Heron Resources Limited
Tarago Operations Pty Limited

Woodlawn Mine

SML 20

Environmental Management Strategy

July 2018

Document Control Details

DOCUMENT DETAILS	Name:	Environmental Management Strategy
	Author:	Robert Byrnes
	Reference:	EMS
	Revision No.:	6
	Document Status	Operational

REVISION DETAILS

Revision No.	Date	Details of Revision	Reviewed By	Approved By
1	18/6/14	Draft for internal Review	HS	RB
2	2/7/14	Issue to Department of Planning and Environment	RB	HS
3	11/12/14	Amend company details	RB	HS
4	3/4/18	General Update	RB	AL
5	10/5/18	Issue to DPE	RB	AL
6	31/7/18	Incorporation of DPE Comments	RB	AL

CIRCULATION DETAILS

Name	Department/Organisation
Wayne Taylor	Heron Resources
Rob Byrnes	International Environmental Consultants
Chris Wilson	Department of Planning and Environment
Stephen Shoesmith	Department of Planning and Environment
Andrew Lawry	Heron Resources
Brian Hearne	General Manager
Simon Fitzgerald	Mine Manager
Zoe Read	Environmental Officer

Table of Contents

1. Introduction **1**

1.1 Purpose 1
1.2 Specific Management Plans which form the EMS 1
1.3 Woodlawn Mine Key Personnel and Responsibilities 2
1.3.1 Responsibility 2
1.4 Legislative Requirements 3
1.5 Statutory Approvals 5

2. Strategic Framework **7**

2.1 Management Structure 7
2.2 Managing Environmental Aspects 7
2.2.1 Environmental Management Plans 7
2.2.2 Annual Review 7
2.2.3 Environmental Audits 8
2.2.4 Environmental Action Plans 8
2.2.5 Industry Initiatives and Benchmarks 8
2.3 Environmental Training 8

3. Environmental Issues Management **9**

3.1 Woodlawn Mine Overview 9
3.2 Environmental Risk Assessment 9
3.3 Environmental Issues 10
3.3.1 Construction 10
3.3.2 Mining Operations 11
3.3.3 Rock/Overburden Emplacement 11
3.3.4 Processing Residues and Tailings 12
3.3.5 Waste Management 12
3.3.6 Acid Mine Drainage 13
3.3.7 Mine Subsidence 13
3.3.8 Erosion and Sedimentation Control 14
3.3.9 Flora 14
3.3.10 Fauna 14
3.3.11 Aboriginal and Natural Heritage 15
3.3.12 Operational Noise 15
3.3.13 Blasting 15
3.3.14 Water Management 15
3.3.15 Groundwater Management 16
3.3.16 Contamination 17
3.3.17 Hazardous Materials 17
3.3.18 Air Quality Management 17
3.3.19 Transportation Management 18
3.3.20 Bushfire Management 18
3.3.21 Visual and Stray Light 19

3.3.22 Public Safety 19
3.4 Environmental Incidents and Emergencies 19
3.4.1 Emergency Response Procedures 19
3.4.2 Environmental Incidents 19

4. Stakeholder Communication 21

4.1 Community Involvement 21
4.2 Community Complaints 22
4.3 Community Dispute Resolution 22
4.4 Government Liaison 22
4.5 Consultation with Veolia 23
4.6 Consultation with Infigen 23
4.7 Pollution Incident Response Management 23

5. Verification and Corrective Action 25

5.1 Environmental Monitoring 25
5.1.1 Groundwater Monitoring 25
5.1.2 Surface Water Monitoring 26
5.1.3 Dust Monitoring 26
5.1.4 Noise and Blast Monitoring 27
5.1.5 Subsidence Monitoring 27
5.1.6 Rehabilitation Monitoring 28
5.1.7 Transportation Monitoring 28
5.2 Reporting Procedures 28
5.3 Non-Conformance, Corrective Action and Adaptive Management 29
5.4 Preventative Action Procedures 30
5.5 Record Keeping 30
5.6 Auditing Procedures 30
5.7 Management Review 31
5.8 Continuous Improvements 31
5.9 Trials and Research 32
5.10 Trigger Action Response Plan 32

Appendices

Appendix A - Plans
Appendix B - Project Approval
Appendix C – Environment Protection Licence

List of Plans

Plan 1 Locality Plan
Plan 2 Woodlawn Mine Site Details
Plan 3 Water Management
Plan 4 Rehabilitation
Plan 5 Environmental Monitoring

1. Introduction

1.1 Purpose

This Environmental Management Strategy (EMS) has been prepared in response to Condition 1 Schedule 6 of the Project Approval (07_0143 MOD2) for the Woodlawn Mine. The requirements of the EMS are:

- ❒ provide the strategic framework for the environmental management of the project;
- ❒ identify the statutory approvals that apply to the project;
- ❒ describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
- ❒ describe the procedures that would be implemented to:
    - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
    - receive, handle, respond to, and record complaints;
    - resolve any disputes that may arise during the course of the project;
    - respond to any non-compliance;
    - respond to emergencies; and

    include:
    - copies of any strategies, plans and programs approved under the conditions of this approval; and
    - a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

This EMS was submitted to the then Director General of Planning and Infrastructure on 4th July 2014 representing 12 months from the date of the original Project Approval in accordance with Condition 1(a), Schedule 6 of the Project Approval. This EMS has been updated to include project details as at the commencement of construction. This EMS will be further updated as required during the operational phase of the mine.

1.2 Specific Management Plans which form the EMS

The Woodlawn Mine operates alongside a suite of operational management plans which provide the overarching framework for the management of Woodlawn Mine.

These include:

- ❒ Construction Environmental Management Plan;
- ❒ Community Engagement Plan;
- ❒ Pollution Incident Response Management Plan
- ❒ Extraction Plan;
- ❒ Noise and Blasting Management Plan;
- ❒ Air Quality Management Plan;
- ❒ Water Management Plan, including: Site Water Balance, Surface Water Management Plan, Groundwater Management Plan, Surface and Groundwater Response Plan;

- ❒ Vegetation and Rehabilitation Management Plan (incorporating the Tailings Management Strategy, Vegetation Management Plan and Rehabilitation Management Plan);
- ❒ Heritage Management Plan;
- ❒ Transport Management Plan, including Road Transport Protocol;
- ❒ Paste Fill Management Plan;
- ❒ Waste Rock Management Plan; and
- ❒ Environmental Monitoring Plan.

All component management plans under this EMS will be reviewed on an annual basis and updated as required over the life of the mine to ensure they are relevant to the current approvals and licensing.

1.3 Woodlawn Mine Key Personnel and Responsibilities

As required by Condition 1(d) of Schedule 3 of the Project Approval, management responsibility for the Woodlawn Mine will be as follows.

Table 1.1 – Roles of Key Personnel

Position/Role	Personnel	Authority and Responsibility	Contact Details
Managing Director	Wayne Taylor	Overall responsibility for the construction and operation of the Woodlawn Project	02 9119 8111
Chief Operating Officer	Andrew Lawry	Responsible for project delivery and operations, reports to the General Manager	02 9119 8111 02 4816 6341
General Manager	Brian Hearne	Conduct of mining and processing operations, reports to the COO	02 4816 6344
Mine Manager	Simon Fitzgerald	Mine Planning and Design, responsible for the conduct of mining, reports to the General Manager	02 4816 6323
Construction Manager	David Walls	Responsible for the conduct of construction activities, reportable to the COO	02 4816 6347
General Manager – Exploration and Geology	David von Perger	Resource evaluation and responsible for the conduct of exploration activities	02 9119 8111 08 6500 9202
Environmental Officer	Dr Zoe Read	On site environmental management	02 48166335
Environmental Consultant	Robert Byrnes	Assist with environmental management and compliance	02 4878 5502

1.3.1 Responsibility

The **Managing Director** has overall responsibility for the implementation of the EMS at Woodlawn Mine as well as to review and approve expenditure and resources necessary to effectively implement the EMS and individual management plans.

The **Chief Operating Office** will ensure that the approved management provisions and requirements of the individual Environmental Management Plans and commitments are

implemented. The Chief Operating Officer will review and evaluate the performance of the EMS program and environmental protection initiatives.

The **General Manager** is responsible for the conduct of mining and processing operations and provides direction to the Mine Manager and Environmental Officer.

The **Mine Manager** is responsible for the day to day management of the mine and overview role for environmental management systems on site, which will include:

- ❒ Ensuring compliance with environmental requirements for the site.
- ❒ Represent the on site contact officer under the Environment Protection Licence and other statutes.
- ❒ Report to the Managing Director on a monthly basis on the environmental performance of mine.
- ❒ Liaise with the Environmental Officer on environmental matters as required.

The **Environmental Officer** will provide the following assistance with the EMS:

- ❒ Provide technical assistance on environmental matters to the Mine Manager and General Manager.
- ❒ Undertake the necessary environmental monitoring program.
- ❒ Organise external environmental experts as required.
- ❒ Organise external environmental audits of the site as required by the Project Approval.
- ❒ Develop Corrective Action Programs in consultation with the Mine Manager and General Manager to monitor their implementation.
- ❒ Develop and implement appropriate environmental training for the key mine personnel.

1.4 Legislative Requirements

Of relevance to the Woodlawn Mine is the following legislation. As required by Condition 1(c) of Schedule 6, the following section also outlines the statutory approvals which apply to the Woodlawn Mine, while the existing approvals held are listed in Section 1.5.

Mining Act 1992 – This Act covers the exploration and extraction of the State's resources having regard to the need to encourage ecologically sustainable development. It provides a framework for compensation to landholders for loss or damage resulting from such operations and requires the payment of security to provide for the rehabilitation of mine sites, effective rehabilitation of disturbed land and water, and ensures mineral resources are identified and developed in ways that minimise impacts on the environment.

Environmental Planning and Assessment Act 1979 – Provides the primary approval path for mining projects and sets environmental management and reporting conditions as part of the approval. For new mining approvals, it also provides an integrated approach to other mining related approvals. Woodlawn Mine holds Project Approval 07_0143 MOD2 covering its development and operations. The Project Approval sets out the requirements for the EMS and component environmental management plans. This EMS however also includes other environmental management plans which will assist with the ongoing operation of the mine.

Protection of the Environment Operations Act 1997 (POEO Act) - The POEO Act is administered by the Environment Protection Authority (EPA) and requires licensing for environmental protection, including waste generation and disposal, water, air and noise pollution. Under the POEO Act, an EPL is required for the Woodlawn Mine as it is defined as a scheduled activity. EPL 20821 has been issued by the EPA and is provided as Appendix C. The site has now been divided between EPL 11436 held by Veolia Environmental Services (Australia) Pty Limited (Veolia) and a separate part of the site by Infigen as shown on Plan 2.

Protection of the Environment Legislation Amendment Act 2011 – The POELA Act requires the preparation and implementation of a Pollution Incident Response Management Plan (PIRMP). The PIRMP falls under this EMS and has been completed and issued to the EPA.

Water Management Act 2000 and Water Act 1912 - The Water Management Act 2000 (WMA) and the Water Act 1912 are administered by the Department of Primary Industries-Water and contain approval requirements for some developments to protect watercourses from any adverse effects resulting from works within or in proximity of these watercourses and to administer the taking of groundwater. Woodlawn is subject to the WMA and Veolia holds a Water Access Licence under the WMA under agreement with Heron.

Contaminated Land Management Amendment Act 2008 – This Act provides regulatory controls to ensure that land is not allowed to be put to an inappropriate use given its land use history and that processes are put in place to identify and investigate any contamination at an early stage in the environmental planning and assessment process. Any necessary remediation can therefore be made an integral part of any redevelopment and rehabilitation activities at the cessation of mining.

Waste Avoidance and Resource Recovery Act 2001 - The purpose of the Act is to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecological sustainable development. The Act provides for the making of policies and strategies to achieve these ends. It is an offence under the POEO Act to wilfully or negligently dispose of waste in a manner that harms or is likely to harm the environment.

Environmentally Hazardous Chemicals Act 1985 and Regulation 2017 - This Act sets out provisions for the manufacturing, processing, keeping, distributing, conveying, using, selling or disposing of an environmental hazardous chemical or waste (prescribed activity). The EPA is required to prepare inventories of environmentally hazardous chemicals and declared chemical wastes. The ongoing development of the Woodlawn Mine will involve the use of explosives and diesel as well as various reagents used in the processing of the ore and will register these chemicals and activities prior to the commissioning of the processing plant. An inventory of chemicals and processes used during the mining operation will be kept on site at all times and Woodlawn will apply for an Environmentally Hazardous Chemicals Licence if required.

Roads Act 1993 – All product concentrate produced at Woodlawn will be transported by road to either Port Kembla or Port Botany. Local roads leading to the Hume Highway are covered by the Roads Act and works and will be subject to a Road Transport Protocol in accordance with Condition 26 of the Project Approval. The Protocol requires monitoring of

the trucking and be prepared in consultation with Council and Roads and Maritime Services. The construction program involves a new access road intersection with Collector Road which required the involvement of the RMS and Council prior to its construction.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 – this policy replaces the Drinking Water Catchments Regional Environmental Plan No 1 and specifically requires all proposed development in the Sydney drinking water catchment to demonstrate a neutral or beneficial effect on water quality. Water NSW forms part of the ongoing government agency consultation process. The Woodlawn site is partly within the very outer edge of the Warragamba Dam catchment however the requirements of the SEPP still apply.

Environment Protection and Biodiversity Conservation Act 1999 – The EPBC Act is administered by the Commonwealth Department of the Sustainability, Environment, Water, Population and Communities (SEWPaC). Part 3 of the EPBC Act states that an action that has, will have or is likely to have a significant impact on a Matter of National Environmental Significance (MNES), may not be undertaken without prior approval of the Minister for SEWPaC. As there are no MNES relevant to the operation of Woodlawn Mine this Act currently does not apply however, should any matters be determined as relevant to the ongoing operations a referral will be submitted to SEWPaC for consideration.

1.5 Statutory Approvals

The Woodlawn Mine, as shown on Plan 1, received Project Approval on 4th July 2013 with subsequent modifications received on 22nd April 2016 and 6th July 2017. The approval was obtained under the provisions of Part 3A of the Environmental Assessment Act 1979 and following the public exhibition of an Environmental Assessment document. The site is covered by Special Mining Lease 20 (SML20) which is held by Tarago Operations Pty Ltd (Tarago Operations), a subsidiary of Heron Resources.

The Table 1.2 below summarises the licences and consents relating to Woodlawn:

Table 1.2 – Licences and Consent

Authority	Title	Critical date:
Department of Industry - Resources and Energy	Special (Crown and Private Lands) Lease 20 (known as SML20)	November 2029
Department of Industry - Resources and Energy	Mining Operations Plan	30 November 2021
Environment Protection Authority	Environment Protection Licence 20821	Issued May 2017 and reviewed every 3 years.
Department of Primary Industries - Water	Water Access Licence 40WA411642 Works Approval for new bore (Notice of Determination A7441)	15/1/2025 held by Veolia under agreement with Heron
NSW Dams Safety Committee	Surveillance Reports for Five Prescribed Dams	Surveillance reporting currently every 2.5 years
Department of Planning and Environment	Heron Resources proposed Woodlawn Mine Project (MP 07 0143)	4 July 2013 for a period of 21 years

Table 1.2 – Licences and Consent

Authority	Title	Critical date:
Department of Planning and Environment	Relocation of Mine Portal and Overland Haul modification (MP07-0143MOD1)	22 April 2016 for the period of the original consent
Department of Planning and Environment	Site Layout Update MP07-0143 MOD2)	6 July 2017 for the period of the original consent

Tarago Operations will undertake the activities described in this EMS and as required by the Project Approval 07-0143MOD2, Environment Protection Licence 20821 and the requirements of component Environmental Management Plans.

At the date of issue of this EMS, no further approvals are required or pending. The construction program is underway and first product shipments are scheduled to occur in mid 2019. Further modifications to the Project Approval may arise during the course of mining.

2. Strategic Framework

2.1 Management Structure

The Woodlawn Mine is operated by Tarago Resources Pty Limited which is a fully owned subsidiary of Heron Resources Limited. Tarago Resources holds SML20 and EPL20821, as highlighted on Plans 1 and 2.

2.2 Managing Environmental Aspects

The Woodlawn Mine manages environmental aspects of its operations by ensuring that appropriate management plans have been prepared in accordance with statutory requirements and that these plans are effectively implemented throughout all areas of the operation. The implementation procedures involve strategic planning and scheduling of work, monitoring, internal audits and development of action plans. The key components are described in the following sections.

2.2.1 Environmental Management Plans

Environmental Management Plans are in place for each aspect of environmental management, namely construction activities, surface water and groundwater management, noise and blasting, air quality, heritage, rehabilitation, ecology, waste, subsidence, underground paste filling, traffic and transportation and community engagement. These plans have been prepared to conform to the requirements of the Project Approval both in content and timing.

The list of plans which fall under this EMS is provided in Section 1.2. In accordance with the Project Approval, component plans have specific form and content requirements, stakeholder consultation requirements and in some cases require separate approval from the Department of Environment and Planning (DPE). The project approval has also specified that some critical plans be prepared by suitably qualified and experienced personnel that have received prior approval of the DPE. This is to ensure that the plans are sufficiently robust to ensure effective management of the specific environmental aspects relevant to the Woodlawn Mine.

The management plans are reviewed on an annual basis and updated as required. The current management plans are publicly available on Heron's web page.

2.2.2 Annual Review

An Annual Review is prepared each year which provides a summary of environmental monitoring data and outcomes of the management process. This document is provided to a range of government agencies and community representatives as listed in Section 5.2.

The Annual Review describes the overall management system for the operation and specifically reports on the progress made in implementing any specific initiatives noted in the various Environmental Management Plans or matters raised by government agencies.

2.2.3 Environmental Audits

Woodlawn commissions and pays the full cost of and Independent Environmental Audit every three years, unless the Secretary of the DPE directs otherwise. The first audit is to be commissioned by mid 2018 and completed by September 2018.

2.2.4 Environmental Action Plans

Action Plans resulting from the audits are developed in consultation with the Secretary of the DPE. The implementation of the action plans will be approved by the Woodlawn Mine Manager and monitored by the Environmental Officer.

Environmental procedures and training programs are developed by the Woodlawn Environmental Officer and cover rehabilitation management, pollution control system management, oil and fuel management, monitoring methods, general site maintenance and documentation. Internal Action Plans are developed from time to time in response to site specific issues.

2.2.5 Industry Initiatives and Benchmarks

Heron is actively involved in industry forums, conferences, and organisations. Liaison with other metalliferous mining operations within Australia and peak industry bodies occurs on a regular basis. Environmental management of tailings dams, rehabilitation methods, use and development of manufactured soil using MBT compost and monitoring systems are all key areas of scientific research which will be regularly reviewed to ensure that current best practice is maintained within the Woodlawn operation.

This process will keep Heron fully informed of industry trends in environmental issues and where necessary, these are incorporated into the EMS and relevant component Environmental Management Plans.

2.3 Environmental Training

The EMS requires that all employees at Woodlawn receive an appropriate level of environmental awareness training. This training will be tailored to suite the mine and covers the following levels:

- ❒ Managers (including Electrical, Mechanical, Surface and Underground Managers, Process Plant Managers and Supervisors).
- ❒ Surface workforce.
- ❒ Underground workforce.
- ❒ Process Plant operators.
- ❒ Induction level for visitors.

Competency based training is provided to key personnel. This training will cover environmental legislation, performance criteria, details of specific pollution control systems for the site and emergency planning.

General surface workforce is trained in specific site procedures and management of pollution control systems while all employees are made aware of the Woodlawn Mine's environmental obligations and statutory requirements.

3. Environmental Issues Management

3.1 Woodlawn Mine Overview

The mine started operations in 1978 and closed in 1998, when Denehurst Limited, the company operating the mine, went into receivership. During this time, copper, lead and zinc concentrates were produced from the site, first from an open pit and later from an underground mine beneath the pit. At the cessation of operations, the site was not fully rehabilitated and the landscape remains highly disturbed, including the existing tailings dams which continue to present a rehabilitation obligation.

Most of the ongoing environmental issues associated with Woodlawn relate to the previous operation. Conditions of the Project Approval and SML20 transfer require Heron Resources to manage the original mining features as well as any new environmental aspects. Similarly, the Environment Protection Licence requires Heron to monitor these aspects in order to determine if additional environmental controls are needed.

The new Woodlawn Mine will produce up to 150,000 tonnes of copper, lead and zinc concentrates per year, for up to 21 years. The ore will be derived from continuation of mining within the existing underground workings as well as additional drivage into new ore lenses. Underground extraction will be supplemented by reprocessing of three existing tailings dams left over from the original operation. The concentrate will be trucked to Port Kembla and/or Port Botany for export.

The site layout is shown on Plan 2. A separate processing plant is currently under construction which will have a separate access road onto Collector Road. Ore from the underground mine will be transported from a new entry on the western side of the Bioreactor via a haul road to the new processing plant in Hickory's Paddock.

3.2 Environmental Risk Assessment

The Project Approval requires Heron to assess and manage project related environmental risks to ensure that there are no exceedances to the criteria and/or performance measures contained in the approval and as identified in the component Environmental Management Plans. Environmental Risk Assessment is an ongoing process which commenced with the 2011 Environmental Assessment. This risk assessment was expanded in the identification matrix contained in the Woodlawn Mine Mining Operations Plan (MOP) and in more detail within each individual environmental management plan which fall under this EMS.

Risk management is the term applied to a logical and systematic method of identifying potential hazards, analysing and evaluating risks (risk assessment), identifying controls and development of a monitoring process associated with any activity. The main outcome of this process is to reduce risks of adverse impacts on the environment but has also included occupational health and safety perspectives as well.

Factors affecting the environmental risks associated with the Woodlawn Mine include:

- ❒ Historic acid mine drainage caused by sulphide rich geology and past land use management. This has had a bearing on rehabilitation methods.
- ❒ Lack of progressive rehabilitation when the mine was last operating.
- ❒ Agreement with government stakeholders to recycle water from all sources on site and to maintain the site as nil discharge of contaminated waters. This factor simplifies the water pollution control and management system on site and provides overall positive benefits by reducing reliance on the Willeroo Borefield.
- ❒ A substantial 2,500ha buffer zone around the mine, consisting of private land associated with the existing mining lease, which reduces any potential risk of dust, noise and vibration on the community. This buffer has in turn provided opportunities to create a substantial vegetation offset which takes into account the original mine development.
- ❒ The need to transport the product concentrate by road through Tarago and Lake Bathurst.
- ❒ An underground mine plan which only lies beneath existing mine infrastructure and highly disturbed land. The mine plan avoids subsidence impacts on private land or public infrastructure.
- ❒ Interaction with other the site occupiers, Veolia and Infigen.

Following from the above general factors, the key environmental issues identified during previous investigations and assessments included:

- ❒ Rehabilitation in hostile environments;
- ❒ Groundwater ;
- ❒ Surface water, specifically the issue of acid rock mine drainage;
- ❒ Water balance and management during operation; and
- ❒ Traffic and transport.

These issues were addressed in the Environmental Assessment, subsequent conditions of approval and included in each of the environmental management plans which fall under this EMS.

3.3 Environmental Issues

The following sections discuss environmental issues in two ways, firstly in terms of the stages of the mine development, commencing with construction and then specific operational activities. The environmental issues are then discussed by category relevant to the subject matter of each environmental management plan.

3.3.1 Construction

A standalone infrastructure site is currently being constructed. The key features will include:

- ❒ Establishment of temporary construction compounds;
- ❒ Establishment of temporary construction materials facilities e.g. concrete plant, material storages, overburden emplacement, clay and topsoil stockpiles;

- Construction of initial and permanent water management structures including the water treatment plant and pollution control ponds;
- Construction of both temporary and permanent site access.
- Earthworks to establish the processing plant area;
- Construction and commissioning of the processing plant and infrastructure;
- Construction of the new tailings storage facility (TSF4);
- Construction of the power infrastructure;
- Construction of truck loading facilities and ancillary infrastructure;
- Construction of permanent administrative facilities including offices, amenities, laboratory, and car parking; and
- Installation of security infrastructure to ensure public safety and security for mining operations.

A new box cut, portal and decline are being constructed on the western side of open cut void (Bioreactor) to connect with the existing main decline at approximately 145 m below surface. The existing underground accesses will be refurbished and ventilation facilities installed.

The issues relevant to construction activities include noise, dust, soils and erosion. These are covered in the Construction Environmental Management Plan.

3.3.2 Mining Operations

Ore will be extracted utilising underhand stoping techniques with cemented paste fill. The engineered nature of paste fill makes the stoping operations more reliable and systematic, with the length of open voids controlled to ensure local stability. Conventional drill and blast development, equipment and practices will be utilised. Broken ore will be removed from the stope using remotely controlled loaders and then hauled by truck to the surface run-of-mine stockpile adjacent to the processing plant.

The mining activities may result in some surface movement as well as generate noise and dust from the surface operations. Subsidence issues are covered in the Extraction Plan while noise, blasting and dust issues are covered in a separate Noise and Blast Management Plan and Air Quality Management Plan.

The Woodlawn Mine has legacy rehabilitation liability and challenging landscapes. Rehabilitation activities covering the original mine site as well as final rehabilitation on completion of the operation, are covered in the Vegetation and Rehabilitation Management Plan (VRMP) as well as the Mining Operations Plan (MOP). An MOP is prepared every 7 years and the last MOP includes a Final Closure Plan. The VRMP and MOP will replicate the rehabilitation methodology, monitoring and verification procedures and final completion criteria.

3.3.3 Rock/Overburden Emplacement

Waste rock will be produced throughout the construction and operational phases of the mine while overburden will predominantly be produced during the construction phase only. Overburden during construction will consist of the box cut and decline material and minor quantities from the processing plant and TSF4 construction areas.

A new waste rock emplacement area will be established for the waste rock generated while constructing the new box cut and decline, which will also be used during the underground mining operations. The approved waste emplacement area will cover a footprint of up to 7 hectares (ha) and will have a maximum storage capacity of approximately 1.06 million m^3. This provides sufficient capacity to cater for the life of mine. Material stored in the waste rock emplacement will be temporary with most being used as for general purposes on site, underground backfill and stabilisation with the remainder being used in final rehabilitation works. The waste emplacement is located on an existing disturbed area near the tailings dams however other temporary sites are available which do not involve land disturbance.

The key environmental issue is the progressive reduction in acid mine drainage at Woodlawn. Effective management of this issue will assist with both final rehabilitation and water management solutions. The operation of the waste rock emplacement is governed by a separate Waste Rock Management Plan which includes consideration of potential acid formation. The operation will have an ongoing need for non-acid forming rock while potentially acid forming material will be separately handled and safely disposed to avoid long term acid mine drainage issues.

3.3.4 Processing Residues and Tailings

Recovery of tailings for retreatment will be based on conventional hydraulic mining methods. After each tailings dam is initially dewatered, a 'slot' of tailings will be removed using excavators and trucks, and the reclaim drainage channels and pumping station will be installed. Mining will then commence using two high pressure water monitors working the crest of the slot, cutting out the face below.

The repulped slurry will flow down the drainage channels to a floating pontoon supporting the reclaim pumps, where the slurry will be pumped to the tailings thickener after passing through a trash screen. Tailings will be thickened to 60% weight to weight (solids to water) before pumping to the pulp storage tanks located at the process plant. Return water from the thickener will be returned to the monitor water supply tanks for re-use in hydraulic mining operations.

The key environmental issues relate to management of surface waters during the reclamation process and final rehabilitation of the completed tailings dams. These are detailed in the Vegetation and Rehabilitation Management Plan and Water Management Plan.

3.3.5 Waste Management

There are five categories of waste produced at the Woodlawn Mine:

- ❒ Recyclable or recoverable waste.
- ❒ Commercial and Industrial solid waste;
- ❒ Hazardous waste;
- ❒ Sewage; and
- ❒ Tailings and process residues.

Recyclable materials will be separated from the normal commercial and industrial wastes. Although limited recycling is available in the area, metals, glass, oils and paper will be

recycled as far as reasonably practicable. General wastes will be disposed in the Bioreactor under agreement with Veolia.

Hazardous waste from the workshop and processing plant will be collected and disposed in licensed facilities which may not include the Bioreactor. The acceptability of waste classes will be determined by Veolia. All materials not suitable will be transported off site and disposed in appropriate licensed facilities.

The main process waste is tailings. A component of the tailings will be used to produce a paste to backfill completed stopes or areas requiring stabilisation underground. Excess tailings will be disposed of in either the existing tailings dams once reprocessed or in the new Tailings Storage Facility 4.

The production, use and management of paste is covered by the Paste Fill Management Plan. This plan includes the manufacture, delivery and long term environmental issues associated with the use of paste fill. The management of tailings ponds and their final rehabilitation is provided in the Vegetation and Rehabilitation Management Plan which includes a separate Tailings Management Strategy.

Potential Acid Forming (PAF) waste rock found in the underground mining areas will be managed in accordance with the Waste Rock Management Plan. Usage and handling of the material will be carefully controlled throughout the mine life to ensure acid generating wastes are controlled and to determine if practical separation of the non-acid forming (NAF) and PAF material can occur. If so, the material will be managed such that suitable acid consuming and/or NAF material surrounds any PAF rock, or the waste rock will be co-deposited with paste fill in the mined out stopes or buried deep within the tailings dams.

3.3.6 Acid Mine Drainage

Due to the geochemistry of the site, the Woodlawn Mine has well a documented historic acid generation issue. The Water Management Plan details measures to be taken to minimise the risk of acid mine drainage impacting off site waterways while the mine is operating. The Vegetation and Rehabilitation Management Plan provides details of rehabilitation methods for all PAF materials including the tailings dams. This work will be further detailed in the Final Closure Plan which will be prepared as part of the last Mining Operations Plan for the site.

The Waste Rock Management Plan includes details of both short and long term management of potential acid forming materials on site. This plan also includes a range of post closure permanent control measures.

3.3.7 Mine Subsidence

Subsidence issues and ongoing management provisions are provided in the Extraction Plan. The underground mine plan does not extend outside land owned by the operation. The proposed underground mining method will reinforce the existing mine access drives and paste fill any significant voids which will increase the stability of the underground mine, relative to current conditions. The underground mine plan also includes an exclusion zone around the existing open cut (Bioreactor) to further mitigate against any potential connectivity that could result in increased water, leachate or gas flows into the

underground mine or other impacts to the surface infrastructure as a result of underground mining.

Ongoing investigations and monitoring will be undertaken throughout the life of the mine, to assess and mitigate against potential underground mining impacts as necessary. As described above, the use of tight paste fill in underground extraction areas will remove the potential for surface subsidence impacts to occur.

3.3.8 Erosion and Sedimentation Control

Erosion and sedimentation controls required for the ongoing operation are included in the Water Management Plan. As the site is controlled by existing drainage provisions and these have been extended to include the new processing plant site. All runoff from the mine site will pass through at least one sedimentation control structure prior to discharge into a sediment control pond. The erosion control measures are designed to safely convey water from disturbed areas, reduce runoff velocity, increase batter and bench stability and reduce solids loading prior to entering the pollution control structures. Surface stability will be improved where possible by the use of temporary and permanent revegetation measures. Erosion control structures will be inspected regularly, particularly after heavy rainfall, and upgraded or repaired where necessary.

All erosion control measures will be maintained in accordance with the principles specified in the "Managing Urban Stormwater: Soils and Construction – 4th Edition", Landcom 2004 (Blue Book).

3.3.9 Flora

The Woodlawn Site is within the South Eastern Highlands Bioregion, and is within an area that has experienced extensive clearing, disturbance due to previous land uses and is fragmented. No threatened ecological communities were identified in the mine area.

The Project Approval requires Heron to establish at least 71 hectares of the Western Tablelands Dry Forest vegetation community within buffer land surrounding the mine. This area has been identified and management provisions detailed in the Vegetation Management Plan component of the Vegetation and Rehabilitation Management Plan.

The proposed biodiversity offset area is significant and by far exceeds current best practice by taking into account the original mine disturbance area rather than just the disturbance required to reopen the mine.

3.3.10 Fauna

With the minimal impact to existing vegetation, the anticipated impact on fauna and fauna habitat is equally minimal. To further minimise the impact on fauna, the Woodlawn Mine includes management measures to address:

- ❒ delineation of development envelopes;
- ❒ pre-clearing survey protocols;
- ❒ implementation of sediment control measures prior to construction;
- ❒ vegetation clearing protocols, including salvage and relocation of suitable dead logs;
- ❒ protection of waterways, and aquatic and riparian habitats;

- ❒ ongoing monitoring of the operations in regard to the mine site's retained habitats, including water quality; and
- ❒ management of weed invasion.

These management measures are further detailed in the Vegetation and Rehabilitation Management Plan, the implementation of which will ensure that potential impact on threatened fauna is minimal.

3.3.11 Aboriginal and Natural Heritage

Based on previous Aboriginal and Heritage surveys, no areas of Aboriginal or European Heritage will be impacted by the mine or its associated activities. A Heritage Management Plan has been prepared and approved by DPE in accordance with the Project Approval which provides appropriate management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site and should any additional items of significance be discovered. No further improvements are considered necessary at this stage.

3.3.12 Operational Noise

The ongoing mine operation will generate noise from its processing operation, hauling of ore from the mine and offsite transportation of product. The Environmental Assessment for the Woodlawn Mine included a detailed noise impact assessment which has been expanded and refined in the Noise and Blasting Management Plan. Although the noise modelling and impact assessment predicted that noise levels would meet the required performance criteria, the Noise and Blasting Management Plan includes ongoing monitoring to verify the impact predictions.

The assessment also considered cumulative noise impacts, incorporating noise generated from other industrial noise sources in the vicinity. Some exceedances were predicted at Veolia-owned properties nearest to the surface facilities site. These impacts will be managed through a negotiated agreement between Veolia and Heron. With the closest private residence, that is, not owned by Veolia being located approximately 6 km away, the risk of noise exceedance or noise nuisance is considered low.

3.3.13 Blasting

Blasting using ANFO and emulsion explosives will be used primarily underground but also during the construction of the box cut. Surface blasting creates both ground vibrations and overpressure while underground blasting impacts solely relate to surface vibration. The key issue for blasting is the potential impact on the Bioreactor operation. These issues are dealt with in both the Extraction Plan and the Noise and Blasting Management Plan.

Given the large buffer around the mine, privately owned residences are unlikely to experience the impacts of blasting. In accordance with the Noise and Blasting Management Plan, Heron will develop blasting methods and monitor blasting impacts to ensure blasting criteria are not exceeded at any privately owned residential receiver.

3.3.14 Water Management

Maintaining effective management of water has been a long standing feature of the mining operations at Woodlawn and remains a key issue in the ongoing operation. Heron has

developed its Water Management Plan for the Woodlawn Mine which largely replicates the existing water management system but with some enhancements and integration with Veolia's operations.

The Water Management Plan includes specific matters in relation to the dewatering of the underground workings and water recycling initiatives. An important component of the Woodlawn Mine is the implementation of a comprehensive water recycling and reuse system in order to meet the government reduced allocation from the Willeroo Borefield. To meet this objective, the Woodlawn mining operation is required to preferentially use water available on site and only use fresh water from the Willeroo Borefield as a last resort.

The water management system at Woodlawn includes an extensive network of clean water contours diverting water away from disturbed areas. The Water Management Plan is designed with flexibility allowing drainage from disturbed areas to be pumped to either the Evaporation Dams or the tailings dams either directly or via other pollution control dams. The Water Management Plan ensures careful management of surface waters is employed to ensure that the site operates with zero discharge of contaminated water. The flexibility has been included in the Environment Protection Licence and the system of water transfers is included in the licence, as provided in Appendix C.

Woodlawn operates under a comprehensive environmental monitoring program designed to verify performance the performance of the water management system and rectify any potential issues as they arise. The monitoring program is contained in a separate Environmental Monitoring Program and shown on Plan 5.

3.3.15 Groundwater Management

Groundwater Management is included in the Water Management Plan. There are two basic components to groundwater management. The first is that groundwater forms and integral part of the water supply system which includes inflows into the underground workings and the Willeroo Borefield. The second component relates to managing any seepage into the groundwater system from mining related activities.

The hydrogeological setting at Woodlawn is well documented following 20 years of open cut and underground mining operations. Historical data provides assurance that there are no adverse impacts on the environment outside the mining lease as a result of the mining operations. There are however small localised impacts associated with some water storages on site and these are closely monitored.

The Willeroo borefield licences have been converted to a single Water Access Licence under the Water Management Act 2000. The groundwater allocation has been set at 600 MLpa which although well below the original allocation of 900 MLpa, is considered sufficient to satisfy future mine dewatering, water supply to the processing plant, tailings reprocessing feed and the ongoing demand from Veolia's Bioreactor.

Water conservation through active recycling forms part of the approved Water Management Plan. Water treatment facilities will be installed to treat contaminated water from the underground and surface water storages to facilitate recycling of water around the site. This includes water generated by the Bioreactor which will also form part of the overall water balance for the mine. Despite these recycling and reuse initiatives, there is

still the potential for shortfalls to occur in extended dry conditions and if this arises, additional water allocation would be purchased on the market.

Heron conduct a comprehensive groundwater quality monitoring program consisting of approximately 50 piezometers around the site. The Water Management Plan discusses the potential for progressive rationalisation of the program and this will be done in consultation with relevant government agencies.

3.3.16 Contamination

Virtually all areas disturbed by past mining have some level of contamination. As the mine involves the retreatment of the tailings material, the largest source of site contamination will be significantly reduced. The rehabilitation program will further isolate any residual sources of contamination thereby reducing the risk of contamination leaving the site.

Fuel and oil stores are required in the operation of mining and reprocessing operations. All fuel and oil stores will be fully bunded. There is no known hydrocarbon contamination within area of Heron's responsibility. Heron have constructed new infrastructure facilities in a separate area outside the Bioreactor. The new infrastructure site includes current best practice hydrocarbon management and containment facilities. Any material collected within these containment facilities are disposed off site or bioremediated on site as considered appropriate.

3.3.17 Hazardous Materials

The ongoing development of the Woodlawn Mine will involve the use of explosives and diesel as well as various reagents used in the processing of the ore and will register these chemicals and activities prior to the commissioning of the processing plant. An inventory of chemicals and processes used during the mining operation will be kept on site at all times and Woodlawn will apply for an Environmentally Hazardous Chemicals Licence if required.

3.3.18 Air Quality Management

The management of dust generation during operations is covered by an Air Quality Management Plan. This plan includes several mitigation strategies and updated modelling and assessment data. These strategies involve:

- ❒ Use of a water cart during construction to wet exposed surfaces during windy conditions or heavy traffic resulting in visible dust lift off.
- ❒ Limiting the site disturbance during the construction phase to only that required at any one time.
- ❒ Once final batters are completed, temporary revegetation works will be undertaken to stabilise the exposed surface or batter.
- ❒ Clearly defining haul roads and limiting the number of trafficable routes over unsealed surfaces.
- ❒ Imposing speed limits on unsealed surfaces for light vehicles.
- ❒ Rehabilitation of exposed areas as soon as practicable.

The plan requires Heron to take all reasonable and feasible measures to minimise dust in order to meet the project approval assessment criteria for dust emissions. An exceedance of any of these criteria constitutes an air quality incident.

3.3.19 Transportation Management

A Transport Management Plan, including Road Transport Protocol forms a component plan of this EMS. This plan covers the following key management issues:

- ❒ Heavy vehicle speed around the site and access road;
- ❒ Driver fatigue and compliance with the National Heavy Vehicle Accreditation Scheme;
- ❒ Heavy vehicle control and driver behaviour, particularly through Tarago and Lake Bathurst townships;
- ❒ Transport of dangerous goods and adherence to the Australian Code for the Transport of Dangerous Goods by Road and Rail;
- ❒ Load covering and containment;
- ❒ Truck dispatch rules including avoiding congestion with peak Velia truck movements and generally limiting truck dispatch to one movement per hour;
- ❒ Vehicle cleanliness and mechanical compliance;
- ❒ Interaction with school buses and adherence to speed restricted school zones.

The plan requires Heron to undertake random compliance audits with at least two per 12 month period over the first 24 months following first concentrate shipment. The audits will include inspection of paperwork covering appropriate transport approvals, dangerous goods compliance and vehicle inspections.

3.3.20 Bushfire Management

Under the *Rural Fires Act 1997,* there are a number of obligations that must be met with respect to managing the land. In summary, these include:

- ❒ Occupiers of land are to extinguish fires or notify fire fighting authorities immediately; and

- ❒ It is the duty of the owner or occupier of land to take practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from that land.

The following measures will be employed at the site to ensure that these obligations under the Rural Fires Act are met:

- ❒ Water storages on site will be available for fighting purposes if required. This will include on site dams and water tanks.
- ❒ Firebreaks will be constructed as appropriate.
- ❒ The amount of dead timber on site will be kept to minimum to reduce the fire hazard.
- ❒ Fire fighting equipment will be placed at strategic stationary positions.

The Rural Fire Service (Taylor's Creek) houses a truck on the adjacent Pylara property and Tarago Fire Service is also within 10 kilometres of the site. The proposed measures are considered appropriate at this stage and no additional improvements are considered necessary.

3.3.21 Visual and Stray Light

The site is well located from a visual perspective, with the nearest non-Veolia owned residence being 6km away. The operation of the site will occur 24 hours per day 7 days per week but over a small footprint and therefore extensive use of lighting will not be required. No further improvements are considered necessary at this stage.

3.3.22 Public Safety

A Public Safety Management Plan is included in the Extraction Plan for the mine. The mine property is currently fenced, and a lockable gate has been installed at the entrance. Warning signs have been erected on the fences on all sides of the mine and Heron will put in place any additional controls as considered appropriate to prevent unauthorised access to the public for the newly established facilities. Only authorised vehicles are permitted on either the mine site or Bioreactor premises. All visitors to the site will undergo a safety induction and be escorted at all times by Heron personnel.

3.4 Environmental Incidents and Emergencies

Conditions 1(e) and 7 of Schedule 6 requires Heron to describe the procedures that would be implemented to respond to emergencies and incidents.

3.4.1 Emergency Response Procedures

An Environmental Emergency is defined as any incident that has, or has the potential to, cause harm to the environment outside the pollution control systems operating on site. This may include, but not limited to:

- The release of untreated mine water off site.
- The release or spillage of tailings off site.
- A spill of chemicals on site which is unlikely to be contained by existing pollution controls.
- The release of fumes, dust or odour into the atmosphere in contravention of any conditions of the Environment Protection Licence.
- Fire.

In accordance with the Pollution Incident Response Plan described in Section 4.7, in the event of a defined emergency specific notification procedures will apply. This includes government agencies and surrounding community.

3.4.2 Environmental Incidents

Environmental incidents are defined in three categories as described below.

Category 1 is the same as defined under Environmental Emergencies. These incidents have a reasonable likelihood to have caused off site environmental harm and the

procedures for corrective action and reporting are described in Section 5.3 and as contained in the Pollution Incident Response Management Plan. The actions are generally summarised as stop, contain followed by clean-up of the pollution. All Category 1 incidents are to be reported to the Department of Planning and Environment and other relevant agencies as soon as practicable. A report detailing the event, mitigation and notification activities is to be provided within 7 days of the incident.

Category 2 is an incident involving failure of an internal pollution control or containment system that has a reasonable likelihood to give rise to environmental harm off site. Any incident which requires clean-up or mitigation to reduce the risk of off site harm falls within this category. All Category 2 incidents are to be reported to the Department of Planning and Environment and other relevant agencies as soon as practicable. A report detailing the event, mitigation and notification activities is to be provided within 7 days of the incident.

Category 3 is a procedural or systems failure which is unlikely to cause environmental harm. These can range from procedural non-compliances to minor spills that are fully contained within existing pollution controls. These will be reported in the Annual Review.

4. Stakeholder Communication

Ongoing government authority and community consultation has been maintained as part of the re-opening of the mine. Heron is committed to continue this consultation work with key government and community stakeholders.

4.1 Community Involvement

The Woodlawn Community Engagement Plan sets out a range of initiatives to keep the local community informed of the activities on site. Central to this plan is the Community Consultative Committee (CCC) which consists of an Independent Chair, representative from Goulburn Mulwaree Council and four community members. Invited observers to the meetings can include representatives from Veolia and other community organisations. The committee meets up to four times per year and is designed to keep the community informed about the operation and environmental performance of the mine. The minutes are published on Heron's web page.

Details are provided at these meetings on a number of specific studies that are being undertaken in relation to the reopening of the underground mine including:

- mine dewatering;
- surface and groundwater water quality;
- geotechnical and subsidence studies;
- groundwater and dam integrity investigations; and
- details of the various environmental management plans.

This committee acts as an interface between the residents of Tarago and surrounding communities and the operations on site. This committee has been involved in all previous planning developments at the site and is familiar with the Bioreactor, Mechanical Biological Treatment Facility and Windfarm. Some members are also aware of the original mining operation on site and are therefore well aware of the environmental and social issues relating to the site.

A large number of stakeholders and members of the community have been involved in consultation activities to date, including:

- Woodlawn Bioreactor (Veolia);
- Woodlawn Windfarm (Infigen);
- Department of Planning and Environment - Resources and Geoscience (DRG);
- Department of Planning and Environment (DPE);
- Office of Environment and Heritage (OEH);
- Environment Protection Authority (EPA);
- Goulburn Mulwaree Council;
- Queanbeyan-Palerang Regional Council;
- Water NSW (Sydney Catchment Authority);
- Department of Primary Industries - Water (DPI-Water);
- NSW Roads and Maritime Services (RMS);
- Tarago Progress Association and open community forums; and
- Individual neighbouring land owners.

Meetings with the CCC will be ongoing which will include progress on the construction activities, monitoring outcomes and local employment initiatives.

4.2 Community Complaints

As required by the Project Approval and Environment Protection Licence, the Woodlawn Mine will maintain a community complaint register that identifies actions required to resolve community issues. The main phone line will be advertised in the white pages and will be used as the designated community complaints line. The complaints register will record the following details:

- ❒ Complainant name and contact details.
- ❒ Nature of the complaint (noise, dust, traffic etc).
- ❒ Time and date of the complaint.
- ❒ Specifics of the complaint.
- ❒ Actions taken to resolve the complaint.
- ❒ Confirmation that the complaint has been resolved.

In the event that an issue is unresolved, the register will include details of the outstanding issues and any actions that are required. It is recognised that some issues may not have a simple resolution and have resulted in multiple complaints. These form part of the ongoing environmental improvement program for the operation.

Co-ordination between Veolia and Tarago Operations will be necessary to avoid duplication of effort but more importantly inadvertent identification of complaints between the two operators on site.

The complaints register is published on Heron's web page at the following link: http://www.heronresources.com.au/woodlawn-community.php

4.3 Community Dispute Resolution

Heron is committed to resolving disputes in a respectful, courteous and professional manner. Heron recognises the importance of gaining and maintaining a social licence to operate which requires the ongoing support of the community. Should a dispute arise, the following procedures will be followed:

- ❒ Initiate a face to face meeting with the complainant;
- ❒ Provide additional information to assist with determining the extent of any impact, including perceived or esoteric effects;
- ❒ Seek independent assistance if necessary.

Should a resolution of the dispute cannot be found, Heron will accept the Secretary of DPE to be the final arbiter in the dispute.

4.4 Government Liaison

Government stakeholders have been involved throughout the approval process and environmental management plan development. Liaison with specific authorities in relation to each environmental management plan were listed in the Project Approval. Consultation

logs were kept and are included in each management plan. Final versions of the management plans are issued following receipt of approval by DPE. The plans will be re-issued if they are subsequently modified. All final plans are hosted on Heron's web page.

4.5 Consultation with Veolia

Veolia Environmental Services (Veolia) are the single key stakeholder relevant to the Woodlawn Mine. They own and operate the Bioreactor located within the old open cut mine void and associated dewatering and gas extraction infrastructure. Veolia's leachate management system utilises Evaporation Dam 3 (ED3) and a portion of Evaporation Dam 1 (ED1). The existing and future underground workings lie beneath a small portion of these dams.

Heron and Veolia have entered into a Cooperation Agreement. This agreement recognises that there are opportunities for mutual benefit with the respective operations. One notable benefit is the ore processing plant's water demand can be partially offset by the excess water generated by the Bioreactor. The agreement establishes an internal committee comprising representatives of the two organisations which meets at least fortnightly. The role of the committee is to:

- disseminate information such as monitoring data and updates on operational activities;
- resolve conflicts in a cooperative and proactive manner;
- develop strategies for mutual benefit such as water recycling, ongoing use of compost for mine rehabilitation and synergies with earthmoving activities;
- raise issues on the rights and responsibilities of each party.

4.6 Consultation with Infigen

Infigen own and operate the Woodlawn Wind Farm which includes 23 turbines, 11 of which are located on the ridgeline within SML20. Consultation with Infigen occurred during the environmental approvals process, establishing separate environment protection licenses and continues with the development of the underground mine plan. Although the wind turbines are not directly impacted by the Woodlawn Mine, Heron will continue to liaise with Infigen on an as needed basis throughout the life of the mine.

4.7 Pollution Incident Response Management

The Pollution Incident Response Management Plan (PIRMP) includes specific consultation and notification obligations. The PIRMP describes:

- Existing controls to prevent pollution incidents;
- Incident response actions to mitigate potential incidents;
- Immediate reporting of pollution incidents to relevant statutory authorities;
- Maintaining communications with Appropriate Regulatory Authorities during incident response;
- Reporting of incidents to stakeholders including local communities; and
- Site specific roles and responsibilities in incident response and reporting.

The PIRMP provides notification procedures as required by the POEO Act and the (POEO(G) Regulation). These include:

- Compulsory Notifications covering the EPA, NSW Fire and Rescue, WorkCover, Sydney South West Public Health Unit and Council.
- Other Agencies as relevant including Sydney Catchment Authority, Mines Rescue, Bushfire Control Office, Roads and Maritime Services, NSW Office of Water, Poisons Information Centre and utilities.
- In case of pollution incidents or bushfire that may potentially pose a threat to health or safety of the neighbours the nearby residents will be notified. A contact list is maintained by the mine but notifications will also be made by door knocking as necessary.

5. Verification and Corrective Action

An essential component of the EMS is verification and implementation of corrective actions as required to achieve the requirements of the Project Approval and Environment Protection Licence (EPL).

5.1 Environmental Monitoring

Woodlawn Mine has established and documented procedures to monitor and measure on a regular basis the environmental impact of its operations. These are included in the Environmental Monitoring Plan.

Records of all environmental monitoring and results are kept on site and made readily available. Environmental monitoring is used to check the performance of the operation with regulatory standards and planning initiatives.

The type, location and frequency of monitoring is determined largely by the statutory monitoring required under the Environment Protection Licence and Project Approval, however additional monitoring will be undertaken as part of specific projects or as part of compliance auditing. The Environmental Monitoring Plan includes the current monitoring program outside the Bioreactor area, the commitments made in the EA and Environment Protection Licence. These commitments are summarised in the following sections.

5.1.1 Groundwater Monitoring

Woodlawn Mine maintains approximately 50 groundwater monitoring bores around the site. These are used to monitor groundwater quality and static water levels and located at strategic sites to allow an assessment of any impacts on groundwater quality. Under the approved Water Management Plan, the groundwater monitoring program will be progressively rationalised to better target potential impacts. This rationalisation will include additional piezometer installations as well as removal of duplicate sites. The key groundwater monitoring sites are:

- MB2, MB3 and MB10 which lie in the Crisps Creek Catchment downstream from ED1.
- MB4 and MB8 which lie upslope and downslope respectively from the processing plant site in Hickory's Paddock.
- F1 which is located downstream of the main dam wall of TDS.
- X2 which lies downstream of TDS eastern dam wall of TDS.
- ETP8 which lies downstream of TDN on the eastern side.
- An additional site downstream of the new TSF4.
- MB6 which is located adjacent to the paste fill plant and new mine entry.
- MB15 which is located on the western side of the Rehabilitated Waste Rock Dump.
- MB13 which is located on the western side of SML20 in Allianoyonyiga Creek.
- Water levels within the underground workings.

By continuing to measure water levels in the above bores, the impact on regional groundwater levels can be determined. This will continue to provide information on the potential to impact on groundwater supplies to neighbouring properties. The data collected is reported within the Annual Review.

5.1.2 Surface Water Monitoring

The current surface water monitoring program commenced in 1996 as part of the original mining operation. This program is now being shared between Heron and Veolia under separate Environment Protection Licences. Given the length of the program, there is a large database currently available which has proved valuable in the assessment of potential impacts of the mine.

There are two components to the surface monitoring program. The first represents the sites nominated in the Woodlawn Mine EPL20821. The second component includes historical sites such as the various dam storages. As the site does not discharge water, the quality contained in the onsite dams are only used for internal purposes such as determining treatment requirements.

There are four critical surface water monitoring sites. These are listed on the EPL and provide data on the environmental performance of the mine.

Table 1 - EPL20821 Surface Water Monitoring Sites

EPL Site Identification Number	Location Description
6	Site 115 - Allianoyonyiga Creek
7	Site 105 - Crisps Creek
8	Site 100 – Woodlawn / Willeroo boundary
9	Site 109 – Pylara boundary
10	Site 300 – process plant pollution control dam

Other key surface water monitoring sites include the Evaporation Dams, Tailings Dams, Waste Rock Dam and Plant Collection Dam. Monitoring is generally undertaken on a quarterly basis and include a range of physical and chemical properties. All data collected is reported in the Annual Review which includes an analysis of trends and discussion on any potential consequences of the data.

5.1.3 Dust Monitoring

Dust monitoring has been undertaken at Woodlawn for several years. There are currently four dust deposition gauges associated with the mining operation, these are referred to as DG22 on the eastern side of the void, DG24 on the western side of the void, DG28 located at Pylara and DG33 located on the south east side of the site adjacent to the Rehabilitated Waste Dump as shown on Plan 6.

DG33 was installed as part of Veolia's MBT Plant and added to EPL 20821 at the end of 2017. Two High Volume Air Samplers were installed at Pylara in 2017 to measure atmospheric concentrations of Total Suspended Particulates per cubic metre of air and the PM_{10} fraction, that is, 10 micron component in each cubic metre of air.

Sampling and analysis of dust deposition is carried out in accordance with Australian Standard AS2724.1 Ambient Air - Particulate Matter. Monitoring is conducted monthly and results are recorded as total dissolved solids analysed according to Australian Standard AS3580.10.1 – Methods for sampling and analysis of ambient air. Any identified exceedances of dust performance criteria will be reported to the EPA and DPE while all monitoring results will be reported in the Annual Review.

In accordance with the Environmental Monitoring Plan, the dust monitoring program will be reviewed on an annual basis and modified if required. The most recent review in early 2018 identified the need for an additional two dust monitoring locations which will be the subject of a modification to the EPL.

5.1.4 Noise and Blast Monitoring

Attended noise monitoring is undertaken at Pylara on a monthly basis during the construction program. Noise monitoring will continue quarterly once the new processing plant is commissioned.

A noise audit will be conducted 12 months following completion of the processing plant or when Heron believes that all mining and processing activities are being conducted. The purpose of the audit is to verify the impact predictions made in the 2011 Environmental Assessment for the mine. This audit will be undertaken by an external noise consultant and the results provided in the Annual Review. Should noise exceedances be identified then the DPE and EPA will be informed and additional attenuation measures will be employed.

Although limited surface blasting is anticipated, each blast will be monitored for ground vibration and overpressure. The key locations include Pylara, the MBT Plant and Bioreactor. Underground blasting will be monitored for ground vibration, primarily within the Bioreactor. The results will be provided to Veolia on a monthly basis and also contained in the Annual Review.

5.1.5 Subsidence Monitoring

Subsidence issues have been addressed in the Extraction Plan. The Extraction Plan contains six separate management plans covering specific issues detailed in the DPE Extraction Plan Guidelines. As the surface expression of the underground workings do not extend outside the infrastructure footprint of the mine, there are no aspects of the biophysical or cultural heritage environment remaining above the mine workings. There is also no privately owned land or public infrastructure located above the mine workings.

Although measurable subsidence caused by mining is not anticipated, the mine features that will require monitoring include the ED1 and ED3 dam walls and the Bioreactor (open cut void. Monitoring activities relevant to underground mining and subsidence will include:

- ❒ Survey control GPS monitoring stations located at each evaporation dam wall. Data collected quarterly commencing one month before stope development.
- ❒ Survey control GPS monitoring stations located within the Bioreactor in consultation with Veolia. Data collected quarterly commencing one month before stope development.

- ❒ Groundwater monitoring around each evaporation dam with samples collected quarterly. Samples analysed for leachate indicators including Ammonia and Total Organic Carbon.
- ❒ Monitoring of water inflows into the mine workings to determine source.

Environmental inspections of the surface features above the underground mining area will occur on a monthly basis. The inspections will report on any detected ground movement, deformation or surface cracking. Any indicators of surface movement will be investigated and the results published in the Annual Review.

5.1.6 Rehabilitation Monitoring

Details of the rehabilitation program and final rehabilitation are provided in the approved Mining Operations Plan and the Vegetation and Rehabilitation Management Plan.

A rehabilitation monitoring program involving Landscape Function Analysis (LFA) or similar will be developed for the Woodlawn Mine. The EFA methodology created indices based on simple field indicators that reflect the measured variables of stability, water infiltration and nutrient cycling in turn monitoring the functional status of the landscape. The methodology used does not replace the traditional methods of monitoring vegetation and fauna, but adds a functional interpretation to link vegetation structure and organisation more closely with soil function and the development of habitat for native fauna.

The Project Approval requires the establishment of a vegetation offset area comprising 71 ha of revegetation within the overall site. This area basically surrounds the mine site and facilities and will consist largely of Hickory Wattle Low Open Forest and native grassland. There are only small patches of this community in the local area as most has been highly disturbed by agricultural activities. The EFA monitoring program will include the remaining small patches of this community.

5.1.7 Transportation Monitoring

In accordance with the Transportation Management Plan, the following data will be recorded:

- ❒ Records of heavy vehicle deliveries during the construction and operational phases.
- ❒ Volumes of concentrate leaving the site on at least a monthly basis for reporting purposes.
- ❒ Weighbridge records.
- ❒ Records of truck driver training and inductions.

A summary of the data, including any transport related complaints, will be reported each year in the Annual Review.

5.2 Reporting Procedures

All environmental monitoring requirements specified in EPA licences and approvals will be undertaken and all data kept on site. Copies are provided to the Mine Manager, who in consultation with the site Environmental Officer, reviews the data monthly. A summary of the data is provided to regulatory authorities as required by statutory approvals. Other

data collected as part of projects or auditing procedures are reported internally in accordance with the EMS verification procedures.

An Annual Review will be provided to relevant government departments and will report on the environmental management of the site, provide results of monitoring data, the rate and success of rehabilitation during the reporting period, and planned works for the coming year. The Annual Review is an important tool for measuring and documenting the success and implementation of the commitments and planning made in the MOP, Environmental Management Plans, the 2011 Environmental Assessment, Modifications 1 and 2 and Project Approval.

The Annual Review will be provided to the following agencies:

- Department of Planning and Environment – Division of Resources and Geoscience;
- Department of Planning and Environment;
- Water NSW;
- Goulburn Mulwaree Council and Queanbeyan-Palerang Regional Council;
- NSW Department of Primary Industries - Water;
- NSW Office of Environment and Heritage;
- NSW Environment Protection Authority, and
- NSW Roads and Maritime Services.

Specifically, the Annual Review will provide an analysis of the environmental monitoring data collected during the reporting period and compare these with the stated objectives and targets. This will include:

- Surface and groundwater monitoring results;
- Air and noise monitoring;
- Subsidence monitoring;
- Results of rehabilitation trials and vegetation monitoring;
- Threatened Flora and Fauna, weeds and pests;
- Material transport, processing and production; and
- Details of complaints and results of community liaison.

An annual meeting will be held with key government stakeholders to discuss the contents of the Annual Review. This meeting will usually occur within three months of completion and distribution of the Annual Review.

5.3 Non-Conformance, Corrective Action and Adaptive Management

Responsibility for identifying non-conformances will rest with a number of personnel to ensure that any non-conformances are identified as soon as possible. Primary responsibility rests with the Mine Manager who is supported by the Environmental Officer. All non-conformances are reported to the Mine Manager in the first instance and then to the General Manager for action. Environmental incidents are defined by three categories as detailed in Section 3.4. Category 1 and 2 incidents require reporting to DPE and other relevant government agencies as soon as practicable and a detailed report provided within 7 days of the incident.

Corrective actions will be implemented as soon as practicable on identification of any non-conformances, and records of such are to be maintained. As soon as practicable is

defined as 24 hours for first internal notifications which will be followed up by a work scope with a defined timetable for implementation. The ultimate timetable for implementation of any corrective actions will be dependent on their scale and complexity. Corrective actions are to be in line with Heron's environmental policy and current best practice within the industry and ensure that appropriate guidelines are met.

As part of the Project Approval conditions, corrective action will be form part of the Adaptive Management process where any exceedance of the criteria and/or performance measures has occurred.

In such cases, Woodlawn Mine will at the earliest opportunity:

- ❒ take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- ❒ consider all reasonable and feasible options for remediation (where relevant) and submit a report to the DPE and EPA describing those options and any preferred remediation measures or other course of action; and
- ❒ implement remediation measures as directed by the Secretary of DPE.

5.4 Preventative Action Procedures

Preventative action will consist predominantly of monthly inspections undertaken by the on site Environmental Officer as well as external audits required under the Project Approval. Inspections will also occur following rain events greater than 25 mm in 24 hours. This additional inspection will centre on erosion and sedimentation controls, ponds and rehabilitation areas. Steps will be taken to ensure that any potential non-conformances do not occur. Any preventative actions will be commensurate with the environmental impact anticipated.

Any changes in procedures resulting from corrective and preventive action will be documented and the appropriate personnel notified, including Heron's management team.

5.5 Record Keeping

Records are kept of all environmental monitoring, audits and actions taken under the EMS. Records will be legible, identifiable and traceable to the activity and stored and maintained so that they are readily retrievable and protected against damage, deterioration or loss.

5.6 Auditing Procedures

The Project Approval requires that an independent environmental audit be undertaken within one year of commencing construction of the mine facilities, and every three years thereafter for the life of the mine. Separate internal audits may be carried out as part of any specific project or activity, or to assess the effectiveness of existing environmental controls and procedures. These audits may be formal or informal and aim to highlight any areas for improvement in environmental risk control.

The independent audit carried out in accordance with the Project Approval must:

- be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
- include consultation with the relevant agencies;
- assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);
- review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
- recommend appropriate measures or actions to improve the environmental performance and rehabilitation of the project while on care and maintenance or following mine closure.

An annual internal audit of the EMS will also be undertaken to ensure that it conforms with planned arrangements for environmental management and the requirements of the Project Approval, Environment Protection Licence, and that the system has been properly implemented and maintained. Outcomes of the audit will be used to review and update the EMS.

5.7 Management Review

The purpose of management review of the EMS is to identify any weaknesses or out of date procedures. The aim is to maintain the EMS in line with current industry and Australian standards and changes to environmental legislation.

Management will review the EMS on an annual basis. The management review process will ensure that the necessary information is collected to allow management to carry out this evaluation and the review document.

The management review should address the possible need for changes to policy, objectives and other elements of the environmental management system, in light of environmental management system audit results, changing circumstances and the commitment to continual improvement.

5.8 Continuous Improvements

A key component of the EMS is the commitment to continuous improvement. This will be measured by formal and informal criteria. Formal measures will include internal and external inspection and action plans. These reports will be used to establish trends in environmental performance. The level of performance with both statutory and company standards will then be summarised in the Annual Report.

The auditing will also provide an assessment of housekeeping and general environmental awareness of the operation, how the site has adopted new technology, maintenance of pollution control systems, preventative actions, community consultation and responded to incidents and corrective action plans. This information will be used to provide a general trend in environmental performance.

5.9 Trials and Research

Rehabilitation of the Woodlawn Mine will require specialised techniques. There have been several trials undertaken which has resulted in the formulation of the current method contained in the Vegetation and Rehabilitation Management Plan as well as the current MOP. Previous methods have included commercial products such as Promac, the use of biosolids and construction of various capping materials to produce capillary breaks to protect the overlying growing media.

The proposed method builds on this earlier work and involves a multi-layer media using compost sourced from Veolia's Mechanical Biological Treatment Plant. Details of the method is provided in the Vegetation and Rehabilitation Management Plan, which will first involve a series of trials before using on a larger scale over the completed reprocessed tailings dams. The results of the trials will be presented in each Annual Review.

5.10 Trigger Action Response Plan

An important component of this Environmental Management Strategy is the development of effective Trigger Action Response Plans (TARPs), to allow early detection of events and actions that may result in material harm to the environment, the mining operation or people. The level of likely impact that may result from the trigger being activated is assessed on a progressive scale which will influence the type of response action proposed. An initial set of TARPs have been developed within each environmental management plan under this EMS. These TARPs will be reviewed and refined on an annual basis for each environmental aspect.

Appendix A - Plans

Appendix B – Project Approval

Appendix C – Environment Protection Licence