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 EPC and O&M Contractor appointed 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, as appropriate.
- 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 a 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 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. Where appropriate, 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 Tshepong 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. NEMBA 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 purposed 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 species confirmed on site that need to be eradicated by law:

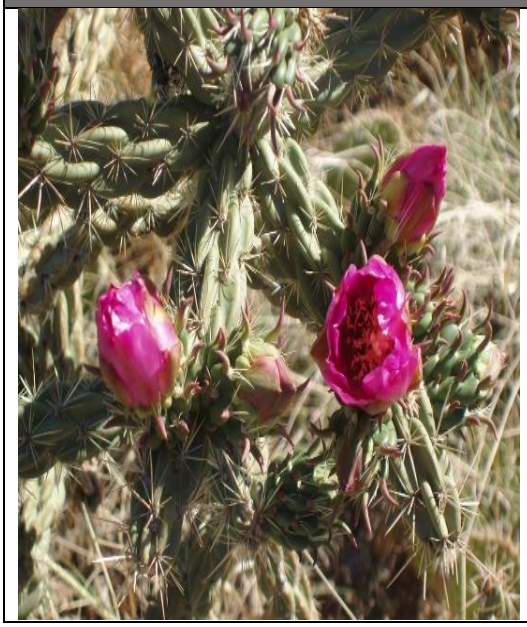
- *Eucalyptus camaldulensis* and *Opuntia lindheimeri*

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

- *Asparagus laricinus*
- *Melia azedarach (Category 1b)*
- *Pseudognaphalium luteo-album*
- *Solanum incanum*
- *Gomphocarpus fruticosus*
- *Ailanthus altissima (Category 1b)*
- *Nicotiana glauca (Category 1b)*
- *Opuntia humifusa (Category 1b)*
- *Cylindropuntia imbricata (Category 1b)*

Ailanthus altissima	
	Tree of Heaven Status: Category 1b AIP (Declared weed, prohibited and must be controlled o A prolific seed producer and established trees produce numerous root suckers. o Competes with and has the potential to replace indigenous species.
Melia azedarach	
 	Syringe/Sering Status: Category 1b AIP (Declared weed, prohibited and must be controlled o The leaves, bark, flowers and ripe fruits are poisonous. o Fruits are spread by birds, other animals, water and human activities. o 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

Nicotiana glauca	
	Wild Tobacco Status: Category 1b AIP (Declared weed, prohibited and must be controlled o This plant is poisonous. o Competes with pioneering indigenous species. o Unpalatable and poisonous to domestic and wild animals.
Opuntia humifusa	
	Large Flowered Prickly Pear Status: Category 1b AIP (Declared weed, prohibited and must be controlled o Competes with and replaces indigenous species. o Dense infestations reduce the grazing potential and hence the carrying capacity of the land, and restrict access by domestic and wild animals. o The very spiny cladodes adhere to passing animals, and the barbed spines cause severe injuries. Spines become entangled in sheep's wool and cause downgrading of the wool. o All these factors combine to cause the drastic devaluation of agricultural land.

Cylindropuntia imbricata	
	Imbricate Prickly Pear Status: Category 1b AIP (Declared weed, prohibited and must be controlled o Competes with and replaces indigenous species. o Dense infestations reduce the grazing potential and hence the carrying capacity of the land, and restrict access by domestic and wild animals. o The very spiny cladodes adhere to passing animals, and the barbed spines cause severe injuries. Spines become entangled in sheep's wool and cause downgrading of the wool. o All these factors combine to cause the drastic devaluation of agricultural land.

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 whole of 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 two wetlands located near to the site - a small seasonal depression wetland located to the west and a slope seepage wetland located to the east. 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 these above-mentioned wetlands 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	Indictor	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	Indictor	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 over time 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	Indictor	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
Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3	Alien plant surveys and distribution map	Biannually for 3 years

Monitoring Action	Indictor	Timeframe
years after decommissioning and rehabilitation.		
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 Tshepong PV Facility Grid Connection Infrastructure, Free State Province.

EROSION 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 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
- 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 and 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 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.

- Disturbed watercourse areas by the development: roads, cabling, permanent laydown areas, 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 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 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.
- Monitor the progress of the rehabilitation as needed and record all the findings in a site diary.
- All actions with regards to the incidents must be reported on a monthly compliance monitoring report.

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.
- 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)
- Other suitable methods agreed with the ECO

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 case 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 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 or similar energy dissipating arrangements. 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 that all stormwater control features have soft engineered areas that attenuate flows, allowing for water to percolate into the local groundwater table 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 as far as possible, 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).
- Where applicable, 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), or otherwise protected from erosion.
- Logging or stepping following the contours of the slope, to reduce surface runoff (where applicable).
- Earth or rock-pack cut-off berms (where applicable).
- 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.

» 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.
» 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) or otherwise stabilised 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 or other suitably experienced ecologist or rehabilitation 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 rehabilitation 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 layed/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 if construction timelines allow for this.
» 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.
» Rehabilitation planting should be undertaken in the wet/rainy season if possible, or alternately 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 m^2 (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 / Rehabilitation 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/ rehabilitation contractor) and they must be mixed for sowing either in summer or in winter, as applicable.

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.
- Where required, steep slopes must be protected against wind erosion 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 (to 12 months , or a time period specified by the Horticultural Landscape Contractor, particularly if planting of trees and shrubs occurs.
- The rehabilitation phase (including post seeding monitoring and maintenance) should be at least 6 months (depending on time of seeding and rainfall) to ensure establishment of plants with a minimum 80% cover is achieved (excluding alien plant species).
- If the plants have not established and the 80% cover 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 & Stormwater 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 compliance with legislative requirements. This document forms part of the EMPr, 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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Tongway, D. J., & Ludwig, J. A. (2004). Heterogeneity in arid and semi arid lands. Queensland: Sustainable Ecosystems.

Van der Linde, M., & Feris, L. (2010). Compendium of South African Legislation. Pretoria: Pretoria University Press.

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, used oil etc.
- 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.

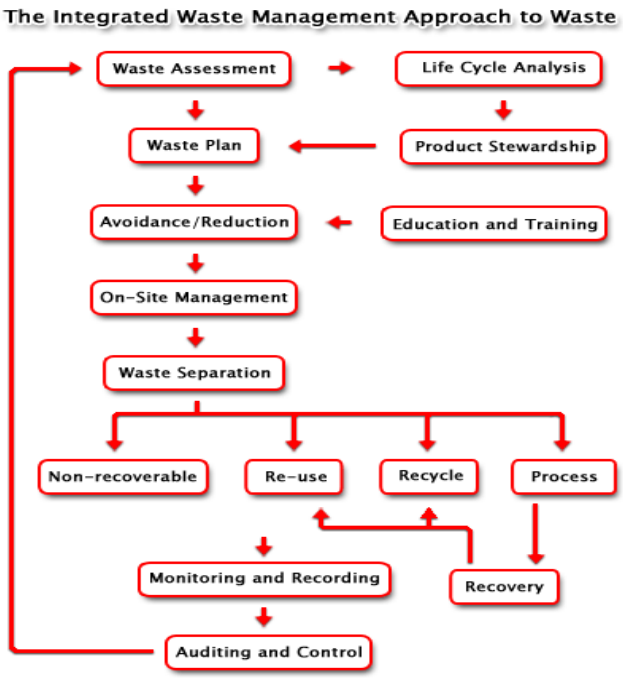

Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

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 if/as applicable.

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 unless authorised by the competent authority.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass, hazardous 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 110% 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 or EO, 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 or EO.
- 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.
- Establish or utilise an appropriate Hazardous Store for the storage of Hazardous substances (not just hazardous waste) 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 bunded, 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, if applicable.
- 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, unless that waste can be diverted for recycling or re-use. 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, and other spent 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, unless such waste can be diverted for recycling or re-use. Proof of appropriate disposal must be provided by the contractor and kept on site.
  -
- 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 from 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).

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures to reduce the impact of the development of the Tshepong PV Solar Facility on listed and protected plant species and their habitats and to provide guidance on search and rescue of species of conservation concern.

2. RELEVANT ASPECTS OF THE SITE

An Ecological Pre-construction Walk-Through Survey was conducted within the development footprint, to inform search-and-rescue efforts and permitting requirements. During the walk-through survey of the Tshepong PV Solar footprint, no Red Data species were recorded within the development footprint. Four protected plant species were recorded, namely; *Helichrysum caespititium, Schizocarpus nervosus, Helichrysum rugulosum* and *Acacia (Vachellia) erioloba*. All four species are protected under provincial regulations (Free State Nature Conservation Ordinance, 1969 (Act No. 8 of 1969)). *A. erioloba* is furthermore, a national protected tree, listed within the National Forest Act of 1998 (Act No 84 of 1998). *Acacia erioloba* was listed as Declining by Raimondo et el. (2009); however, this species is listed as Least Concern within the Red List (2015.1).

During the walk-through survey of the power line corridor; no Red Data or Protected species were recorded.

The Project Company will thus have to apply for the necessary destruction and relocation permits from the relevant authorities, which will then be applicable to all contractors/staff appointed by the Project Company.

3. PRINCIPLES OF SEARCH AND RESCUE

Successful plant rescue can only be achieved if:

- Species can be removed from their original habitat with minimal damage to the plant, especially the roots.
- All plants removed are safely stored and treated according to their specific requirements prior to being transplanted again.
- They are relocated into a suitable habitat and protected from further damage and all disturbances to aid their re-establishment.
- Timing of planting activities is planned with the onset of the growing season as far as possible within the construction timelines.
- Steps are taken where necessary to aid the initial establishment of vegetation, including occasional watering.

The following principles apply in terms of plant rescue and protection:

- A permit is required to translocate or destroy any listed and protected species even if they do not leave the property. This permit should be obtained prior to any search and rescue operations being undertaken.
- Where suitable species are identified, a search and rescue operation of these species should be undertaken within the development footprint prior to the commencement of construction.
- As far as possible, timing of search and rescue activities should be planned with the onset of the growing season.
- Affected individuals should be translocated to a similar habitat outside of the development footprint and marked for monitoring purposes. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device.
- The rescued plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat.
- Rescued plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed. Re-planting into the wild must cause as little disturbance as possible to existing natural ecosystems. The position of he rescued individual/s must be recorded to aid in future monitoring of that plant.
- During construction, the ECO must monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the ECO or Environmental Officer and any listed species present which are able to survive translocation should be translocated to a safe site.
- Any listed species suitable for translocation observed within the development footprint that were not previously observed be translocated to a safe site.
- The collecting of plants or their parts should be strictly forbidden. Appropriate signage in this regard should be placed at the entrance gates to the site if necessary, to ensure compliance. Staff should be informed of the legal and conservation aspects of harvesting plants from the wild as part of the environmental induction training.
- Sensitive habitats and area outside project development should be clearly demarcated as no go areas during the construction and operational phase to avoid accidental impacts.

4. PROTECTED PLANT SPECIES OBSERVED DURING THE WALK-THROUGH

The following listed and protected plant species were observed during the ecological walk-through of the development footprint and powerline corridor:

Legend	
FSNCO	Free State Nature Conservation Ordinance (Act 8 of 1969)
NFA	National Forest Act 84 of 1998
AIP	Alien Invasive Plant

Species	Status	Size of Cluster (estimated amount)
Schizocarpus nervosus	FSNCO	
Schizocarpus nervosus	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	6
Helichrysum caespititium	FSNCO	6
Helichrysum caespititium	FSNCO	
Helichrysum rugulosum	FSNCO	
Ailanthus altissima	Category 1b AIP	
Acacia (Vachellia) erioloba	FSNCO & NFA	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Opuntia humifusa	Category 1b AIP	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	
Helichrysum rugulosum	FSNCO	
Helichrysum caespititium	FSNCO	22
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	12
Helichrysum caespititium	FSNCO	18
Helichrysum caespititium	FSNCO	14
Helichrysum caespititium	FSNCO	16

Species	Status	Size of Cluster (estimated amount)
Helichrysum caespititium	FSNCO	14
Acacia (Vachellia) erioloba	FSNCO & NFA	
Helichrysum caespititium	FSNCO	
Schizocarpus nervosus	FSNCO	
Helichrysum caespititium	FSNCO	21
Helichrysum caespititium	FSNCO	14
Cylindropuntia imbricata	FSNCO	
Helichrysum rugulosum	FSNCO	12
Helichrysum caespititium	FSNCO	15
Schizocarpus nervosus	Category 1b AIP	
Helichrysum caespititium	FSNCO	
Helichrysum caespititium	FSNCO	8
Acacia (Vachellia) erioloba	FSNCO & NFA	

REVEGETATION AND HABITAT REHABILITATION PLAN

1. PURPOSE

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities of the Tshepong PV Solar Facility are rehabilitated with a plant cover that reduces the risk or erosion from these areas as well as restores some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

» Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
» Re-vegetate all disturbed areas with suitable local plant species.
» Minimise visual impact of disturbed areas.
» Ensure that disturbed areas are safe for future uses.

This Revegetation and Rehabilitation Plan should be closely aligned with other site-specific plans, including the Erosion Management Plan and Alien Invasive Management Plan. Where a site-specific plan is developed, this site-specific plan may take precedence and must replace this plan.

3. IDENTIFICATION OF TARGET AREAS

The construction activities required for the development will result in significant disturbance at the site. Rehabilitation is costly and time-consuming and therefore priority areas where rehabilitation should be focused must be identified. Priority areas include areas vulnerable to erosion such as on steep slopes as well as areas near to important ecosystems such as areas near to drainage lines.

4. TOPSOIL MANAGEMENT

Effective topsoil management throughout the project life cycle is a critical element of rehabilitation. Where any excavation or topsoil clearing is required, the topsoil should stockpiled and later used to cover cleared and disturbed areas once construction activity has ceased.

» Topsoil is the top-most layer (0-25cm) of the soil in undisturbed areas. This soil layer is important as it contains nutrients, organic matter, seeds, micro-organisms fungi and soil fauna. All these elements are necessary for soil processes such as nutrient cycling and the growth of new plants. The biologically active upper layer of the soil is fundamental in the maintenance of the entire ecosystem.
» Topsoil should be retained on site in order to be used for site rehabilitation. The correct handling of the topsoil is a key element to rehabilitation success. Firstly, it is important that the correct depth of topsoil is excavated. If the excavation is too deep, the topsoil will be mixed with sterile deeper soil, leading to reduction in nutrient levels and a decline in plant performance on the soil.
» Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil. Topsoil placed directly onto rehabilitation areas contains viable seed, nutrients and microbes that allow it to revegetate more rapidly than topsoil that has been in stockpile for long periods.
» If direct transfer is not possible, the topsoil should be stored separately from other soil heaps until construction in an area is complete. The soil should not be stored for a long time (longer than 12 months)

and should be used as soon as possible. The longer the topsoil is stored, the more seeds, micro-organisms and soil biota become sterile.

» Ideally stored topsoil should be used within a month and should not be stored for longer than three months. In addition, topsoil stores should not be too deep, a maximum depth of 2m is recommended to avoid compaction and the development of anaerobic conditions within the soil.
» If topsoil is stored on a slope then sediment fencing should be used downslope of the stockpile in order to intercept any sediment and runoff should be directed away from the stockpiles upslope.
» Reduced activity at the site after large rainfall events when the soils are wet is encouraged. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
» Any topsoil, waste rock or other material dumps should be protected from erosion with silt traps and other suitable prevention measures.
» Gabions and other stabilisation features may be utilised during construction activities on steep slopes in order to prevent erosion, where necessary.

5. GENERAL PRINCIPLES FOR REHABILITATION

5.1. Mulching

Mulching is the covering of the soil with a layer of organic matter of leaves, twigs bark or wood chips, usually chopped quite finely. The main purpose of mulching is to protect and cover the soil surface as well as serve as a source of seed for revegetation purposes.

» During site clearing, the standing vegetation should not be cleared and mixed with the soil, but should be cleared separately, either mechanically or by hand using a brush-cutter. The cleared vegetation should be stockpiled and used whole or shredded by hand or machine to protect the soil in disturbed areas and promote the return of indigenous species.
» Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
» No harvesting of vegetation may be done outside the area to be disturbed by construction activities.
» Brush-cut mulch shall be stored for as short a period as possible.

5.2 Seeding

In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required. Seed should be collected from plants present at the site and should be used immediately or stored appropriately and used at the start of the following wet season. Seed can be broadcast onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch.

» Indigenous seeds may be harvested for purposes of re-vegetation in areas that are free of alien / invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
» Seed may be harvested by hand and if necessary dried or treated appropriately.
» Seed gathered by vacuum harvester, or other approved mass collection method, from suitable shrubs or from the plant litter surrounding the shrubs must be kept apart from individually harvested seed.
» No seed of alien or foreign species should be used or brought onto the site.

» In instances where it is not possible to harvest sufficient seed on site, seed mix can be brought to site provided the seed mix is appropriate for the site and is not an invasive species (as advised by the ECO/ ecologist/ rehabilitation contractor/ landscaper)

5.3 Transplants

Where succulent plants are available or other species which may survive translocation are present, individual plants can be dug out from areas about to be cleared and planted into areas which require revegetation. This can be an effective means of establishing indigenous species quickly.

» Plants for transplant should only be removed from areas that are going to be cleared.
» Perennial grasses, shrubs, succulents and geophytes are all potentially suitable candidates for transplant.
» Transplants should be nearby and should not be transported around the site to distant areas.
» Transplants must remain within the property and may not be transported off the property. Therefore, it is recommended that before construction commences individuals of listed species within the development footprint should be marked and translocated to similar habitat outside the development footprint under the supervision of an ecologist or someone with experience in plant translocation. Permits from the relevant provincial authorities must be obtained prior to relocation of listed plant species.

5.4 Use of soil savers

On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.

» In areas where soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface; and
» Soil saver may be seeded directly once applied as the holes in the material catch seeds and provide suitable microsites for germination.

5.6. General

» Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
» Once revegetated, areas should be protected to prevent trampling and erosion.
» No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been revegetated.
» Where rehabilitation sites are located within actively grazed areas, they should be fenced.
» Fencing should be removed once a sound vegetative cover has been achieved.
» Any runnels, erosion channels or wash aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

6. OPEN SPACE MANAGEMENT PRINCIPLES

Access Control:

» Access to the facility should be strictly controlled.
» All visitors and contractors should be required to sign-in.
» During construction, signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.

Prohibited Activities:

The following activities should not be permitted by anyone except the landowner or his representatives:

» No fires within the site.
» No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty or other suitable Contractor and with the appropriate permits and landowner permission.
» No driving off of demarcated roads.
» No interfering with livestock.

Fire Risk Management:

Although fires are not a regular occurrence at the site, fires may occasionally occur under the right circumstances. Ignition risk sources in the area include the following:
» Lightning strikes
» Personnel within the facility
» Infrastructure such as transmission lines

The National Veld and Forest Fires Act places responsibility on the landowner to ensure that the appropriate equipment as well as trained personnel are available to combat fires. Therefore, the management of the facility should ensure that they have suitable equipment as well as trained personnel available to assist in the event of fire.

Firebreaks

Targeted risk management should be implemented around vulnerable or sensitive elements of the facility such as in the immediate vicinity of the solar facility, or other high-risk components. Within such areas, the extent over which management action needs to be applied is relatively limited and it is recommended that firebreaks are created by mowing and then burning to create firebreaks, provided this does not in itself pose a risk of runaway fires. Where such firebreaks need to be established around the solar facility, a strip of vegetation approximately 5-10 m wide can be cleared manually and maintained relatively free of vegetation through manual clearing on an annual basis. However, if alien species colonise these areas, more regular clearing should be implemented.

7. MONITORING REQUIREMENTS

As rehabilitation success is unpredictable, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring provision may be used as a guide in the absence of a site-specific plan having been developed:

- Re-vegetated areas should be monitored every 3 months for the first 12 months and every 6 months thereafter for the next year.
- Re-vegetated areas showing inadequate surface coverage (less than 30% within 12 months after re-vegetation) should be prepared and re-vegetated.
- Where transplants have been used the survival rate of the different species used should be monitored every 3 months for the first 12 months and every 6 months thereafter for the next year. The results should be used to inform the choice of species for transplant / supplemental revegetation and other factors which may influence survival.

STORMWATER MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes it is possible to develop storm water management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate storm water management are increased erosion risk and risks associated with flooding.

This Storm Water Management Plan addresses the management of storm water runoff from the development footprint and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of storm water management measures and infrastructure are:

» Topography and slope gradients;
» Placing of infrastructure and infrastructure design;
» Annual average rainfall; and
» Rainfall intensities.

The objective of the plan is, therefore, to provide measures to address runoff from disturbed portions of the development footprint, such that they:

» do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses, provided the relevant water use authorisation allows for this.
» do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the facility infrastructure, if not necessary, and provided the relevant water use authorisation allows for this.
» do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water, unless permissible in any relevant water use authorisation.

This Storm Water Management Plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various storm water management principles should be considered including:

» Prevent concentration of storm water flow at any point where the ground is susceptible to erosion.
» Reduce storm water flows as far as possible by the effective use of permissible attenuating devices (such as swales, berms, silt fences) where allowed in terms of any water use authorisation, if applicable. As construction progresses, the storm water control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
» Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.

- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary and where allowed in terms of any water use authorisation, if applicable.
- Minimise the area of exposure of bare soils to minimise the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of storm water flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all storm water control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct storm water management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development storm water flow should not exceed the capacity of the culvert. To assist with the storm water run-off, gravel roads should typically be graded and shaped with a 2-3% crossfall back into the slope, allowing storm water to be channelled in a controlled manner towards the, natural drainage lines and to assist with any sheet flow within the development footprint.
- Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development storm water flow at that point. Provide detention storage on the road and/or upstream of the storm water culvert. Where any culverts are required within watercourses, this may only be undertaken if absolutely necessary and where the relevant water use authorisation allows for this, where applicable.
- Where water use authorisation is required and permits, design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
- Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by storm water must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the storm water system.
- Preferably all drainage channels on site should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Storm Water Management Plan describing and illustrating the proposed storm water control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of this Storm Water Management Plan. This should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction) must be indicated within the Final/Updated Storm Water Management Plan.
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Storm Water Management Plan.

- The drainage system for the development footprint should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying storm water around and away from infrastructure.
- Procedures for storm water flow through a site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
- An on-site Engineer or Environmental Officer is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- The EPC/ Civils/ Construction Contractor holds ultimate responsibility for remedial action in the event that the approved storm water plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Storm Water Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Storm Water Management Plan are met before, during and after construction. The Storm Water Control Method Statement must also comply with any relevant water use authorisation, where applicable. The designated responsible person on site, must be indicated in the Storm Water Control Method Statement and shall ensure that no construction work takes place before the relevant storm water control measures are in place, and are in compliance with any relevant and applicable water use authorisation.

An operation phase Storm Water Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of the construction phase detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must include the following:

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

The Tshepong PV solar facility is proposed to be located on the Farm Free State Geduld 448 under the jurisdiction of the Matjhabeng Local Municipality and the Lejweleputswa District Municipality, Odendaalsrus, Free State Province.

The purpose of the facility will be to provide up to 10MW of power to the Tshepong Mining Shaft of the Harmony Gold Mining Company for operational purposes. The aim of the proposed project is to reduce the Harmony Gold Mining Company's dependency on Eskom to supply energy whilst simultaneously decreasing their carbon footprint.

In order to evacuate the generated power into the Harmony Gold Mining Company's Tshepong shaft, a grid connection needs to be established. An overhead power line will be the connection between the mini substation on the PV Solar Facility and the main substation which will be used as the connection point to the shaft. The main substation associated with this grid connection will be the existing Anglo Geduld Substation.

The facility development footprint, which is proposed to be approximately 19.6ha in extent, will include the following infrastructure:

» Photovoltaic (PV) panels of up to 5m in height (fixed-tilt/static or tracking technology) with a generating capacity of up to 10MW.
» Mounting structures to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels.
» Cabling between the project components, to be lain in trenches ~ 1-2m deep.
» Power inverters between the PV arrays.
» Transformers with a step-up of up to 33kV.
» A mini-substation.
» An over-head power line of up to 33kV voltage for the distribution of the generated power which will be connected to the Anglo Geduld substation.
» A main external access road that leads to the development site and minor internal roads (5 meters in width) between the PV arrays.
» Office, workshop area for maintenance and storage.
» Lighting and fencing will be available in and around the facility for security and visibility purposes.
» During construction (temporary infrastructure) such as laydown areas will also be required.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

» Local Emergency: An alert confined to a specific locality.
» Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
» Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the EO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

- All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
- All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
- No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk (in event of a major spill).
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times

during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies located outside of the study area. The following methods could be used:

» *Dykes* - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches* - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags or where unsuitable, other appropriate containers for future disposal. All materials mentioned in this section are to be available in or alongside the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

iii. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify the Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.
7. Record the incident on the company database or filing register.

i. Procedures

Because large scale fires may spread very fast it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguishers, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in the use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

In terms of the requirements of NEMA[1], the responsible person must, within 14 days of the incident, report to the Competent Authority, as well as the provincial head of department (for environmental affairs) and municipality.

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The Site Manager must have copies of the Report form to be completed.

[1] Incident, defined in terms of Section 30 of NEMA: "means an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property".

SUMMARY: RESPONSE PROCEDURE

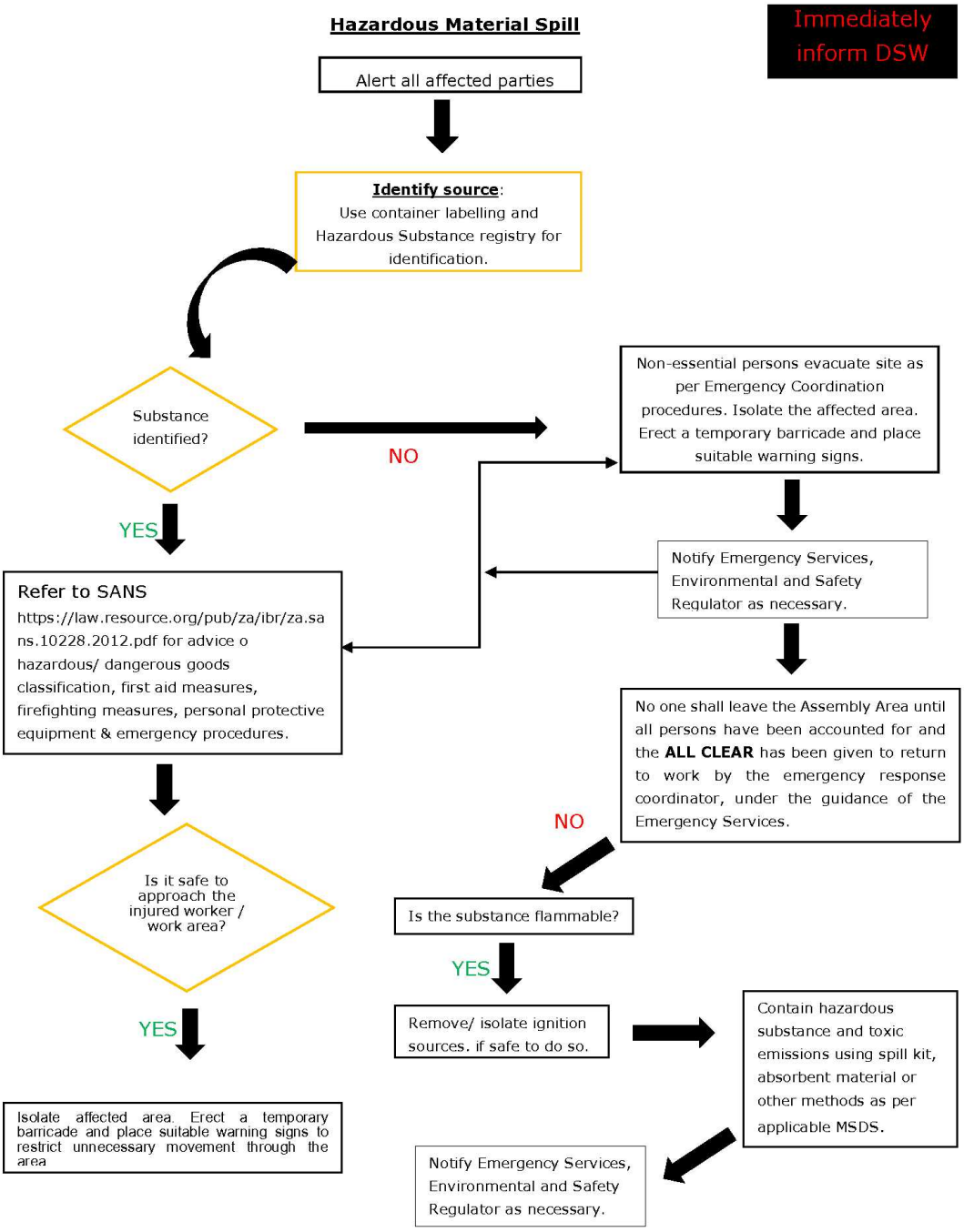

Figure 1: Hazardous Material Spill

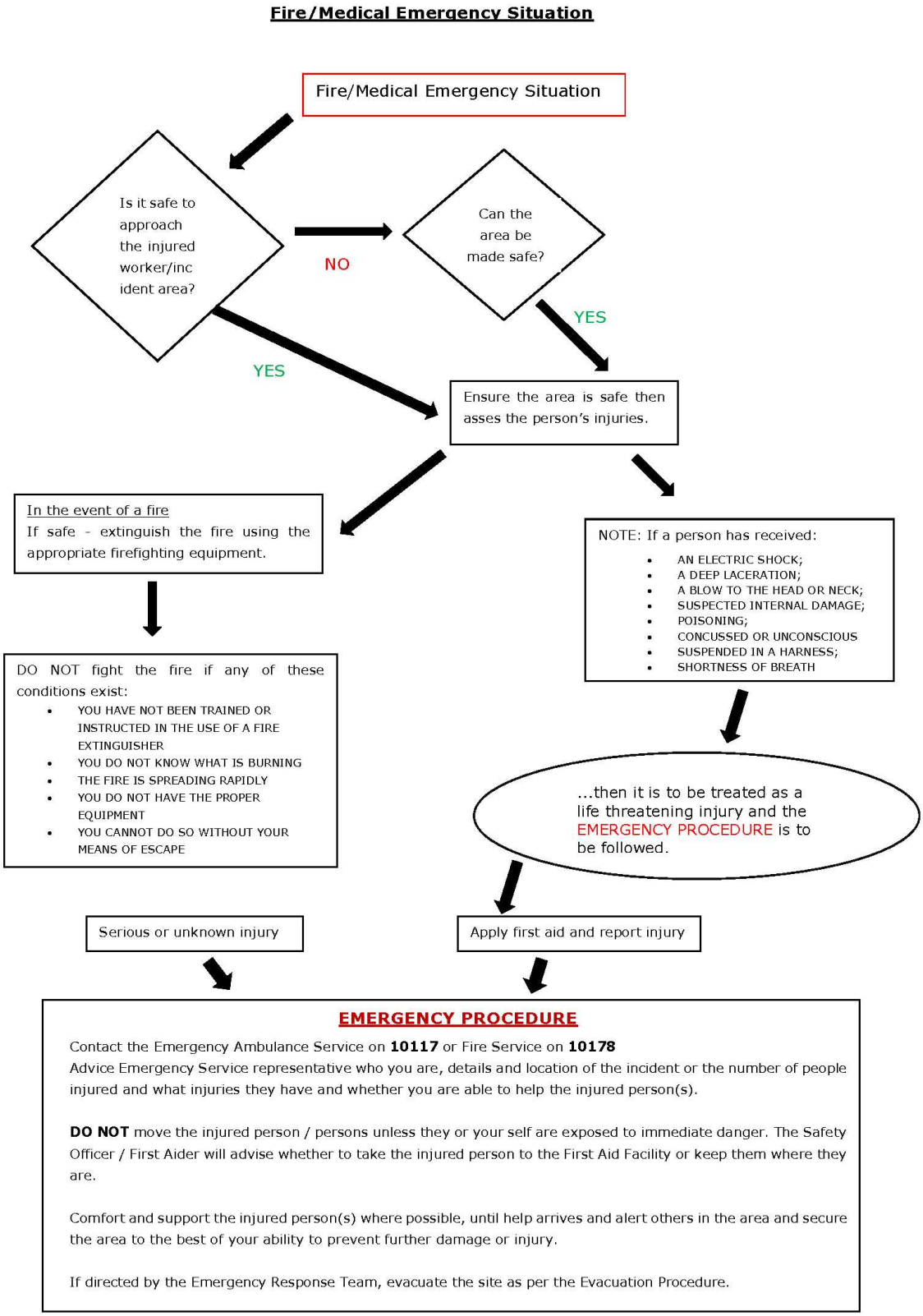

Figure 2: Emergency Fire/Medical

4. PROCEDURE RESPONSIBILITY

The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor or Project Company, is responsible for managing the day-to-day on-site implementation of this Plan, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental emergencies or incidents and related issues.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness programmes.