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1. Purpose

This Environmental Improvement Plan describes how Melbourne Water uses various processes to provide continuous improvement in environmental management at the Eastern Treatment Plant (ETP) located in Bangholme and the Western Treatment Plant (WTP) located in Werribee. This plan defines the key high priority actions Melbourne Water is pursuing to achieve its various environmental goals; however, it does not attempt to capture all of the initiatives in place.

The plans for both the ETP and the WTP have been combined within this document to reflect the integrated approach to management systems and the amalgamated Environmental Protection Authority (EPA) Victoria licence. This combined approach will promote shared knowledge, consistency and transparent management practices between the treatment plants to enable the identification of gaps and areas for improvement. It also acknowledges the significant differences between the two treatment processes, site characteristics, requirements and values.

2. Scope

This plan provides an outline of how Melbourne Water’s management processes operate to:

- establish environmental policy and priorities
- deliver effective operation
- identify, assess and implement options for improvement
- monitor and verify environmental performance.

It also describes how Melbourne Water engages with the community through various avenues. The plan provides high level objectives and performance measures that can be used by the community to understand Melbourne Water’s performance and progress, and the mechanisms through which the community can be, and are, engaged.

It is anticipated that this plan will be in effect for the duration of the 2016 Price Submission (formerly known as the Water Plan). The Price Submission 2016 is approved by the Essential Services Commission (ESC) and defines the program of work and price for a period of 5 years. This improvement plan will be reviewed and updated in support of the next Price Submission.

3. General Description

The Eastern Treatment Plant (ETP) and the Western Treatment Plant (WTP) are owned and operated by Melbourne Water and are located in the suburbs of Bangholme and Werribee. The ETP and WTP are the two major sewage treatment plants which service Melbourne. Around 360 megalitres of sewage per day from the south-eastern suburbs of Melbourne flow through the trunk sewerage network to the ETP, while 500 megalitres per day flow from the north-western suburbs of Melbourne to the WTP.
The sewage is treated through the processes described below:

**Western Treatment Plant**

The key difference between the treatment plants’ processes is that the WTP is predominantly a lagoon-based treatment.
Western Treatment Plant

The WTP occupies around 10,500 hectares on the western side of Port Phillip Bay, with nine licensed discharge points into the Bay. In the past, most of this land was used for land or grass filtration to treat the sewage, with gradual upgrading to lagoon-based processes. In the early 2000s, major improvements were undertaken which included activated sludge plants for nitrogen removal, covering the anaerobic ponds and capturing biogas for renewable energy and odour reduction, and tertiary treatment (UV and chlorination) for Class A recycled water. By 2005, land and grass filtration was no longer required, subsequently these areas were irrigated with Class C recycled water to manage salinity and further reduce nitrogen discharge into Port Phillip Bay. Up to 18 per cent of the flow is treated through the tertiary treatment process to Class A standard for off-site recycled water use. The balance is treated to Class C quality and approximately 23 per cent of the total inflow is sold to Melbourne Water’s on-site agribusiness partner or used in our conservation lagoons and terrestrial margins, with the remaining flows discharged to Port Philip Bay in accordance with the EPA licence, AL74284.

Methane gas is a generated by-product of the sewage treatment process. It is captured and used as an energy source by energy company AGL, which has a small energy plant on site, to generate over 100 per cent of the site’s electricity, with the remainder, at times, being exported.

Eastern Treatment Plant

The Eastern Treatment Plant (ETP) was constructed in 1975 on a site of around 1100 hectares in the suburb of Bangholme. The treatment plant is comprised of mechanical plant & tanks, effluent holding basins, sludge drying pans and holding areas for dried sludge. The ETP was constructed to relieve pressure on the Western Treatment Plant and cater for urban growth in the south eastern suburbs.

Up until 2012, the wastewater that flowed to the eastern treatment plant was treated through primary and secondary treatment with chlorine disinfection to a Class C standard. The treatment plant was later upgraded in 2007 to a nitrification de-nitrification process to reduce nitrogen loads discharged, and improve the recycled water quality. The tertiary treatment plant upgrade soon followed in 2012 to improve the recycled water quality to Class A standard, enabling a wider range of recycled water uses and to reduce the environmental impact on the receiving environment.

At the ETP, 100 per cent of the flow is treated through the complete process train and the final treated water is both a Class A recycled water product and suitable for environmental discharge. The treated water is pumped off site into the South Eastern Outfall (SEO) which runs 56 kilometres along the Mornington Peninsula to Boags Rocks, between Gunnamatta and St Andrews Beach. The treated water from the site is either supplied to recycled water end users for both Class A and Class C applications, with the balance discharged to the receiving marine environment via a near-shore outfall.

Captured solids are digested, producing biogas which is used for electricity generation, and the residual sludge is dried and stockpiled for potential re-use opportunities. Around 22 per cent of the electricity demand for the ETP is provided from this biogas and over 300,000 tonnes of dry biosolids were re-used over the 2016/17 financial year; about 11 times the sludge generated in one year. This was made possible due to the availability of legacy clay-rich biosolids stored on site in combination with an approved re-use application. That said, Melbourne Water is continuing market research for sustained re-use of annually-produced biosolids. For more information, see section 10.5.

Additional information about the ETP and WTP can be found on Melbourne Water’s website.

4. Legislative Requirements and Guidelines

Melbourne Water works within the bounds of a series of environmental legislation, guidelines, government policies and international treaties. For details on the legislative requirements and guidelines that Melbourne Water complies with, please see Appendix C.

5. Environmental Policy and Strategy

Environmental sustainability at the ETP and WTP is managed as part of Melbourne Water’s Environmental Management System. Environmental management is guided by an Environmental Stewardship Policy which provides a commitment to “Enhance the value of our natural and cultural assets”.

The policy provides direction on how this is to be achieved: “We will achieve this commitment by building the capability of our people, knowledge and business systems to increase the contribution of natural and cultural assets to liveability and customer value.

We will look for outcome-based solutions, and factor financial and non-financial values of these assets into our investment, asset management and operational decisions. This includes achieving continual improvement in reducing the environmental risks from our activities and ensuring legal compliance.”
The policy also describes how objectives are established: “Objectives and targets for environmental stewardship are developed through normal business processes and through considering Melbourne Water’s aspects and impacts.”

Melbourne Water has employed an Environmental Stewardship Strategy to protect and enhance natural and cultural assets so they continue to deliver value to current and future customers. These assets include land and waterways, biodiversity, cultural heritage and materials used.

The Environmental Stewardship Strategy provides a framework for driving towards:

- planning and management processes aligned with environmental stewardship principles
- an outcome-focused, risk-based approach to managing our natural and cultural assets
- excellent understanding of the value and services provided by our natural and cultural assets and continuing to maximise that value
- factoring financial and non-financial values into our investment, asset management and operational decisions
- strong support for our environmental stewardship approach from customers and industry partners.

The objective of this strategy is to reduce Melbourne Water’s ecological footprint by 2021/22.

6. Environmental Management System

Melbourne Water’s Environmental Management System identifies aspects and impacts for the ETP and WTP and prioritises these according to their degree of risk or opportunity.

Aspects and impacts are recorded in Melbourne Water’s risk register, the Integrated Risk and Incident System (IRIS). These risks and opportunities form part of the focus of this Environmental Improvement Plan and are addressed through three key mechanisms, namely:

1. research, to better quantify environmental effects and/or identify and develop new solutions to existing or emerging challenges
2. investment in upgrades, to improve the capacity and/or capability of the treatment infrastructure (outlined in Section 8 below)
3. adjustments in operational processes, procedures and settings, to improve outcomes from existing infrastructure (outlined in Section 8 below).

Aspect and impact registers have been reviewed during the implementation of this Environmental Improvement Plan and will continue to be reviewed on an annual basis.

7. Contingency Planning

Melbourne Water uses the General Emergency Management System (GEMS) and IRIS as the primary tools for managing and reporting events.

Emergency response, business continuity, disaster recovery and contingency planning are all undertaken across Melbourne Water.

Contingency plans have been developed and prioritised based on an assessment of the risk associated with hazard scenarios. A set of contingency plans have been developed for both the ETP and WTP which address potential hazard scenarios. Contingency plans are regularly reviewed as part of Melbourne Water’s Integrated Quality Management System and priority scenarios are tested with periodic exercises.

In addition to contingency and emergency response plans, Melbourne Water uses a series of process safety procedures and implements controls to protect people and the environment. The Eastern treatment plant was relicensed (occurs every 5 years) by Worksafe in 2017 as a Major Hazard Facility (MHF licence), which reflects the strong history of safety performance and the robust controls and systems in place for continued safe operation.

8. Operational Arrangements to Achieve Objectives

The ETP and WTP operate as part of the Melbourne Water corporate structure and under corporate policies and procedures. The corporate structure provides an integrated approach to planning and service delivery.

In terms of environmental management, the key corporate functions are:

- the Customer and Strategy group which identifies longer term environmental priorities and trends, setting the strategic direction to address these issues
- the Integrated Planning team which identifies options and solutions and strategic plans to set long term direction for specific aspects like waterways, sewerage, drinking water etc and to address environmental issues and improve environmental performance
- the Commercial and Technology Services, Risk and Business Process group which provides commercial leadership and support, focusing on efficiencies by delivering an Integrated Management System incorporating environmental elements.
- the Asset Management Services group maintain and renew our assets to ensure our infrastructure is fit for purpose and able to deliver on requirements into the future.
the Major Program Delivery team deliver all major capital projects, plus the design and construction of Melbourne Water’s infrastructure in order to service our customers needs. Delivery project vary across the business but are generally driven by growth, improvement or compliance factors.

Within the corporate structure, the ETP and WTP are operated as discrete sites with local management structures. The local management teams are accountable for day-to-day operational delivery and management of the sites. They are supported by the Integrated Planning group which undertakes planning for future capacity requirements, and the Major Program Delivery group which manages delivery of new infrastructure identified through Planning and approved in the Price Submission process. Together, these business groups work to deliver services to customers in line with the Sewerage and Recycled Water strategies.


The IMS comprises a document library within Inflo, Melbourne Water’s information management system, which collectively forms the QMS, HACCP, Occupational Health and Safety (OHS), and Environmental and Public Health Management System (EPHMS) Manual/s.

9. Environmental Improvement Plan Action Summary

The actions raised under the below priority improvement areas have been identified because of their contribution to improving environmental performance. Some of these projects may span over a number of Price Submissions; therefore, the action reflects the project’s target milestone for the current Price Submission.

The goals for the priority areas are considered with respect to risk and value to the community, the actions raised must be considered feasible in order to be delivered.

See details below on the following 2 pages.

The following summary outlines planned actions for the ETP and WTP:
**Goal** | Minimise environmental impact | Maximise utilisation of resources | Develop high community values  
---|---|---|---  
**Priority Area** | Effluent Discharge | Odour Emissions | Recycled Water | Biosolids | Energy & Greenhouse | Waste Management | Biodiversity | Liveability  
**Approach** | Maintain compliance and ensure treatment capacity can keep up with population and load growth | Minimise the impact of odour on the local community | Produce recycled water that is fit-for-purpose and available for use | Maintain capacity and maximise drying efficiency and re-use potential | Minimise energy consumption and greenhouse emissions and maximise renewable energy produced onsite | Minimise/eliminate waste and maximise re-use of generated wastes | Protect and improve the biodiversity values of the site | Increase community experience and values of the site  
**Vision** | Enhance the natural environment at the Eastern and Western Treatment Plants which is valued by the community  
---|---|---|---|---|---|---|---|---  
**ETP Priority Actions** | 1.1 Implement advanced control to maximise current infrastructure performance. | 2.1 Commission Manhole 2 odour control facility to reduce the odour emissions from a major point source. | 3.1 Work with our retail water customers to promote and advocate for recycled water re-use opportunities in growth and redevelopment precincts. | 4.1* Reuse a total of 470,000 dry tonnes of biosolids during the 2016/21 Price Submission from ETP and WTP. ETP will primarily be geotechnical reuse. | 5.1 Investigate and review options for building a large-scale renewable energy station. | 6.1* Finalise the General Waste Procedure and identify gaps in processes for managing waste across Melbourne Water. | 7.1 Investigate and review options to redevelop the ’Golden Triangle’ to create a diverse range of habitats. | 8.1 Hold an open day to increase the community’s awareness of the sites operations and biodiversity values.  
1.2 Implement the solids handling capacity augmentation program of works:  
- primary sludge thickening  
- secondary sludge thickening  
- sludge digestion | 2.2 Commission a new weather station to support odour dispersion modelling. | 3.2* Review recycled water supply agreements, and update the Recycled Water Quality Management Plan (RWQMP). | 4.2 Develop a plan to increase biosolids dewatering and drying capacity that is linked to the market opportunities for re-use. | 5.2 Conduct Preliminary Investigation into options to improve biogas production and utilisation. | 6.2 Improve processes to procure odour control media with re-use potential at the end of its life. | 7.2 Investigate and review options to revegetate wetlands and buffer zones to enhance biodiversity and habitat complexity. | 8.2* Update and expand the Melbourne Water website to share information with the community.  
1.3 Investigate and review aeration tank and primary sedimentation tank augmentation project plans. | 2.3* Review the Odour Reduction Strategy and develop an Odour Action Plan. | 3.3 Continue implementing the ETP aeration tanks solids balancing project to reduce recycled water supply interruptions to customers. | 4.3 Investigate market opportunities to find cost-effective re-use and management options. | 5.3 Investigate opportunities to reduce power consumption associated with the aeration tank diffusers. | 6.3* Include broader waste streams in the next Waste to Resources Plan review (that is, legacy and future waste management). | 7.3 Investigate and review options to install rocks and logs to increase habitat diversity within existing wetlands. | 8.3 Develop a Land Use Plan that ensures current and future land use is managed appropriately.  
*Actions are repeated for both ETP and WTP.*
**Vision**

Enhance the natural environment at the Eastern and Western Treatment Plants which is valued by the community

<table>
<thead>
<tr>
<th>Goal</th>
<th>Minimise environmental impact</th>
<th>Maximise utilisation of resources</th>
<th>Develop high community values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority Area</td>
<td>Effluent Discharge</td>
<td>Odour Emissions</td>
<td>Recycled Water</td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>Maintain compliance and ensure treatment capacity can keep up with population and load growth</td>
<td>Minimise the impact of odour on the local community</td>
<td>Produce recycled water that is fit-for-purpose and available for use</td>
</tr>
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**WTP Priority Actions**

1.4 Continue the 160S Nutrient Reduction Plant construction to increase treatment capacity and keep pace with predicted load growth.

2.4 Continue the 25W Lagoon biogas cover replacement to reduce odour and generate electricity.

3.4* Review recycled water supply agreements, and update the Recycled Water Quality Management Plan (RWQMP).

4.4 Implement new sludge drying pans.

5.4 Replace and improve 25W Lagoon biogas cover to reduce odour emissions and generate electricity.

6.4 Continue co-digestion trial to receive and treat industrial food waste products.

7.4 Research and understand influencing factors on avian health.

8.4 Implement Austin Road bird hide project and associated works including the road upgrade, car park construction, screening and bird hide installation.

1.5 Continue design of the 55E Activated Sludge Plant Upgrade.

2.5* Review the odour reduction strategy and develop an Odour Action Plan.

3.5 Investigate opportunities to optimise Class A supply reliability.

4.5* Reuse a total of 470,000 dry tonnes of biosolids during the 2016/21 Price Submission from ETP and WTP. WTP will primarily be agricultural reuse in accordance with regional land application of biosolids.

5.5 Onsite power station expansion (stage 4) to reduce greenhouse gas emissions.

6.5* Finalise the General Waste Procedure and identify gaps in processes for managing waste across Melbourne Water.

7.5 Habitat enhancement: fence off and revegetate riparian corridor adjacent to Little River. Continue to manage conservation ponds for Ramsar values and EPBC-listed species.

8.5 Improve the visitation facilities: interpretive signage, waypointer marker, road safety signs and visitation amenities.

2.6 Investigate and review options for improved odour monitoring.

3.6 HACCP alarm rationalisation to reduce Class A plant shutdowns and improve recycled water availability.

4.6 Develop a specific biosolids Environmental Improvement Plan which proposes a suitable timeframe for 100 per cent sustainable re-use of annually produced biosolids.

5.6 Investigate and review options to optimise 25W ASP blowers to potentially reduce power consumption based on revised control systems and additional online instrumentation.

6.6* Include broader waste streams in the next Waste to Resources Plan review (that is, legacy and future waste management).

7.6 Continue biodiversity offsets pilot at Ryan’s Swamp.

8.6* Update and expand the Melbourne Water website to share information with the community.

*Actions are repeated for both ETP and WTP.*
10. Priority Improvement Areas

Melbourne Water’s approach does not assume that known problems and existing solutions are the answer to environmental sustainability. It begins with ensuring that the environmental impacts and challenges are well understood and quantified, and alternative and novel solutions are explored to ensure that solutions which are adopted are as effective and efficient as practical. Problems and opportunities are quantified and solutions identified through a targeted research program together with an investment program developed and approved through the Price Submission Process.

10.1. Previous Plan Submission Achievements

**Eastern Treatment Plant**

The key priority for the previous price submission (Water plan 3 and commenced in Water Plan 2) was to reduce the impact on the marine environment near the treated water discharge at Boags Rocks. This saw delivery of the ETP Tertiary Upgrade Project which significantly improved the quality of the treated water discharged from the plant and thereby provided a range of environmental and social benefits for current and future generations including:

- significant improvements to the receiving marine environment at Boags Rocks, and the community’s recreational use of surrounding beaches
- improvement of the recycled water quality from Class C to Class A, which can be used for a broader range of end uses, and hence maximise recycling opportunities including contributing to broader water resource management benefits.

During the same period, a number of odour reduction projects have been implemented based on targeting the highest point source emissions for which the foul air can feasibly be captured and treated. For more information on the ETP, visit [Melbourne Water’s website](https://www.melbournewater.com.au).

**Western Treatment Plant**

The key priorities for the previous price submission were to increase treatment capacity to maintain discharge compliance and to reduce the size of the mixing zones while maintaining and improving biodiversity. This will be achieved by delivering high value projects including:

- the commencement of construction of a new activated sludge plant integrated with the 5SE Lagoon to increase the treatment capacity and meet EPA licence and recycled water objectives for projected load growth (future project)
- the commencement of the design phase of the existing 5SE activated sludge plant renewal and upgrade to maintain the level of service for 5SE and improve safety of operation and reduce operational costs
- the installation of multiple small outlets to reduce the loss of nutrients to offshore waters providing more nutrients to the benthic fauna, in turn supporting the shorebird population and reducing the impact to wider Port Phillip Bay
- the installation of a new pump and transfer main to connect low cost agricultural users to available recycled water and reduce the size of the mixing zone around outlets with low biodiversity value (115E Lagoon)
- the installation of a pipeline to Lake Borrie to provide partially treated water for low cost treatment and restore nutrient supply to the key bird foraging area
- the construction of 205W sludge drying plans
- the reduction of odour emissions by 50 per cent under the odour strategy by the installation of the 25W and 5SE anaerobic lagoon covers.

The benefits of these projects are expected to be realised over the course of the next Price Submission period.

10.2. Treated Effluent Discharge

The ETP and WTP operate in accordance with Environment Protection Authority (EPA) Victoria’s [Amalgamated licence (AL74284)](https://www.epa.vic.gov.au). This sets out regulatory requirements and permissible limits for discharge to air, land and water. The licence is available to view on [EPA Victoria’s website](https://www.epa.vic.gov.au). Melbourne Water provides an annual performance statement to EPA Victoria which is published on the [EPA website](https://www.epa.vic.gov.au) to demonstrate compliance with the licence.

**Eastern Treatment Plant**

Melbourne Water monitors water quality of the ETP South Eastern Outfall which discharges at Gunnamatta beach. The data can be viewed on [Melbourne Water’s website](https://www.melbournewater.com.au) > Water > Health Monitoring > Beach health monitoring

**Western Treatment Plant**

The Draft Port Philip Bay Environmental Management Plan (PPB EMP 2017-2027) has been developed by the State of Victoria Department of Environment, Land, Water & Planning (DELWP). This document describes a set of targets focusing on improving the Bay’s environmental values. The plan identifies a set of actions to achieve the objectives, including undertaking improvement works at the WTP to ensure that nitrogen loads to the Bay do not exceed 3100 tonnes per year (as a three-year rolling average). The actions identified in this Environmental Improvement Plan for the WTP effluent discharge focus on reducing the nitrogen load to the Bay.
Melbourne Water is committed to understanding the impacts of its activities on the environment and the community, including maintaining compliance with the discharge licence. The key challenges associated with sewage treatment are continuing to provide cost-effective treatment services while servicing increasing loads associated with population growth. These challenges drive the need for a robust integrated planning process; to research, model and identify when the treatment plants require augmentations, and upgrades to effectively manage their impacts and meet obligations, including discharge licence compliance. A major capital delivery process is designed to deliver on high priority capital projects which have successfully made it through the scrutiny of the business, DTF and the Essential Services Commission (ESC). This process ensures project alignment with business objectives and that the expected outcomes will be realised in practice.

Projects which address implications of increasing influent loads and treatment capacity are outlined in Table 1 below:

**Table 1: Actions to address implications of increasing influent loads and treatment capacity**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Implement advanced control to maximise current infrastructure performance</td>
<td>Improvement</td>
<td>June 2021</td>
</tr>
<tr>
<td>ETP</td>
<td>Implement the solids handling capacity augmentation program of works: <em>primary sludge thickening</em> <em>secondary sludge thickening</em> <em>sludge digestion</em></td>
<td>Growth</td>
<td>June 2020</td>
</tr>
<tr>
<td>ETP</td>
<td>Investigate and review aeration tank and primary sedimentation tank augmentation project plans</td>
<td>Growth</td>
<td>June 2021</td>
</tr>
<tr>
<td>WTP</td>
<td>Continue the 160S Nutrient Reduction Plant construction to increase treatment capacity and keep pace with predicted load growth</td>
<td>Growth</td>
<td>December 2018</td>
</tr>
<tr>
<td>WTP</td>
<td>Continue design of the 55E Activated Sludge Plant Upgrade</td>
<td>Renewal/Compliance</td>
<td>2022/23</td>
</tr>
</tbody>
</table>

### 10.3. Odour Emissions

Melbourne Water’s EPA Victoria licence requires that offensive odours must not be discharged beyond the boundary of a plant’s premises as supported by the State Environment Protection Policy (Air Quality Management). Melbourne Water has focused on reducing odour impacts from all its sites prior to 2005. There are several ways in which odour emissions can be controlled and these include:

- optimising treatment processes to reduce the risk of odour
- upgrading the treatment process to reduce the risk of odour
- building and maintaining odour treatment facilities to reduce odour emissions.

Melbourne Water has also been focused on improving the responsiveness to, and engagement with, the community in relation to odour issues. We encourage community members to alert us when they detect a change in ambient odour characteristics to help us identify the cause and implement controls to rectify the matter where possible. The community also has the option to lodge an odour complaint, which is handled in the same way as an odour alert but is also reported as non-compliance in our Annual Performance Statement to the EPA at the end of financial year.

**Eastern Treatment Plant**

Over the past 10 years, the ETP has progressively implemented an Odour Action Plan which has sought to remove and treat odour from a number of high priority odour sources including:

- inlet pipes and manholes
- grit and screen processing buildings
- primary treatment inlet and outlet channels
- solids thickening process streams.
A review of the Odour Action Plan was conducted in 2016/17 to assess progress and determine priority areas for managing site odour. Actions following this review include:

- implementing improved sludge harvesting operational management practices
- continued routine monitoring of key odour sources and adoption of an industry best practice approach to site odour dispersion modelling
- continued investigation of opportunities to cost-effectively reduce site odour emissions. Following completion of the Manhole 2 Odour Treatment Facility, the primary odour source at the ETP is the sludge drying pans and associated sludge dewatering/drying/harvesting activities.

In addition to the routine performance monitoring and reporting conducted at the site (see section 12 below), the ETP also has an operational working group in place to monitor and implement actions that minimise the risk of odour. The group reviews operational activities, process-monitoring results, monitoring programs, and renewals and upgrade progress, as well as any additional opportunities to improve odour emission performance.

### Western Treatment Plant

Over the past 10 years, the WTP has progressively implemented the 2007 Odour Reduction Strategy which has sought to remove and treat odour from a number of high priority odour sources including:

- extension of the 55E anaerobic lagoon cover
- decommissioning the main eastern carrier
- converting 115E anaerobic pond to a facultative pond.

These projects worked to reduce the odour emissions by 50 per cent.

A review of the Odour Action Plan is underway, together with an analysis of historical data and implementation of new models to determine priority areas for further odour reduction. Actions following this review include:

- timing of the capital project to cover the main inlet carrier to reduce the odour emissions
- investigating the use of continuous odour-monitoring devices for model validation.

### Table 2: Actions to improve odour management

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Commission Manhole 2 odour control facility to reduce the odour emissions from a major point source</td>
<td>Compliance</td>
<td>July 2018</td>
</tr>
<tr>
<td>ETP</td>
<td>Weather station upgrade to support odour dispersion modelling</td>
<td>Improvement</td>
<td>Completed in May 2017</td>
</tr>
<tr>
<td>ETP/WTP</td>
<td>Review the Odour Reduction Strategy and develop an Odour Action Plan</td>
<td>Improvement</td>
<td>December 2017/June 2018</td>
</tr>
<tr>
<td>WTP</td>
<td>Continue the 25W Lagoon biogas cover replacement to reduce odour and generate electricity</td>
<td>Renewal Improvement</td>
<td>Completed in August 2017</td>
</tr>
<tr>
<td>WTP/ETP</td>
<td>Investigate and review options for improved odour monitoring</td>
<td>Improvement</td>
<td>June 2019</td>
</tr>
</tbody>
</table>
10.4. Recycled Water

Recycled water of both Class A and Class C standards is generated on site by both the ETP and WTP under a hazard analysis critical control point (HACCP) quality system which constantly monitors the recycled water product quality to ensure it is fit for use. The HACCP system is guided by the Recycled Water Quality Management Plan (RWQMP) which outlines Melbourne Water’s responsibility for maintaining a fit-for-purpose product.

Class C standard recycled water can be used for irrigation and discharge to the environment (WTP) while Class A recycled water has a wide variety of uses including clothes washing, garden irrigation, food crop consumption, firefighting, etc.

Production of high quality fit for purpose water maximises the potential for increasing non-potable uses for the recycled water.

Melbourne Water has a Water Recycling Research program which is looking at ways to increase the safe use of recycled water.

ETP and WTP both employ recycled water agreements with annual objectives and targets. To maximise recycled water use, the annual operating plan for scheduled major equipment maintenance is designed to minimise process interruptions and resulting impacts on recycled water availability.

Water supply for existing and new developments is designed according to regional integrated water supply strategies which identify the most effective approach to water supply for the particular region.

The Integrated Planning team has an integrated water cycle approach to urban growth area planning. In the development planning process, Melbourne Water works with retail water companies and local councils to identify the most appropriate water resource solution.

In the short term, the operational objective is to ensure that recycled water supply meets customer requirements for quality and quantity. In addition, the operational focus is to maximise recycled water availability through process improvement opportunities.

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**Table 3: Actions to improve recycled water quality & use**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Work with our retail water customers to promote and advocate for recycled water re-use opportunities in growth and redevelopment precincts</td>
<td>Improvement</td>
<td>Ongoing</td>
</tr>
<tr>
<td>ETP/WTP</td>
<td>Review recycled water supply agreements, and update the Recycled Water Quality Management Plan (RWQMP)</td>
<td>Customer Experience</td>
<td>Ongoing</td>
</tr>
<tr>
<td>ETP</td>
<td>Continue implementing the ETP aeration tanks solids balancing project to reduce supply interruptions of recycled water to customers</td>
<td>Improvement</td>
<td>December 2017</td>
</tr>
<tr>
<td>WTP</td>
<td>Investigate opportunities to optimise Class A supply reliability</td>
<td>Compliance</td>
<td>June 2019</td>
</tr>
<tr>
<td>WTP</td>
<td>HACCP alarm rationalisation to reduce Class A plant shutdowns and improve recycled water availability</td>
<td>Availability</td>
<td>June 2018</td>
</tr>
</tbody>
</table>
10.5. Biosolids

Melbourne Water produces biosolids as a by-product of the sewage treatment process which generally comprise a mix of organic matter and inorganic compounds. The production of biosolids involves sludge thickening, anaerobic digestion, de-watering, stabilisation and on-site storage.

Melbourne Water’s current biosolids practices and five-year plan is to:

- characterise stockpiles and align with potential end markets
- work with potential partners on sponsored trials
- lower the regulatory barriers (Environmental Improvement Plans)
- improve agility and response times to capture future episodic opportunities (rolling Expressions of Interest)
- maintain characterised stockpiles to help response times to episodic opportunities
- fund ongoing Quantitative Risk Assessment work to ensure chemical and pathogen risks are managed for each application
- reduce cost of re-use by proving up user benefits and active marketing over alternatives
- demonstrate that the key to a sustainable re-use position is to couple episodic project opportunities with future base load volumes into consumable markets such as:
  - agriculture
  - geotechnical
  - energy/product recovery
- demonstrate that field trials, regardless of technology used, include a viable path to market (including by-products) so Melbourne Water or its partners can reliably ‘sell’ biosolids products
- revisit policy targets and willingness to pay prior to next Price Submission period.

Melbourne Water has developed a Regional Environment Improvement Plan (REIP) for the application of biosolids to land. This recently saw 3600 dry tonnes of biosolids beneficially used on broadacre farms in the Geelong and Moorabool districts. Melbourne Water also has an Environmental Improvement Plan for geotechnical biosolids which has seen some 600,000 dry tonnes used to remediate a cap at a closed landfill.

The overall aim for Melbourne Water is to increase the re-use of biosolids across both treatment plants into the future to reduce capacity limitations in addition to continuous improvement. Melbourne Water Corporation will re-use in total 470,000 dry tonnes of biosolids during the 2016/21 Price Submission period from both ETP and WTP biosolids.

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP/WTP</td>
<td>Reuse a total of 470,000 dry tonnes of biosolids during the 2016/21 Price Submission from ETP and WTP. ETP biosolids will primarily be geotechnical reuse and WTP reuse primarily through land application of biosolids.</td>
<td>Compliance</td>
<td>June 2021</td>
</tr>
<tr>
<td>ETP</td>
<td>Develop a plan to increase biosolids dewatering and drying capacity that is linked to the market opportunities for re-use</td>
<td>Growth</td>
<td>June 2019</td>
</tr>
<tr>
<td>ETP</td>
<td>Investigate market opportunities to find cost-effective re-use and management options</td>
<td>Compliance</td>
<td>Ongoing</td>
</tr>
<tr>
<td>WTP</td>
<td>Implement new sludge drying pans</td>
<td>Growth</td>
<td>November 2020</td>
</tr>
<tr>
<td>WTP</td>
<td>Develop a specific biosolids Environmental Improvement Plan which proposes a suitable timeframe for 100 per cent sustainable re-use of annually produced biosolids</td>
<td>Compliance</td>
<td>September 2018</td>
</tr>
</tbody>
</table>

Table 4: Actions to improve biosolids
10.6. Energy and Greenhouse Gas

Melbourne Water has a long history of reducing carbon emissions, both in the use of its resources and infrastructure to generate its own electricity from renewable sources (reduced scope 2 emissions) and in the capture of fugitive emissions both at the ETP and WTP (reduced scope 1 emissions).

This has been achieved despite the growth in service demand as population increases in the catchment area. For example, sewage loads to our treatment facilities have grown by around 20 per cent since 2001.

Projects contributing to this achievement include:

- electrification of the ETP outfall pump station (2000) to direct biogas to trigeneration
- utilisation of biogas at the ETP with biogas engines (2002)
- introduction of covers at the WTP over 55E (2000) and 25W anaerobic reactors (2004/05)
- development and progressive expansion of the WTP biogas-fuelled Power Station (1998-2009)
- decommissioning of land and grass filtration at the WTP (2005)
- changes to land management and agriculture practices at the WTP
- renewal and enhanced design of covers over the WTP anaerobic reactors (2014-16).

As a result of these initiatives, as at July 2016, Melbourne Water already generates the equivalent of 56.7 per cent of the electricity it consumes from low emission sources.

To achieve the carbon pledge, Melbourne water will:

- reduce emissions from electricity by reducing the use of grid electricity through on-site electricity generation using low emission sources
- extinguish some renewable energy certificates (RECs) to claim a carbon emissions reduction
- position itself for the end of the AGL contract (2030) to be self-sufficient in renewable electricity, further reducing emissions
- work toward measuring and reducing its direct greenhouse gas emissions, especially from its wastewater treatment plants, identifying treatment process change, sequestration opportunities and, if required, offset its emissions to achieve outcomes
- purchase carbon offsets.

Operational arrangements to minimise power consumption also support the business to meet the carbon pledge targets by:

- minimising the energy (electricity) consumption required for sewage transport, treatment and disposal
- maximising the energy (biogas) recovered from the sewage treatment process, and maximising on-site electricity generation from the biogas fuel.

### Table 5: Actions to decrease use of energy from non-renewable sources and reduce greenhouse gas emissions

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Investigate and review options for building a large-scale renewable energy station</td>
</tr>
<tr>
<td>ETP</td>
<td>Conduct a preliminary investigation into options to improve biogas production and utilisation</td>
</tr>
<tr>
<td>ETP</td>
<td>Investigate opportunities to reduce power consumption associated with the aeration tank diffusers</td>
</tr>
<tr>
<td>WTP</td>
<td>Replace and improve 25W Lagoon biogas cover to reduce odour emissions and generate electricity</td>
</tr>
<tr>
<td>WTP</td>
<td>On-site power station expansion (stage 4) to reduce greenhouse gas emissions</td>
</tr>
<tr>
<td>WTP</td>
<td>Investigate and review options to optimise 25W ASP blowers to potentially reduce power consumption based on revised control systems and additional online instrumentation</td>
</tr>
</tbody>
</table>
10.7. Waste Management

Melbourne Water manages a number of wastes that are generated from the catchment and treatment process including, but not limited to:
- biosolids
- wetland sediment
- grit and screened material
- filter media
- prescribed wastes.

Melbourne Water faces the challenge of increasing landfill costs and volumes of waste generated as a result of limited landfill space and growing urbanisation.

All waste management activities within Melbourne Water are governed by the hierarchy described by the Environmental Stewardship Policy (Figure 1) whereby we seek to maximise value from assets and waste products.

Figure 1: Environmental Stewardship Hierarchy

Melbourne Water has implemented a Waste to Resources Plan which coordinates and drives innovation and collaboration in waste management activities across the organisation. The target outcomes of the plan include:
- reduced ecological footprint
- a reduction in the estimated management costs from a forecast $25M per annum in 2019/20 to $10M per annum in 2020/21
- creation of new business opportunities and delivery of cross-business/industry innovation
- resources in waste are valued and used
- improvements to Melbourne’s liveability through integration with the solid waste management sector.

The ETP is not licensed to accept waste other than what arrives via the sewer. Therefore, the waste management practices as described by the Environmental Protection Act 1970 apply to the site’s management practices of waste. The WTP, however, is licensed to accept and treat prescribed industrial waste as part of the WTP co-digestion trial to treat high strength organic waste from food industries where trucked waste is blended with incoming sewage and treated in anaerobic pots. A restriction on the overall load is in place and described by the EPA licence.

Table 6: Actions to improve waste management

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP/WTP</td>
<td>Finalise the General Waste Procedure and identify gaps in processes for managing waste across Melbourne Water</td>
<td>Improvement</td>
<td>June 2018</td>
</tr>
<tr>
<td>ETP/WTP</td>
<td>Include broader waste streams in the next Waste to Resources Plan review (that is, legacy and future waste management)</td>
<td>Improvement</td>
<td>June 2020</td>
</tr>
<tr>
<td>ETP</td>
<td>Improve processes to procure media with re-use potential at the end of its life</td>
<td>Improvement</td>
<td>December 2017</td>
</tr>
<tr>
<td>WTP</td>
<td>Continue co-digestion trial to receive and treat industrial food waste products</td>
<td>Improvement</td>
<td>August 2018</td>
</tr>
</tbody>
</table>
10.8. Biodiversity Improvement

The nature of the treatment process results in large volumes of treated effluent stored in holding basins or lagoons at the ETP and WTP. This is a valuable freshwater resource for birds, particularly when ephemeral wetlands are dry.

**Eastern Treatment Plant**

Areas of the ETP precinct are recognised as sites of biological and State conservation significance by Melbourne Water and the Department of Environment, Land, Water and Planning. The site is also listed by Birds Australia as an international ‘Important Bird Area’.

Five core processes are currently threatening the biodiversity of the precinct – weed invasion; altered hydrology and hydrogeology; degradation of vegetation structure; pest animals; and cattle grazing. Of these threatening processes, weed invasion and altered hydrological conditions provide the most serious and immediate threats. Therefore, the recommended priority actions for conserving and enhancing biodiversity are weed control, revegetation, stock grazing management, pest animal control, and maintenance or establishment of appropriate hydrological regimes.

Undertaking biodiversity conservation action will contribute to enhancing the capacity of the ETP precinct to absorb change and disturbance. Conservation actions will aid in building resilience and fortifying the system against vulnerability to the many threatening processes present in the surrounding landscape.

Melbourne Water has prepared an ETP Precinct Biodiversity Conservation Strategy which provides strategic direction for the conservation of biological diversity within the treatment plant’s boundary.

A Waterways Sites of Biodiversity Significance Plan was developed for the protection and enhancement of significant biodiversity values – particularly threatened species/communities – detailing effective management of those waterways sites that support these values and ensuring Melbourne Water’s legislative obligations are met. The plan outlines the prioritisation process using selection criteria and defines the program targets.

**Western Treatment Plant**

The environmental values of the WTP are of local, regional, national and international significance. The site is part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar-listed ‘Wetland of International Importance’ and protected under the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC). Over 3000 hectares are currently dedicated to conservation (of the total 10,500 hectares at the WTP) and the site is home to many conservation values including the EPBC-listed Orange-bellied Parrot and Growling Grass Frog. It is known as one of Australia’s top birdwatching areas with 284 species of birds recorded at the site. The environmental values are dependent on a reliable year-round source of water and nutrients, and the site is an important drought refuge for a large number of water birds.

The biodiversity values are managed using an adaptive management framework which includes investigations, restoration and improvement projects, weed and pest control, monitoring and reporting.

The WTP has a Biodiversity Conservation Advisory Committee which provides specialist advice to Melbourne Water on the conservation and management of the WTP’s unique native biodiversity values. Combining the expertise of a number of government and non-government agencies, the committee was instrumental in initiating wildlife studies and developing the first biodiversity conservation plans for the site. Members of the committee include:

- Melbourne Water
- representatives of adjacent land managers
- other government agencies
- experts in botany, ornithology, mammalogy, herpetology, wildlife health and marine biology
- representatives of interest groups that visit the site for birdwatching and conservation purposes.

The committee was founded in 1986 and meets four times a year.
### Table 7: Actions to improve biodiversity

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Investigate and review options to redevelop the ‘Golden Triangle’ to create a diverse range of habitats</td>
<td>Improvement</td>
<td>June 2018</td>
</tr>
<tr>
<td>ETP</td>
<td>Investigate and review options to revegetate wetlands and buffer zones to enhance biodiversity and habitat complexity</td>
<td>Improvement</td>
<td>June 2018</td>
</tr>
<tr>
<td>ETP</td>
<td>Investigate and review options to install rocks and logs to increase habitat diversity within existing wetlands</td>
<td>Improvement</td>
<td>December 2018</td>
</tr>
<tr>
<td>WTP</td>
<td>Research and understand influencing factors on avian health</td>
<td>Improvement</td>
<td>December 2020</td>
</tr>
</tbody>
</table>
| WTP   | Habitat enhancement  
  - fence off and revegetate a riparian corridor adjacent to Little River  
  - continue to manage conservation ponds for Ramsar values and EPBC-listed species | Improvement | December 2018  
  Ongoing |
| WTP   | Continue biodiversity offsets pilot at Ryan’s Swamp | Improvement | June 2018 |

### 10.9. Improving Liveability

The most significant contribution of the ETP and WTP to liveability is the provision of sewage treatment for around 42 per cent and 52 per cent respectively of the city of Melbourne. At a more local level, the ETP and the WTP have the potential for positive impacts on liveability. Key aspects include the opportunity for the ETP and WTP to contribute to community education and recreation through activities such as tours and birdwatching.

Melbourne Water’s objectives are:
- to maximise opportunities for the ETP and WTP to contribute to the local and broader community to provide environmental activities and education
- to enable Melbourne’s population to grow while maintaining the level of service required by the environment and customers, and remain compliant with regulations and licences.

To support the opportunities at the WTP, a Future Land Use Plan and Eco-tourism Concept Plan have been developed to leverage off the site’s values. Similarly, a Future Land Use Plan for the ETP is under development.

### Table 8: Actions to improve liveability

<table>
<thead>
<tr>
<th>Plant</th>
<th>Project</th>
<th>Driver</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETP</td>
<td>Hold an open day to increase the community's awareness of the site's operations and biodiversity values</td>
<td>Customer experience</td>
<td>Completed in July 2017</td>
</tr>
<tr>
<td>ETP</td>
<td>Develop a Land Use Plan that ensures current and future land use is managed appropriately</td>
<td>Improvement</td>
<td>December 2018</td>
</tr>
<tr>
<td>ETP/WTP</td>
<td>Update and expand the Melbourne Water website to share information with the community</td>
<td>Improvement</td>
<td>December 2018</td>
</tr>
<tr>
<td>WTP</td>
<td>Implement the Austin Road bird hide project and associated works including the road upgrade, car park construction, screening and bird hide installation</td>
<td>Improvement</td>
<td>2017/18</td>
</tr>
<tr>
<td>WTP</td>
<td>Improve the visitation facilities: interpretive signage, waypoint markers, road safety signs and visitation amenities</td>
<td>Improvement</td>
<td>June 2020</td>
</tr>
</tbody>
</table>
10.10. Groundwater and Land Management

Melbourne water is continuously improving groundwater and land management practices with the help of specialised consultants and a program of work for asset renewals.

The EPA Victoria discharge licence for ETP requires that the treatment plants do not adversely affect beneficial uses of groundwater. Melbourne Water has an ongoing monitoring program to determine whether the treatment plants are affecting the groundwater within the plant boundary. Groundwater standing water level (SWL) and quality is measured twice each year, in order to assess compliance with the EPA licence 74284 pertaining to premises 68533 and 73314.

Groundwater trends are analysed after each monitoring event with respect to the historical data enabling changes in the groundwater quality to be identified. These changes may lead to more data investigations to understand the influencing factors of the results and potential for impact to beneficial uses that exist. The slow moving nature of the groundwater in the region of the ETP and WTP creates a lag between an event and changes in groundwater quality. A program of works to upgrade the sludge drying pans at ETP was recently completed in 2016 which is expected to minimise the potential for groundwater changes in future.

Melbourne water holds a number of leases with a range of tenants including utility gas companies, agricultural and turf farmers, nurseries and recreational shooting and golf clubs. Melbourne Water requires the tenants to produce Environmental Management Plans ensuring their practices do not adversely affect the land or groundwater in line with the EPA licence. Lease holders are required to implement controls and monitoring programs where such need exists.

10.11. 2016 Price Submission Priorities

Having made substantial investments in the ETP and the WTP upgrades, Melbourne Water is moving into a consolidation phase. The focus is realising and embedding operational improvements supported by ongoing targeted investment in growth, renewals and compliance. This approach is in line with community expectations regarding affordability of water services while continuing to meet service obligations.

The investment program detailed for the ETP and the WTP are underpinned by ongoing endeavours to provide excellent operational performance and delivery against regulatory requirements. For more information on planned upgrades, see the 2016 Price Submission which includes a project breakdown.

Eastern Treatment Plant

Improvement priorities identified for the 2016 Price Submission include:

- continuing to facilitate water recycling to reduce the volume of water discharged to the receiving marine environment and further reduce any residual environmental impacts at Boags Rocks
- upgrading sections of the treatment plant to reduce net energy consumption
- improving liveability for the neighbouring community by reducing the impact of odour emissions.

Western Treatment Plant

Improvement priorities identified for the 2016 Price Submission include:

- the commissioning of a new activated sludge plant integrated with the 55E Lagoon to increase the treatment capacity and meet EPA licence and recycled water objectives for projected load growth
- commencement of the design phase of the existing 55E activated sludge plant renewal and upgrade to maintain the level of service for 55E and improve safety of operation and reduce operational costs
- construction of 125W sludge drying plans to meet the future drying needs for sludge generation to prevent further sludge accumulation allowing the WTP to effectively and efficiently treat sewage and produce recycled water that is fit-for-purpose
- a new biosolid stockpile area to maintain compliance with the licence and guidelines for handling biosolids with population growth and increasing loads to the plant
- mechanical and electrical renewals to maintain service levels.
11. Stakeholder, Customer and Community Engagement

Engaging with Melbourne Water’s stakeholders, customers and communities is vital and will enable us to identify and implement continuous environmental improvements at both the ETP and WTP.

Ongoing engagement will help Melbourne Water to build capacity and trust, develop these important relationships and plan for the future.

The following table outlines the ‘who’, ‘why’ and ‘how’ of our stakeholder, customer and community engagement activities.

Table 9: Planned & potential engagement activities

<table>
<thead>
<tr>
<th>Who? Community and stakeholders can include:</th>
<th>Why we engage:</th>
<th>How? Activities can include:</th>
</tr>
</thead>
</table>
| Engaged community members, groups and associations. (Registered Aboriginal Parties, Indigenous community members, friends groups, Bird Life Australia, local, State and national media, birdwatchers – license holders, universities and schools). | • To educate and build capacity about the significance and operations of the ETP and WTP  
• To share knowledge, learn from one another build relationships and harness interest in both sites  
• To involve in planning for the future. | • Annual community open days  
• On site exhibitions  
• Regular tours for schools, universities and key stakeholder groups  
• Regular newsletters/ communications  
• Website  
• Melbourne Water Your Say page  
• Social media  
• Media releases. |
| Individuals, residents and businesses located near the ETP and WTP. | • To raise awareness of potential impacts (including odour or noise controls, and land use planning)  
• To provide education about site operations and upcoming activities  
• To provide notice of when upgrade works will take place on the site  
• To involve in planning for the future. | • Bulletins, leaflets, emails and/or door knocks  
• Annual community open days  
• Site tours and community information sessions as required  
• Surveys. |
| Federal, State and local government organisations, and water retailers. (Federal Department of Environment and Energy; Environment Protection Authority Victoria; Department of Environment, Land, Water and Planning; Parks Victoria; Department of Human Services; Heritage Victoria; Department of Treasury and Finance; Country Fire Authority; water retailers, Members of Parliament; councillors; and council staff). | • To involve in planning for the future  
• To ensure effective decision-making and beneficial environmental outcomes  
• To provide notice of works improving or affecting government agencies, corporation assets or services. | • Participation in municipal management and planning committees  
• Water Retailer tours  
• Engagement on pricing submissions  
• Council forums. |
Melbourne Water will continue to work on ways to strengthen its strategic engagement with the community — both our engaged community groups and the broader community. This will be particularly evident through our online channels (including improvements to our website and the 'Your Say' digital engagement platform) whereby Melbourne water seeks community input on specific projects. Some of the actions in this plan may be communicated in this way, while the main mechanism for engaging on the EIP itself will be an informing approach (using the Melbourne water website and notifying the local community on where they can find the plan for more details). This approach has been adopted due to the level of community interest gauged by surveys for both ETP and WTP.

Community engagement is undertaken at two levels: engaging broadly with customers as a whole regarding objectives, priorities and pricing primarily as part of the Price Submission process, and engaging specifically about matters relating to the ETP or WTP.

Engagement for the Price Submission includes:

- seeking feedback on key principles and options that frame the approach and key proposals in the Price Submission. This is conducted with the community as a whole using web-based discussion papers and key questions
- seeking feedback on the draft Price Submission and the formal public review process. This provides the opportunity for broad-based feedback on the priorities and affordability of initiatives.

12. Performance Monitoring and Reporting

A comprehensive performance monitoring system and program is in place for the ETP and WTP. This includes:

- extensive online monitoring and recording of process data and metrics through the Process Control System/MOSAIC. This provides equipment status and performance data for equipment and processes throughout the sewage treatment process
- substantial day-to-day process observation, sampling and analysis which includes water quality analysis, measurement of sewage process variables, observations of status and trends in process behaviour and inspection and assessment of equipment and facilities
- comprehensive end-point testing of water quality to verify process performance and reliability of performance
- operational guidance principles used to assess the plants’ performance on a daily and weekly basis. Routine review of performance against objectives is conducted and is used to make operational decisions for improvement.

Internal reporting follows a cascading reporting framework which ranges from real-time feedback to lead operators through to monthly Board performance reporting. In addition to this performance monitoring program, Melbourne water reports annually to the EPA on the performance of the treatment plants with respect to the licence. These reports are made available on the EPA website.

13. Plan Auditing and Review

Melbourne Water has an integrated approach to internal and external auditing that encompasses OHS, quality, HACCP and environmental management requirements. The audit program checks and validates objectives and targets to minimise, and where possible, eliminate environmental impacts. Specifically, internal audits will review high level risks, captured in Melbourne Water’s Integrated Risk and Incident System (IRIS) to ensure controls are delivering the right outcomes.

A rigorous external audit process at Melbourne Water ensures appropriate, suitably qualified auditors are selected to review processes and plans for the delivery of the organisation’s Price Submission commitments. The external audit is completed annually and recertification issued every three years. This plan will be incorporated into the Integrated Management System (IMS) Audit Program for 2017. There is also a comprehensive audit program (internal and external) associated with the Statement of Obligations that includes the processes of development and delivery of Water Plan commitments.

We will proactively seek continuous improvement opportunities through the rigorous audit program and seek input from an EPA-accredited environmental auditor. External auditing of the Environmental Improvement Plan’s actions will occur every three years in recognition of the timeframes over which the actions of this plan can be progressed and implemented.

It is anticipated that this plan will be in effect for the duration of 2016 Price Submission and will be reviewed as part of the preparation for the next Price Submission. The progress on actions defined in the plan will be monitored regularly through the Capital Management System (CMS) and IRIS.

In addition, actions in the plan will be formally reviewed annually in an integrated management oversite meeting to ensure that they remain on track. Where community interest exists on the plan, progress a report can be made available. This Environmental Improvement Plan for the ETP and WTP is required to be consistent with neighbouring Environmental Improvement Plans where they exist. No known neighbouring plans are in place for Bangholme or Werribee at this time.
## 14. Glossary of Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11SE</td>
<td>Western Treatment Plant lagoon system</td>
</tr>
<tr>
<td>25W</td>
<td>Western Treatment Plant lagoon system</td>
</tr>
<tr>
<td>SSE</td>
<td>Western Treatment Plant lagoon system</td>
</tr>
<tr>
<td>AGL</td>
<td>Publically-listed Australian gas company</td>
</tr>
<tr>
<td>Biosolids</td>
<td>Product of the solids handling streams in wastewater treatment, typically biologically active</td>
</tr>
<tr>
<td>Class A</td>
<td>Highest class of recycled water for non-drinking purposes</td>
</tr>
<tr>
<td>Class C</td>
<td>Recycled water fit for specific non-drinking purposes</td>
</tr>
<tr>
<td>DELWP</td>
<td>Department of Environment Land Water and Planning</td>
</tr>
<tr>
<td>EIP</td>
<td>Environmental Improvement Plan</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority Victoria</td>
</tr>
<tr>
<td>EPBC</td>
<td>Environment Protection and Biodiversity Conservation Act</td>
</tr>
<tr>
<td>EPHMS</td>
<td>Environmental and Public Health Management System</td>
</tr>
<tr>
<td>ETP</td>
<td>Eastern Treatment Plant</td>
</tr>
<tr>
<td>HACCP</td>
<td>Hazard Analysis Critical Control Points, a food safety control system</td>
</tr>
<tr>
<td>IMS</td>
<td>Integrated Management System</td>
</tr>
<tr>
<td>IRIS</td>
<td>Integrated Risk and Incident System</td>
</tr>
<tr>
<td>MOSAIC/PCS</td>
<td>Process Control System used to monitor the treatment process</td>
</tr>
<tr>
<td>QMS</td>
<td>Quality Management System</td>
</tr>
<tr>
<td>RWQMP</td>
<td>Recycled Water Quality Management Plan</td>
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<tr>
<td>WTP</td>
<td>Western Treatment Plant</td>
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15. Endorsement by Management

ETP Management

David Norman
Manager
Eastern Treatment Plant

WTP Management

Martin Bowles
Manager
Western Treatment Plant

Integrated Planning

Jenelle Watson
Manager
Treatment & Resources
16. Appendix A: Eastern Treatment Plan Site Maps
16. Appendix A: Eastern Treatment Plan Site Maps (continued)
17. Appendix B: Western Treatment Plan Site Map

Western Treatment Plant (WTP)

Capital Works Projects

Project Benefits

- Conserve Biodiversity
- Asset Upgrade
- Protect Bay Health
- Cost Effective & Safe Sewage Treatment
- More Fit-For-Purpose
- Recycled Water
- Future Growth

25W Lagoon Biogas Cover Replacement

Construct a new biogas cover over the 25W lagoon to reduce odour and generate electricity. Once the cover is complete, biogas will be collected and the AGL gas plant will convert the biogas to renewable energy for site use.

Onsite Power Station Expansion

Construct a new power station to generate electricity from the biogas collected under pond covers. This will provide more power to the power grid, and reduce costs and greenhouse gas emissions as a result of lower electricity purchases.

55E Activated Sludge Plant Upgrade

Renewal and upgrade of the existing 55E activated sludge plant which will maintain the level of service, improve safety of operation, ensure treatment performance reliability and reduce whole of life costs.

New Sludge Drying Pans

Increase drying pan capacity to accommodate future growth in sludge which will safeguard the wastewater treatment process at WTP and protect the health of Port Phillip Bay.

25W Lagoon Biogas Cover Replacement

Install a new activated sludge plant at the 55E lagoon to increase treatment capacity and keep pace with predicted load growth to WTP.
18. Appendix C: Legislative Requirements and Guidelines

18.1. Legislation

The principal environmental legislation influencing the management of the ETP and WTP is the Environment Protection Act 1970. The Act sets the framework for Victoria’s licensing and permitting system, under which EPA Victoria issues licences and permits for the discharge of waste to the environment. The Act covers general requirements relating to discharge to air, land, water and groundwater, and control of noise, litter and waste. There are also a number of Victorian and Commonwealth acts that relate to the operation and management of the ETP and WTP, as follows:

- Aboriginal & Torres Strait Islander Heritage Protection Act 1984 (Commonwealth)
- Environment Protection & Biodiversity Conservation Act 1999 (Commonwealth)
- Agricultural and Veterinary Chemicals (Control of Use) Act 1992 (Vic)
- Aboriginal Heritage Act 2006 (Vic)
- Catchment and Land Protection Act 1994 (Vic)
- Conservation, Forests and Lands Act 1987 (Vic)
- Dangerous Goods Act 1985 (Vic)
- Drugs, Poisons and Controlled Substances Act 1981 (Vic)
- Environment Conservation Council Act 1997 (Vic)
- Environmental Effects Act 1978 (Vic)
- Flora and Fauna Guarantee Act 1988 (Vic)
- Food Act 1984 and Food (Amendment) Act 2001 (Vic)
- Health Act 1958 (Vic)
- Heritage Act 1995 (Vic)
- Livestock Disease Control Act 1994 (Vic)
- Occupational Health and Safety Act 2004 (Vic)
- Planning and Environment Act 1987 (Vic)
- Victorian Environmental Assessment Council Act 2001 (Vic)
- Water Act 1989 (Vic)
- Wildlife Act 1975 (Vic).

18.2. Environmental Guidelines

The following guidelines have relevance to the ETP and WTP:

- Australian Guidelines for Water Recycling (AGWR): Managing Health and Environmental Risks (Phase 1)

- Environment Protection Authority Victoria – Publication 1015

- Guidelines for Environmental Management – Biosolids Land Application, 2004 (EPA Publication 943)


- Guidelines for Environmental Management – Use of Reclaimed Water, 2003 (EPA Publication 464.2)


- Guidelines for Wastewater Irrigation, 1991 (EPA Publication 168)

- Guidelines for Environmental Management – Biosolids Land Application, 2004 (EPA Publication 943)


- Australian National Guidelines for Ramsar Wetlands – Implementing the Ramsar Convention in Australia (currently under development)
18.3. Government Policies

The following policy applies to ETP & WTP:


Licence objectives require that Melbourne Water meets all relevant provisions of all State Environment Protection Policies (SEPPs) and Industrial Waste Management Policies (IWMPs). SEPPs are declared under clause 16(1) and 16 A (1) of the Environment Protection Act 1970. They identify:

- beneficial uses of the environment to be protected
- environmental quality objectives to protect beneficial uses
- environmental indicators to define environmental quality
- a program to enable the attainment of the quality objectives.

These policies provide a context for environmental decision-making, granting of works approvals, licensing, issuing of pollution abatement and infringement notices, and for making regulations under the Act. The Aspects and Impacts Risk Register identifies the relevant policy and SEPP requirements against the applicable risk. The following IWMPs and SEPPs are particularly relevant to the treatment plants:

- Industrial Waste Management Policy (Prescribed Industrial Waste)
- State Environment Protection Policy (Waters of Victoria)
- State Environment Protection Policy (Groundwaters of Victoria)
- State Environment Protection Policy (Air Quality Management)
- State Environment Protection Policy (Noise from Commerce, Industry and Trade)

18.4. International Treaties (Western Treatment Plant)

There are five international wildlife treaties that specifically impact the WTP:

- The Ramsar Convention (Convention on Wetlands of International Importance especially as Waterfowl Habitat). The WTP is included in the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar site, which was listed as a Wetland of International Importance under the Ramsar Convention in 1982.

- The Japan–Australia Migratory Birds Agreement (JAMBA) and the China–Australia Migratory Birds Agreement (CAMBA). Treaties between Australia and Japan and Australia and China were signed in 1974 and 1986, and came into force in 1981 and 1988 respectively. The treaties commit the governments to protect migratory birds and their habitats. Several of the species listed under this agreement frequent the WTP.

- The Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals) is a multilateral treaty for the protection of migratory wildlife, obliging member countries to protect migratory species. It was signed by Australia in 1991.

- The Rio Convention (Convention on Biological Diversity) was signed by Australia in 1993. This treaty obliges Australia to conserve its biodiversity (ecological, species and genetic).