Woodlawn Bioreactor

Modification of DA 31-02-99 and MP 10_0012 for the construction of a leachate treatment plant and associated infrastructure, and changes to regional waste limits and operating hours

Prepared for Veolia Environmental Services (Australia) Pty Ltd

May 2017

SG HADDAD ADVISORY

Strategic Planning Services

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Approval:	Sam Haddad – SG Haddad Advisory	Date: 25/05/2017

Abbreviations

ED1	Evaporation Dam 1
ED2	Evaporation Dam 2
DPE	NSW Department of Planning and Environment
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
IMF	Intermodal Facility
Ktpa	Kilotonnes per annum
LTP	Leachate Treatment Plant
MBT	Mechanical Biological Treatment
Mtpa	Million tonnes per annum
SRF	Solid Recovered Fuel
Tpa	Tonnes per annum

Executive Summary

Introduction
Veolia Environmental Services (Australia) Pty Limited (Veolia) own and operate the Woodlawn Bioreactor and Crisps Creek Intermodal Facility (IMF). The IMF services the Bioreactor by transferring containers of compressed waste sourced from Sydney from rail to road for disposal at the Bioreactor. The Bioreactor, which is located approximately 40 km south of Goulburn and 50 km north of Canberra, is a major putrescible landfill that services the Sydney metropolitan area.

The Bioreactor and IMF were approved in 2000 and commenced in 2004. A Mechanical Biological Treatment (MBT) plant was approved for the site in 2007 and is now commissioning with a view to commencing operations in July 2017.

The Bioreactor was originally approved to accept up to 500,000 million tonnes of putrescible waste per annum. However, in 2012, an increase in maximum throughput to 1.13 mtpa was approved. Key drivers for the increase were the consistent demand for the disposal of approximately 2 million tpa of Sydney's putrescible waste, decreasing landfill capacity in the Sydney metropolitan area, and the slow uptake of alternative waste technology.

Need for the Modification
The amount of leachate being generated in the waste mass is greater than what was originally modeled and is now beyond the capacity of the existing leachate management system to deal with effectively. This unanticipated increase in leachate within the pit has reduced the efficiency of gas extraction and increased the potential for odour impacts. Subsequently, to maintain operational and environmental performance Veolia has been forced to extract more leachate from the Bioreactor resulting in existing leachate storage approaching capacity.

On 5 August 2016, Veolia submitted a long-term leachate management strategy (LTLM Strategy) to the EPA and NSW Water. The document outlined a proposal for improving the extraction and treatment of leachate from the waste mass by installing a new membrane bioreactor (MBR) treatment plant to treat leachate at a faster rate and to a much higher quality than is currently possible, and discharging the treated leachate to Evaporation Dam 1 (ED1).

On 9 September 2016 DPE approved a modification to Veolia's planning approvals to convert storm water storage to leachate storage to temporarily address the shortfall in leachate capacity. While only a short term solution, the conditions of the modification approval required Veolia to develop and implement the LTLM Strategy in consultation with the EPA.

Veolia has now reached in-principle agreement with the EPA to implement the LTLM Strategy which is reflected in condition U1.1 of Veolia's Environment Protection License (EPL 11436), which was amended by the EPA on 14 October 2016.

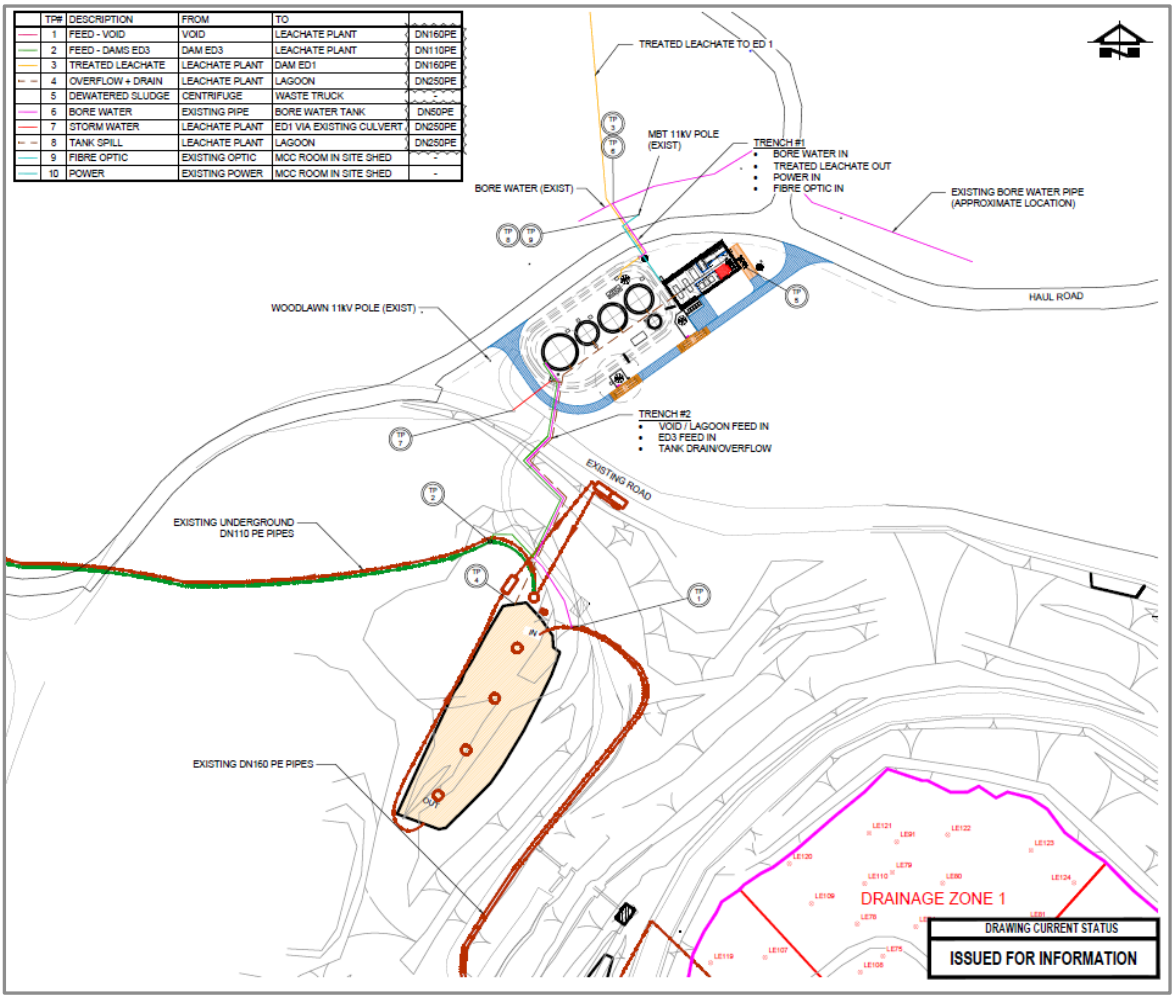
Subsequently, this modification seeks planning approval to build and operate a Leachate Treatment Plant (LTP) and associated infrastructure required to fully implement the LTLM Strategy. It also seeks to make a number of changes to conditions relating to regional waste limits and operating hours.

Proposed Modification
The modification seeks approval for key elements of the LTLM Strategy as follows:

- The construction of a leachate treatment plant to process leachate from the Bioreactor, Evaporation Dam 3 North (ED3N) and Evaporation Dam 3 South (ED3S) to an agreed standard

- The discharge of all treated leachate into Evaporation Dam 1 (ED1) which will become the primary leachate storage facility
- The use of mechanical evaporation (and possibly heating) equipment (up to 4) when necessary
- To ensure the integrity of Evaporation Dam 1 (ED1) against leakage prior to the discharge of treated effluent into ED1.

The leachate treatment plant is to be located on disturbed land between the bioreactor and Evaporation Dam 1. Overland pipelines (trenched under roads) will transfer raw leachate from the Bioreactor directly to the leachate treatment plant. Once processed it will be discharged into Evaporation Dam 1. Leachate already stored in Evaporation Dam 3 will also be piped to the plant for treatment to reduce leachate volumes in this dam.



Proposed location of leachate treatment plant and associated infrastructure

The modification request also seeks changes to conditions as follows:

- To remove the need to seek upfront approval from the Secretary for the receipt of regional waste above 50,000 tpa
- To ensure operating hours in MP 10_0012 are consistent with those in DA31-02-99 by allowing operation during public holidays (other than Christmas Day and Good Friday).

The approvals for Woodlawn are transitional Part 3A projects and therefore can be modified under Section 75W of the EP&A Act. Veolia submits that the Minister can be satisfied that the proposed

modifications are consistent with the approved projects and do not constitute new projects in their own right.

Woodlawn Mine Project

Heron Resources Ltd has project approval for the Woodlawn Mine Project (07_0143) located within the Woodlawn Eco-Precinct which enables it to extract 1.5 million tonnes of copper, lead and zinc ore for up to 21 years from the existing tailings dams and underground workings. The mine project includes dewatering the under-ground mine workings into, and drawing processing water from, evaporation dams which will also receive water from Veolia's proposed LTP. The environmental assessment has considered Heron's requirements in its impact analysis.

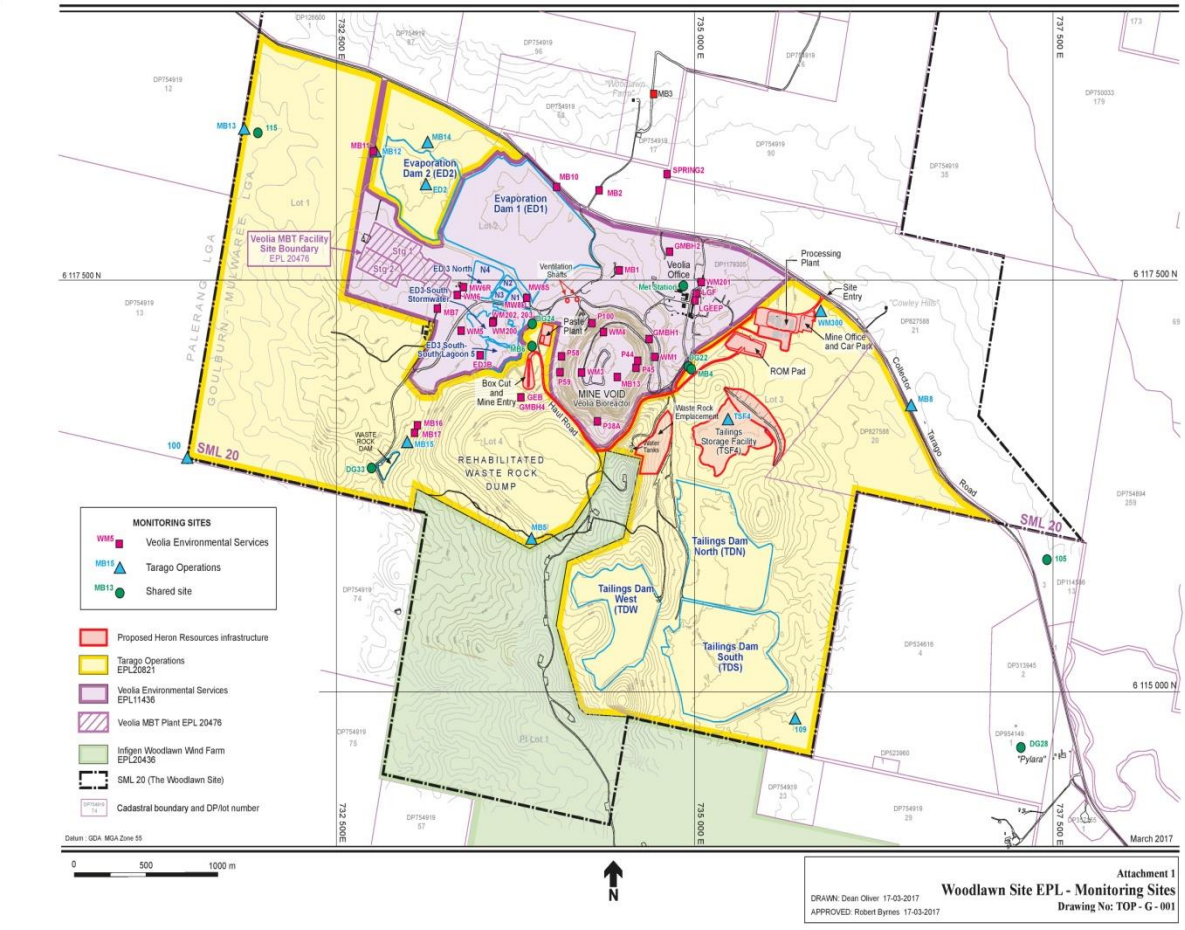


Figure Showing operations of both Veolia's Woodlawn facility and proposed Woodlawn mine project.

Impact assessment

Surface Water and Leachate Management

The Woodlawn Eco-Precinct is a nil water discharge site, and subsequently a key to the ongoing performance of the Bioreactor is the effective management of leachate and the integration of Veolia's site water needs with the water requirements of Heron's proposed Woodlawn mine. Under its consent, Heron intends dewatering the under-ground mine workings into, and draw processing water from ED1 and/or ED2 to ensure there is enough space in the system at all times for Veolia's water disposal requirements.

The LTLM Strategy was supported by a detailed site water balance. This balance found that ED1 could store the stormwater and leachate volumes for the life of the project without water transfer or mechanical evaporation for most scenarios where ED1 was used exclusively for Veolia's operations (i.e. no dewatering from the Woodlawn mine). However, for scenarios involving additional water/leachate from Veolia's operations or poorer rates of evaporation, up to 4 mechanical evaporation units would be required for worst-case leachate production under the wet climate scenario.

It also demonstrated that ED1 and ED2 combined could store:

- treated leachate from the mine void and the ED3 ponds
- stormwater from the mine void
- mine dewatering from Heron's mine

The water balance submitted with the LTLM Strategy has now been supplemented by an additional site water balance to further confirm the disposal requirements of both Veolia's and Herons operations. The additional water balance confirmed that Evaporation Dams 1 and 2 have sufficient capacity under all climatic conditions (including a worst-case scenario) to accommodate the water related requirements of both projects without mechanical evaporators. Provided the integrity of both dams is maintained this will ensure the Woodlawn Eco Precinct will remain a nil zero discharge site.

In this respect, Veolia recently completed an investigation into the integrity of both ED1 and ED2 which found little evidence of contamination leaving the premises or otherwise impacting waterways. The investigation also identified available and proven technology effective in mitigating potential seepage such as high-density polyethylene (HDPE) liners, but that the application of such liners was complex and not necessarily commensurate with the potential risks posed by the dams. The report recommends the preparation of an Ecological Risk Assessment to inform appropriate measures to either mitigate the potential for harm or remediate groundwater contaminated by seepage.

Air Quality

The LTLM Strategy was also supported by an air quality impact assessment which included detailed modeling of the potential for offensive odours from the treatment and disposal of treated leachate into Evaporation Dam 1. While the location of the treatment plant has moved closer to Evaporation Dam 1, all other parameters with the potential to affect odour remain the same. On this basis Veolia submits that additional modeling is not required and that the current odour impact assessment remains relevant.

This is supported by advice from the Odour Unit (TOU) which carried out a review of the proposed location variation for the leachate treatment plant (LTP) (Appendix G) noting that the amended location for the LTP is approximately 40 metres from the original location, resulted from the final detailed design work for the LTP and has no impact no impact on the proposed Evaporation Dam 1 (ED1) System. The TOU advised that based on the information provided by Veolia and the modeled outcomes documented in the July 2016 Report, the proposed new location for the LTP is considered to reflect a negligible change to the projected odour impacts for the long term treated leachate solution at the Woodlawn Bioreactor Facility.

The assessment supporting the LTLM Strategy found that the discharge from the leachate treatment plant will be of a higher quality than possible under the existing leachate management system and concluded that the proposed Leachate Treatment Plant and subsequent storage of the treated leachate in the ED1 system would:

- comfortably meet the relevant NSW EPA odour performance criterion
- Improve existing amenity in terms of odour

Noise

Apart from the blower which is external, the leachate treatment plant is fully enclosed. A qualitative assessment which considered the noise emissions from the blower at 1 metre from the source, against the noise levels in the approval, found that the LTP would not generate excessive noise and would comfortably meet the established limits at sensitive receivers. In fact the assessment predicted that the leachate treatment plant would be inaudible at the nearest sensitive receptor.

Greenhouse Gas Emissions

Australia's total greenhouse gas emissions in 2012 amounted to 554.6 million tonnes of carbon dioxide equivalent (Mt CO_2-e). In the same year, New South Wales accounted for 154.7 Mt of the total. A GHG assessment for the leachate treatment plant found that emissions would be negligible with an estimated 420 kg CO_2-emissions per year representing less than 0.0000003% of NSW' annual emission rate.

Conclusion

The modification will facilitate better environmental and operational performance by allowing Veolia to extract and treat greater volumes of leachate and reduce the generation of odour. The modification will also enable more efficient gas extraction maximizing the waste to energy benefits of the Bioreactor.

The potential water and odour impacts have been fully considered. The water assessment demonstrates that the water requirements for both Heron's Woodlawn Mine project and Veolia's leachate treatment plant can be accommodated while the odour assessment indicates that the treatment and disposal of leachate will improve odour emissions from the site and that the relevant criteria can be comfortably met. Similarly, noise emissions associated with the operation of the leachate treatment plant will comfortably meet noise levels set in the original approval at sensitive receivers.

Other recommended changes have been fully justified. The reduced administrative burden associated with accepting regional waste by road, as well as the return to the originally approved operating hours, would contribute to greater efficiencies without unacceptable impacts.

It is submitted that the proposed modifications will make a positive environmental contribution enabling the full implementation of the LTLM Strategy which in turn will support the long-term sustainability of this important waste management project for NSW. Subsequently, it is considered to be in the public interest and should be approved.

Proposed modifications to relevant conditions

No.	Condition	Proposed change
Sch. 2 Condition 64 (DA 31-02-99)	Stormwater in the mine void must only be discharged into ED3S sump, for transfer via pipeline to ED2, or otherwise used for operational purposes within the landfill, as approved in writing by the EPA.	Stormwater in the mine void must only be discharged into ED3S sump, for transfer via pipeline to **ED1**, or otherwise used for operational purposes within the landfill, as approved in writing by the EPA.
Sch. 2 Condition 65 (DA 31-02-99)	Stormwater collected in the mine void may only be transferred into ED3S sump and ED2 provided that: a) The Applicant can always comply with condition 58; and b) The stormwater to be transferred contains no leachate, unless otherwise approved in writing by the EPA.	Stormwater collected in the mine void may only be transferred into ED3S sump and **ED1** provided that: a) The Applicant can always comply with condition 58; and b) The stormwater to be transferred contains no leachate, unless otherwise approved in writing by the EPA.
Sch. 2 Condition 70B (DA 31-02-99)	The Applicant must prepare a management plan for ED2 to ensure that: a) onlv mine void stormwater that does not contain leachate and direct rainfall and runoff is received and stored within ED2; b) the dam is lined and maintained to prevent the leakage of stored acid mine drainage waters in order to protect groundwater and surface water; c) a monitoring and inspection program is implemented including installation of monitoring bores, a review of monitoring data and six-monthly inspections to evaluate the integrity of the barrier and to assess if leakage from the dam is occurring; d) adequate storage is retained in ED2 to meet the environmental performance requirements in condition 58 e) measures are identified to maintain adequate capacity within a suitable time period after receiving water from a rainfall event; f) there is an emergency plan for the management of water in excess of the capacity of ED2; g) the sources of water that are collected or received in ED2 are	The Applicant must prepare a management plan for **ED1 and** ED2 to ensure that: a) the dams are lined and maintained to prevent the leakage of stored acid mine drainage waters in order to protect groundwater and surface water; b) a monitoring and inspection program is implemented including installation of monitoring bores, a review of monitoring data and six-monthly inspections to evaluate the integrity of the barrier and to assess if leakage from the dam is occurring; c) adequate storage is retained in ED1 and ED2 to meet the environmental performance requirements in condition 58 d) measures are identified to maintain adequate capacity within a suitable time period after receiving water from a rainfall event; e) there is an emergency plan for the management of water in excess of the capacity of ED2; f) the sources of water that are collected or received in **ED1 and** ED2 are identified; and g) the quantity of water from each

<table>
<tr><th>No.</th><th>Condition</th><th>Proposed change</th></tr>
<tr><td></td><td>identified; and
h) the quantity of water from each source that reports to ED2 is monitored and compared in graphical format with rainfall data.
The plan must be prepared in consultation with the EPA and submitted to the Secretary for approval within two months of the date of approval for MOD 2 or as otherwise agreed by the Secretary. The revised plan shall be documented in the LEMP.</td><td>source that reports to ED1 and ED2 is monitored and compared in graphical format with rainfall data.
The plan must be prepared in consultation with the EPA and submitted to the Secretary for approval within two months of the date of approval for MOD 3 or as otherwise agreed by the Secretary. The revised plan shall be documented in the LEMP.</td></tr>
<tr><td>Sch. 3 Condition 6 (MP 10_0012)</td><td>Prior to the receipt of more than 50,000 tpa of regional waste by road at the Landfill, the Proponent shall obtain approval in writing from the Director-General to vary the limit for the receipt of regional waste not exceeding 130,000 tpa at the Landfill. Any such request must demonstrate to the satisfaction of the Director-General that the receipt of the additional regional waste from each LGA state or territory government:
• would result in a net environmental benefit, including but not limited to, the permanent closure of a smaller municipal landfill facility with poor environmental performance;
• is not inconsistent with and would not undermine any resource recovery strategy, target/s or initiative of the source local, state or territory government; and
• would not significantly impact on the capacity of the Landfill and its primary purpose to accept waste from Sydney.</td><td>If more than 50,000 tpa of regional waste by road (up to a maximum of 130,000 tpa) is received at the Landfill, the Proponent shall report the total volume received in the Annual Environmental Management Report (required under Condition 5 Schedule 7). This report must demonstrate to the satisfaction of the Secretary that the additional waste:
• resulted in a net environmental benefit, including but not limited to, the permanent closure of a smaller municipal landfill facility with poor environmental performance;
• is not inconsistent with and does not undermine any resource recovery strategy, target/s or initiative of the source local, state or territory government; and
• did not significantly impact on the capacity of the Landfill and its primary purpose to accept waste from Sydney.</td></tr>
<tr><td>Sch.4 Condition 20 (MP 10_0012)</td><td>The Proponent shall comply with the operating hours in Table 7 for the site, unless otherwise agreed in writing by the OEH.
Table 7: Operating Hours
<table>
<tr><th>Activity</th><th>Day</th><th>Hours</th></tr>
<tr><td>Construction</td><td>Monday - Friday</td><td>7 am – 6 pm</td></tr>
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<tr><td>Operations</td><td>Monday - Saturday</td><td>6am – 10 pm</td></tr>
<tr><td></td><td>Sunday & Public Holidays</td><td>Nil</td></tr>
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<tr><td>Operations</td><td>Monday - Saturday</td><td>6am – 10 pm</td></tr>
<tr><td></td><td>Sunday, Christmas Day & Good Friday</td><td>Nil</td></tr>
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<tr><td>Sch.5 Condition 17 (MP 10_0012)</td><td>The Proponent shall comply with the operating hours in Table 9 for the site, unless otherwise agreed in writing by the OEH.
Table 9: Operating Hours
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1. Introduction

This document supports the application by Veolia Environmental Services (Australia) Pty Ltd ('Veolia') to modify its Woodlawn Bioreactor development approvals (DA 31-02-99 and MP 10_0012) as follows:

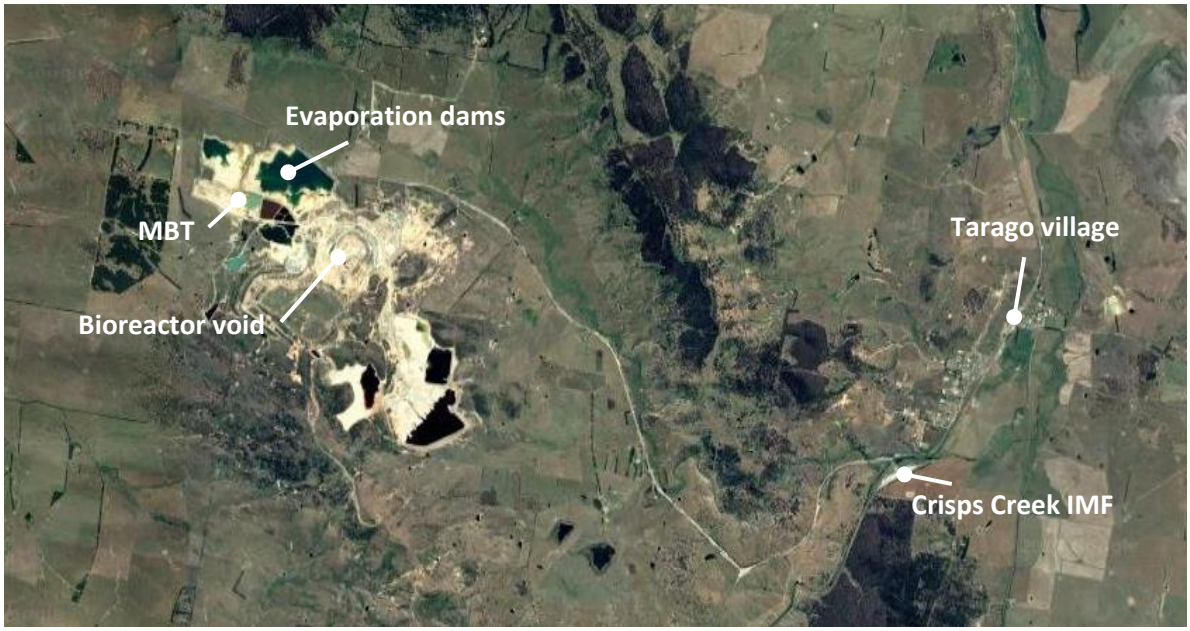
- Construction of a Leachate Treatment Plant, associated infrastructure and discharge into Evaporation Dam 1
- Changes to regional waste limits and operating hours.

1.1 Background

1.1.1 Woodlawn waste management operations

Veolia's Woodlawn Eco-Precinct is located approximately 10 kilometres southwest of Tarago and 40 kilometres south of Goulburn in the Goulburn Mulwaree Local Government Area. A mining lease (currently no processing activity) lies immediately north of the site. Otherwise the site is surrounded by agricultural land uses (see Figure 1). The nearest sensitive receiver not associated with the site is approximately 1.6 kilometres away ("Pylara").

Figure 1: Site location



The Eco-Precinct includes the following projects:

- Woodlawn Mechanical Biological Treatment (MBT) Facility (currently being commissioned)
- Woodlawn Bioreactor
- Crisps Creek Intermodal Facility
- Woodlawn Wind Farm
- Woodlawn Farm
- Woodlawn Fish Farm

The MBT Facility was approved in 2007 and is recognised as an example of best practice waste processing technology. At full capacity, it is approved to receive up to 280,000 tonnes per annum of mixed waste from Sydney for processing to extract recyclable materials or compost. The compost is matured on site and used to rehabilitate the mine. Changes to site layout, technology and operating

hours were approved in 2014. Stage 1 of the facility which will be able to process up to 144,000tpa will be operational in mid 2017.

The Bioreactor was approved in 2000. Containerised waste from Veolia's Clyde and Banksmeadow Transfer Terminals is delivered to the Bioreactor from the Crisps Creek Intermodal Facility via heavy vehicle. The containers are emptied directly into the bioreactor (a former open cut mine) and then compressed and covered (see Figure 2).

Figure 2: Woodlawn Bioreactor in November 2016 (Woodlawn Wind Farm turbines in background)

Facilities within the Bioreactor complex include:

- The former mine void / landfill
- Stormwater collection system and evaporation ponds
- Leachate collection and treatment system and evaporation dams
- Biogas collection system
- Biogas-fired power station
- Administration buildings and roads

Leachate is re-circulated within the landfill to encourage biogas, which is recovered for energy generation. Excess leachate is extracted and treated within an aeration dam. It is then discharged to ED2 via ED3. Following approval of the modification, all leachate will be discharged into ED1. The layout of the bioreactor complex, including the current leachate collection, treatment and discharge system is shown in Figure 3.

1.1.2 Woodlawn mine – Heron Resources Ltd

In 2013, Heron Resources Ltd obtained a project approval for the Woodlawn Mine Project (07_0143) within the Woodlawn Eco-Precinct. The Woodlawn Mine project has two stages - the recovery of resources from the existing tailings dams, and the reopening of the underground mine. Up to 1.5

million tonnes of tailings and underground ore would be extracted per year to produce a maximum of 150,000 tonnes of copper, lead and zinc ore concentrate per year, for up to 21 years. This concentrate would be trucked to Port Kembla for export.

The Woodlawn mine project has consent to dewater the under-ground mine workings into, and draw processing water from ED1 and/or ED2. ED1 will also receive treated leachate from Veolia's leachate treatment plant. Subsequently, both Veolia and Heron have been working closely and have adopted a whole of site approach to their respective water requirements. The volume and quality of water going in and out of ED1 as a result of the Woodlawn mine project has been included in the water balance. The odour assessments for this modification also consider Heron's dewatering activities to ensure the cumulative impacts of both operations have been duly considered.

It should be noted that Veolia continues to work with Heron via legal agreements and a joint management committee to ensure both operations can occur unimpeded and in accordance with the approval and license conditions for both projects. Further detail in this respect is provided in Section 3.5.3.

1.2 Need for the modification and project justification

The modification, in particular the construction of the leachate treatment plant (LTP) will facilitate better environmental and operational performance by allowing Veolia to extract and treat greater volumes of leachate thereby reducing the generation of odour from the site. The modification will also enable more efficient gas extraction maximizing the waste to energy benefits of the Bioreactor.

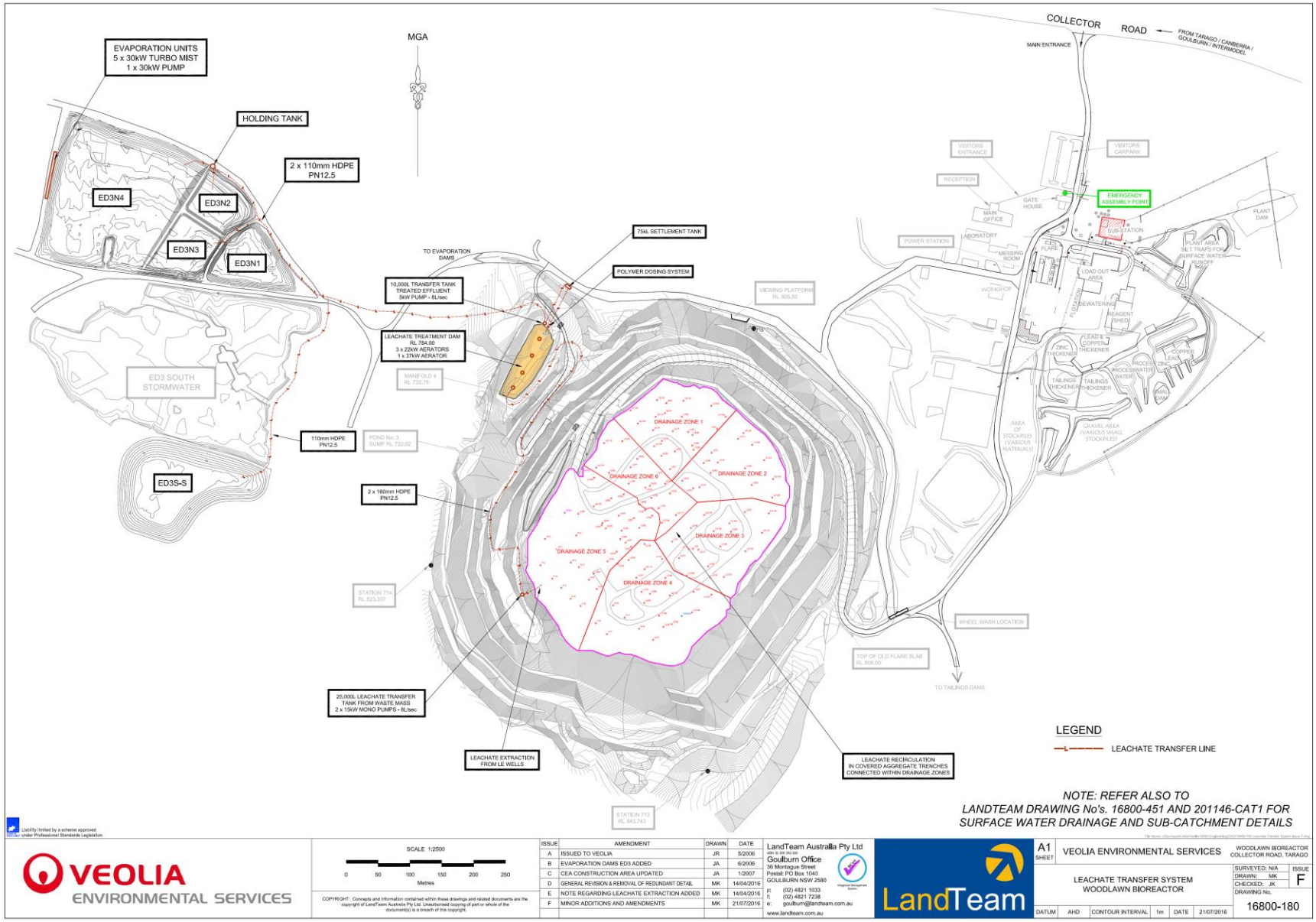
The amount of leachate currently being generated in the waste mass is greater than what was originally modeled and is now beyond the capacity of the existing leachate management system. Moisture levels within the Bioreactor have increased adversely affecting the efficiency of the landfill gas capture and extraction system. This has stymied the effective management of odour within the existing system, where in order to maintain the gas extraction there has been the need to pump more leachate from the Bioreactor. This has resulted in the existing leachate storage dam approaching capacity.

In 2016, DPE approved a modification to provide additional leachate and stormwater storage capacity within existing evaporation dams. While this solution has improved gas extraction and odour management, it is not sustainable in the long term and additional leachate treatment and storage capacity is required. This was acknowledged in the DPE's approval which included a condition requiring a long-term leachate management solution to be implemented for the site.

The LTLM Strategy was submitted to the EPA in August 2016 and in principle agreement for the implementation of the Strategy (Appendix A) reached with the EPA in October the same year. Implementation of the Strategy is now a requirement of Veolia's EPL. The key element of the Strategy is the construction and operation of the leachate treatment plant (LTP) which will improve odour outcomes, increase gas extraction system efficiency and provide a long term solution for water management at the site.

Subsequently, to assist in the implementation of the Strategy, this modification seeks amendments to site operations as follows:

Figure 3: Bioreactor layout and existing leachate management system



- The construction of a leachate treatment plant to process leachate from the Bioreactor, Evaporation Dam 3 North (ED3N) and Evaporation Dam 3 South (ED3S) to an agreed standard
- The discharge of all treated leachate into Evaporation Dam 1 (ED1) which will become the primary leachate storage facility
- The use of mechanical evaporation (and possibly heating) equipment (up to 4) when necessary
- To ensure the integrity of Evaporation Dam 1 (ED1) against leakage prior to the discharge of treated effluent into ED1.

Veolia has considered a number of alternatives to the proposed modification including:

Do Nothing
This option involves no changes to the existing leachate treatment system apart from the continual construction of additional evaporation ponds to accommodate the extra leachate volume. This would lead to ongoing increases to odour levels and is unsustainable in the long term. Alternatively, leachate would remain in the waste mass, reducing biogas capture and the environmental performance of the site.

Irrigation
This option would involve irrigating the treated leachate (after additional treatment by reverse osmosis). This would require further consideration to determine the feasibility, if any, of this option in consultation with relevant government authorities. The uncertainties surrounding this option are significant and would add further delays to the implementation of a long-term leachate management solution extending the length of time to effect improvements to the gas capture and odour management for the bioreactor operations.

Brine Storage
This option would involve using additional technology in the treatment plant to significantly reduce the volume of treated leachate output but significantly increase its concentration into brine. This option would create a significant ongoing energy requirement which is considered less sustainable in the long term.

1.3 Environmental Assessment Requirements

Veolia received the Secretary's Environmental Assessment Requirements for this modification which include the requirements of the EPA. It was originally proposed to include a Solid Recovered Fuel (SRF) facility as part of this modification application, however this component has been removed from the proposal. Hence the requirements have been addressed to the extent they apply to the LTP and associated infrastructure as listed in Table 1.

Table 1: Summary of Secretary's Environmental Assessment Requirements and where addressed in this modification

Requirement	Where addressed
Department of Planning and Environment	
Updated plans showing the revised location of AWT plant and equipment	Plans for Leachate Treatment Plant are provided in Section 2.1 (page 18) and Appendix D.
An assessment of the likely impacts of the new equipment (noise, odour etc.)	Sections 4 & 5
Revised Air Quality Assessment - in particular, revised modelling of odour impacts of the long term leachate management strategy	Appendix C – Air Quality Impact Assessment and summary provided in Section 4.2 (page 36)

Requirement	Where addressed
A geotechnical investigation or similar of the integrity of the clay lined dams and any proposed alterations (installation of a lining etc.) needed	Section 2.1 (page 18)
A detailed water balance which indicates that under a worst case scenario (wet year) there is sufficient capacity to store the leachate on site	Appendix A – Long-term Leachate Treatment Solution Submission Report Appendix B – Water Balance
Environment Protection Authority	
Inclusion of the *Long-term Leachate Treatment Solution Submission Report* submitted to the EPA on 5 August 2016	Appendix A – Long-term Leachate Treatment Solution Submission Report
Further details on the use of mechanical evaporator units	Section 2.1 (page 18) and Appendix A – Long-term Leachate Treatment Solution Submission Report Appendix B – Water Balance
Updated Water Balance to reflect progressive dewatering of ED3	Appendix A – Long-term Leachate Treatment Solution Submission Report Appendix B – Water Balance
ED1 and ED2 Improvements required under EPL	Section 2.1 (page 18)

In addition to the environmental assessment requirements, Veolia considered all other potential environmental impacts associated with the proposed modification. A summary of the potential impacts and Veolia's response is provided in

Table 2.

Table 2: Response to other potential environmental impacts

Potential impact	Response
Water	The LTP will increase the volume of leachate that can be treated, and improve its quality. The plant will be fully bunded and the lining of ED1 and ED2 repaired prior to leachate discharge. A full water balance is provided in Appendix B which considers both Veolia's and Heron Resources' activities and demonstrates that the site will not discharge any contaminated or treated water off-site. These are considered further in Section 4.1
Odour	The LTP will treat the leachate to criteria designed to reduce odour impact. While a greater volume of treated leachate will be discharged compared to the current leachate treatment system, the quality of this leachate will be much higher. A detailed air quality impact assessment is provided in Appendix C and considered in Section 4.2 which demonstrates that, even if the odour-generating compounds in the leachate are up to ten times the target values, offensive odours will not be generated beyond the site. Subsequently, the LTP will facilitate better environmental and operational performance by allowing Veolia to extract and treat greater volumes of leachate thereby reducing the generation of odour from the site which has been a key community and regulatory concern regarding operations at the site.
Dust	Dust generated during construction of the leachate treatment plant and associated

Potential impact	Response
	pipelines and infrastructure will be managed through the dust mitigation measures in approval conditions and the draft CEMP (Appendix E), such as the treatment of unsealed road surfaces to prevent dust.
Noise	The leachate treatment plant and associated infrastructure will not be a major generator of noise because: • The leachate treatment plant apart from the blower is fully enclosed; and • The qualitative assessment in Section 4 found that the blower will not result in any exceedences of noise levels (established in the development approval) at sensitive receivers noting that the nearest sensitive receiver is located more than 1.6km away from the site. Furthermore, the existing measures in the draft CEMP (Appendix E), OEMP and EPL will provide adequate safeguard for the acoustic environment.
Biodiversity	The site for the leachate treatment plant, pipelines and associated infrastructure are highly disturbed and devoid of flora and fauna habitat. There will be no impacts on biodiversity as a result of the modification.
Heritage	There are no heritage items or areas within the proposed leachate treatment plant footprint, which is a disturbed area. Notwithstanding, existing approval conditions for heritage will continue to apply which include appropriate safeguards if unexpected Aboriginal site(s) are found during construction.
Traffic	Construction traffic will be managed through the provisions of the draft CEMP (Appendix E). Traffic generation during operation is limited to approximately 10 deliveries per month, being: • 1 B-double truck delivering methanol every 10-20 days • 1 B-double truck delivering sodium hydroxide every 10 days • 1 truck for the 1000L immobilized cell bioreactor every month • 1 truck per week to remove dewatered sludge These truck movements will be managed through the approved Traffic Code of Conduct for the project.
Visual amenity	The impact of the leachate treatment plant on visual amenity is minimal due to the highly disturbed nature of the site, the industrial zoning, existing infrastructure, and lack of nearby receptors. The plant will be visible from some sections of Collector Road however it would be viewed as a minor item in the foreground of existing infrastructure such as the MBT Facility.
Soil and Water	No groundwater disturbance or contamination is anticipated during the construction works. If any contamination is detected, the management practices detailed in the Construction Site Contamination Management Plan (CSCMP), appended to the Construction Environmental Management Plan (CEMP). A Construction Soil, Water and Leachate Management Plan (SWLMP) has also been prepared (Appendix F) to help (i) effective erosion and sediment control; (ii) conservation of water quality; and (iii) management of surface and storm water during the construction stage of the LTP, in accordance with relevant regulatory conditions.

Veolia submits that the modification is minor focusing primarily on improving odour performance consistent with Veolia' EPL and the 2016 modification which requires that the LTLM Strategy be implemented by the end of 2017. While more detailed analysis has been undertaken for water, odour, noise and GHG emissions (refer to Section 4), additional assessment for dust, biodiversity, heritage, traffic and visual amenity is not warranted given the limited impacts expected and the ability of these issues to be effectively managed under existing conditions of approval and relevant environmental management plans.

Finally, Table 3 demonstrates how the approval conditions requiring a Long-term Leachate Management Strategy have been addressed by this modification.

Table 3: Conditions of approval for Long-term Leachate Management Strategy and response

Condition	Requirement	Response
70D (DA 31-02-99) 18B (MP 10_0012)	The Proponent must develop and implement a Long-term Leachate Management Strategy that: Minimises the generation of leachate at the premises	Leachate generation is a product of factors including the moisture content of received waste. The LTP is designed to balance treated leachate volumes with odour target values and dam storage capacity as agreed by the EPA.
	Captures, treats and disposes of all leachate generated at the premises	The LTP will capture and treat all leachate from the Bioreactor as well as from the existing leachate storage dams. All treated leachate will be disposed of to Evaporation Dam 1.
	Maintains leachate levels in the waste mass to a level that does not inhibit the efficiency of the landfill gas extraction system	The LTP will treat up to 4L/s of leachate, which will significantly reduce leachate in the pit and ensure efficient gas extraction. Ongoing monitoring of leachate levels will ensure efficient gas extraction.
	Progressively removes all treated leachate from ED3	The LTP will treat leachate from ED3 at up to 1L/s. This will ensure all treated leachate is progressively removed from ED3 over the next 8 years under a dry climate.
	Minimises the emission of offensive odours from leachate treated and stored onsite so that there is no off site impact.	The odour assessment indicates that the facility will comfortably meet amenity criteria at sensitive receptors, even at up to 10 times the target values for the treated leachate.
	The LTLM Strategy must be submitted to the Secretary and the EPA (for inclusion as a Pollution Reduction Program attached to environment protection licence 11436) for approval within two months of the approval date of MOD 2.	The LTLM Strategy was submitted to the EPA in August 2016, and EPL 11436 varied by the EPA in October 2016 to include a Pollution Reduction Program for the installation of the LTP for which this modification seeks approval for.
70E (DA 31-02-99) 18C (MP 10_0012)	Treated leachate must not be discharged to any part of	Veolia continues to comply with this requirement.

Condition	Requirement	Response
	ED3S, other than ED3S-S, until such time as the Long-term Leachate Management Strategy has been approved by the Secretary and the EPA.	
70F (DA 31-02-99) 18E (MP 10_0012)	The Long-term Leachate Management Strategy must be operational no later than 20 December 2017, or as otherwise agreed by the Secretary.	The preparation of this modification application has been delayed until now by: • detailed design of the LTP; • clarification of interactions between Veolia and Heron operations on site: and • discussions to clarify the approval pathway and assessment. Based on approval being granted in time for construction to commence in July, Veolia will seek the Secretary's approval for an extension as provided for in the Conditions.

If the proposed modification is approved, Veolia commits to updating all relevant management plans required under the approval conditions to reflect the project as modified, including:

- Construction Environmental Management Plan
- Landfill Environmental Management Plan
- Stormwater Management Plan
- Management Plans for ED1 and ED2
- Soil and Water Management Plan
- Leachate Management Plan

2. Proposed modification

2.1 Long-term Leachate Management Strategy

Veolia developed the LTLM Strategy in close consultation with the EPA. The key elements of the Strategy relevant to this modification include:

- The construction of a leachate treatment plant to process leachate from the Bioreactor, Evaporation Dam 3 North (ED3N) and Evaporation Dam 3 South (ED3S) to an agreed standard
- The discharge of all treated leachate into Evaporation Dam 1 (ED1) which will become the primary leachate storage facility
- The use of mechanical evaporation (and possibly heating) equipment (up to 4) when necessary
- To ensure the integrity of Evaporation Dam 1 (ED1) against leakage prior to the discharge of treated effluent into ED1.

The LTLM Strategy itself will be incorporated into the project's Landfill Environmental Management Plan and Leachate Management Plan when updated following approval of the modification application.

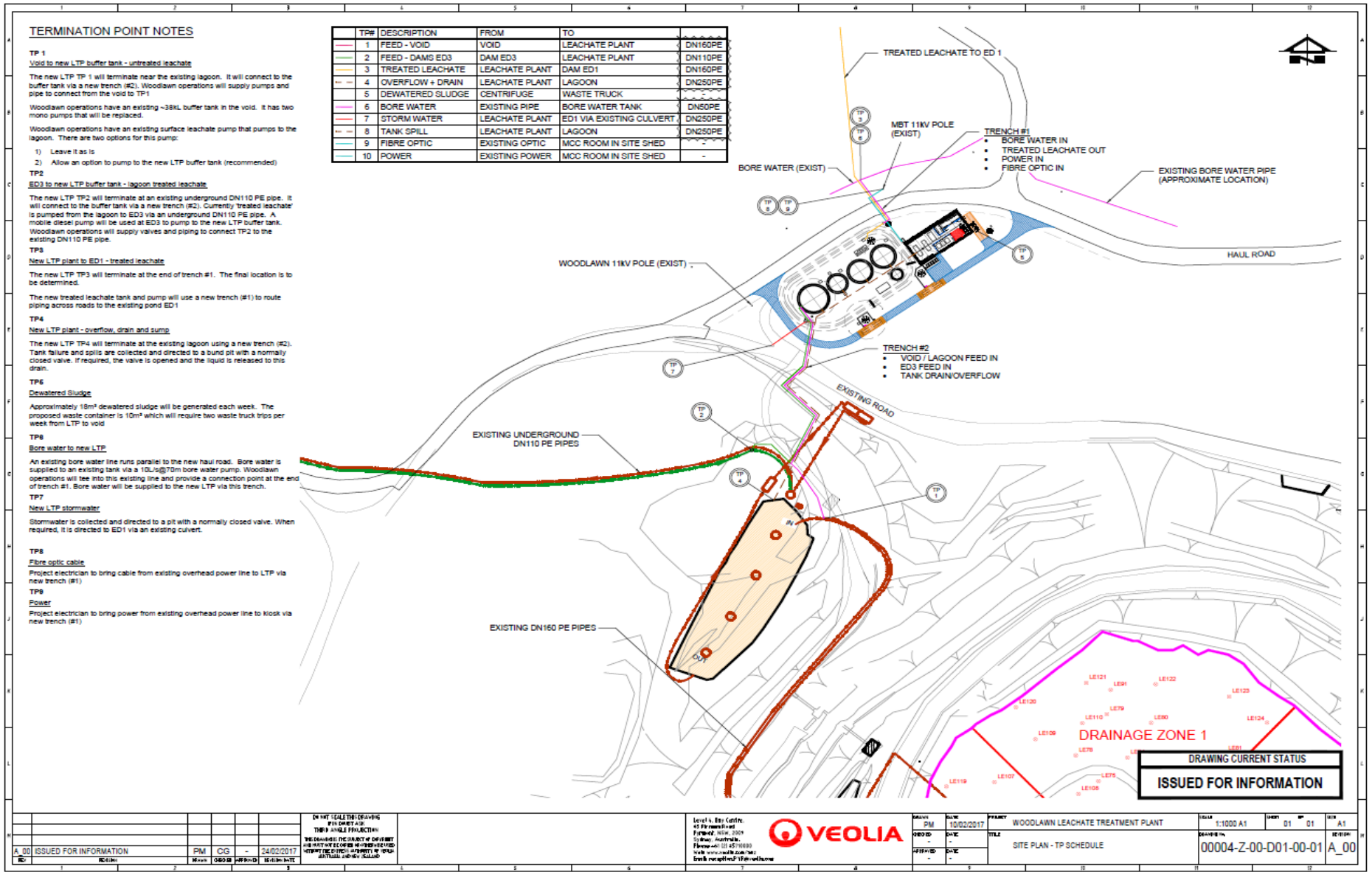
2.1.1 Leachate Treatment Plant (LTP)

The LTP will be located on disturbed land between the bioreactor and Evaporation Dam 1 (see Figure 4 and 5). Additional concept plans for the LTP are provided in Appendix D.

Figure 4: Proposed location for Leachate Treatment Plant

Overland pipelines (trenched under roads) will transfer raw leachate from the Bioreactor directly to the leachate treatment plant. The LTP will be capable of treating leachate at a rate of up to 4 litres per second including up to 1 litre per second from ED3 to reduce leachate volumes in this dam. The proposed pipe infrastructure connecting the void, LTP and dams is shown in Figure 5.

Figure 5: Proposed Leachate Treatment Plant – location plan

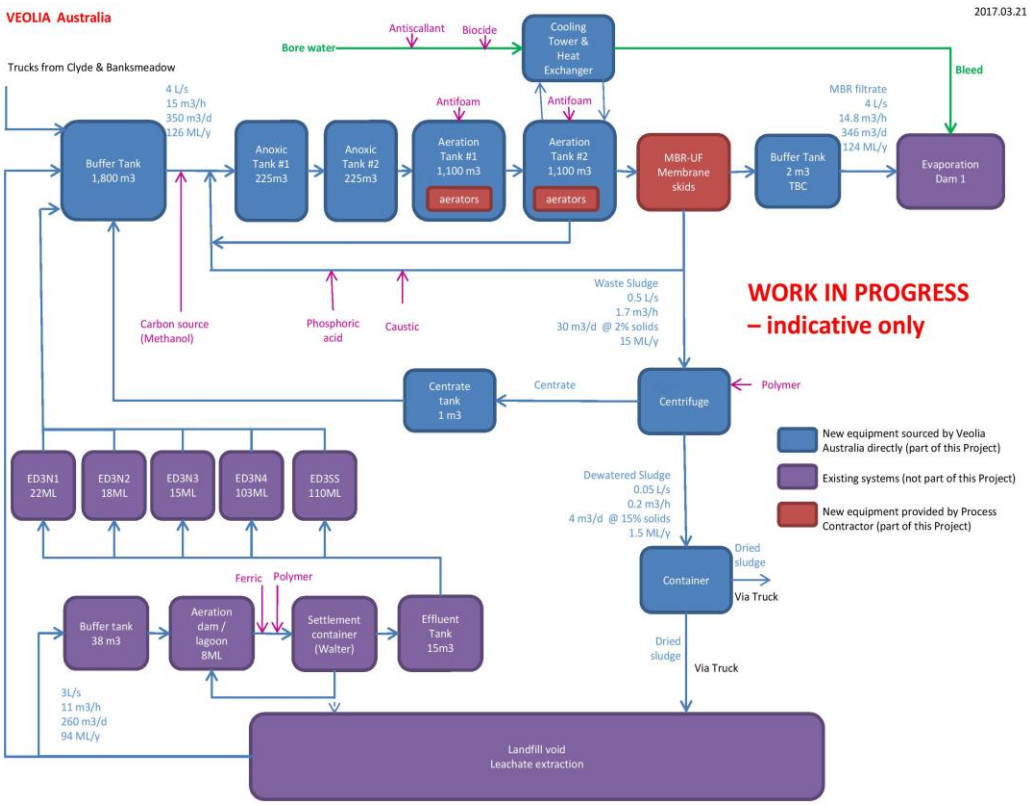


There are a number of components to the leachate treatment plant (see Figure 6). The primary purpose of each component is as follows:

- Balance tank: A balance tank will be used to remove potential peak flow events and even the quality accepted from the raw leachate collection.
- Biological reactor: A biological reactor configured into anoxic and aerobic zones will be used for biodegradation of the leachate matter and nutrient removal. Caustic will be added to control the bioreactor pH. An external carbon source will be added to assist in nitrogen removal.
- Membrane filtration: Membranes will separate the treated leachate from the mixed liquid suspended solids to produce a filtrate and act as a primary disinfection barrier.
- Final Treated Leachate Storage: the treated leachate will be stored in a tank. The tank will be used to buffer treated leachate supply.
- Chemical dosing: A variety of chemical dosing systems will be used for process requirements
- Return Activated Sludge: return activated sludge will be recirculated from the aerobic tank back to the anoxic tank.
- Waste Activated Sludge: waste activated sludge will be discharged from the membrane filtration system back into the void.

Once treated, the leachate will be transferred to Evaporation Dam 1 via an effluent line.

Figure 6: Leachate treatment plant process flow diagram



2.1.2 All treated leachate to Evaporation Dam 1

All of the treated leachate from the leachate treatment plant will be discharged to Evaporation Dam 1. Evaporation Dam 1 has been selected as the most suitable location for storage of treated leachate for the following reasons:

- Climatic conditions at Woodlawn make evaporation a viable management measure for volume reduction (Evaporation = 1,000 – 1,500mm/annum, Rainfall = 600 – 850mm/annum)
- The large surface area of Evaporation Dam 1 (47.6 hectares) will maximise evaporation loss potential
- The large storage volume of Evaporation Dam 1 (1,345 Megalitres) will maximize storage capacity.

Evaporation Dam 1 currently contains approximately 150 Megalitres of residual liquid from:

- Direct rainfall
- Runoff from the dolerite stockpile
- Runoff from the former plant area via the Plant Collection Dam.

Prior to the commissioning of the LTP, Veolia will temporarily re-route the plant collection dam to the South Tailings Dam until such time as rehabilitation works for the former plant area are completed. Following this, water from the rehabilitated former plant area would then be treated as clean flow and discharged via natural drainage channels to Crisps Creek.

2.1.3 Integrity of Evaporation Dams 1 & 2

ED1 and ED2 were constructed between 1987 and 1991, initially to hold water from the mine open cut workings, and later the water from dewatering of the underground mine workings. Since mining ceased in 1998, “dirty” mine runoff water continues to be stored in the dams.

Both Veolia and Heron intend using ED1 and ED2 for storage of processed leachate and stormwater runoff. Veolia is required to investigate the integrity of the dams as part of a Pollution Reduction Program attached to its EPL (11436). The investigation is now complete and has been forwarded to the EPA for consideration. The report is attached as Appendix H and considered in Section 4.1.

The investigation found that there is little evidence of contamination leaving the premises or otherwise impacting off site waterways. It also identified that there was available and proven technology effective in mitigating potential seepage such as high-density polyethylene (HDPE) liners. However, it is argued such liners are complex and may not be commensurate with the potential risks posed by the dams. Subsequently, it was recommended that an Ecological Risk Assessment be prepared to inform appropriate measures to either mitigate the potential for harm or remediate groundwater contaminated due to seepage.

2.1.4 Mechanical Evaporation

The water balances submitted as part of this modification have demonstrated that ED1 can store the stormwater and leachate volumes for the life of the project without water transfer or mechanical evaporation for most scenarios where ED1 was used exclusively used for Veolia’s operations (i.e. no dewatering from the Woodlawn mine).

However, for scenarios involving additional water/leachate from Veolia’s operations or poorer rates of evaporation, up to 4 mechanical evaporation units would be required for worst-case leachate production under the wet climate scenario. Under these circumstances, leachate from the LTP will be discharged through mechanical evaporation sprayers, with the potential to be heated, to enhance the evaporation rate of the leachate. Veolia currently operates Turbomist S30P mechanical sprayers which increase the evaporative potential of liquid pumped through these units by

approximately 30%. However, the actual rate is dependent on actual pan evaporation rates and solids content in the liquid.

To ensure the required evaporation rates are met, a minimum of three evaporators or other equivalent evaporative devices will be utilized when the leachate treatment plant commences operations. Veolia is confident that ongoing monitoring and mechanical evaporation readiness will ensure the Eco-precinct remains a nil discharge site.

2.1.5 Amendments to Conditions

Veolia does not believe that any approval conditions need to be modified to allow the construction and operation of the LTP and discharge into ED1, other than administrative conditions describing the project and modification application.

However, it is proposed to discharge stormwater from the Bioreactor into ED1 rather than ED2. Further, as per the heads of agreement, Heron will ensure that Veolia's disposal requirements are maintained (i.e. 150ML discharge for treated leachate) (refer to Section 4.1) by transferring treated leachate and stormwater from ED1 to ED2. The proposed changes to conditions to allow these new arrangements are summarised in Table 4.

Table 4: Proposed changes to stormwater discharge conditions

No.	Condition	Proposed change
Sch. 2 Condition 64 (DA 31-02-99)	Stormwater in the mine void must only be discharged into ED3S sump, for transfer via pipeline to ED2, or otherwise used for operational purposes within the landfill, as approved in writing by the EPA.	Stormwater in the mine void must only be discharged into ED3S sump, for transfer via pipeline to **ED1**, or otherwise used for operational purposes within the landfill, as approved in writing by the EPA.
Sch. 2 Condition 65 (DA 31-02-99)	Stormwater collected in the mine void may only be transferred into ED3S sump and ED2 provided that: a) The Applicant can always comply with condition 58; and b) The stormwater to be transferred contains no leachate, unless otherwise approved in writing by the EPA.	Stormwater collected in the mine void may only be transferred into ED3S sump and **ED1** provided that: a) The Applicant can always comply with condition 58; and b) The stormwater to be transferred contains no leachate, unless otherwise approved in writing by the EPA.
Sch. 2 Condition 70B (DA 31-02-99)	The Applicant must prepare a management plan for ED2 to ensure that: a) onlv mine void stormwater that does not contain leachate and direct rainfall and runoff is received and stored within ED2; b) the dam is lined and maintained to prevent the leakage of stored acid mine drainage waters in order to protect groundwater and surface water; c) a monitoring and inspection program is implemented including installation of monitoring bores, a review of monitoring data and six-monthly	The Applicant must prepare a management plan for **ED1 and** ED2 to ensure that: a) the dams are lined and maintained to prevent the leakage of stored acid mine drainage waters in order to protect groundwater and surface water; b) a monitoring and inspection program is implemented including installation of monitoring bores, a review of monitoring data and six-monthly inspections to evaluate the integrity of the barrier and to

No.	Condition	Proposed change
	inspections to evaluate the integrity of the barrier and to assess if leakage from the dam is occurring; d) adequate storage is retained in ED2 to meet the environmental performance requirements in condition 58 e) measures are identified to maintain adequate capacity within a suitable time period after receiving water from a rainfall event; f) there is an emergency plan for the management of water in excess of the capacity of ED2; g) the sources of water that are collected or received in ED2 are identified; and h) the quantity of water from each source that reports to ED2 is monitored and compared in graphical format with rainfall data. The plan must be prepared in consultation with the EPA and submitted to the Secretary for approval within two months of the date of approval for MOD 2 or as otherwise agreed by the Secretary. The revised plan shall be documented in the LEMP.	assess if leakage from the dam is occurring; c) adequate storage is retained in ED2 to meet the environmental performance requirements in condition 58 d) measures are identified to maintain adequate capacity within a suitable time period after receiving water from a rainfall event; e) there is an emergency plan for the management of water in excess of the capacity of ED2; f) the sources of water that are collected or received in **ED1 and** ED2 are identified; and g) the quantity of water from each source that reports to **ED1 and** ED2 is monitored and compared in graphical format with rainfall data. The plan must be prepared in consultation with the EPA and submitted to the Secretary for approval within two months of the date of approval for MOD **3** or as otherwise agreed by the Secretary. The revised plan shall be documented in the LEMP.

2.2 Administrative changes to conditions of consent/approval

2.2.1 Regional waste limit

Condition 6 Schedule 3 of MP10_0012 requires Veolia to obtain the Secretary's written approval to receive more than 50,000tpa of regional waste by road (up to a maximum limit of 130,000tpa). The condition was imposed to retain the facility's primary role as a landfill for Sydney's putrescible waste, and to manage traffic impacts on regional roads. Due to changes in landfill capacity at other facilities in the region, as well as variations in landfill demand, Veolia is likely to require approval in the near future.

Veolia is committed to the objectives listed in condition 6. However, the requirement to obtain written approval prior to receipt reduces Veolia's responsiveness to variations in regional waste capacity and demand. The current process adds unnecessary delay and cost to the process for Veolia, regional councils and businesses, and the Department.

Veolia seeks to remove the requirement to obtain the Secretary's approval on each occasion. Instead, receipt of any regional waste by road above 50,000tpa would be reported in the Annual Environmental Management Report required under Condition 5 Schedule 7 of MP10_0012. The

report would include consideration of the objectives listed in condition 6. The 130,000tpa cap on regional waste would remain. In addition, Veolia will continue to comply with Condition 3 Schedule 6 which restricts the routes along which regional waste can be transported. It should also be noted that Veolia already has a Transport Code of Conduct which has been approved in accordance with Condition 4 Schedule 6.

The proposed changes are summarized in Table 5.

Table 5: Proposed changes to regional waste limit condition

No.	Condition	Proposed change
Sch. 3 Condition 6	Prior to the receipt of more than 50,000 tpa of regional waste by road at the Landfill, the Proponent shall obtain approval in writing from the Director-General to vary the limit for the receipt of regional waste not exceeding 130,000 tpa at the Landfill. Any such request must demonstrate to the satisfaction of the Director-General that the receipt of the additional regional waste from each LGA state or territory government: • would result in a net environmental benefit, including but not limited to, the permanent closure of a smaller municipal landfill facility with poor environmental performance; • is not inconsistent with and would not undermine any resource recovery strategy, target/s or initiative of the source local, state or territory government; and • would not significantly impact on the capacity of the Landfill and its primary purpose to accept waste from Sydney.	**If more than 50,000 tpa of regional waste by road (up to a maximum of 130,000 tpa) is received at the Landfill, the Proponent shall report the total volume received in the Annual Environmental Management Report (required under Condition 5 Schedule 7). This report must demonstrate to the satisfaction of the Secretary that Veolia has met the objectives of the conditions as they relate additional waste as follows:** • **resulted in a net environmental benefit, including but not limited to, the permanent closure of a smaller municipal landfill facility with poor environmental performance;** • **is not inconsistent with and does not undermine any resource recovery strategy, target/s or initiative of the source local, state or territory government; and** • **did not significantly impact on the capacity of the Landfill and its primary purpose to accept waste from Sydney.**

2.2.2 Hours of operation

In the original consent for the Woodlawn facility (DA 31-02-99), Condition 97 allowed operations on public holidays other than Christmas Day and Good Friday. These operating hours were also in Veolia's Statement of Commitments for MP 10_0012 (refer to Appendix 1 of the MP 10_0012 approval).

However, the approval conditions for MP 10_0012 removed all public holidays from the permitted hours of operation. Veolia did not identify this inconsistency at the time MP10_0012 was approved and it is affecting operations at Woodlawn as follows:

- Up to 9 more days each year are lost in addition to the 54 already lost on Sundays, Christmas Day and Good Friday
- Many of the public holidays throughout the year coincide with major public events such as New Years Day and Australia Day which require additional waste collection
- The restriction is inconsistent with the 24/7 operating hours permitted at the Clyde and Banksmeadow Transfer Terminals which feed the Woodlawn facilities, adding delays and costs to these operations.

Veolia requests that the relevant conditions in MP10_0012 be amended to reflect the original approval to operate on public holidays other than Christmas Day and Good Friday. The noise and traffic impacts associated with these operating hours were assessed and approved in the original consent. There are no traffic, noise, or other environmental impacts that warrant the restriction of operating hours on these other public holidays. The proposed changes are summarized in Table 6.

Table 6: Proposed changes to operating hours conditions

<table>
<tr><th>No.</th><th>Condition</th><th>Proposed change</th></tr>
<tr><td>Sch.4 Condition 20</td><td>The Proponent shall comply with the operating hours in Table 7 for the site, unless otherwise agreed in writing by the OEH.
Table 7: Operating Hours
<table><tr><th>Activity</th><th>Day</th><th>Hours</th></tr><tr><td>Construction</td><td>Monday - Friday</td><td>7 am – 6 pm</td></tr><tr><td></td><td>Saturday</td><td>7 am – 1 pm</td></tr><tr><td></td><td>Sunday & Public Holidays</td><td>Nil</td></tr><tr><td>Operations</td><td>Monday - Saturday</td><td>6am – 10 pm</td></tr><tr><td></td><td>Sunday & Public Holidays</td><td>Nil</td></tr></table></td><td>The Proponent shall comply with the operating hours in Table 7 for the site, unless otherwise agreed in writing by the EPA.
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<tr><td>Sch.5 Condition 17</td><td>The Proponent shall comply with the operating hours in Table 9 for the site, unless otherwise agreed in writing by the OEH.
Table 9: Operating Hours
<table><tr><th>Activity</th><th>Day</th><th>Hours</th></tr><tr><td>Construction</td><td>Monday - Friday</td><td>7 am – 6 pm</td></tr><tr><td></td><td>Saturday</td><td>7 am – 1 pm</td></tr><tr><td></td><td>Sunday & Public Holidays</td><td>Nil</td></tr><tr><td>Operations</td><td>Monday - Saturday</td><td>6am – 10 pm</td></tr><tr><td></td><td>Sunday & Public Holidays</td><td>Nil</td></tr></table></td><td>The Proponent shall comply with the operating hours in Table 9 for the site, unless otherwise agreed in writing by the EPA.
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</table>

3. Statutory framework

3.1 Existing approvals

A number of approvals have been granted for projects within the Woodlawn Eco-Precinct but the following approvals are relevant and proposed to be modified:

- DA 31-02-99 (approved 30 November 2000) for the establishment of the Woodlawn Bioreactor with a maximum input rate of 500,000 tonnes per annum.
- MP10_0012 (approved 16 March 2012) for an increase in maximum input rate to 1,130,000 tonnes per annum.

3.2 Modification of approvals

The Bioreactor operates under Development Consent (DA 31-02-99) and Project Approval (MP 10_0012). The DA has been modified on two occasions (11 August 2010 and 9 September 2016) by the Minister's delegate. The first modification related to the receival of 50,000 tpa of waste by road from nearby councils, and the second related to the increased storage of leachate.

On 16 March 2012, the Planning Assessment Commission, as Delegate of the Minister for Planning and Infrastructure, granted Project Approval (MP10_0012) under Part 3A of the EP&A Act for the Woodlawn Waste Expansion Project, to allow an increase in the maximum input rate for the bioreactor from 500,000 tpa to 1 .13 Million tpa. This approval has been modified once on 9 September 2016 to enable the increased storage of leachate.

DA 31-02-99 and MP10_0012 have been designated as transitional Part 3A projects and can therefore be modified under Section 75W of the EP&A Act. Section 75W requires the Minister to be satisfied that the proposed modifications are consistent with the approved project and do not constitute a new project. Veolia submits that the proposed modification to leachate management is of a scale that is consistent with the Woodlawn facility projects. The modifications would not change the intent or purpose of the approved project given:

- it would remain a waste landfill and processing facility;
- it would retain essentially the same development approvals; and
- the environmental consequences of the modification would be similar in nature to those resulting from the existing operations at the site.

It should also be recognised that essentially the modification is required to implement the condition within the 2106 modification which requires the implementation of the LTLM Strategy by the end of 2017.

In addition, the modification will provide a long term solution for leachate disposal and importantly help reduce odour generation from the Eco-precinct which has been the subject of ongoing community concern and consultation. Veolia conducts quarterly meetings to listen to community concerns and to inform the community regarding its efforts to resolve odour related issues including information relevant to:

- 2015 NSW Government mandated independent odour audit
- Implementation of odour management measures resulting from auditing process
- Detailed information on gas capture improvements and leachate storage issues
- Information on a site visit by the EPA Board and executives
- Update on the performance of gas capture system and the proposed LTLM Strategy
- Information on the final design of the Leachate Treatment Plant and proposed modification to the Department of Planning & Environment seeking approval for the LTP.

Importantly, the modification will significantly improve the environmental and amenity performance of the facility and help support the long-term sustainability of this important waste management asset for the wider NSW community.

3.3 Permissibility

The site is zoned IN3 Heavy Industrial and RU2 Rural Landscape under *Goulburn Mulwaree Local Environmental Plan 2009*. The proposed development is permissible with consent under *State Environmental Planning Policy (Infrastructure) 2007* as a waste or resource management facility on land in a prescribed zone.

3.4 State Environmental Planning Policies

3.4.1 State Environmental Planning Policy No. 33 – Hazardous & Offensive Development

SEPP 33 requires consent authorities, in assessing DAs for industrial development, to consider the potential risk and offensiveness of the proposal in terms of impacts on human health, property and the biophysical environment. No dangerous goods, as classified by the Australian Dangerous Goods Code, would be handled at either the bioreactor or the leachate treatment plant in quantities that could result in significant off-site impacts. Accordingly, it is considered that the proposal is not potentially hazardous. The proposal is potentially offensive in that it would potentially emit polluting discharges that could have adverse off-site impacts. However, the proposal is not classified offensive as it must demonstrate that it is able to obtain all relevant pollution control licenses. The proposed modification will require an amendment to its existing license under the Protection of the Environment Operations Act 1997.

3.4.2 State Environmental Planning Policy No. 55 – Remediation of Land

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. The Bioreactor site is defined as contaminated land and consequently SEPP 55 applies.

Under SEPP 55, a consent authority must consider a range of contamination issues before it can grant consent to carry out development on a site. The proposed modification does not alter the contamination issues associated with the Woodlawn facility. The site would be remediated in accordance with the approved Landfill Closure and Rehabilitation Management Plans for the Project (see conditions 27 and 28 in schedule 4 of the Project approval).

3.4.3 State Environmental Planning Policy (Rural Lands) 2008

The Rural Lands SEPP generally aims to facilitate the orderly and economic use and development of rural lands for rural and related purposes and to protect state and regionally significant rural lands from inappropriate land use changes.

The Project does not involve changing the use of rural land and the viability and productivity of rural lands would not be adversely affected.

3.4.4 State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The proposed modification will not alter the project's neutral or beneficial effect on water quality because:

- The site will continue to operate as a zero contaminated water discharge site
- No significant changes will be made to water flows, watercourses or riparian corridors
- Pollutant loads will continue to be effectively treated and disposed

The leachate treatment plant will increase surface imperviousness and involve the storage of chemicals, however this is wholly contained within a bunded area (see detailed plans in Appendix D). All soil disturbed as a result of the proposed modification (plant, pipelines, dams) is considered to be already disturbed and will be managed through the Construction Environmental Management Plan (Appendix E) and the Construction Soil Water & Leachate Management Plan (Appendix F).

The proposed leachate treatment plant will have a positive impact on water quality by allowing Veolia to remove more leachate from the Bioreactor void, treat it to a high quality, and discharge it to an effectively designed and operated evaporation dam.

3.5 Other NSW legislation

3.5.1 Protection of the Environment Operations Act 1997

Veolia has reached in-principle agreement with the EPA to implement the LTLM Strategy which is reflected in condition u1.1 of Veolia's Environment Protection License (EPL 11436), which was amended by the EPA on 14 October 2016. The modification is now required to obtain planning approval to implement key elements of the Strategy, specifically the LTP.

3.5.2 Water Management Act 2000

No additional water will be extracted or captured at the site as a result of the modification, therefore a water access licence or aquifer interference approval are not required. The proposal is not on waterfront land or a floodplain. The other approvals required under this Act do not apply to Part 3A projects.

3.5.3 Mining Act 2000

Part of the site is located within Exploration Licence 7257, which is held by Tri Origin Mining Pty Ltd. Special Mining Lease 20, held by Heron Resources, also applies to the site. Mining under SML 20 has not occurred in the past 18 years, however DPE granted project approval for the Woodlawn Mine Project (07_0143) in 2013.

The Woodlawn Mine project has two stages - the recovery of resources from the existing tailings dams and the reopening of the underground mine. Up to 1.5 million tonnes of tailings and underground ore would be extracted per year to produce a maximum of 150,000 tonnes of copper, lead and zinc ore concentrate per year, for up to 21 years. This concentrate would be trucked to Port Kembla for export.

The project infrastructure includes a new box cut portal and 1.2 km decline to the former underground mine, pipelines connecting the existing tailings and evaporation dams to a new processing plant, a new tailings dam and a temporary waste rock dump to store the material extracted from the new decline. The project would also require a range of ancillary infrastructure, including a new access road, administration and laboratory buildings, and a water treatment plant (see Figure 7).

In June 2016, Heron Resources indicated to the ASX its intention to begin mining in 2018. At present it proposes to dewater the mine into, and draw processing water from, the existing dams within the Woodlawn facility – most likely Evaporation Dam 2. These activities are a key consideration in the water balance and odour assessments for Veolia's proposed leachate treatment plant and discharge to Evaporation Dam 1 (see Appendix B).

Veolia continues to work with Heron via a cooperation deed and a joint management committee to ensure both operations can occur unimpeded. The deed simplifies the ownership of the dams, while protecting each party's existing rights to discharge and extract in accordance with their approvals. If the Woodlawn Mine project proceeds, Veolia will retain ownership of ED1, which secures its right to

discharge from the LTP. Heron will own and discharge to ED2, and retain the right to extract water from both ED1 and ED2 in accordance with its project approval.

The water balance and odour assessments for this modification demonstrate that Veolia and Heron's operations can both occur within the dam storage capacity and odour limits at the site.

3.5.4 Dams Safety Act 1978

Evaporation Dams 1 and 2 are prescribed dams under this Act. The capacity of these dams will not be altered as a result of the proposed modification. Veolia will consult with the Dam Safety Committee regarding the proposed remedial works following approval of the modification.

3.6 Commonwealth legislation

3.6.1 Environment Protection and Biodiversity Conservation Act 1999

An approval under the Environment Protection and Biodiversity Conservation (EPBC) Act is required for any action that is likely to have a significant impact on Matters of National Environmental Significance (MNES). Nine MNES are listed under Part 3 of the EPBC Act. None are relevant to the site. Subsequently, Veolia submits that there will be no significant impact on MNES and a referral to the Federal Department of Sustainability, Environment, Water, population and Communities is not required in this instance.

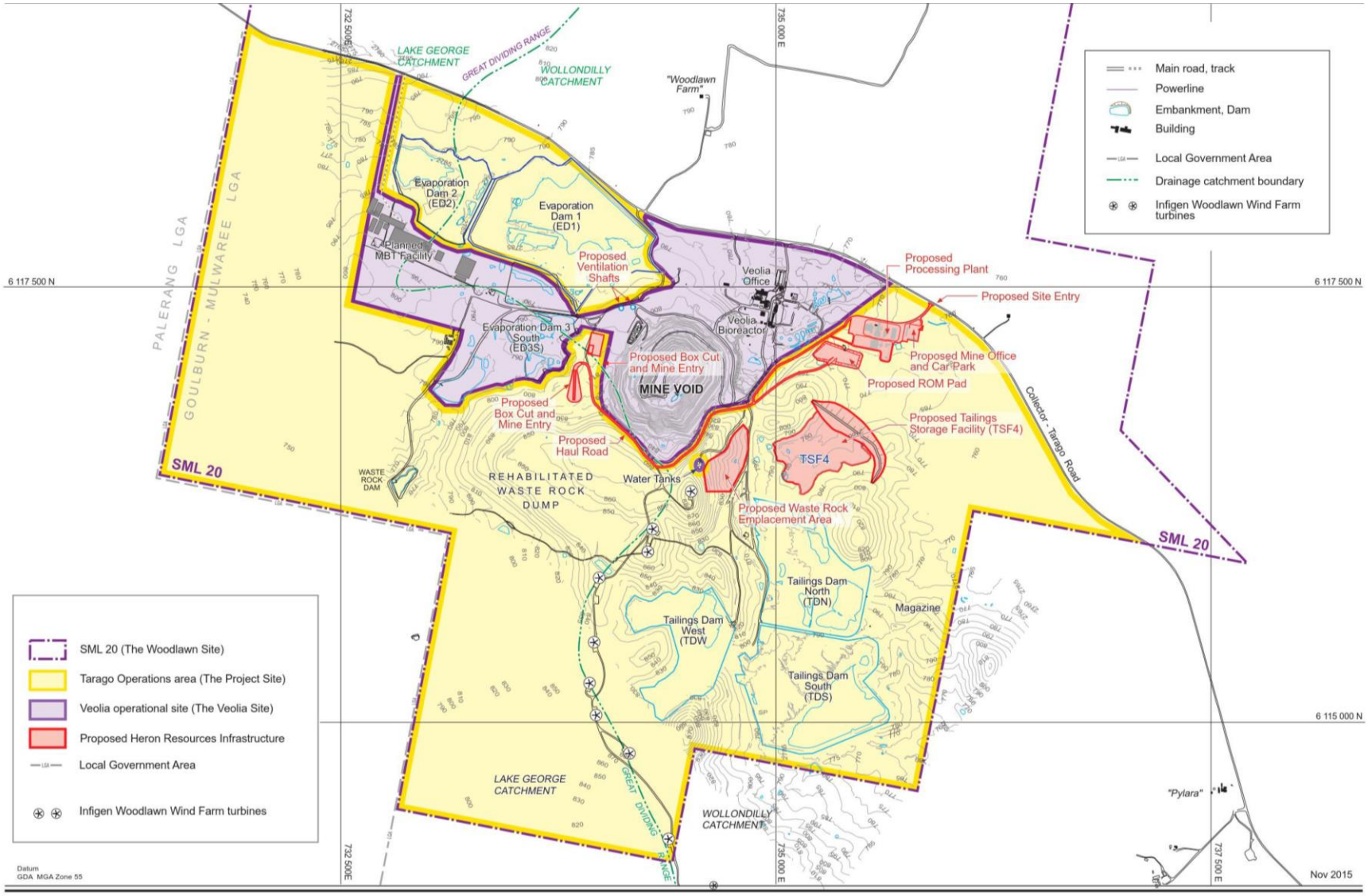
3.7 Consultation

On 14 October 2016, Veolia met with representatives of both the NSW Department of Planning and Environment and the NSW Environment Protection Authority to discuss the proposed modification and to request assessment requirements for this modification. Prior to this, Veolia had been in regular contact with both authorities regarding the operation of the facility and leachate management. This included a meeting with the EPA in April 2016 to discuss ongoing issues associated with the performance with the Bioreactor.

As identified in Section 3.2 Veolia has kept the community abreast with quarterly meetings to discuss efforts to resolve odour related issues including information on the 2015 NSW Government mandated independent odour audit, implementation of odour management measures resulting from the auditing process, detailed information on gas capture improvements and leachate storage issues including the LTLM Strategy, and detailed information on the final design of the LTP and this modification request.

Goulburn Mulwaree and Palerang Councils have not raised any complaints with Veolia regarding operation of the Woodlawn facility since it commenced operations.

Figure 7: Woodlawn Mine Project



4. Environmental Impact Assessment

4.1 Surface water and leachate management

4.1.1 Impact assessment

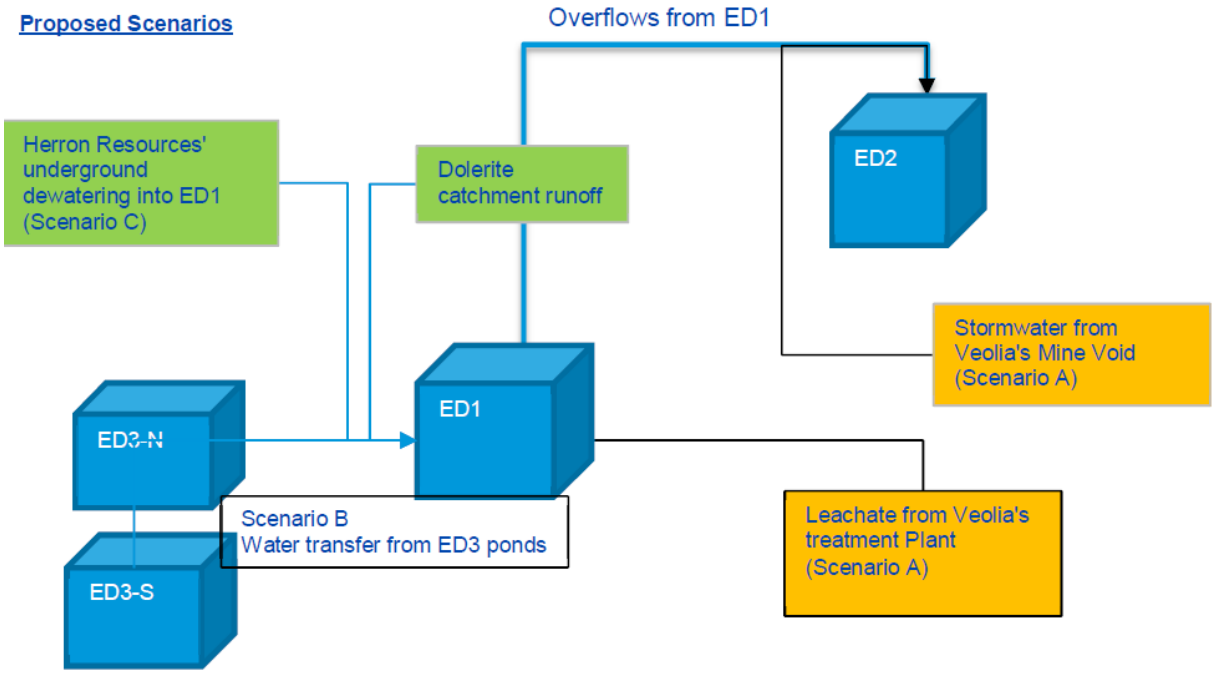
Veolia commissioned Parsons Brinckerhoff to undertake a water balance of the proposed LTLM Strategy. The water balance simulation aimed to demonstrate that ED1 and ED2 combined could store:

- treated leachate from the mine void and the ED3 ponds (via the LTP);
- stormwater from the mine void; and
- mine dewatering from Heron's mine (see Figure 8).

The simulation assumed the wet climatic scenario from 1947 to 1986. The climate sequence from 1947 to 1986 was termed as the wet sequence as it contains five years with more than 1,000 mm of annual rainfall and 22 years with more than 680 mm of annual rainfall, which is a long term average from 1932 to 2015.

The simulation also assumed a low evaporation rate (pan value) and no seepage from the dams to simulate worst-case evaporative conditions. It used the GOLDSIM based water balance model that was previously used in the assessment of ED3S for a licensing application, calibrated to the existing condition for ED1 and ED2, and was run on a daily basis.

Figure 8: Scenarios modelled in the first water balance study



The results indicated that if:

- ED1 and ED2 are exclusively used for Veolia's operations (i.e. no dewatering from the Woodlawn mine) and
- leachate production follows Veolia's predictions throughout the life of the project (initially 3L/s declining to 1.7L/s by project end) and
- evaporative conditions are favourable (pan factor of 0.85)

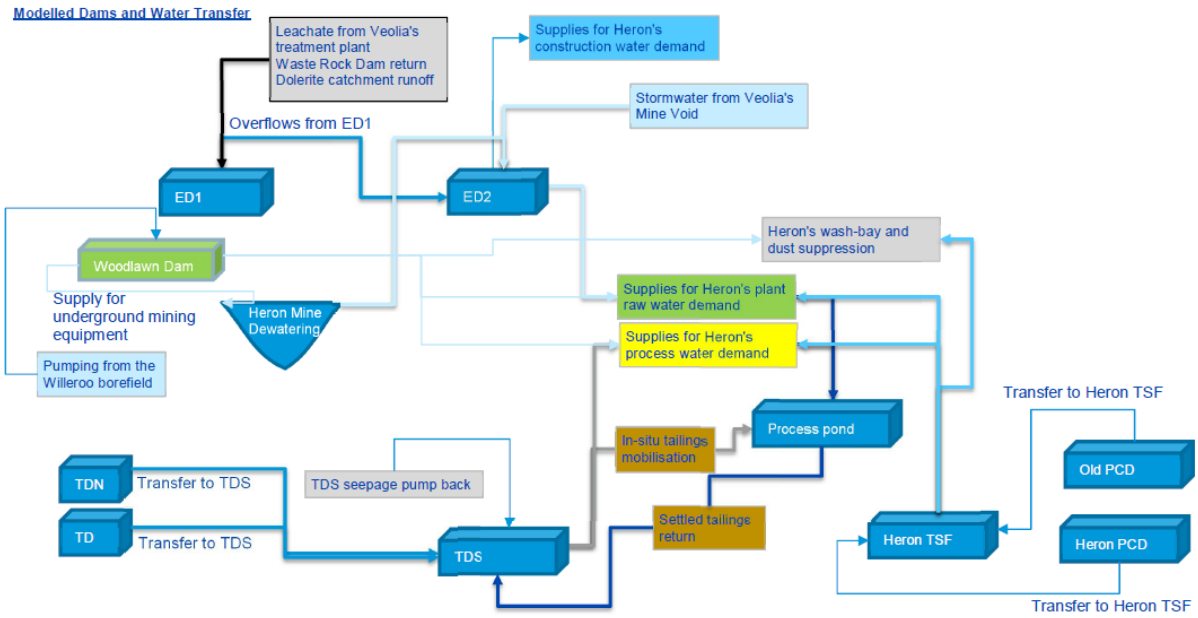
Then ED1 and ED2 could store the stormwater and leachate volumes for the life of the project without water transfer or mechanical evaporation.

However, for any other scenario involving additional water/leachate from Veolia's operations or poorer rates of evaporation, mechanical evaporation would be required to prevent overflows from ED2. The water balance assessment suggests that 4 mechanical evaporation units may be required for the worst-case leachate production under the wet climate sequence similar to 1947 to 2015 with a pan factor of 0.6, when water is transferred from ED3 cells at 1 L/s.

If Heron dewatering into ED2 is added to this scenario, the assessment predicted that overflows would be prevented if Heron used water from the dams at a minimum rate of 10 L/s.

Veolia has also obtained a recent water balance prepared by Parsons Brinckerhoff for Heron's Woodlawn Mine project, which updated the water demand and supply rates for the mine to the water balance for Veolia's operations in Evaporation Dams 1 and 2 (see Figure 9). This water balance is also provided in Appendix B.

Figure 9: Scenarios modelled in the second water balance study



Importantly, this second water balance revised the dewatering rates (i.e. the rate of Woodlawn mine water entering ED2) from 0.82 ML/day to 0.13 ML/day. It also revised Heron's demand for process water from ED2 from up to 15L/s to up to 10.9L/s. The same assumptions for wet climate scenario, evaporation and seepage rates were applied to the GOLDSIM model as for the initial water balance assessment. The model was again calibrated and run on a daily basis.

The resulting water balances for Evaporation Dam 1 (see Figure 10) and Evaporation Dam 2 (Figure 11) indicate that overflow from ED1 into ED2 will occur several times over the life of the Veolia and Heron projects. However, overflow from ED2 into the environment would be avoided by relying **almost exclusively** on the capacity of ED2. Under the model, ED2 would only risk overflow on one occasion – in 2023 following a very wet climatic cycle. On that occasion, water from ED2 would be transferred to another storage dam on the site.

Figure 10: Simulated daily total storage volumes in ED1 and rate of water transfer from ED1 under wet climate sequence

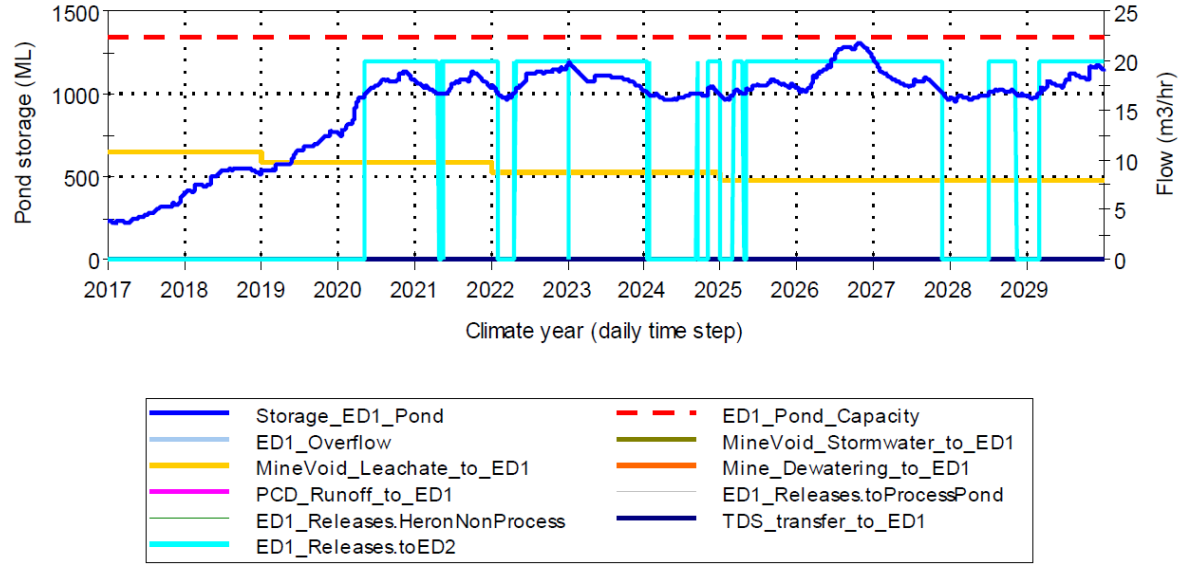
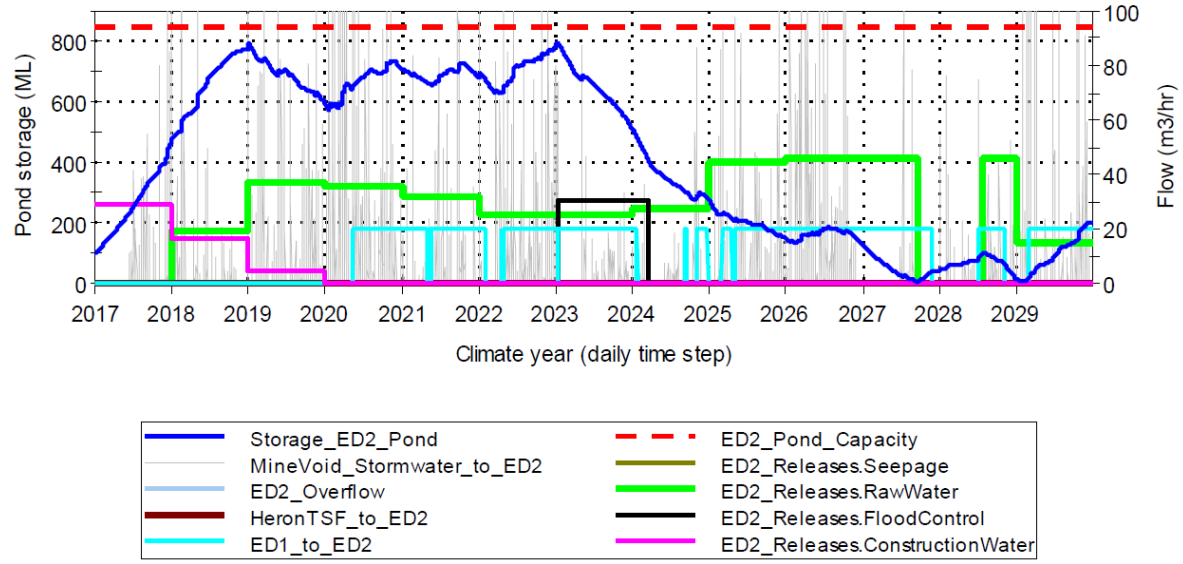


Figure 11: Simulated daily total storage volumes in ED2 and rate of supply from ED2 under wet climate sequence



Together, the two water balances demonstrate that Evaporation Dam 1 and Evaporation Dam 2 have sufficient capacity under all climatic conditions and scenarios, including the worst-case scenario where the dams receive leachate from the Bioreactor and Evaporation Dam 3 (via the LTP), stormwater from the mine void, and dewatering from/drawing process water to the Woodlawn mine. The proposed mechanical evaporation rates and provision for water transfer from ED2 to another dam if necessary would be effective in ensuring zero discharge from ED1 and ED2 under all climatic conditions.

4.1.2 Mitigation and management

Water Transfer

All treated leachate storage dams are maintained with a freeboard of 0.5m to ensure that there is sufficient freeboard to withhold liquid from a significant rainfall event and prevent wind generated waves contained within the pond. This will also be applied to ED1 and ED2.

The water balance relies on the transfer of water between dams. For example, ED1 will release to ED2 when it nears capacity, and ED2 may need to transfer to another dam on very rare occasions (see the releases accounted for in Figure 10). The water balance demonstrates that ED1 can store the stormwater and leachate volumes for the life of the project without water transfer or mechanical evaporation for most scenarios where ED1 was used exclusively used for Veolia's operations (i.e. no dewatering from the Woodlawn mine).

Mechanical Evaporators

However, for scenarios involving additional water/leachate from Veolia's operations or poorer rates of evaporation, up to 4 mechanical evaporation units would be required for worst-case leachate production under the wet climate scenario. Under these circumstances, leachate from the LTP will be discharged through mechanical evaporation sprayers, and possibly heated, to enhance the evaporation rate of the leachate. Veolia currently operates Turbomist S30P mechanical sprayers which increase the evaporative potential of liquid pumped through these units by approximately 30%.

The recommended number of mechanical evaporators would be maintained for use, and water levels, discharge rates and climatic conditions will continue to be monitored to ensure releases between dams occur when necessary and off-site discharges are avoided.

Dam Integrity

It is noted that the water balance assessments assumed zero seepage from the dams. This is a conservative approach but also reflects the requirement under conditions 18D (MP10_0012) and 70A-70C (DA 31-02-99) that the dams receiving treated leachate be adequately lined to prevent seepage.

ED1 and ED2 were constructed between 1987 and 1991, initially to hold water from the mine open cut workings, and later the water from dewatering of the underground mine workings. Since mining ceased in 1998, "dirty" mine runoff water continues to be stored in the dams.

Veolia is required to investigate the integrity of evaporation dams ED1 and ED2 in accordance with a PRP required by Condition U2.2 of its EPL (11436). The condition requires that the investigation assess:

- the geophysical conditions under and around the dams;
- the integrity of the existing liner mechanisms for the dams;
- any identified points of liner failure/faults;
- the pathways for the migration of pollutants from the dams into the surrounding environment;
- the nature and extent of groundwater pollution caused by the dams;
- appropriate control measures

AECOM Australia was appointed to conduct the assessment undertaking an extensive program of desktop and field investigations. It included a historical review of site investigations, an inspection of site walls, consideration of dam construction practices, a drilling program of the dam floors, surface geophysics around the dams to identify potential seepage and zones of enhanced permeability which may facilitate dam water migration, groundwater testing, and a geotechnical seepage assessment.

The investigation is attached in full at Appendix H. It was recently completed and forwarded to the EPA for consideration in accordance with Veolia's license condition. The report includes all the results from the investigation, an interpretation of the results, a conceptual groundwater model and recommendations for future investigations. Key findings are as follows:

Dam Integrity

- Historical information and data from additional bores drilled as part of the investigation indicate no continued seepage apart from some discreet seepage from ED2.
- The floor and walls of both evaporation dams were inspected and six samples taken for testing found that the existing liner material met the required permeability specification of the NSW Environmental Guidelines for Solid Waste of 1 x 10-9m/s;
- The geophysical survey found discrete areas of elevated apparent conductivity (higher permeability areas) which were then targeted by the installation of additional monitoring bores. A total of 14 bores completed with none detecting metals, acidic water or unusually elevated conductivity;
- Some of the bores detected elevated sulphate levels which AECOM believe is an indication that leakage maybe occurring in the immediate vicinity of the dams, noting that elevated sulphate levels are common in close proximity to sulphate rich organics.

Seepage Migration

- Groundwater conditions surrounding the dams indicate that there is a confined aquifer created through seepage, within the transition zone between low permeable bedrock and the overlying alluvium;
- The permeability of these groundwater zones is however low, discrete and non-continuous, and reliant on artificial recharge which in turn restricts groundwater flow.
- Groundwater derived base flow in streams is likely to be low given the non-preferential nature of creeks, the low permeability of the underlying strata, and the elevation differences between groundwater levels and surface water drainage.
- The sulfate and hydrochemistry results in the monitoring bores adjacent to the evaporation dams indicated limited seepage migration from the dams.

Overall the investigation demonstrated that should leakage pathways exist, there is little evidence of contamination leaving the premises or otherwise impacting off site waterways. The report identified available technology effective in reducing potential seepage such as lining the dams with high-density polyethylene (HDPE) liner.

However, it noted that the application of such liners were complex and may not be commensurate with the potential risks posed by the dams. Subsequently, a key recommendation of the investigation is the preparation of an Ecological Risk Assessment to inform the potential for environmental harm and what measures would be appropriate to either mitigate the potential for harm or remediate groundwater due to seepage.

It should be noted that Veolia is committed to the completion of the Ecological Risk Assessment and any associated remediation works as agreed to by the EPA prior to the commencement of discharge from the leachate treatment plant to ensure the ponds are capable of safely storing treated leachate and stormwater.

4.2 Odour

4.2.1 Impact assessment

The leachate treatment plant and the treated leachate evaporation process have the potential to generate odour and to contribute to the cumulative odour impacts at the site.

The LTLM Strategy was supported by an air quality impact assessment undertaken by the Odour Unit which included detailed modeling of the potential for offensive odours from the treatment and disposal of treated leachate into Evaporation Dam 1. While the location of the treatment plant has moved closer to Evaporation Dam 1, all other parameters with the potential to affect odour remain the same. On this basis it is considered that additional modeling is not required and that the current odour impact assessment remains relevant.

This is supported by advice from the Odour Unit (TOU) which carried out a review of the proposed location variation for the leachate treatment plant (LTP) (Appendix G). In evaluating the associated effects of this proposed location variation to the expected odour-related outcomes, TOU referenced its own report titled Woodlawn Bioreactor Facility Odour Modelling Study – Long Term Treated Leachate Solution dated 22 July 2016 (the July 2016 Report). In undertaking its review the TOU noted that:

- The amended location for the LTP is approximately 40 nominal metres from the original location
- The new location resulted from the final detailed design work for the LTP
- The proposed new location for the LTP has no impact on the proposed Evaporation Dam 1 (ED1) System.

The Odour Unit advised that based on the information provided by Veolia and the modeled outcomes documented in the July 2016 Report, the proposed new location for the LTP is considered to reflect a negligible change to the projected odour impacts for the long term treated leachate solution at the Woodlawn Bioreactor Facility. TOU further advised that it had no concerns with the amended site location for the LTP from an odour viewpoint.

The TOU's air quality assessment that supported the LTLM Strategy comprised modeling runs on the odour dispersion model for the original environmental assessment undertaken in 2011. The target values for the treated leachate being discharged into ED1 from the LTP are listed in Table 7.

Table 7: Final treated leachate target values

Parameter	Units	Average	Maximum
pH	--	--	6.5-8.5
Conductivity	µS/cm	36,000	--
COD	mg/L	--	2,500
BOD	mg/L	--	10
Total Phosphorus	mg/L	--	13
Ammonia	mg/L	--	10
Nitrate	mg/L	--	<1,500
TSS	mg/L	--	5
TDS	mg/L	--	30,000
Chloride	mg/L	--	5,000

The assessment identified Biological Oxygen Demand (BOD) and Ammonia as having the strongest influence on odour emission rates from the system. It modelled various scenarios for these two

leachate parameters, including up to ten times the target values listed in Table 7. It concluded that the discharge from the leachate treatment plant will be of a much higher quality than possible under the existing leachate management system leading to significant improvements in odour generated from leachate at the site.

The assessment also modelled odour dispersion and the results are shown in Figure 12. The modelling projection results demonstrate comfortable compliance with the relevant odour criterion at the nearest sensitive receptor and minimal sensitivity to possible fluctuations in leachate quality of 2, 5 and 10 times above the target values. On this basis, it can be safely concluded that the proposed Leachate Treatment Plant and subsequent storage of the treated leachate in the ED1 system would:

- not result in any increase to off-site odour impacts
- comfortably meet the relevant NSW EPA odour performance criterion
- Improve existing off-site amenity in terms of odour

This is attributable to the high leachate treatment quality criteria proposed.

Overall, the modeling study finds that the LTP and subsequent storage of the final treated effluent represents a sustainable, long term solution for the management and storage of leachate at the site.

Veolia has also obtained the odour assessment prepared by the Odour Unit for the dewatering trials for Heron's Woodlawn Mine project, which is proposed to trial dewatering into ED3 before proceeding with fully fledged dewatering into ED2. This odour assessment is also provided in Appendix C.

This assessment tested two samples from the Woodlawn Mine dewatering project using techniques designed to simulate odour generated by wind and evaporation. Both testing methods found that the water from the mine dewatering project were of comparable or better quality in terms of odour generation than the treated leachate currently stored in the system.

For example, the mean SOER result was 0.10 ou.$m^3/m^2/s$, compared to 0.159 ou.$m^3/m^2/s$ for treated leachate stored in ED3N and 394 ou.$m^3/m^2/s$ for untreated leachate from the Bioreactor. It is noted that these are initial test results and dewatering will cease if adverse water quality findings occur. Notwithstanding, Veolia will need to be cognisant of any future results which may have implications for the leachate treatment system.

Together, the two odour assessments demonstrate that the discharges from the LTP and the Woodlawn Mine dewatering project will lead to better odour outcomes within and beyond site boundaries.

4.2.2 Mitigation and management

No additional mitigation and management measures are proposed as a result of the modification. The existing requirements in the approval conditions, including no offensive odour and regular odour audits provide for a robust management framework to ensure the treated leachate target values are achieved and odour impacts reduced. Reporting and consultation requirements with regulatory agencies and the Tarago community will continue to keep key stakeholders updated on the performance of the LTP.

4.3 Noise

4.3.1 Leachate Treatment Plant

The leachate treatment plant is generally fully enclosed within a building and therefore has low noise emissions. The main noise source from the leachate treatment plant is the blower. The blower is located outside of the building. The blower will also have an enclosure and the expected noise level from the blower enclosure is 74 dBA @ 1metre.

The nearest sensitive receptor to the leachate treatment plant is Woodlawn farm approximately 1,800 metres away.

In the original consent for the Woodlawn facility (DA 31-02-99), Condition 19 states the noise criteria for the facility at private residential receiver, being:

1. 35 $L_{Aeq(15minutes)}$ from 6am to 10pm;
2. 35 $L_{Aeq(15minutes)}$ from 10pm to 6am; and
3. 45 $L_{A1(1minute)}$ from 10pm to 6am.

It also states that noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

The $L_{Aeq(15minute)}$ noise levels are considered intrusive noise levels which are energy averaged over a 15minute period. The $L_{A1(1minute)}$ level is the noise level exceeded 1 percent of a 1 minute period. The $L_{A1(1minute)}$ level is a typical maximum noise level and is used to assess sleep disturbance.

Noise modelling at the nearest sensitive receptor under worst case noise enhancing conditions is predicted to be less than 10 $L_{Aeq(15minutes)}$ and 15 $L_{A1(1minute)}$ using the CADNA A noise model using the CONCAWE noise algorithms. The predicted noise level at the nearest sensitive receptor is well below the day and night time noise criteria and as such is unlikely to contribute to the existing noise levels from the Woodlawn facility. The predicted leachate treatment plant noise levels are at a level that indicates inaudibility at the nearest sensitive receptor.

4.4 Greenhouse Gas Emissions

The purpose of this assessment is to quantify the level of greenhouse gas (GHG) emissions for the proposed leachate treatment plant. The assessment of GHG emissions directly relates to the energy consumption and the associated impact on the environment. The following GHG have been identified as significant contributors to global warming:

1. Carbon dioxide (CO_2);
2. Methane (CH_4);
3. Nitrous oxide (N_2O);
4. Synthetic gases; and
5. Hydro fluorocarbons HFCs, SF_6, CF_4, C_2F_6.

HFCs and synthetic gases are not relevant to the proposed development. National Greenhouse Accounts Factors (July 2016) have been used to provide a consistent set of emissions factors, which are suitable for reporting Greenhouse Gas Emissions. Under the Department of Climate Change and Energy Efficiency protocol, GHG emissions are categorised as Scope 1, Scope 2 and Scope 3 emissions, being;

1. Scope 1 – Direct (or point-source) emission factors emissions, are direct emissions from sources owned or operated by the facility. These may be calculated using 'Point Source Emissions Factors' as defined in the AGO Factors and Methods Workbook;
2. Scope 2 – Indirect emission factors – emissions are GHGs released as a result of the generation of electricity, or the production of heat, cooling or steam purchased by the reporting company.
3. Scope 3 – Various emission factors – emissions are all other GHG emissions that are not covered under Scope1 or Scope 2. Scope 3 emissions can include activities such as employees commuting to work; extraction, production and transport of fuels, materials and other goods; and use of products manufactured and sold.

This GHG assessment considers Scope 2 – Indirect Emissions for energy used to run the leachate treatment plant. The expected annual electrical energy usage conservatively has been estimated to be 500 kWh.

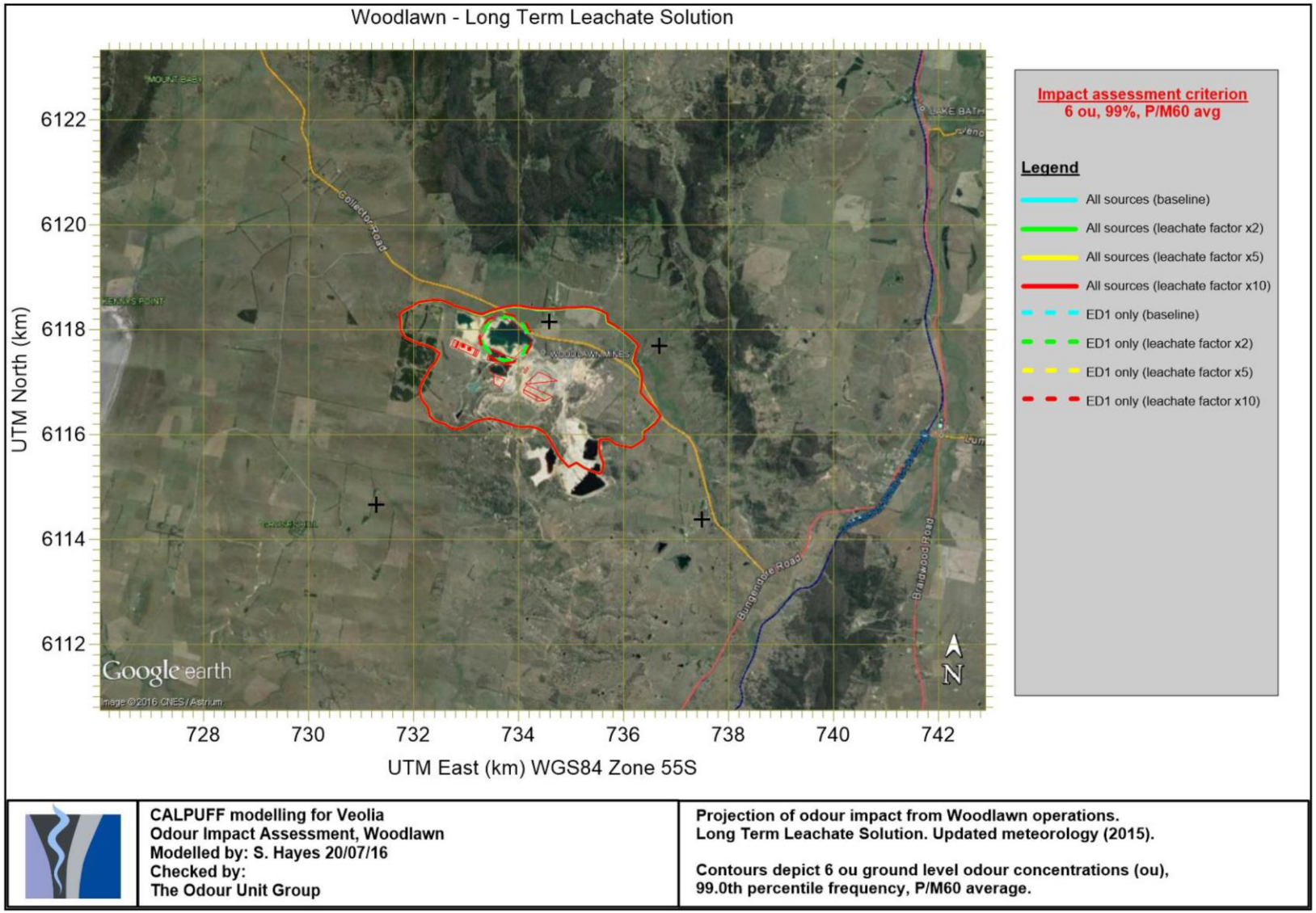
Inventories of greenhouse gas emissions can be calculated using published emission factors. Different gases have different greenhouse warming effects and emission factors take into account the global warming potentials of the gases created during combustion. The estimated emissions are referred to in terms of CO_2-equivalent emission by applying a global warming potential of one for CO_2.

The relevant emission factors applicable to the leachate treatment plant have been derived from the National Greenhouse Accounts Factors August 2016. Emission factors for Indirect Emissions for electricity used are 0.84 kg CO_2-e/kWh.

Equivalent CO_2-e emissions have been estimated to be 420 kg CO_2-e per year.

Australia's total GHG in 2012 amounted to 554.6 million tonnes of carbon dioxide equivalent (Mt CO_2-e) whilst New South Wales, in 2012, accounted for 154.7 Mt of the total. Therefore, the leachate treatment plant will account for less than 0.0000003% of NSW GHG emissions.

Figure 12: Odour dispersion modelling results



5. Conclusion

The modification seeks approval for key elements of Veolia's Long Term Leachate Strategy approved by the EPA and established within a Pollution Reduction Program on Veolia's Environment Pollution Licence (EPL).

The modification will facilitate better environmental and operational performance by allowing Veolia to extract and treat greater volumes of leachate and minimise and reduce the generation of odour. The modification will also enable more efficient gas extraction maximizing the waste to energy benefits of the Bioreactor.

The potential water, odour and noise impacts have been fully considered. The water assessment demonstrates that the water requirements for both Heron's Woodlawn Mine project and Veolia's leachate disposal system can be accommodated while the odour assessment indicates that the treatment and disposal of leachate will improve the generation of odour from the site and that the relevant air quality criterion can be comfortably met at all sensitive receivers. Similarly, noise emissions generated by the LTP will comfortably meet the limits established in the development approval for sensitive receivers and greenhouse gas emissions associated with the running of the leachate plant are negligible.

Other recommended changes have been fully justified. The reduced administrative burden associated with accepting regional waste by road, as well as the return to the originally approved operating hours, would contribute to greater efficiencies without unacceptable impacts.

It is submitted that the proposed modifications would support the long-term sustainability of this important waste management project and is therefore in the public interest and should be approved.

Appendix A – Long-term Leachate Treatment Solution Submission Report

Appendix B – Water Balance Studies

Appendix C – Air Quality Impact Assessments

Appendix D – Leachate Treatment Plant Concept Plans

Appendix E – Construction Environmental Management Plan

Appendix F – Construction Soil Water & Leachate Management Plan

Appendix G – Air Quality advice from The Odour Unit

Appendix H - Woodlawn Evaporation Dams ED1 and ED2 Seepage Investigation