the likely usage and demand for stormwater (i.e. the volume of water required and its frequency of use). The water balance assessment prepared in Step 1 will assist with the storage design in terms of volumes and sizing.

There are several factors that influence what type of storage is most suitable to a particular site including:
• volume of water required for use – this will indicate whether the demand and supply are balanced, or whether a backup water supply is required to meet total demand
• amount of water that can be captured – this will influence the size of storage required

Stormwater can be collected in the drainage network and then be directed to an underground storage area.

Some open water bodies such as this specifically designed sedimentation basin and constructed wetland can also be used to store stormwater before reuse.

Closed storages (above or below-ground) such as tanks similar to those used to collect and store rainwater are preferred by Council to open storages and are easier and more cost-effective to maintain. If open storages are planned, they should be designed using the principles for constructed stormwater wetlands. These principles can be viewed at www.brisbane.qld.gov.au/water
Regardless of the type of storage facility, stormwater should be used within 24 hours. This short timeframe allows for some fine sediment to settle out of the water, and avoids the potential for water to become rich in nutrients and potentially harmful to the environment and general public if discharged. Treatment of the harvested stormwater prior to storage may be required if it is intended to store the water for any length of time beyond 24 hours. Designs that include elements of Water Sensitive Urban Design (WSUD) such as gross pollutant traps (GPTs), sediment basins, rain gardens (bioretention systems), or constructed wetlands provide very effective pretreatment and can be applied to suit various treatments levels. For more information on WSUD, visit the SEQ Healthy Waterways Partnership Water by Design web page at www.healthywaterways.org/wbd_project_overview.html

**Storage tip**
Generally, the greater the level of nutrients and the higher the temperature, the shorter the storage time should be.

All storages must have a legal point of discharge to ensure that overflows are managed and any nuisance to neighbours (such as flooding and odour) is avoided.

### 2.4 Identify the treatment requirements matched to the intended end use

The final intended use is the key driver to determining whether harvested stormwater is a suitable alternative water source. With appropriate treatment, stormwater has potential to be used for a wide range of uses, including irrigation of open spaces and sports fields, industrial uses, ornamental water features, and as a source of water for aquifer storage or groundwater recharge.

Stormwater quality varies greatly between locations, and at different times it can be affected by rainfall, adjacent construction activities, use of fertilisers, pesticides, septic tanks, ageing sewerage systems and traffic volumes in the upstream catchments. Even when obvious solid material such as litter is removed from the stormwater, dissolved material, biological (e.g. bacteria and viruses) and chemical pollutants may still be present, but not visible. Careful consideration must be given to the desired end use of any captured stormwater, and to the risk these contaminants may have on the environment and public health.

Uses that are satisfied with lower water quality include those where there is a low risk of contamination or exposure to humans. The water must be appropriately treated to ensure that the uses planned pose no risk to the environment or public health. The challenge to consider in doing this, is to ensure that you don’t adversely affect the economic viability of stormwater harvesting by overtreating the water for the chosen end use. This is why stormwater harvesting is particularly well suited to low-quality end uses, as it reduces the treatment and associated costs significantly.

1 & 2. WSUD techniques such as natural channel design and constructed wetland systems provide excellent pretreatment of stormwater.

3 & 4: Disinfection through ultra violet treatment or chlorination will produce a very high quality water fit for most end uses such as surface irrigation in public areas.

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**Case Study**

**Kogarah Town Square (NSW)**

Kogarah is a city of 50,000 residents, located 15 kilometres south of Sydney. Its village-like centre, Kogarah Town Square, has undergone a major redevelopment which includes residential, retail and commercial precincts.

A stormwater recycling facility has been established that collects and treats rainwater and runoff for reuse in gardens, toilets and washing cars. The system has been designed to capture 85% of rainwater falling on site. This reduces the potable water demands of the Square by 42%.

Following collection, stormwater is filtered via a gross pollutant trap, stored in underground storage tanks and filtered through sand and biologically engineered soil. The system supplies all water for irrigation and about 70% of the water used for toilet flushing.

Utilising captured stormwater runoff to top-up roof water ensures a reliable alternative water supply. Further information can be found by visiting www.kogarah.nsw.gov.au
### Treatment options

Treatment options range from basic to advanced, depending on the quality of stormwater captured and the proposed end use. The following table provides some preliminary information regarding treatment types. Experts must be consulted to ensure an appropriate level of treatment is incorporated in the design of the stormwater harvesting system. Basic and/or intermediate treatment is suggested prior to storage and depending on final use, advanced treatment immediately before application or use.

### Stormwater treatment types and uses

<table>
<thead>
<tr>
<th>Treatment types</th>
<th>Quality of water (following treatment)</th>
<th>Potential uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic treatments</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| (Level 3)               | Remove litter and gross pollutants  
✓ Gross pollutant trap, trash rack or screen  
Does not remove:  
X Fine sediments, bacteria, dissolved chemical contaminants and organic materials  
Removes:  
✓ Leaves, litter and large materials | Public access to water must be controlled  
✓ Controlled irrigation  
– spray or drip irrigation  
– subsurface irrigation of open spaces, parks and sportsgrounds  
✓ Industrial use  
– dust suppression, construction site use  
✓ Ornamental water bodies (with access controls) |                                                                                  |
| **Intermediate treatments** | Sand filters  
✓ Sedimentation (settling ponds)  
✓ Porous pavers  
✓ Bioretention  
✓ Constructed wetlands  
Removes:  
✓ Sediments  
✓ Dirt, grit and some associated metals  
✓ Nutrients  
✓ Some pathogens  
Does not remove:  
X All pathogens – reduces levels but does not completely remove | Fit for many uses  
✓ Irrigation  
– spray or drip irrigation of open spaces, parks and sports grounds  
✓ Industrial use  
– dust suppression, construction site use, process water  
✓ Ornamental water features with high chance of public contact  
✓ Firefighting |                                                            |
| (Level 2)               |                                                                                                         |                                                                                                |
| **Advanced treatments** | Membrane technology  
✓ Electrolysis  
✓ Disinfection – chlorination, UV or ozone  
Removes:  
✓ All Level 2 and 3  
✓ Pathogens | Fit for uses that have close public contact  
✓ Reticulated non-potable water  
– garden watering  
– toilet flushing  
– car washing |                                                            |
2.5 Investigate approvals and permits

Depending on the catchment area, the size and intended design of the stormwater harvesting scheme and associated infrastructure, a number of licences and approvals from Council and the State Government may be required. Refer to Section 1.5 Statutory requirements as a guide only.

Regulations in relation to stormwater harvesting are constantly evolving and changing. Many of these changes are outside the control of Council. It is strongly recommended that additional research and consultation be undertaken with all relevant government regulators and stakeholders to ensure all relevant statutory requirements are identified before the concept design is finalised.

2.6 Seek endorsement of concept design

To ensure proposed stormwater harvesting projects meet Council expectations and address key issues, concept design should be discussed early in the process with:

- a Council Development Assessment officer, if the project is associated with a current development application
- the Council Leasing Unit, if the project is located on a site leased from Brisbane City Council
- an officer from Council’s Water Resources for all other projects.

You should also discuss the concept with the land owner (if not Brisbane City Council).

2.7 Proceed to the next step

As discussed in this step, requirements differ depending on the ownership of the site being considered for stormwater harvesting.

- **Leasehold land:** If you lease land from Brisbane City Council or another government body, you must submit your concept design to Council or the relevant land owner for interim approval. You will receive notification of interim approval once Council is satisfied that all standards and risks have been addressed.

  If your application was not approved, there are many other water initiatives that may be worth considering. Visit www.brisbane.qld.gov.au or phone (07) 3403 8888 for more information on Council’s water saving strategies.

- **Private land:** If you are a private landowner, ensure that you have addressed all of the elements in Step 2.

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**Case Study**

**Docklands Park, Victoria**

Docklands is a waterfront destination in Melbourne which houses approximately 20,000 people. It is also a major tourist destination, with a significant area dedicated to outdoor spaces.

Docklands Park, within the Docklands precinct, is an ecologically sustainable parkland. The design of the park’s stormwater collection and reuse system features three wetlands, which will capture and treat 90% of the stormwater generated from the seven-hectare Grand Plaza and Harbour Esplanade catchment area.

The captured stormwater is initially treated using biofilters and the wetlands, and is further refined through ultra violet treatment prior to use. Treated stormwater is stored in sub-surface tanks for park irrigation. Eighty percent of the park’s annual irrigation requirements will ultimately be met from treated stormwater, saving an estimated 10 million litres of Melbourne drinking water each year.

Further information can be found by visiting www.docklands.com
Step 3: Submit application and gain approvals

3.1 Develop a detailed design of your stormwater harvesting system

A detailed design of your stormwater harvesting system will be required to support a development application. This detailed design builds on the conceptual design developed in Step 2. You will most likely require the services and advice of qualified professionals to assist in developing this. Phone Council on (07) 3403 8888 to discuss your project with a Development Assessment officer, who will confirm what you are required to submit.

The following references may be useful in developing your detailed design.


3.2 Submit a development application

As in Step 2, the process for submitting a development application differs depending on the ownership of the site being considered for stormwater harvesting.

- Leasehold land: If you lease land from Brisbane City Council, you need to submit your final detailed design package to Council’s Leasing Unit. Council will sign the development application on behalf of the lessee and submit it to Council’s Development Assessment Branch. Even if you are not required to submit a development application under Council’s City Plan, stormwater harvesting applications need to be cited by Council’s Leasing Unit for sign off and approval before you can commence with any works.

- Private land: If you own the property, you can lodge your development application directly with Council through the development assessment process (visit www.brisbane.qld.gov.au for more information).

3.3 Prepare final work plans and site management plans

Final approval for simple stormwater projects not requiring development approval from Council may only take a couple of weeks for the final project design to be approved. Negotiation of the Licence to Access Stormwater Infrastructure may take a little longer as this is a legally binding document and may require additional consultation with legal representatives.

Timeframes associated with the approval of more complex stormwater harvesting projects associated with development applications should be discussed with the project’s allocated Development Assessment officer.

During this time, you may wish to consider the development finalisation of work plans, construction schedules and site management plans to ensure the site and the stormwater harvesting scheme is managed safely and sustainably.
Step 4: Use stormwater responsibly

4.1 Prepare a risk management plan

You may be required as a condition of the Licence to Access Stormwater Infrastructure to prepare and submit to Council a Risk Management or Environmental Management Plan. The purpose of the Risk Management Plan is to ensure you have identified all possible hazards and assessed the likelihood that the hazard will result in an adverse impact on employees, public health and safety, on the environment or on the effective operation of the system. Importantly, the Risk Management Plan identifies what actions the project owner has taken or will take to minimise these identified risks.

For example, if you are using treated stormwater to irrigate a sports field, you should schedule this during hours when there is little or no chance that the public will come in contact with the water. You should also use signage to communicate the intended use of the recycled water.


4.2 Understand your reporting and monitoring requirements

In addition to preparing and submitting the Risk Management Plan, you may also be required to provide to Council and other agencies regular performance management reports. The reports are likely to require you to document:

- the volume of stormwater harvested, treated and reused
- any public health and safety incidents
- any environmental incidents or breaches of legislation
- a summary of key inspection and maintenance activities
- changes in personnel involved in the ownership or operation of the system.

These reports also provide valuable information on how policy, guidelines and technical advice can be improved in the future.

The following tips are provided to guide the responsible use of stormwater:

**Tips for using stormwater responsibly**

- Ensure that all staff or volunteers who are responsible for using or maintaining stormwater harvesting systems are briefed on correct procedures for safe use, particularly in safeguarding the existing storage facility and taking measures to prevent backflow contamination.
- Monitor the water quality in stormwater storages to ensure the water is not stagnant and remains fit-for-purpose.
- Monitor irrigation sites to avoid overwatering or saturating the soil, as this increases the chance for the stormwater to run off into local waterways and to create possible sites for mosquito breeding.
- Ensure any plants or vegetation receiving stormwater are suited to the likely stormwater quality.
- Keep a record of the volume and frequency of stormwater application, along with the benefits of the irrigation.

4.3 Identify opportunities for education and learning

Stormwater harvesting is a relatively new and innovative approach to sustainable water management. There are often many benefits which may not appear obvious at first. It is also important that the local community understands what impact they may have on the quality of stormwater in their local area and what they can do to enhance the quality of the stormwater, for example, not tipping chemicals or contaminants down the stormwater drain.
## Potential stormwater project costs

<table>
<thead>
<tr>
<th>Project costs</th>
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<tbody>
<tr>
<td><strong>Preliminary investigations and concept design</strong></td>
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<tr>
<td>Geotechnical and soil survey</td>
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<tr>
<td>Engineering design</td>
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<td>Landscape design and other design</td>
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<tr>
<td>Application fees</td>
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<tr>
<td><strong>Infrastructure and construction</strong></td>
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<tr>
<td>Site preparation and construction</td>
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<tr>
<td>Stormwater capture and collection</td>
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<td>Storage facility</td>
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<td>Treatment plant and systems</td>
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<td>Distribution network and irrigation</td>
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<td>Landscaping</td>
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<tr>
<td><strong>Maintenance and operation</strong></td>
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<tr>
<td>Ongoing treatment costs and replacement parts</td>
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<tr>
<td>Inspections</td>
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<td>Regular maintenance</td>
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<td>Electricity</td>
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<td><strong>TOTAL</strong></td>
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Stormwater harvesting checklist

Step 1: Confirm suitability for stormwater harvesting

☐ Determine if your site is suitable
☐ Prepare a water balance assessment
☐ Identify the risks associated with using stormwater
☐ Investigate the likely costs of stormwater harvesting and funding options
☐ Review statutory requirements
☐ Talk to key stakeholders
☐ Proceed to the next step

Step 2: Prepare a concept design

☐ Identify key skills and expertise to help develop a concept design
☐ Plan how you will capture or collect stormwater
☐ Plan how you will store the collected stormwater
☐ Identify the treatment requirements matched to the intended end use
☐ Investigate approvals and permits
☐ Seek endorsement of concept design
☐ Proceed to the next step

Step 3: Submit application and gain approvals

☐ Develop a detailed design of your stormwater harvesting system
☐ Submit a development application
☐ Prepare final work plans and site management plans

Step 4: Use stormwater responsibly

☐ Prepare a risk management plan
☐ Understand your reporting and monitoring requirements
☐ Identify opportunities for education and learning