Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

PARKS AND WILDLIFE SERVICE

# Bayswater Brook Catchment Local Water Quality Improvement Plan Review Summary

June 2018

**Acknowledgements**
Thank you to the City of Bayswater for their contributions to the review of the Bayswater Brook Catchment Water Quality Improvement Plan (WQIP).

**Purpose and use of this document**
The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service, with the support of the City of Bayswater, has reviewed the implementation of the Bayswater Brook Catchment WQIP. The purpose of this document is to summarise that review and inform future updates of the Bayswater Brook Catchment WQIP. The Swan Canning Water Quality Improvement Plan is proposed to be reviewed in 2018 and the updated catchment modelling will be used to inform updates of the local WQIPs. It is intended that these documents will be used by partner organisations that will continue to have a role in implementation of the WQIPs.

**Front cover photo:** Eric Singleton Bird Sanctuary Nutrient Stripping Wetland, June 2016. Photo - City of Bayswater

## Local Water Quality Improvement Plans

The Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service works to reduce nutrients and other contaminants entering the Swan and Canning rivers.

DBCA (and previously the Swan River Trust) developed and invested in the implementation of local Water Quality Improvement Plans (WQIPs). The WQIPs were designed to provide stakeholders with a mechanism to prioritise recommendations and resources and seek funding to improve water quality in catchments contributing the greatest amount of nutrients and contaminants.

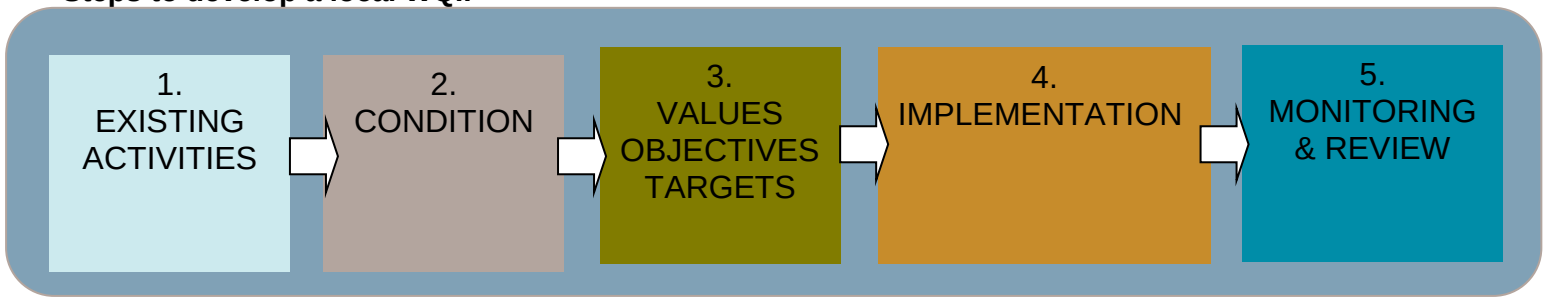
WQIP implementation takes a treatment train approach with actions falling into each of the following stages in the pathway of nutrients and non-nutrients from the source to the discharge point:

**1. Prevention** (Land use planning)
**2. Minimisation** (Ecoefficiency)
**3. Reduction** (Source control)
**4. Amelioration** (Conveyance and transmission)
**5. Treatment – Reuse – Disposal**

**Water Quality Improvement Plans:**

- identify water quality issues and hot spots;
- identify environmental values of water bodies and water quality objectives required to protect the values; and
- identify and commit to a set of cost-effective management measures to achieve and maintain those values and objectives.

**Steps to develop a local WQIP**

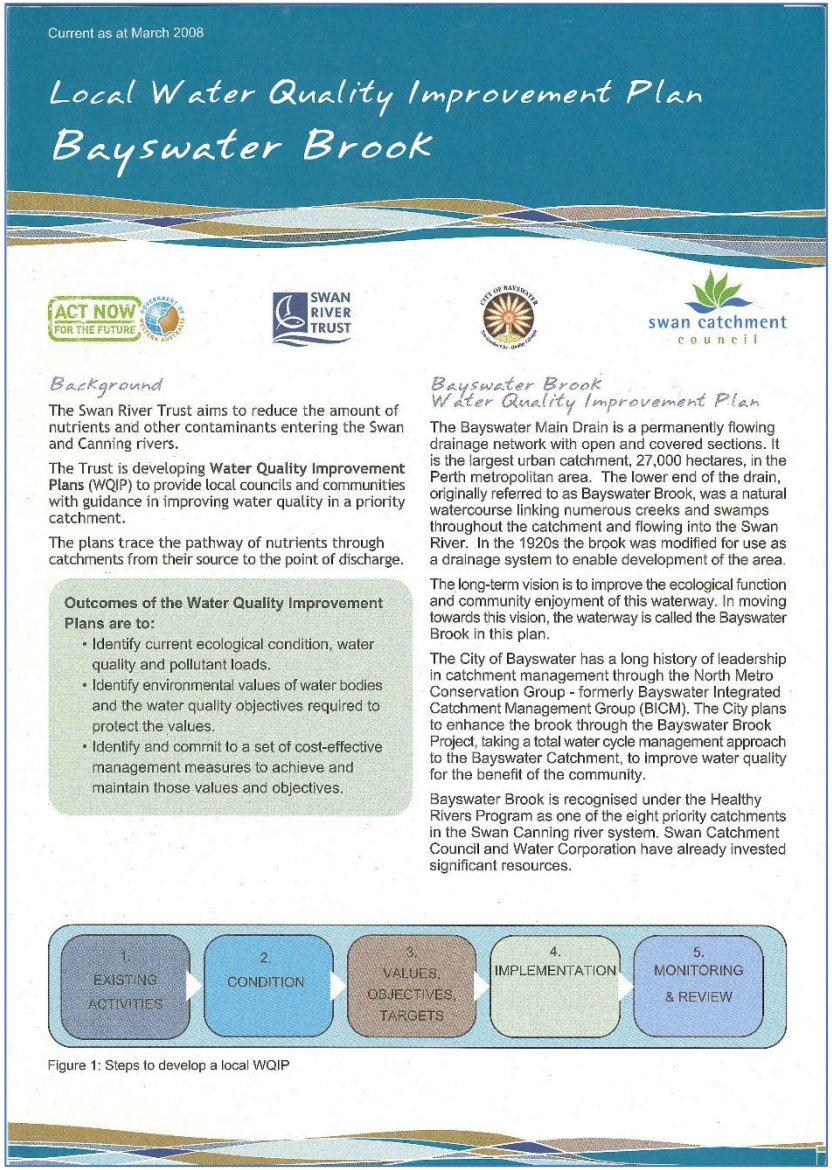


## Local WQIP Review

Ten local WQIPs were developed between 2008 and 2012 with strong involvement of key stakeholders. Implementation of the WQIPs is ongoing, however, many of the actions are complete or require review. There are also actions that are still underway and others that will require an ongoing commitment and additional resources to maintain and improve water quality. This review of the Bayswater Brook Catchment WQIP is based on achievements and stakeholder participation.

There has been significant investment in on-ground nutrient interventions in the Bayswater Brook Catchment. The monitoring associated with specific on-ground projects provides evidence that they are improving water quality in this catchment. Monitoring the effects of non-structural WQIP actions, such as community education and behaviour change programs, and changes to local government policies and procedures, on catchment water quality is more complicated. Therefore, statistically linking WQIP actions to changes in overall catchment water quality is not attempted at this stage. Variations in annual flow, changes in catchment land uses, and the long timeframes required for some catchment management practices to affect water quality at the catchment discharge point are other factors that can contribute to discharge water quality.

The Swan Canning River Protection Strategy supports the development and implementation of the Swan Canning and local WQIPs as an action to achieve nutrient load reduction targets and provides the framework for DBCA to update local WQIPs. This review will determine the local WQIPs to be updated based on the level of support from key stakeholders and need for further water quality improvement. Modelling of water quality improvement targets is proposed as part of an update of the Swan Canning WQIP in 2018.


Current as at March 2008

Local Water Quality Improvement Plan

Bayswater Brook

ACT NOW FOR THE FUTURE

SWAN RIVER TRUST

swan catchment council

Background

The Swan River Trust aims to reduce the amount of nutrients and other contaminants entering the Swan and Canning rivers.

The Trust is developing **Water Quality Improvement Plans** (WQIP) to provide local councils and communities with guidance in improving water quality in a priority catchment.

The plans trace the pathway of nutrients through catchments from their source to the point of discharge.

**Outcomes of the Water Quality Improvement Plans are to:**

- Identify current ecological condition, water quality and pollutant loads.
- Identify environmental values of water bodies and the water quality objectives required to protect the values.
- Identify and commit to a set of cost-effective management measures to achieve and maintain those values and objectives.

Bayswater Brook Water Quality Improvement Plan

The Bayswater Main Drain is a permanently flowing drainage network with open and covered sections. It is the largest urban catchment, 27,000 hectares, in the Perth metropolitan area. The lower end of the drain, originally referred to as Bayswater Brook, was a natural watercourse linking numerous creeks and swamps throughout the catchment and flowing into the Swan River. In the 1920s the brook was modified for use as a drainage system to enable development of the area.

The long-term vision is to improve the ecological function and community enjoyment of this waterway. In moving towards this vision, the waterway is called the Bayswater Brook in this plan.

The City of Bayswater has a long history of leadership in catchment management through the North Metro Conservation Group - formerly Bayswater Integrated Catchment Management Group (BICM). The City plans to enhance the brook through the Bayswater Brook Project, taking a total water cycle management approach to the Bayswater Catchment, to improve water quality for the benefit of the community.

Bayswater Brook is recognised under the Healthy Rivers Program as one of the eight priority catchments in the Swan Canning river system. Swan Catchment Council and Water Corporation have already invested significant resources.

1. EXISTING ACTIVITIES
2. CONDITION
3. VALUES, OBJECTIVES, TARGETS
4. IMPLEMENTATION
5. MONITORING & REVIEW

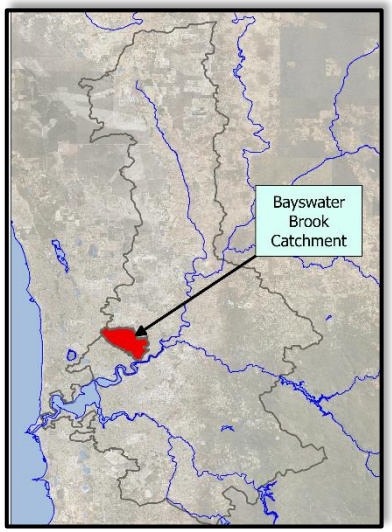
Figure 1: Steps to develop a local WQIP

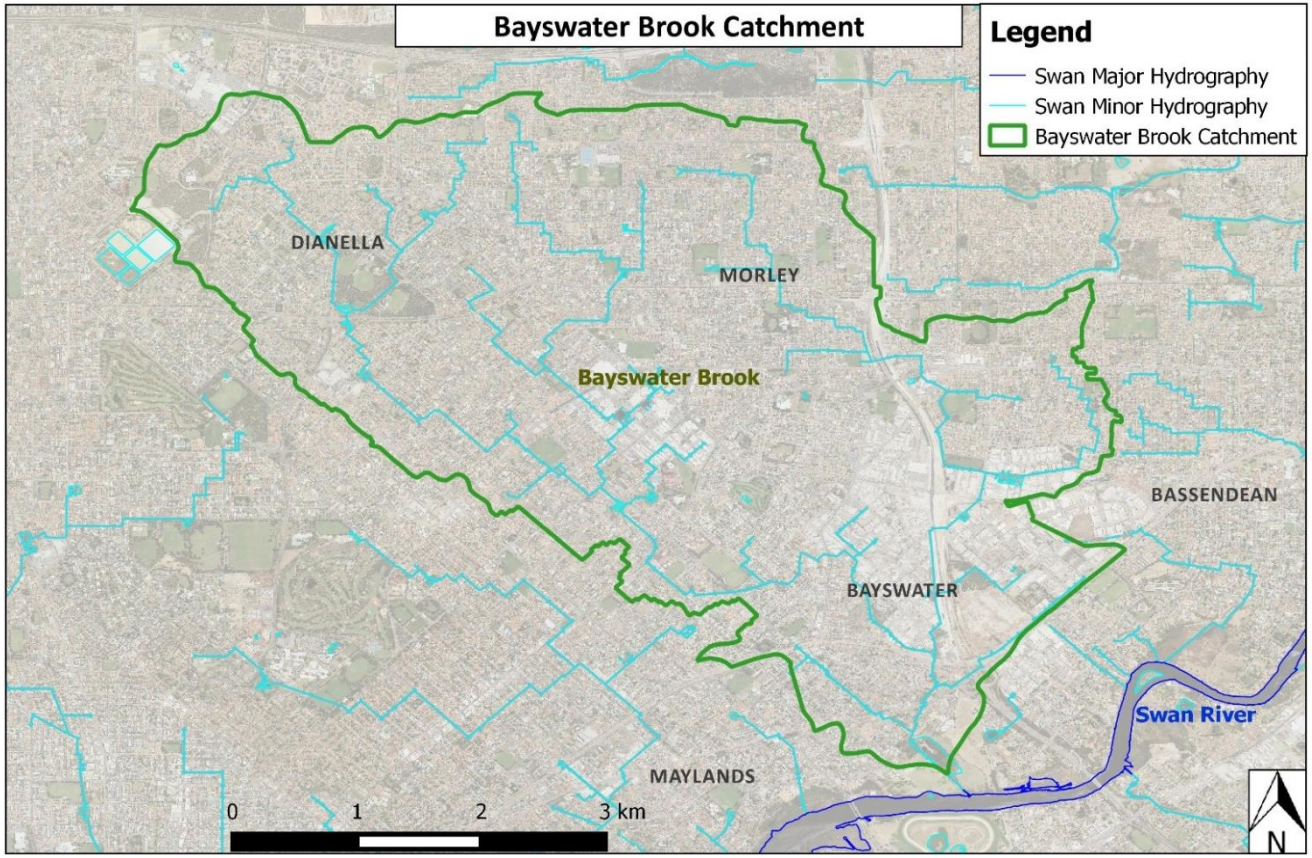
*Local WQIP front cover for illustration purposes only*

## Bayswater Brook Catchment

The Bayswater Brook Catchment is a large urban catchment covering approximately 27-square kilometres of residential, commercial and industrial areas across Bayswater, Morley, Bassendean, Embleton, Noranda, Bedford and Dianella. The catchment contains an extensive drainage system of open and piped drains, and several compensating basins. The drains merge and flow towards the Swan River near the Eric Singleton Bird Sanctuary, where a large portion of the flow is diverted into, and treated by, the newly constructed nutrient stripping wetland before discharging to the river.

The Water Corporation manages the main drains for flood protection of the surrounding commercial and residential areas. Local government managed drains feed into the Water Corporation main drains. Several of the compensating basins connected to the main drains are within parks and recreation reserves also managed by the local government. The soils in the catchment are predominately Bassendean sands. The groundwater is close to the surface and is intersected by stormwater drains in places resulting in a baseflow year-round.



## Bayswater Brook WQIP Review Summary

The Bayswater Brook WQIP has a total of 19 actions; 84 percent of those have been addressed: including three that have been completed or are on track to completion, and 13 that are implemented but will require ongoing commitment or further investment for catchment-wide implementation. There are three actions that have had little or no progress (see Appendix 1 for details).

Considerable progress in improved catchment management has occurred in the Bayswater Brook Catchment since the development of the WQIP. Several on-ground drainage improvement projects have been completed, the largest being the Eric Singleton Bird Sanctuary Nutrient Stripping Wetland, completed by the City of Bayswater in partnership with DBCA. This project provides multiple benefits for the community and the environment at the end of the catchment before the brook flows into the Swan River and has won several awards including the Premier's Excellence in Public Sector Management Award 2016 (Managing the Environment Category).

**Major projects:**

- Eric Singleton Bird Sanctuary Nutrient Stripping Wetland (DBCA and the City of Bayswater)
- Rain gardens at Bath Street, the Rise and Railway Parade
- Weld Square Living Stream (DBCA and the City of Bayswater)
- 2015-17 Light Industry Program - the City of Bayswater is participating in the partnership program with the Department of Water and Environmental Regulation (DWER) and DBCA
- Permeable carpark at the Rise

Before WQIP development in 2008, strategic direction of activities in the Bayswater Brook Catchment were guided through the Bayswater Main Drain Catchment Management Strategy 1994, developed by the Bayswater Integrated Catchment Management Group. The ongoing momentum in this catchment has continued through the Bayswater Brook WQIP, complemented in 2012 by the Bayswater Brook Action Plan developed by the Bayswater Brook Working Group (including representatives from the City of Bayswater, (then) Swan River Trust, (then) Department of Water, Water Corporation, Perth Region NRM and CSIRO Land and Water). In 2010 an assessment of all wetlands and drainage sites in the catchment was undertaken to identify potential future project sites. The City of Bayswater's current plan to work with partners and the community to restore drainage sites in the catchment through on-ground projects will continue to improve water quality, habitat value and liveability in this catchment.

The City of Bayswater was awarded Gold Waterwise Council status by the Water Corporation in 2016 for demonstrating significant progress towards best practice sustainable water management, community education and behaviour change.

There are currently opportunities for the community to be involved in catchment restoration through eleven local 'Friends of' groups supported by the City of Bayswater, and opportunities that are available across the Swan Canning Catchment through the DBCA's River Guardians Program. Some of the primary schools in this catchment are involved in the DBCA's River Rangers Cadet Program providing year 5 and 6 students an opportunity to help protect the rivers locally, and students from Weld Square Primary School were actively involved in the Weld Square Living Stream restoration. Occasional opportunities also arise for other students to participate through events such as the Catchment Activity Day each year and the Autumn River Festival. However, ensuring all school students in this and other catchments are provided with learning opportunities within their local environment requires increased and ongoing support.

The Bayswater Brook median total phosphorus concentration continues to pass both the short and long-term targets (0.2mg/L and 0.1mg/L respectively). Bayswater Brook continues to pass the short-term median total nitrogen concentration however is still failing the long-term target of 1mg/L (Department of Water and Department of Parks and Wildlife 2015, Swan Canning Catchment Nutrient Report Update).

Ensuring nutrient inputs do not increase through land use changes requires ongoing commitment and reducing non-nutrient contaminants from entering the waterways will also require ongoing attention. Feedback from the City of Bayswater indicates that a revised WQIP would be useful in this catchment to help continue the momentum for improved catchment management, however, future actions should be specific, costed and measurable.

**WQIP Review Summary**

| WQIP catchment | Release date | Total number of actions | Actions fully achieved or on track | Actions implemented but ongoing commitment required | Actions with little or no progress | % of actions being implemented |
|---|---|---|---|---|---|---|
| **Bayswater Brook** | March 2008 | 19 | 3 | 13 | 3 | **84** |

**Summary of investment in WQIP (from commencement of WQIP to June 2018)**

| | DBCA investment | Other State Government investment | Local Government and Community | **Total Investment (approximate)** |
|---|---|---|---|---|
| Investment in Bayswater Brook WQIP projects | $1,823,000 | $165,000 | $2,490,000 | **$4,478,000** |

## Future priorities and actions – Bayswater Brook Catchment

- Relevant government and non-government organisations work collaboratively to implement the actions of the Swan Canning River Protection Strategy.
- Ensure all new development and infill/retrofit proposals are in line with Perth's transition to a water sensitive city.
- Ensure that all local government planning schemes and policies support the transition to a water sensitive city.
- Land-use planning decisions to ensure the State Planning Policy 2.10 (Swan-Canning River System) requirement for developers to maintain or improve water quality is upheld.
- Ensure all new developments are connected to sewer and aim for infill sewer to all existing urban areas.
- Increase community awareness, education and involvement in catchment management to reduce nutrient and contaminant outputs.
- Continue to take opportunities to retrofit existing drainage systems in line with Water Sensitive Urban Design (WSUD) principles. Current proposals include: Russell Street Living Stream and Pocket Park, Gross Pollutant Traps at suitable locations and Jakobsons Way Living Stream.
- Continue to look for, and take opportunities to improve water quality, habitat, and community benefit of wetlands and vegetated areas in the catchment.
- Reduce local government's nutrient outputs through local management practices by providing up-to-date training to all staff involved in fertiliser application, grounds keeping and maintenance of drainage infrastructure.
- Seek commitment to maintain Light Industry Audits for an ongoing program to prevent industrial pollutants entering surface and groundwater.
- Discourage the planting of deciduous trees near drainage infrastructure to reduce organic loads and excessive nutrients entering waterways.
- Develop a revised WQIP for this catchment to help continue the momentum for improved catchment management. Future actions should be specific, costed and measurable.

## Bayswater Brook case study: Eric Singleton Bird Sanctuary Nutrient Stripping Wetland

The Eric Singleton Bird Sanctuary Nutrient Stripping Wetland project has restored the health of a struggling wetland that was relying on bore water to keep it from drying out, and was experiencing poor water quality due to accumulated contaminated sediments, sulphidic soils and high nutrient concentrations.

*Access path at Eric Singleton Bird Sanctuary Nutrient Stripping Wetland, March 2017*

The wetland now receives and treats stormwater diverted from the Bayswater Brook before it reaches the Swan River. The wetland no longer relies on top-ups from bore water, provides improved habitat for wetland birds and other native fauna, and is a place for the community to enjoy nature.

The restoration work involved:

- treating and capping the contaminated sediments of the wetland with crushed limestone;
- shaping and grading the wetland basins to provide a variety of water treatment and habitat types including open water pools, marsh lands and ephemeral zones;
- installation of a gross pollutant trap at the entry to the wetland to prevent litter and other gross pollutants entering the river;
- inclusion of a sediment pond at the beginning of the wetland flow path to encourage slower flow velocities and settling out of sediments and associated contaminants;
- revegetation with local native species to promote nutrient and contaminant removal from the water while providing improved and varied habitat types throughout the wetland; and
- installation of an access pathway, seating and information to help the community enjoy and understand the restored environment.

The wetland is expected to remove around 40 tonnes of gross pollutants and sediments, and prevent around 1.35 tonnes of nitrogen and 200kg of phosphorus entering the Swan River each year.

The project has received strong community support, due at least in part to the early and comprehensive community engagement and consultation process that began during the design stage and has continued throughout the project implementation. The improvements are aligned to the original intent of the bird sanctuary, envisioned by Mr Eric Singleton.

# Eric Singleton Bird Sanctuary Nutrient Stripping Wetland

*Before restoration, March 2014*

*Wetland vegetation, March 2017*

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| Area of project site: | 4 ha |
| Volume of crushed limestone imported to treat sediments: | 25,000 tonnes |
| Number of seedlings planted: | 170,000 (local wetland and dryland species) |
| Project partners: | Department of Biodiversity, Conservation and Attractions, City of Bayswater, GHD Pty Ltd (Consultant Engineer), Water Corporation |
| Cost of project construction: | $3,000,000 |
| Awards: | Premier's Excellence in Public Sector Management Award 2016 (Managing the Environment Category)<br>Australian Engineering Excellence Awards Western Australia 2016 (Environment Category)<br>Australian Institute of Landscape Architects Excellence Awards 2017 (Land Management Category) |

# Appendix 1: Bayswater Brook Catchment WQIP - Action Review

| Tally and explanation of WQIP actions review categories – Bayswater Brook | | | |
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| **Total number of actions** | **19** | **Percentage** | **Explanation** |
| **Action achieved** | 2 | 10.5 | The action has been completely fulfilled. |
| **Action on track** | 1 | 5.3 | Significant progress has been made and the action is likely to be completed in the near future. |
| **Ongoing action** | 9 | 47.4 | This action will require ongoing commitment or maintenance. |
| **Projects/Programs implemented** | 4 | 21.1 | There are projects and programs in place that address this action, however significantly more investment is required to enable catchment wide implementation. |
| **Little or no progress** | 3 | 15.8 | Little or no progress has been made on this action. This can be for various reasons. |
| **No longer relevant or viable** | 0 | 0 | Can be for various reasons. |
| **Summary categories** | | | |
| **Total number of actions** | **19** | **Percentage** | **Explanation** |
| **Action fully achieved or on track to being achieved** | 3 | 15.8 | First two categories above combined. |
| **Action implemented but ongoing commitment required** | 12 | 68.4 | Second two categories above combined. |
| **Little or no progress** | 4 | 15.8 | Last two categories above combined. |

| Bayswater Brook Catchment WQIP – Action Review | | | | | | | |
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| **Treatment train approach** | **Management strategies** | **Implementation actions** | **Lead organisations** | **Supporting partners** | **Timing** | **Status comments** | **Review category** |
| **1. Prevention** Land use and planning | **1.1** Implement local planning policies, strategies and planning conditions that incorporate best management practices | **1.1.1** Implement Best Management Practice through the City of Bayswater (CoB) statutory processes to reduce nutrient inputs from new developments, redevelopments and subdivision, and as opportunities occur. | CoB | Department of Planning, Lands and Heritage (DPLH), Western Australian Planning Commission (WAPC), Perth NRM | Commencing 2008 | • CoB's Streetscape Masterplan (due for completion in 2017) will provide a vision for the future of the Morley Activity Centre. The plan will outline the location, number and species of plants to be installed in the centre and will incorporate water sensitive urban design (WSUD) principles and help improve stormwater management and catchment permeability.<br>• CSIRO (Barron et al. 2010a, 2010b & 2010c) have reported on effectiveness of best management practices to reduce nutrient flows in local (Perth) urban drains. | |
| | | **1.1.2** Implement State Government Codes of Practice and legislation at the local level. | | | | • Ongoing action<br>• The Swan Canning River Protection Strategy identifies the responsibilities of local governments in river management. | |
| **2. Minimisation** Ecoefficiency | **2.1** Fertiliser minimisation and management | **2.1.1** Educate the community in the use of slow release, low water-soluble fertilisers. | CoB, Department of Biodiversity, Conservation and Attractions (DBCA) | Perth NRM | Commencing 2008 | • DBCA supports the Phosphorus Awareness Program and Fertiliser Wise Fertiliser Training delivered by the South East Regional Centre for Urban Landcare (SERCUL) across the Swan Canning Catchment. Great Gardens workshops sponsored by Parks and Wildlife over three years ended 2015-16. The new Riverwise Gardens Program is sponsored by DBCA. | |

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| | | | | | | • CoB supports Beyond Gardens and Great Gardens community workshops. | |
| | | **2.1.2** Support the use of alternative fertilisers at the point of sale. | | | | • The Fertiliser Partnership (2012-16) superseded the Fertiliser Action Plan (2007). DBCA worked with the Department of Primary Industries and Regional Development and other partners on the Fertiliser Partnership objectives.<br>• The *Environmental Protection (Packaged Fertiliser) Regulations 2010* puts limits on the phosphorus content and nitrogen ratio for fertiliser in 50kg or less bags sold in WA to target urban users. | |
| | | **2.1.3** Implement best management practices for fertiliser use through sustainable landscaping. | | | | • CoB conducts soil and leaf tissue analysis to guide fertilisation of public open spaces. Landscape plans include low water use plants, hydro zoning and soil amendments.<br>• CoB was awarded Gold Waterwise Council status in 2016 for demonstrating significant progress towards best practice sustainable water management, community education and behaviour change. | |
| **3. Reduction** Source control | **3.1** Undertake soil investigation and relevant amendments | **3.1.1** Conduct an Acid Sulphate Soils (ASS) analysis in identified sites of concern. | CoB | Perth NRM, Department of Water and Environmental Regulation (DWER) | Commencing 2009 | • ASS research is conducted on an as-needed basis depending on project proposals.<br>• An ASS scald trial at Baigup Wetland was completed in 2017. A salt scald was also found during this trial, and actions were taken to remediate both the ASS and the salt scald. | |

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| | | **3.1.2** Develop an ASS management plan. | | | | • An ASS management plan was completed for the Eric Singleton Bird Sanctuary Nutrient Stripping Wetland. An ASS plan was also completed for Baigup Wetland following the ASS scald trial. | |
| | | **3.1.3** Implement soil amendments to reduce nutrient run-off and infiltration to the groundwater. | | | | • A small-scale trial of coated wood chips was undertaken at Weld Square.<br><br>• Soil improvers were used in rain garden projects in the catchment. | |
| | **3.2** Reduce community outputs through building community capacity | **3.2.1** Educate the community in the use of soil amendments and sustainable landscaping practices. | CoB, DBCA | (former) North Metro Conservation Group, Perth NRM | Ongoing | • DBCA supports the Phosphorus Awareness Program and Fertiliser Wise Fertiliser Training delivered by SERCUL across the Swan Canning Catchment. Great Gardens workshops sponsored by DBCA for several years ended in 2015-16. The new Riverwise Gardens Program is sponsored by DBCA.<br>• CoB supports regular Beyond Gardens and Great Gardens workshops in the area.<br>• Curb markers were installed along main drainage networks above the stormwater entry pits. A curb marker project was also undertaken with schools. A community education booklet was produced. | |
| | | **3.2.2** Raise community awareness through involvement in revegetation activities. | | | | • DBCA supports a part-time Water Quality Officer position in CoB to work with community groups, schools, universities and general community on revegetation and water quality improvement projects.<br>• DBCA and CoB work together to develop and implement water quality improvement projects in the North Sub region to improve | |

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| | | | | | | the health of the Swan River.<br>• CoB work with 'Friends-of' groups at Lightning Swamp, Gobba Lake, Swan Lake, Eric Singleton Bird Sanctuary Nutrient Stripping Wetland, Claughton Reserve and Baigup Wetland. | |
| | | **3.2.3** Integrate with opportunities for biodiversity and recreation enhancement. | | | | • CoB implement cost-effective measures that aim to maximise infiltration and disconnect the existing piped drainage system throughout the catchment. Projects include: Bath Street Rain Garden, the Rise Rain Garden, Weld Square Living Stream (State NRM funding).<br>• Several Riverbank Program (DBCA and CoB funded) projects focusing on erosion control and revegetation along the foreshore at Hinds Reserve, Riverside Gardens, Tranby foreshore and Bath Street Jetty have been completed.<br>• Eric Singleton Bird Sanctuary Nutrient Stripping Wetland Project incorporates recreational opportunities and improved biodiversity at the end-of-catchment wetland site.<br>• Planned Russell Street Living Stream and Pocket Park and proposed Jakobsons Way Living Stream are part of the Drainage for Liveability Program (Water Corporation with partners CoB and DBCA).<br>• Plans to rejuvenate former Bayswater Integrated Catchment Management Group (BICM) project sites and compensating basins/open drains in the catchment: possible future sites include Paterson, | |

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| | | | | | | Mooney, Evans, Hillcrest, Crimea and Swan Lake. | |
| | **3.3** Reduce industry outputs through regulation and education | **3.3.1** Regulate and educate small to medium enterprise. | CoB, Perth NRM | DWER | Ongoing | • As part of the 2015-17 Light Industry Program (DBCA, DWER and partner local governments), CoB's environmental health officer jointly audits businesses with DWER in the Bayswater Brook and Upper Swan areas. From September 2015 to June 2017, 102 audits/inspections were completed in CoB. The audits focus on education and assisting businesses to improve environmental performance, particularly the correct storage, use and disposal of solids and liquids on site and protecting groundwater and stormwater from contamination.<br>• CoB participated in the previous light industry audit and education program delivered through Perth NRM in 2010-11. | |
| | | **3.3.2** Monitor and manage industrial site remediation with Environmental Management Systems. | | | | • *Contaminated Sites Act 2003* and Planning Bulletin 92 Urban Water Management provide clear guidance to WAPC, local governments and developers. It is standard practice now that during the development application (DA) process if the site is a known or suspected contaminated site, a condition is placed on the DA that investigation and/or remediation is required.<br>• The CSBP plant in Bayswater has been remediated and will be developed as an industrial site. | |

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| | **3.4** Reduce council outputs through local management practices | **3.4.1** Implement best management practices for the management of public open space. | CoB | | Commencing 2008 | • Fertilise Wise Training opportunities are available to turf managers across the Swan Canning Catchment including local government officers (through the DBCA and SERCUL Phosphorus Awareness Project).<br>• CoB conduct turf leaf tissue and soil analysis to guide fertilisation of public open spaces. There is limited data available, however, that which is available indicates that only a small amount of nutrients is leached to groundwater from the City's public open spaces (Sports Turf Technology 2010a & 2010b). This concurs with previous studies and indicates that with good irrigation and fertilisation strategies this source of nutrients can be virtually eliminated, a cost-effective way of dealing with one of the major sources of nutrients. | |
| | | **3.4.2** Review current management practices including street sweeping regimes and gross pollutant traps. | | | | • GPT installed at Eric Singleton Bird Sanctuary Nutrient Stripping Wetland, and others in the industrial areas.<br>• Median strip and verge mowers fitted with grass catchers to prevent grass clippings from entering stormwater drains.<br>• Street sweeping helps to reduce deciduous leaves from entering stormwater drains and Bayswater Brook, however, this is still an issue. | |
| **4. Amelioration** Conveyance | **4.1** Nutrient intervention | **4.1.1** Design and construct a nutrient stripping wetland at the Eric Singleton Bird Sanctuary. | CoB, DBCA, Water Corporation | Perth NRM | Commencing 2008 | • Construction and establishment of Eric Singleton Bird Sanctuary Nutrient Stripping Wetland is complete. 170,000 native plants were installed and preliminary water quality | |

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| and transmission | and improved drainage | | | | | results are promising. The project was jointly completed by CoB and DBCA. The wetland is expected to prevent 40 tonnes of gross pollutants and sediment, 200kg of phosphorus and 1.35 tonnes of nitrogen from entering the Swan River each year. The project was a joint winner of the 2016 Premier's Award for Excellence in Public Sector Management in the Environmental Management category, winner of the Australian Engineering Excellence Awards Western Australia 2016 (Environment Category) and the Australian Institute of Landscape Architects Excellence Awards 2017 (Land Management Category). | |
| | | **4.1.2** Develop a series of nutrient stripping basins and living streams along the Bayswater Brook. | | | | • CoB plan to construct one living stream every three years. Weld Square Living Stream was constructed in 2014 and a new opportunity at Jakobsons Way Reserve is planned for 2017-18. The rain garden at The Rise was re-done during September 2016 to use the latest techniques, and a rain garden at Bath Street was created in 2015-16. Plans with Water Corporation for proposed Russell Street Living Stream and Pocket Park and investigation of further opportunities upstream and downstream of this compensating basin are in progress. Other works to rejuvenate past BICM projects and comp basins/open drains in the catchment including Paterson, Mooney, Evans, Hillcrest, Crimea, and Swan Lake.<br>• Prioritisation of potential sites for | |

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| | | | | | | revegetation and living streams was completed in 2010 (Wetlands and Drainage Site Report Review 2010). This project reviewed the change in sites over time from previous assessments.<br>• CoB has a streetscape-scale water sensitive urban design demonstration project at Ninth Avenue, Maylands. This project includes a small rain garden and permeable bitumen car park, designed to infiltrate and treat road runoff. | |
| | | **4.1.3** Progress Bayswater Integrated Drainage Management Strategy. | | | | • Bayswater Brook Action Plan was developed in 2012 to focus investment and prioritise activities in the catchment. The plan aimed to bring together and support the implementation of previous catchment plans including the Bayswater Integrated Drainage Strategy (2007) and the WQIP. | |
| **5. Treatment**<br>**- Reuse**<br>**- Disposal** | **5.1** Full connection to infill sewerage | **5.1.1** Full connection of all current serviced properties including industrial areas, to infill sewerage. | CoB | Water Corporation | Ongoing | • Full connection of all currently serviced properties has not occurred to the knowledge of the author, nor has a system of fulfilling this action been determined.<br>• The 2015-17 Light Industry Program has resulted in some light industrial premises being required to connect to sewer in cases where stormwater drains or groundwater was at risk of contamination from trade waste or wash-down run-off.<br>• In the revised WQIP the lead organisation for this action should be Water Corporation. | |