8.0 Environmental Management

This section compiles the mitigation measures identified in relation to the specific impacts identified in **Sections 5, 6** and **7** of this EA. It also outlines the draft monitoring requirements for the proposed facility. These will form the basis of an Environmental Management Plan which will be developed for construction and operation of the SAWT-BIOWISE facility.

SITA is committed to implementing the environmental mitigation measures, for construction and operation of the SAWT-BIOWISE facility, identified in **Sections 5** to **7** of this EA and summarised in **Table 8.1** and **8.2**. These mitigation measures represent commitments by SITA and will be implemented if the project is approved. The location, layout and design of the SAWT-BIOWISE facility is described in detail in **Sections 1** and **4** of this EA.

Table 8.1: Summary of Environmental Management – Construction Phase

Type of Impact (EA Section)	Construction Phase Mitigation Measures
General	• Prepare a Construction Environmental Management Plan before commencement of works; and • All staff and contractors to undergo environmental induction before working on site.
Waste Management	• Minimise amount of packaging brought to site; and • Provide bins for collection of construction waste for transfer to an appropriate location off-site.
Groundwater	• All drainage paths will be designed to prevent ponding and infiltration into the groundwater as a result of standing water.
Erosion and Sediment Control	• Truck wheel wash to be located near site gate to minimise sediment tracking from the exit onto Elizabeth Drive; • Install diversion banks to divert clean water around exposed areas; • Install temporary eofabrics sediment down slope of disturbed areas where there is the potential for runoff to enter Badgerys Creek; • Use sedimentation ponds with silt mesh in appropriate locations; • Regular inspection of the work site will be undertaken during construction activities to ensure that the surface water management plan is properly implemented and maintained; • Implement regular maintenance of installed sediment & pollution controls including: - Silt traps and barriers; - Sedimentation basins; - Diversion bunds and stormwater drains; and - Revegetated areas. • Train staff and subcontractors to report, repair and maintain erosion and sediment control devices; • Do not locate temporary stockpiles adjacent to drainage lines; • Limit vegetation clearance and soil disturbance to areas required for construction; • Revegetate disturbed areas (where practicable) immediately after completion of works in that area; and • In the event that unexpected contaminated material is disturbed during earthworks, implement controls to divert surface runoff; remove the material from the Site and dispose of at an approved site.

Type of Impact (EA Section)	Construction Phase Mitigation Measures
Dust	• Dust suppression of unsealed work areas and stockpiles using a water truck; • Remove mud from vehicles, using a wheel wash, before leaving the Elizabeth Drive Site, where necessary; • Clean up materials that act as dust sources, as soon as possible; and • Enforce Elizabeth Drive Site speed limits for trucks.
Noise	• Do not operate construction machinery outside of permitted hours.
Flooding and Hydrology	• During detailed design, ensure that all facilities and roads are elevated above the 1:100 year flood event or design the building to prevent ingress of water into the buildings during the 1:100 year flood event.
Flora and Fauna	• Ensure minimal clearing of disturbed areas; • Clearly mark clearing limits and fence prior to construction to prevent accidental impacts to adjacent vegetation; • No heavy machinery permitted outside of clearing limits; and • No building materials (including spoil mounds) to be stored or placed outside of clearing limits.
Aboriginal Heritage	• Riparian precinct to remain fenced and padlocked to prevent contractors from entering the KC/1 vicinity and exclude storage, building rubble and spoil materials; and • Should any Aboriginal archaeological relics, deposits or sites be located or exposed during works, works will cease immediately and DECC will be contacted to confirm a course of action.
Visual Amenity	• Minimise the amount of light spill by selecting suitable security lighting for use around facilities and hardstands. Consideration will be given to use of directional lights that limit light spill. Mobile equipment will be fitted with headlights to be used instead of permanent lighting masts, where feasible; and • Select neutral colours and design of façade and materials of buildings to fit in with landscape.
Landscape	• Plant recommended native species along northern fence line of site; and • Design buildings to sit at an elevation as low as practicable on the SAWT-BIOWISE Site, without compromising flood protection or drainage design.
Hazard and Risks	• Implement standard fuel and oil handling procedures; • Use bunded fuel storage and equipment maintenance area; • Immediate isolation of spill area and use of emergency cleanup kit; and • Call emergency services if spill uncontrollable or hazardous.
Health and Safety	• Health and safety work method statements to be completed and explained to all staff and contractors before working on site commences; • Personal Protective Equipment, such as hard hats, steel capped boots, eye protection, ear mufflers and protective clothing, to be worn by all staff and contractors as required by relevant OH&S requirements; and • All staff and contractors to undergo health and safety induction before working on site.

Table 8.2: Summary of Environmental Management – Operation

Type of Impact (EA Section)	Operational Mitigation Measures
Erosion and Sediment Control	• Implement regular maintenance of installed sediment & pollution controls including: - Silt traps and barriers; - Sedimentation basins; - Diversion bunds and stormwater drains; and - Revegetated areas. • Train staff and subcontractors to report, repair and maintain erosion and sediment control devices.
Groundwater Pollution	• Solid waste will be handled only in an enclosed building with a sealed working surface to limit the generation of leachate; • Composting will occur only in specifically designed composting tunnels and biocells, within an enclosed building. Condensate from composting tunnels and biocells will be recycled in the composting process, which will prevent leachate discharge to other parts of the SAWT-BIOWISE facility; and • Maturation will be carried out on a specifically designed hardstand area that will have a suitably low permeability working surface in order to prevent infiltration of leachate into the groundwater. Any leachate from the maturation pads will be drained to the leachate pond for preferential re-use.
Surface Water	Stormwater generated upstream of the proposed SAWT-BIOWISE facility will be diverted around the facility and stored in either the existing North-Western Sedimentation Pond or the proposed new Sedimentation Pond B. Water from these sedimentation ponds will be used for operational purposes such as use in the composting process, irrigation, dust suppression and fire fighting. These sedimentation ponds will be used to remove coarse particulates from runoff prior use on-site or discharge via overland flow. • Condensate leachate generated within biocells and composting tunnels will be completely re-used in the composting process; • Leachate generated inside buildings will drain (via sealed working surfaces) into sealed concrete sumps and re-used within the composting process; • Leachate, from the SAWT-BIOWISE facility, including the outdoor hardstand and Maturation pads, will be treated in the Leachate Pond prior to being directed via a series of open grassed drains into Sedimentation Pond A; • Leachate will be treated in the Leachate Pond to enable storage for the short to medium term; • Treated leachate will be stored in Sedimentation Pond A, which will be capable of holding the expected runoff from a 1 in 10 year, 24 hour duration storm event (DECC *Composting Guidelines*); • Treated stormwater and leachate will be reused in the composting process at both the composting tunnels, biocells and maturation pads; • Under controlled conditions, any excess leachate will be pumped and re-injected into the Landfill or used for irrigation; • Untreated leachate will not be discharged to Badgerys Creek; and • Regular visual inspections of water height in the sedimentation ponds.

Type of Impact (EA Section)	Operational Mitigation Measures
Leachate	• Leachate storage and treatment ponds and stormwater storage ponds will be lined with a low permeability liner to control infiltration into groundwater; • Detailed design of hard surfaces around composting operations directing stormwater runoff into a control pond; • Detailed design of hard surfaces around Maturation Pad, Biocells, composting tunnels and leachate treatment equipment directing leachate runoff into leachate storage pond; • Regular visual inspections of water height in the Leachate Pond; • Regular maintenance of leachate handling infrastructure; • Treatment of first flush storm leachate to reduce Biological Oxygen Demand; • Preferential reuse of leachate in SAWT-BIOWISE process over 'clean' stormwater from the whole site; • To provide additional storage for leachate from the Maturation Pads, if required, the stormwater contained within Sedimentation Pond B can be pumped out into nearby Badgerys Creek; and • Re-injection of excess leachate into solid waste landfill during extended or heavy wet weather periods.
Flora and Fauna	• Restrict access to the area of Badgerys Creek Riparian Community, adjacent to the SAWT-BIOWISE Site, to SITA staff for the purposes of vegetation management and environmental monitoring only; • Implement rehabilitation works and maintenance of revegetated areas; • Continue active program of weed management on-site; and • Use non-residual herbicides when needed to control weeds.
Waste Transport and Receival	• Transportation of waste to the SAWT-BIOWISE facility will generally occur in enclosed vehicles to avoid leakage and spillage onto roads; • Compost and recyclables exiting the SAWT-BIOWISE facility will be transported in vehicles that comply with RTA requirements; • Appropriate authorisation from NSW Agriculture will be obtained if there is potential for grape vine material to enter the waste stream, in regard to transfer of waste to and from *Phylloxera* exclusion zones to the Site; • As far as possible sort waste on the same day as arrival at SAWT-BIOWISE facility; and • Up to 2 days supply of waste can be stored in the Receival Building before waste will be diverted to another facility licensed to receive it. Maximum storage time of unsorted waste inside SAWT-BIOWISE facility is 3 days in the case of emergency breakdown of critical equipment.
Pest and Vermin Control	• Untreated waste, other than green waste, will be kept in enclosed buildings prior to transfer to biocells or composting tunnels; • The site will be securely fenced to prevent access by nuisance animals; and • Treatment of insect infestations with appropriate biodegradable pesticide best practice management of the composting process.
Health and Safety	Revise SITA Health and Safety Management System to minimise risks to the workers from the material arriving at the proposed SAWT-BIOWISE facility. Procedures will include: • Staff training prior to the commencement of work under workforce supervision; • Use of gloves by all workers at all times to avoid transferring material and potentially pathogenic material from hand to mouth; • Compulsory use of washing facilities prior to meal breaks and before leaving the

Type of Impact (EA Section)	Operational Mitigation Measures
	SAWT-BIOWISE Site; • Use of facemasks as necessary by staff when working outside rooms with forced ventilation and air-conditioned mobile plant machinery cabins; • Use of protective clothing such as overalls; • Worker health checks and monitoring; • Safe work procedures; • Hearing protection in certain areas of the SAWT-BIOWISE facility, as required; • Mechanical waste handling equipment (such as front-end loaders) will be provided in the Receival Building, the Resource Recovery Building and for processes associated with the composting tunnels, biocells and the Maturation Pad; • Loaders to have air-conditioned cabins that provide filtered air to the driver; • Discharge biosolids into a sealed tank/pit to avoid human contact; • Provision of especially designed air-conditioned rooms that incorporate air-conditioned ducting systems that provide fresh air onto the faces of workers in the Resource Recovery Room; and • Design conveyor width to minimise heavy lifting and associated strain injuries or other movements that could result in workers getting too close to waste feedstock.
Odour	• All processes except for green waste shredding and compost maturation will be carried out in fully enclosed buildings under negative air pressure. Note: the refining building will not be under negative air pressure; • Buildings will be equipped with rapid closing roller doors to contain odour. During non-peak operation time the roller doors in the Receival Building will be closed; • Composting will take place in the fully enclosed composting tunnels or biocells which are located within the enclosed composting building; • Store biosolids in a covered pit; • Minimise handling of green waste and Waste materials; • Aerate Biocells and Composting Tunnels to ensure aerobic composting; • Maintenance of oxygen and moisture levels and feedstock composition within optimum range; • Operate biofilters to capture odours before passing air to outside; • Maintain biofilters; • Store leachate in a purpose-built pond; • Treatment of all leachate from the maturation pad and any stormwater runoff leachate from handling areas, prior to short-term pond storage and reuse to avoid odour associated with high BOD levels in stale leachate; • Aeration of the ponds as necessary to prevent anaerobic conditions and odour from occurring; • Reuse leachate efficiently to minimise BOD build-up; • Preferential reuse of stored leachate in the composting process to avoid long-term storage of leachate; • Compost all relevant materials in the Composting Tunnels/Biocells to produce a compost material that is virtually odour free and can be matured on the outdoor maturation pads without creating odour issues; • Air from the Receival Building and Resource Recovery Building will be directed to composting tunnel/biocell area. Air will then be collected via extraction fans

Type of Impact (EA Section)	Operational Mitigation Measures
	and passed through a biofilter to remove odour, before being exhausted to atmosphere; and • Regular inspection and testing of biofilter to ensure adequate operation.
Dust	• Awareness training about the need to minimise dust; • Removing mud from vehicles before leaving the Elizabeth Drive Site, where necessary; • Enforcing Elizabeth Drive Site speed limits for trucks; • Regular cleaning of sealed access road; • Minimise traffic movements on exposed areas; • Dust suppression on unsealed roads and work areas using a water cart; • Prompt clean up of spills as soon as practicable; • Provision of an adequate water supply; • Waste receival and handling in enclosed buildings; • Dampening of stockpiles; • Progressive rehabilitation of cleared land; and • Ensuring procedures for outdoor activities include a requirement for dust minimisation.
Noise	• Reduce noise by building layout and some building shielding of equipment; • Orientation of plant away from noise sensitive residential areas; • Awareness training for operators on possible noise sources and impacts; • Truck speed limit on-site; • Managed use of reversing alarms during truck and loader manoeuvrings; • Selection of appropriate plant & equipment to minimise noise generation; • Checking of critical mobile plant and equipment for noise compliance; • Use of plant in accordance with manufacturers' specifications; • Regular and effective maintenance of stationary and mobile equipment; • Close engine covers, where fitted; • Provision of appropriate noise attenuation devices, if required; • Advice to neighbours about pending operations likely to cause a nuisance; • Liaise with, and obtain feedback from, neighbours regarding noise; • Use an in-duct attenuator and enclose the biocell fans to achieve an effective noise source sound power level of 91dBA per fan unit; • Purchase new front end loaders with the lowest possible noise source sound power level; and • Select an outdoor shredder and noise mitigation to give effective noise source sound power level of 112dBA.
Visual Amenity and Landscape	• At the completion of construction, undertake further landscaping of the surrounding area using endemic native flora species to provide screening for buildings, buffer prevailing winds and provide shade for buildings.

8.1 Environmental Management Plans

Environmental Management Plans (EMPs) will be developed for construction and operation of the facility in accordance with DECC guidelines and Appendix C of the Environmental Guidelines: Composting and Related Organics Processing Facilities (DECC, 2004). The purpose of these plans is to ensure that appropriate environmental practices are followed during construction and operation. The following are outline EMPs, the full EMPs which would be prepared after approval of the project will specify monitoring and control strategies for relevant environmental issues and address the legal and regulatory requirements that will apply to the SAWT-BIOWISE facility. Both EMPs aim to ensure that on- and off-Site impacts from the SAWT-BIOWISE facility are controlled and the environmental impact is kept to a minimum.

8.1.1 General

The EMPs would include:

- Statutory context;
- Siting information;
- Description of existing environment;
- Identification of sensitive areas;
- Description of the project (construction/operation);
- Specific environmental issues;
- Water management;
- Gas and odour management;
- Incoming waste management;
- Product quality assurance;
- Noise management;
- Housekeeping practices;
- Organisational structure;
- Training requirements;
- Complaints handling procedures;
- Fire-fighting and prevention procedures;
- Emergency procedures;
- Monitoring and evaluating; and
- How non-conformances would be addressed.

8.1.2 Construction Environmental Management Plan

The Construction Environmental Management Plan (CEMP) would include details of the following:

- Construction activities;
- Construction stages and timetable;
- Air quality (dust) control;
- Noise management;
- Erosion and sediment control;
- Flora and fauna management;
- Construction machinery and equipment (storage, maintenance, and refuelling);
- Waste management;
- Traffic and transport;
- Security;

- Energy management; and
- Hazards, risks and emergency response management.

8.1.3 Operation Environmental Management Plan

The Operation Environmental Management Plan (OEMP) would address the following:

- Description of the project operations;
- Waste quality control;
- Operational machinery and equipment;
- Odour control;
- Dust control;
- Noise management;
- Leachate management;
- Flora and fauna management;
- Pest and vermin control;
- Landscaping and visual amenity;
- Emergency management;
- Fire management;
- Litter control; and
- Site security.

8.2 Monitoring

Environmental monitoring is to be undertaken to determine the impacts of a project and the effectiveness of the proposed mitigation measures. Details of the monitoring will be included in the Project EMP.

8.2.1 Construction

Groundwater

Quarterly and annual monitoring is currently undertaken in accordance with the existing Landfill's Environmental Protection Licence. The existing monitoring plan has been designed to characterise groundwater quality and levels, both up- and down-gradient of the Elizabeth Drive Site. The proposed SAWT-BIOWISE facility is completely located within the boundaries of the existing landfill site, such that this groundwater monitoring will be sufficient to monitor the SAWT-BIOWISE facility activities as well. By continuing with the monitoring regime, any changes in groundwater quality or levels, either due to the existing Landfill or the operation of the SAWT-BIOWISE facility, will be detected.

Noise

- Regular noise monitoring by a specialist;
- Maintenance of a noise complaints database;
- Follow up of complaints by telephone explaining reason and corrective action; and
- Recording of complaints in a Complaints and Incidents Register.

Dust

- Establishment of background level by monitoring before construction starts;
- Daily inspections (stockpiles, exposed work areas, work practices);

- Monitoring of deposited dust to assess the level of dust being transported beyond site boundary (locations of dust gauges are same as for existing annual environmental monitoring report for Landfill);
- Formal monthly inspections of stockpiles, exposed works and work practices;
- Recording of complaints in a Complaints and Incidents Register; and
- Quarterly reporting to DEC.

Runoff Control

- Regular checking of pollution devices to ensure they would work effectively;
- Daily inspection and also after large storm events; and
- Stormwater monitoring will be undertaken as required.

Waste Management

- Daily checking of bins to ensure that no unacceptable wastes (e.g. waste oils, solvents, adhesives, paints) are disposed of inappropriately; and
- Daily checking of bins to ensure solid wastes are correctly disposed.

Traffic

- Induction for contract drivers;
- Posted speed limits; and
- Enforcement of traffic speed limit on-site.

Flora and Fauna

- Monitoring of fencing of riparian corridor and construction exclusion zone;
- Reporting of any fauna deaths;
- Visual inspections for weeds; and
- Monitoring of the success level of rehabilitation.

8.2.2 Operational Monitoring

The following monitoring will be required during operation of the project.

Air Quality

An air quality monitoring plan will be developed for odours generated in the composting process and leachate storage and dust generated by vehicle movements and stockpiles. This will include:

- On-site weather monitoring;
- Detailed monitoring of flow rates and gas composition of exhaust gas from the Biofilters;
- Dust deposition rates;
- Monitoring of other air quality parameters as per DECC Licence conditions; and
- Recording of complaints in a Complaints and Incidents Register.

Noise

Noise monitoring will be undertaken to assess the impact of noise from operating equipment, vehicle movements and maintenance activities. A noise monitoring program will be developed and include:

- Noise monitoring as per DECC Licence conditions;
- Maintenance of a noise complaints database;
- Follow up of complaints by telephone explaining reason & corrective action; and
- Recording of complaints in a Complaints and Incidents Register.

Water Quality

To prevent the polluted runoff from leaving the site, a soil and water management plan will be developed for operation including:

- Routine inspection of pollution control devices, and inspection after storm events;
- Recording of water level monthly and after a significant rainfall event;
- Regular inspection of all oil and fuel storage areas;
- Reporting to Site Supervisor of all spills or related incidences;
- Water monitoring before water release from the SAWT-BIOWISE site as per DECC Licence conditions; and
- Ongoing surface water sampling and analysis as per DECC licence.

Leachate

Monitoring of leachate will be undertaken to ensure that no untreated leachate leaves the site. This will involve:

- Inspection of leachate pond level monthly & after significant rainfall event; and
- Sampling and analysis of any leachate injected into landfill from SAWT-BIOWISE site.

Waste

To ensure unacceptable waste does not enter the process and that all products are correctly graded, monitoring procedures will be developed, including:

- Initial monitoring of transfer vehicle delivery at Receival Building;
- Close monitoring of all waste entering the SAWT-BIOWISE facility;
- Visual inspection of residual waste at final picking station to ensure conformance with DECC Landfill Licence;
- Visual inspection of recyclables before being taken from Site;
- Monitoring of compost quality to conform with proposed use;
- Daily litter inspection of SAWT-BIOWISE facility, within enclosures; and
- Fortnightly litter inspection of SAWT-BIOWISE site, including external areas.

Fire Risk

- Reporting of every incident on-site to the Emergency Co-ordinator;
- Reporting of every occurrence of a hot load to the Plant Manager;
- Monitoring and recording of extreme fire danger conditions and fire bans;

- Reporting of bushfire incidents to Emergency Co-ordinator; and
- Regular scheduled inspection of all fire fighting equipment such as hose reels, hydrants and extinguishers.

Pest and Vermin Control

- Monitoring of all incoming waste entering facility for infestations;
- Regular site inspections for presence of pest and vermin; and
- Reporting of all incidents to Plant Manager.

Flora and Fauna

Native vegetation and fauna and spreading of weeds during operation. Monitoring will include:

- Inspection of fencing of riparian corridor;
- Visual inspections for weeds;
- Recording of any deaths of native fauna on and adjacent to site; and
- Recording success of rehabilitation.

Landscape and Visual Amenity

- Periodic monitoring of tree growth in rehabilitated and screening areas; and
- Annual comparison of visibility by photograph.