

GRIEVANCE MECHANISM / PROCESS

1. AIM

The aim of the grievance mechanism is to ensure that grievances / concerns raised by local landowners and or communities are addressed in a manner that is:

- » Fair and equitable;
- » Open and transparent; and
- » Accountable and efficient.

It should be noted that the grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. However, the aim should be to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

2. PROPOSED GENERIC GRIEVANCE PROCESS

- » Local landowners, communities and authorities will be informed in writing by the proponent (the renewable energy company) of the grievance mechanism and the process by which grievances can be brought to the attention of the proponent.
- » A company representative will be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person will be provided to local landowners, communities and authorities.
- » Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
The grievance will be registered with the contact person who, within 2 working days of receipt of the grievance, will contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting. Unless otherwise agreed, the meeting will be held within 2 weeks of receipt of the grievance.
- » The contact person will draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting.
- » Prior to the meeting being held the contact person will contact the Complainant to discuss and agree on who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.
- » The meeting will be chaired by the company representative appointed to address grievances. The proponent will provide a person to take minutes of and record the meeting/s. The costs associated with hiring venues will be covered by the proponent. The proponent will also cover travel costs incurred by the Complainant, specifically in the case of local, resource poor communities.
- » Draft copies of the minutes will be made available to the Complainant and the proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes

must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.

- » In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome will be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

In the event of a dispute between the Complainant and the proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s will note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.

- » In the event that the parties agree to appoint a mediator, the proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the proponent, will identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator will be borne by the proponent. The proponent will provide a person to take minutes of and record the meeting/s.
- » In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome will be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- » In the event of the dispute not being resolved, the mediator will prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- » The draft report will be made available to the Complainant and the proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days.

The way forward will be informed by the recommendations of the mediator and the nature of the grievance. As indicated above, the grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the proponent, either party may be of the opinion that legal action may be the most appropriate option.

ALIEN INVASIVE MANAGEMENT PLAN

OVERALL OBJECTIVE

Manage alien and invasive plant species during the construction and operation of the Harmony Eland PV Solar Facility, through the implementation of an alien invasive species management and control programme.

PROBLEM OUTLINE

Alien plants replace indigenous vegetation, leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, loss of grazing resources, increased fire risk, increased erosion, loss of wetland function, impacts on drainage lines, increased water use, etc.

The Developer and all contractors/subcontractors are, as authorised users of the development site (as authorised by the respective landowners), subject to the provisions of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA). These Acts specifically aim to curb the devastation caused by Invasive Alien Plants as well as their spread. NEM:BA (Act no 10 of 2004) / Alien and Invasive Species List, 2015 identifies a total of 559 alien invasive species / groups of species. Of these 559 species, 379 are invasive terrestrial and fresh-water plant species. NEM:BA has furthermore, within the Alien and Invasive Species Regulations of 2014, divided these species into four categories. Each category prescribes different courses of action or remedies depending on the seriousness of the threat caused by the identified IAPs within the category.

These categories are as follows:

Category 1a

- (1) Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated.
- (2) A person in control of a Category 1a Listed Invasive Species must –
 - (a) comply with the provisions of section 73(1), (2) and (3) of the Act, and
 - (b) immediately take steps to combat or eradicate listed invasive species in compliance with section 75(1), (2) and (3) of the Act, and
 - (c) allow an authorised official from the Department to enter onto land to monitor, assist with or implement the combatting or eradication of the listed invasive species.
- (3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must combat or eradicate the listed invasive species in accordance with such programme.

Category 1b

- (1) Category 1b Listed Invasive Species are those species listed as such by notice in terms of section (70)(1)(a) of the Act as species which must be controlled.
- (2) A person in control of a Category 1b Listed Invasive Species must control the listed invasive species in compliance with sections (75)(1), (2) and (3) of the Act.

- (3) If an Invasive Species Management Programme has been developed in terms of section (75)(4) of the Act, a person must control the listed invasive species in accordance with such programme.
- (4) A person contemplated in sub-region (2) must allow an authorised official from the Department to enter onto the land to monitor, assist with or implement the control of the listed invasive species, or compliance with the Invasive Species Management Programme contemplated in section (75)(4) of the Act.

Category 2



- (1) Category 2 Listed Invasive Species are those species listed by notice in terms of section (70)(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be.
- (2) Unless otherwise indicated in the Notice, no person may carry out a restricted activity in respect of a Category 2 Listed Invasive species without a permit.
- (3) A landowner on whose land a Category 2 Listed Invasive Species occurs or person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the Notice or permit.
- (4) If an Invasive Species Management Programme has been developed in terms of section (75)(4) of the Act, a person must control the listed invasive species in accordance with such programme.
- (5) Unless otherwise specified in the Notice, any species listed as a Category 2 Listed Invasive Species that occurs outside the specified area contemplated in sub-regulation (1), must, for purposes of these regulations, be considered to be a Category 1b Listed Invasive species and must be managed according to Regulation 3.
- (6) Notwithstanding the specific exemptions relating to existing plantations in respect of Listed Invasive Plant Species published in Government Gazette No. 37886, Notice 599 of 1 August 2014 (as amended), any person or organ of state must ensure that the specimens of such Listed Invasive Plant Species do not spread outside of the land over which they have control.




Category 3



- (1) Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.
- (2) Any plant species specified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3.
- (3) If an Invasive Species Management Programme has been developed in terms of section 75(4) of the Act, a person must control the listed invasive species in accordance with such programme.

Alien Invasive Plant coverage within the proposed Harmony Eland PV development footprint is moderate. Alien invasive plant species confirmed on site that need to be eradicated by law include the following:

- » *Melia azedarach* – Syringe/Sering (Category 1b)
- » *Tipuana tipu* – Tipu Tree/Tipoeboom (Category 3)
- » *Eucalyptus camaldulensis* – River Red Gum/Rooibloekom (Category 1b in Grassland)
- » *Acacia longifolia* – Sallow Wattle/Bleekwattel (Category 1b)
- » *Cirsium vulgare* – Scottish Thistle/Skotse dissel (Category 1b)
- » *Xanthium spinosum* – Spiny Cockleblur/Boetebossie (Category 1b)
- » *Pinus pinster* – Cluster Pine/Trosden (Category 2)

<i>Acacia longifolia</i>	
	<p>Sallow Wattle/Long-leaved Wattle</p> <p>Status: Category 1b AIP (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none"> » It is a transformer species which out-competes indigenous species.
<i>Melia azedarach</i>	
	<p>Syringe/Sering</p> <p>Status: Category 1b AIP (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none"> » The leaves, bark, flowers and ripe fruits are poisonous. » Fruits are spread by birds, other animals, water and human activities. » It competes with and replaces indigenous species. The effective seed dispersal by water enables this species to invade protected areas far from the parent plant.

<i>Tipuana tipu</i>	
	<p>Tipu Tree</p> <p>Status: Category 1b AIP (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none">» Competes with and has the potential to replace indigenous species particularly along river banks. Because of its potential to grow very large, even a single large tree could have a detrimental effect on a natural ecosystem. Trees along watercourses are likely to cause a significant reduction in stream flow.
<i>Eucalyptus camaldulensis</i>	
	<p>Red River Gum</p> <p>Status: Category 1b AIP - in grassland (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none">» It competes with and replaces indigenous species, especially riverine species. Extensive stands along watercourses are likely to cause a significant reduction in stream flow.
<i>Pinus pinaster</i>	
	<p>Slash Pine</p> <p>Status: Category 2 AIP (Species which require a permit to carry out a restricted activity within an area specified in the permit)</p> <ul style="list-style-type: none">» Competes with and replaces indigenous species.» Dense stands can reduce water runoff and stream flow from mountain catchments, reduce grazing, and pose a fire hazard which threatens the survival of indigenous animal and plant species.

<i>Xanthium spinosum</i>	
	<p>Spiny Cocklebur</p> <p>Status: Category 1b AIP (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none">» Competes with indigenous species.» The seedlings are particularly toxic to domestic livestock.» It readily invades overgrazed pastures and spreads at the expense of the indigenous species.
<i>Cirsium vulgare</i>	
	<p>Scottish Thistle</p> <p>Status: Category 1b AIP (Declared weed, prohibited and must be controlled)</p> <ul style="list-style-type: none">» It competes with and replaces indigenous species, especially riverine species. Extensive stands along watercourses are likely to cause a significant reduction in stream flow.

Weeds and potentially invasive species confirmed on site that need to be monitored and managed:

- » *Brachychiton populneus*
- » *Phoenix canariensis*
- » *Washingtonia robusta*
- » *Widringtonia* spp.
- » *Asparagus laricinus*
- » *Chenopodium album*
- » *Boerhavia diffusa*
- » *Chenopodium abrosioides*
- » *Cucumis myriocarpus*
- » *Schkuria pinnata*
- » *Pseudognaphalium luteo-album*
- » *Solanum incanum*
- » *Gomphocarpus fruticosus*
- » *Portulaca quadrifida*
- » *Cyperus eragrostis*

The following guide is a useful starting point for the identification of alien species:

Bromilow, C. 2010. *Problem Plants and Alien Weeds of South Africa*. Briza, Pretoria.

SPECIFIC MANAGEMENT OBJECTIVES:

- » Ensure alien plants do not become dominant in parts or the site.
- » Initiate and implement a monitoring and eradication programme for alien and invasive species.
- » Control alien and invasive species dispersal & encroachment through appropriate means.
- » Promote the natural reestablishment and planting of indigenous species as appropriate.

VULNERABLE ECOSYSTEMS AND HABITATS

Certain habitats and environments are more vulnerable to alien plant invasion and are likely to bear the brunt of alien plant invasion problems at the site. In addition, construction activities and changes in water distribution at the site following construction are also likely to increase and alter the vulnerability of the site to alien plant invasion.

Areas at the site which are likely to require specific attention include the following:

- » Wetlands, drainage lines and other mesic areas.
- » Cleared and disturbed areas such as road verges, and construction footprints etc.
- » Construction camps and lay-down areas which are cleared or are active for an extended period.

Wetland areas

There are four wetlands near the site of the proposed Harmony Eland PV solar energy facility. The identified wetlands are located between 38 m to 75 m from the edge of the project site boundary. Disturbance within these areas may result in alien plant invasion on account of the greater water and nutrient availability in this habitat. A 32 m buffer has to be placed around the identified wetlands near the site as protection to avoid further degradation of the already transformed wetlands.

Construction camps and laydown areas

Construction camps and lay down areas are either cleared of vegetation or prolonged activities in these areas result in negative impact on indigenous vegetation. In addition, repeated vehicle and human activity in these areas may result in the import of alien plant seed on clothes, dirty vehicles or with construction machinery and materials.

GENERAL CLEARING & GUIDING PRINCIPLES

- » Alien control programs are long-term management projects and should include a clearing plan which includes follow up actions for rehabilitation of the cleared area. Alien problems at the site should be identified during preconstruction surveys of the development footprint. This may occur simultaneously to other required searches and surveys. The clearing plan should then form part of the preconstruction reporting requirements for the site.
- » The plan should include a map showing the alien density & indicating dominant alien species in each area.
- » Lighter infested areas should be cleared first to prevent the build-up of seed banks.
- » Dense mature stands of woody species where present should be left for last, as they probably will not increase in density or pose a greater threat than they are at the moment.
- » Collective management and planning with neighbours may be required as seeds of aliens are easily dispersed across boundaries by wind or water courses.
- » All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing.

CLEARING METHODS

- » Different species require different clearing methods such as manual, chemical or biological or a combination of both.
- » Care should be taken that the clearing method (s) used do not encourage further invasion. As such, regardless of the method (s) used, disturbance to the soil should be kept to a minimum. Fire is not a natural phenomenon at the site and fire should not be used as a clearing method or vegetation management approach at the site.
- » The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. <http://www.dwaf.gov.za/wfw/Control/>.

USE OF HERBICIDES FOR ALIEN CONTROL

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- » Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- » Specific care must be taken to prevent contamination of any water bodies. This includes: due care in storage, application, cleaning of equipment and disposal of containers, product and spray mixtures.
- » Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- » To avoid damage to indigenous or other desirable vegetation, products used should have least effect on non-target vegetation.
- » Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- » The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines should be followed:

Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.

ALIEN PLANT MANAGEMENT PLAN

CONSTRUCTION PHASE ACTIVITIES

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Action	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	Ad hoc
Clearing of vegetation must be undertaken as the work front progresses as far as possible – mass clearing is not allowed unless the entire cleared area is to be rehabilitated or stabilised immediately.	Ongoing
Should re-vegetation not be possible immediately, the cleared areas must be protected with packed brush, or appropriately battered with fascine work or otherwise stabilised. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.	Ongoing
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used. Manual clearing may also be used where this will be appropriate & effective.	Ongoing
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose should be brought onto site. Brush from cleared areas should be used as much as possible, provided it does not contain alien seeds. Arid soils are usually very low in organic matter and the use of manure or other soil amendments is likely to encourage invasion.	Ad hoc
Clearing of vegetation should not be allowed within 50m of any wetland or pan, 80m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless authorised by the relevant authorities and permission is granted by the ECO for specifically allowed construction activities in these areas.	Ongoing
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.	Ongoing
Alien vegetation regrowth must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method should adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Monthly
Clearing activities must be contained within the affected zones (i.e. the development footprint) and may not spill over into demarcated No Go areas.	Daily

Action	Frequency
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only.	Monthly
Where applicable, drainage lines and other sensitive areas should remain demarcated with appropriate fencing or hazard tape while construction activities within the area are underway. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.	Daily

MONITORING – CONSTRUCTION PHASE

The following monitoring actions should be implemented during the construction phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species present at the site.	List of alien species	Pre-construction
Document alien plant distribution.	Alien plant distribution map	3 Monthly
Document & record alien control measures implemented.	Record of clearing activities	3 Monthly
Review & evaluation of control success rate.	Decline in documented alien abundance overtime	Biannually

OPERATIONAL PHASE ACTIVITIES

The following management actions are aimed at reducing the abundance of alien species within the site and maintaining non-invaded areas clear of aliens during operation.

Action	Frequency
Surveys for alien species should be conducted regularly, i.e. every 3 months for the first two years after construction and biannually thereafter provided alien plants are under control. All aliens identified within the site should be cleared.	Every 3 months for 2 years and biannually thereafter
Re-vegetation with indigenous, locally occurring species should take place in areas where natural vegetation is slow to recover or where repeated invasion has taken place.	Biannually or as needed, but re-vegetation should take place at the start of the rainy season.
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	Where necessary
No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.	Where necessary

MONITORING – OPERATIONAL PHASE

The following monitoring and evaluation actions should take place during the operational phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species distribution and abundance over time at the site.	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved.	Records of control measures and their success rates A decline in alien distribution and cover overtime at the site	Quarterly for first 2 years and biannually thereafter
Document rehabilitation measures implemented and success achieved in problem areas.	Decline in vulnerable bare areas overtime	Biannually

DECOMMISSIONING PHASE ACTIVITIES

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.

Action	Frequency
All damaged areas must be rehabilitated if the infrastructure is removed and the facility is decommissioned.	Once off
All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	Once off, with annual follow-up re-vegetation for 3 years where required
Maintain alien plant monitoring and removal programme for 3 years after rehabilitation.	Biannually for 3 years

MONITORING – DECOMMISSIONING PHASE

The following monitoring and evaluation actions should take place during the decommissioning phase of the development.

Monitoring Action	Indicator	Timeframe
Monitor newly rehabilitated areas where infrastructure has been removed to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation.	Alien plant surveys and distribution map	Biannually until such time as the natural vegetation has recovered sufficiently to resist invasion

Monitoring Action	Indicator	Timeframe
Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation.	Alien plant surveys and distribution map	Biannually for 3 years
Document alien plant control measures implemented & success rate achieved.	Records of control measures and their success rates A decline in alien distribution and cover overtime at the site	Annually for 3 years

REFERENCES:

AGIS (2006) Weeds and Invasive Plants Atlas (www.agis.agric.za/wip).

Nkurenkuru Ecology & Biodiversity (2021) Fauna and Flora Pre-construction Walk-Through Report Harmony Eland PV Facility and Grid Connection Infrastructure, Free State Province.

EROSION AND STORMWATER MANAGEMENT PLAN

1. PURPOSE

An Erosion Management Plan addresses the management and mitigation of significant impacts relating to soil erosion. The objective of the plan is to provide:

- » A general framework for erosion management, which enables the contractor to identify areas where erosion can be accelerated from their action.
- » An outline of general methods to monitor, manage and rehabilitate erosion in ensuring that all erosion caused by this development is addresses.

2. LEGISLATION AND STANDARDS

Soil conservation pertaining to erosion has been a topic within legislation form the 1930's till today in South Africa. Internationally, standards have been set by the International Finance Corporation and the World Bank to address soil erosion in construction and decommissioning of areas. Therefore, this document will ensure that the developer meets the South African legislative requirements and the IFC standards with regards to monitoring, managing and rehabilitating soil erosion on the Cookhouse wind energy facility site.

Relevant legislation:

- » Conservation of Agricultural Resources Act No 43 of 1983
- » Environmental Conservation Act No 73 of 1989
- » National Forestry Act No 84 of 1998
- » National Environmental Management Act No 107 of 1998 (as amended)
- » The Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.

3. AREAS WITH A HIGH SOIL ERODIBILITY POTENTIAL

The following areas are generally associated with high soil erodibility potential:

- » Any areas without vegetation cover
- » Excavated areas
- » Steep areas
- » Areas where the soil has been degraded already
- » Dispersive, duplexed soil areas
- » Areas with fine grained soil material with a low porosity

- » Areas which undergo overland flow of water
- » Areas close to water
- » Irrigated areas
- » Compacted areas
- » Rivers
- » Drainage lines
- » And any areas where developments cause water flow to accelerate on a soil surface
- » Coarsely gravelly covered surfaces

4. PRECAUTIONARY MANAGEMENT ACTIVITIES TO AVOID EROSION

In the assessment process the ECO and the contractor must assess all:

- » Infrastructure and equipment placements and function to ensure that the infrastructure or equipment is not causing accelerating soil erosion on the site.
- » Construction activities to ensure that no erosion indicators are forming as a result of the construction activities.

5. MONITORING

5.1. General Erosion

The ECO must assess the site for erosion indicators in the monitoring process, which include:

- » Bare soil
- » Desiccation cracks
- » Terracettes
- » Sheet erosion
- » Rill erosion (small erosion features with the same properties and characteristics as gullies)
- » Hammocking (Soil build-up)
- » Pedestalling (Exposing plant roots)
- » Erosion pavements
- » Gullies
- » Evidence of Dispersive soils

In the assessment process, the ECO and the contractor must assess all:

- » Infrastructure and equipment placements and function to ensure that the infrastructure or equipment is not causing accelerated soil erosion on the site.
- » Construction activities to ensure that no erosion indicators are forming as a result of the construction activities.

If any activities or placement of equipment cause pooling on the site, degrade the vegetation, result in removal of the surface or subsurface soil horizons, create compacted surfaces with steep gradients, or minimise runoff areas, the erosion potential on the site will increase.

If any erosion features are begin forming or are present as a result of the activities mentioned above the ECO must:

- » Assess the situation.
- » Take photographs of the soil degradation.
- » Determine the cause of the soil erosion.
- » Inform and show the relevant contractors the soil degradation.
- » Inform the contractor that rehabilitation must take place and that the contractor is to implement a rehabilitation method statement and management plan.
- » Monitor that the contractor is taking action to stop the erosion and assist them where needed.
- » Report and monitor the progress of the rehabilitation weekly and recorded all the findings in a site diary.
- » All actions with regards to the incidents must be reported on a monthly compliance report which will be submitted to the department.

The contractor/ developer (with the ECO's consultation) must:

- » Select a system to treat the erosion.
- » Design the treatment system.
- » Implement the system.
- » Monitor the area to see if the system functions like it should, if the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- » Monitoring must continue until the area has been stabilised.

5.2. Stormwater Management

The ECO is responsible to monitor the site and the activities to ensure that no unnatural soil degradation is taking place.

The ECO must assess the site for erosion indicators such as:

- » Bare soil
- » Exposed plant roots, pedestalling
- » Sheet erosion
- » Rill erosion
- » Hammocking
- » Erosion pavements
- » Terracettes
- » Gullies

In the assessment process the ECO and the contractor must assess all:

- » Disturbed watercourse areas by the development: roads, bridges, river crossings, cabling, permanent laydown areas, crane pads and any other remaining hard surfaces.
- » Construction activity limited to specified areas. Stockpiles of aggregate and material will be positioned at least 50 m away from drainage lines and wetlands.

If any erosion features are present as a result of the activities mentioned above the ECO must:

- » Assess the situation
- » Take photographs of the soil degradation.
- » Determine the cause of the erosion.
- » Inform and show the relevant contractors the soil degradation.
- » Inform the contractor that rehabilitation must take place and that the contractor is to implement a rehabilitation method statement and management plan.
- » Monitor that the contractor is taking action to stop the erosion and assist them where needed.
- » Monitor the rehabilitation weekly and record the findings in a site diary.
- » All actions with regards to the incidents must be reported on in the monthly compliance monitoring report.

The contractor/ developer must (with the ECO's consultation):

- » Select a system to treat the erosion
- » Design the treatment system
- » Implement the system
- » Monitor the area to ensure that the erosion has been addressed adequately.

6. REHABILITATION

The following erosion control measures and rehabilitation specifications must be implemented to ensure that good environmental practice is conducted and environmental compliance is achieved.

6.1. General Erosion Management

In this section the equipment needed to remediate erosion, the precautionary measures which must be taken to avoid erosion and mitigation requirements for already degraded areas.

6.1.1. Equipment

The civil works contractor may use the following instruments to combat erosion when necessary:

- » Reno mattresses
- » Slope attenuation
- » Hessian material
- » Shade catch nets
- » Gabion baskets

- » Mulching Run-off control (increase the amounts of runoff areas to disperse the water)
- » Silt fences
- » Storm water channels and catch pits
- » Shade / catch nets
- » Soil bindings
- » Geofabrics
- » Hydroseeding and/or re-vegetating
- » Mulching over cleared areas
- » Stone packing
- » Tilling (roughing the surface)

6.1.2. Methods to prevent accelerated erosion

The following practises should be considered and adhered to:

- » Ensure steep slopes are stabilised.
- » Ensure that steep slopes are not stripped of vegetation and left to dry out and become water repellent (which will cause increased runoff and a decreased infiltration rate) increasing the erosion potential.
- » Ensure that all water on site (rain water or water wastage from the construction process) does not result in any surface flow (increase velocity and capacity of water) as a result of the poor drainage systems.
- » Ensure that pooling of water on site is avoided, as the site and the general area consists of dispersive soils, pooling will cause an increase of infiltration on one area, causing the subsurface to begin eroding.
- » Ensure that heavy machinery does not compact those areas which are not intended to be compacted (i.e. areas intended to be managed), as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. where compaction does occur, the areas should be ripped.
- » Ensure that compacted areas have adequate drainage systems to avoid pooling and surface flow.
- » Prevent the concentration or flow of surface water or stormwater down cut or fill slopes, or along pipeline routes or roads, and ensure measures to prevent erosion are in place prior to construction.
- » Ensure that stormwater and any runoff generated by hard surfaces should be discharged into retention swales or areas with rock rip-rap. These areas should be grassed with indigenous vegetation. These energy dissipation structures should be placed in a manner that surface flows are managed prior to being discharged back into a natural watercourse to support the maintenance of natural base flows within the ecological systems and prevent erosion, i.e. hydrological regime (water quantity and quality) is maintained.
- » Ensure siltation and sedimentation through the use of the erosion equipment mentioned structures.
- » Ensure that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local ground watertable in low quantities (to reduce runoff but prevent subsurface erosion).
- » Minimise and restrict site clearing to areas required for construction purposes only and restrict disturbance to adjacent undisturbed natural vegetation.

- » Ensure that vegetation clearing is conducted in parallel with the construction progress across the site to minimise erosion and/or run-off.
- » Ensure that large tracts of bare soil which would cause dust pollution in high winds, or have high erosion susceptibility and increase sedimentation in the lower portions of the catchment are controlled through temporary surface covering.
- » Ensure no diversion of water flows in catchment occurs.
- » Ensure that dust control measures are implemented, but prevent over-wetting/ saturating the area (to cause pooling) and run-off (that may cause erosion and sedimentation).
- » Watercourse (stream) crossings should not trap any run-off, thereby creating inundated areas, but allow for free-flowing watercourses.

6.1.3. Mitigation for previously degraded areas

Previously degraded areas could pose a threat to construction activities in the area and must therefore be stabilised, then remediated and rehabilitated through:

- » Protecting, stabilise and isolate the degraded areas to ensure no further damage is caused by erosion due to construction activities.
- » Increase the drainage in the area but avoid pooling.
- » Prevent increasing sedimentation in areas that have been choked by soils from degraded areas.
- » Once construction has been completed, a method statement must be drafted for the rehabilitation of the previously degraded areas, using equipment mentioned above and implemented.
- » Stabilisation of steep slopes must be undertaken.
- » Ensure that bare soil is covered and hydro seeded to reduce topsoil loss.

6.2. Methodologies

The following erosion control measures and rehabilitation specifications may be required to be implemented to ensure that good environmental practice is conducted and environmental compliance is achieved.

- » Topsoil covered with a geotextile or hessian material and a grass seed mixture (see Rehabilitation Specifications).
- » Logging or stepping following the contours of the slope, to reduce surface runoff.
- » Earth or rock-pack cut-off berms.
- » Packed branches to roughen the surface and promote infiltration.
- » Benches (sand bags).
- » Stabilisation of near vertical slopes (1:1 – 1:2), if created during construction, will be required to utilise hard structures that have a natural look. The following methods may be considered:
 - Gabions (preferred method with geotextile material).
 - Retaining walls.
 - Stone pitching.
- » The slopes of all stream diversions must be protected. The following methods may be considered:

- Reno mattresses (preferred method), ensure that the reno mattresses are buried deep into the subsurface, to avoid undercutting from the water.
 - Coarse rock (undersize rip-rap)
 - Sandbags.
 - Stone packing with geotextile
- » Where feasible use rubber dams as stream diversions when establishing water course crossings. Although (and considering that these are non-perennial watercourses) the recommendation is to construct watercourse crossings during dry periods (or no flow periods), where possible.
- » Any concentration of natural water flow caused by road works or hardstands areas will be treated as follows:
- if water flow is sub-critical, nothing is required
 - if water flow is supercritical, the outlets will be provided with protection (either gabions or stone pitching – depending on the flows) to release water subcritical back into the watercourse at a low velocity.

6.3. Engineering Specifications

A detailed Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers and this includes erosion control.

Requirements for project design:

- » Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
- » The location, area/extent (m²/ha) and specifications of all temporary and permanent water management structures or stabilisation methods.
- » A resident Engineer to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- » The Developer holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.
- » Concrete lined drains placed adjacent to road to transfer the water to the existing water courses.
- » Frequent gravel drains hydroseeded placed on permanent roadway edges.
- » At the point where stormwater is discharged, energy dissipaters to be constructed to reduce the flow rate of run-off.
- » All cut and fill banks will be seeded with an approved seed mix (as per the rehabilitation specifications) to ensure bank stabilisation and the elimination of potential erosion. Reno mattresses may be used to ensure that the area remains stable.

6.4. Rehabilitation Specifications

- » Employ a Horticultural Landscape Contractor to fulfil the rehabilitation of disturbed areas post-construction.
- » A detailed Rehabilitation Plan describing and illustrating the proposed rehabilitation activities on site must be prepared i.e. areas of top soiling, seeding and replanting of vegetation; species mix; requirements for fertilisation; seed sowing rates; watering etc. (i.e. bill of quantities).

- » The following document should be consulted for further support with respect to information regarding rehabilitation, namely: The Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.
- » These specifications may be modified by the Horticultural Landscape Contractor on consideration of site conditions.

6.5. Post - and during construction rehabilitation activities

- » Correct and appropriate stockpile management of topsoil will be required during the construction phase.
- » Rehabilitation of disturbed areas will be implemented as these areas become available for rehabilitation.
- » Disturbed areas will include, for example: construction camp site, areas where underground cabling has been laid/buried, roadsides of new access roads.

7. REHABILITATION STEPS TO MITIGATE THE ERODED AREAS

- » Stockpiled topsoil must be spread over disturbed areas (150 – 200mm thick) just prior to planting/seeding.
- » Rip and scarify along the contours of the newly spread topsoil prior to watering and seeding.
- » Organic fertilizers or compost shall be used if site conditions require it and can be applied as part of hydro-seeding applications.
- » Seed should be sown into weed-free topsoil that has been stockpiled (i.e. original topsoil from the site).
- » Indigenous plants shall be used to rehabilitate disturbed areas.
- » Applying the seed through hydromulching (hydro-seeding) is advantageous (or organic mulching after seeding).
- » Watering is essential and rehabilitation should ideally occur during the wet season.
- » The topsoil in the area is vulnerable to erosion therefore the hydro-seeded surfaces must be covered with a shade cloth material or natural fibre (hessian material) to reduce the loss of soil while the plants establish.

7.1. 'Watering' to avoid erosion

- » Movement of livestock in newly rehabilitated areas must be restricted, where possible, while taking into consideration drinking areas/paths.
- » Watering the rehabilitated areas should be undertaken in the wet/rainy season essential but if this is not possible, an initial watering period (supplemental irrigation) will be required to ensure plant establishment (germination and established growth).
- » Generous watering during the first two weeks, or until the seeds have germinated, is required (unless adequate rainfall occurs) i.e. seed beds will need to be kept moist for germination to occur.
- » For grass to establish (once germination has occurred), rainfall or irrigation is needed at regular intervals, ideally every few days and possibly every day if weather conditions require it.

- » During dry periods, with no rainfall, 100 litres per m² (or 100mm of rain) over a month or more, may be necessary to establish plants capable of surviving dry weather (or otherwise specified by the Horticultural Landscape Contractor).

7.2. Seeding

The developer should make use of an appropriate mix of grass species for rehabilitation (to be determined in consultation with a suitably qualified ecologist) and they must be mixed for sowing either in summer or in winter. Grass species application (Rutherford, 2006) is at the rate specified as kg/ha.

7.3. Steep slopes

- » Areas that have a steep gradient and require seeding for rehabilitation purposes should be adequately protected against potential run-off erosion e.g. with coir geotextile netting or other appropriate methodology.
- » Provision for wind should also be made on these slopes to ensure the fine-grained soil is not removed.

7.4. Maintenance and duration

- » Rehabilitation will occur during construction, as areas for plant rehabilitation become available.
- » The rehabilitation period post construction is estimated to be over a period of 6 (minimum) to 12 months (maximum), or a time period specified by the Horticultural Landscape Contractor, particularly if planting of trees and shrubs occurs.
- » The rehabilitation phase (including post seeding maintenance) should be at least 6 months (depending on time of seeding and rainfall) to ensure establishment of plants with a minimum 80% cover achieved (excluding alien plant species).
- » If the plants have not established and the 80% is not achieved within the specified maintenance period, maintenance of these areas shall continue until at least 80% cover is achieved (excluding alien plant species).
- » Additional seeding may be necessary to achieve 80% cover.
- » Any plants that die during the maintenance period must be replaced.
- » Succession of natural plant species should be encouraged.

8. CONCLUSION

The Erosion Management Plan is a document to assist the contractor, the Developer and the ECO with guidelines on how to manage erosion. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure comply with legislative requirements. This document forms part of the EMP, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project.

9. REFERENCES

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WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

This WMP has been compiled as part of the project EMPr and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated once further detail regarding waste quantities and categorisation become available, during the construction and/or operation phases. This plan should be updated throughout the life cycle of the facility, as required in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the site should be compiled by the Contractor.

2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the facility will generate construction solid waste, as well as general waste and hazardous waste during the lifetime of the project.

Waste generated on site, originates from various sources, including but not limited to:

- » Concrete waste generated from spoil and excess concrete.
- » Contaminated water, soil, rocks and vegetation due to hydrocarbon spills.
- » Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, batteries situated in specially adapted shipping containers, and waste ink cartridges.
- » Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE) and cardboard.
- » Organic waste from food waste as well as alien and endemic vegetation removal.
- » Sewage from portable toilets and septic tanks.
- » Inert waste from spoil material from site clearance and trenching works.

3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

- » National Environmental Management: Waste Act (NEM: WA), 2008 (Act 59 of 2008);
- » National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);

- » The South African Constitution (Act 108 of 1996);
- » Hazardous Substances Act (Act 5 of 1973);
- » Health Act (Act 63 of 1977);
- » Environment Conservation Act (Act 73 of 1989);
- » Occupational Health and Safety Act (Act 85 of 1993);
- » National Water Act (Act 36 of 1998);
- » The National Environmental Management Act (Act 107 of 1998) (as amended);
- » Municipal Structures Act (Act 117 of 1998);
- » Municipal Systems Act (Act 32 of 2000);
- » Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- » Air Quality Act (Act 39 of 2004).

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in GNR 926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on site. Such an approach is illustrated in **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- » Reducing volumes of waste is the greatest priority;
- » If reduction is not feasible, the maximum amount of waste is to be recycled; and
- » Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner.

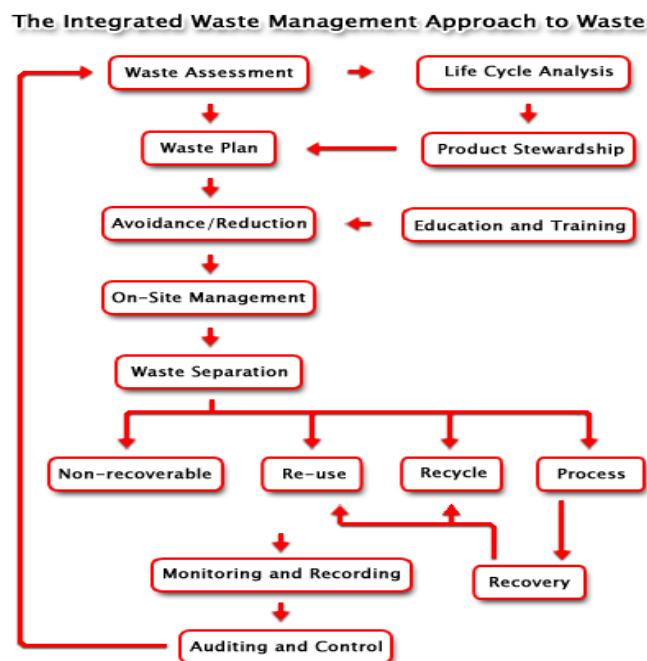


Figure 1: Integrated Waste Management Flow Diagram

(Source: <http://www.enviroserv.co.za/pages/content.asp?SectionId=496>)

4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer.

4.1.1. Waste Assessment / Inventory

- » The Environmental Officer (EO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- » Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- » Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- » The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling and storage

- » It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- » Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- » Septic tanks and portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly.
- » Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- » A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- » Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- » Hazardous waste must be stored within a bunded area constructed according to SABS requirements and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the combined tank capacity. Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria.
- » The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where

required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.

- » Waste storage shall be in accordance with all Regulations and best-practice guidelines.
- » Under no circumstances may waste be burnt or buried on site.
- » A dedicated waste management team must be appointed by the principal contractors' SHE Officer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.
- » All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.
- » SABS approved spill kits must be available and easily accessible.
- » Ensure battery transport and installation by accredited staff / contractors.
- » Compile (and adhere to) a procedure for the safe handling of battery cells during transport and installation.
- » Establish or utilise an appropriate Hazardous Store which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to:
 - Designated area;
 - All applicable safety signage;
 - Firefighting equipment;
 - Enclosed by an impermeable bund;
 - Protected from the elements,
 - Lockable;
 - Ventilated; and
 - Have adequate capacity to contain 110% of the largest container contents.
- » In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.
- » The storage of flammable and combustible liquids such as oils must be undertaken in designated areas which are appropriately banded, and stored in compliance with Material Safety Data Sheets (MSDS) files.
- » An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.

4.1.3. Management of waste storage areas

- » Waste storage must be undertaken in accordance with the relevant Norms and Standards.
- » The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and contaminated storm water.
- » Collection bins placed around the site must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- » Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked, or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- » Waste must be stored in designated containers and not on the ground.

- » Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- » It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- » If any leaks occur in the bund, these must be amended immediately.
- » Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- » Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- » No mixing of hazardous and general waste is allowed.

4.1.4. Disposal

- » Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process, however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
- » Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

4.1.5. Record keeping

The success of the WMP is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

- » Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- » Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the EO and/or ECO.

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils, spent battery components or materials) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriately sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

- » The SHE Manager/ EO (as applicable during the operational phase) must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- » Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- » Recyclable waste must be removed from the waste stream and stored separately.
- » All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
- » Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- » Waste generated on site must be removed on a regular basis throughout the operation phase.
- » Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.
- » Ensure signage on all battery storage areas indicating as a minimum:
 - The battery type (and chemical name/s).
 - Who to contact (immediately) if a spill or leak is detected.
 - MSDS sheets (alternatively ensure that these are available on site).
- » On-site battery maintenance should be done over appropriate sealed surfaces with appropriate containment measures and any hazardous substances must be disposed of appropriately
- » Defective or broken components must be removed and stored within a designated covered storage area prior to being removed from the site.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the Project Company and/or their appointed contractor containing the following information:

- » Monthly volumes/ mass of the different waste streams collected;
- » Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- » Monthly volumes/ mass of the waste that is recycled;
- » Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must form part of the EO's monthly reports, which are submitted to the Project Company's representative and the to the ECO (during construction) and SHE officer (during operations).