

Environmental Management Plan (EMP)



For the Construction of a 2.75 MW PV Plant in Okongo Village

Prepared for



**Dezman Solar
Investments (PTY) Ltd**

Prepared by



TRINITY ENVIRONMENTAL SOLUTIONS
Email: trinityenvir@iway.na
PO BOX 3559
Windhoek, Namibia

22 October 2020

TABLE OF CONTENTS

NO.	SECTION	PAGE
1.	INTRODUCTION	2
1.1	Objectives	4
1.2	Summary of the types of construction work to occur	5
2.	LEGISLATIVE FRAMEWORK	6
3.	ROLES AND RESPONSIBILITIES	7
3.1	Okongo Village Council	7
3.2	Environmental Manager	7
3.3	Dezman Solar Investments (PTY) Ltd	9
4.	COMMUNICATION, RECORD KEEPING, DOCUMENT CONTROL AND COMMUNITY RELATIONS	10
5.	COMPLIANCE WITH EMP	12
6.	CONCLUSION	13
7.	ASSESSMENT OF ENVIRONMENTAL ASPECTS AND PROPOSED MITIGATION MEASURES TO BE PERFORMED BY DEZMAN SOLAR INVESTMENTS DURING CONSTRUCTION AND OPERATIONAL PHASES	15

1. INTRODUCTION

The Namibian electricity industry stands at a cross roads. Internationally high oil and commodity prices have had a ripple effect on the price of gas and coal. Energy prices are escalating at alarming rates. Global warming and a growing awareness of the damage generated by fossil fuels is seeing increasing pressure on countries to turn to other ways of generating energy. Within Namibia there are growing misgivings about the Van Eck dry coal fired power station on the outskirts of Windhoek. And Eskom, the South African power utility that supplies half of Namibia's electricity, has not been able to keep pace with electricity demands in South Africa and is being forced to reduce power to parts of South Africa and neighbouring countries. Compounding this is the historic availability of cheap electricity from Eskom which has been an inhibiting factor to the construction of any new power stations in Namibia and to this day dominates the price expectations in Namibia.

At the same time Namibia has very limited options with using the traditional generation technologies of coal fired, hydro or nuclear power. Namibia does not have any coal reserves that have been proven to be exploitable and must import coal. It is simply cheaper to import electricity from South Africa than import South African coal. Namibia is a very dry country which limits hydro options. Nuclear is an option but is constrained by high capital costs and a relatively small skills base.

Yet there are more opportunities. As one of the countries blessed with natural sunlight, only small amount of Namibia's solar energy resources is utilized. Namibia has the advantage of abundant solar energy which can be utilized for electricity generation. However this platform is underutilized due to lack of knowledge, skills and funding.

Hence, Dezman Solar Investments (PTY) Ltd has secured funding to build a 2.75 MW Photovoltaic (PV) Plant in Okongo Village. The PV plant will be connected to the Namibian Electrical Grid electricity distribution company NORED who has already expressed interest in this project. The electricity produced is to be sold directly to NORED for distribution to its clientele; to complement the national requirements during peak and daytime consumption hours which occur from sunrise to the late afternoon. Thus, this project will help reduce the importation of power by Namibia which is ever increasing year on year.

Photovoltaic offers consumers the ability to generate electricity in a clean, quiet and reliable way. Photovoltaic systems are comprised of photovoltaic cells, devices that convert light energy directly into electricity. Because the source of light is usually the sun, they are often called solar cells. The word photovoltaic comes from “photo” meaning light, and “voltaic” which refers to producing electricity. Therefore, the photovoltaic process is “producing electricity directly from sunlight.” Photovoltaics are often referred to as PV.

Okongo Village is situated in the northern part of Namibia, in the Ohangwena Region in Okongo Constituency (Figure 1). The Constituency supports a population of about 25000 (NPC, 2012) of which about 10% reside in the in Okongo Village.

The proposed facility would generate 2.75 MW and cover approximately 4.5 hectares (ha) (Figure 2). At least 80% of the area is a cultivated land which was secured from the farmer, Mr. Josef Nangolo.

According to the Regional power status of Africa 2010 report, Namibia generates about 1,305 GWh, while it consumes more than 3000 GWh. Table-1 below provides the electricity gap of what Namibia generate locally and what is consumed in the whole economy for a period of 10 years (2000-2010). Since 2000 Namibia power generation has been below 2000 GWh and average at 1,470 GWh. The total demand or consumption needed for the country started with 1,318 in the year 2000 and the trend continues to rise. This demonstrates that as Namibia strives into becoming an industrialized nation by 2030, more economic activities will require substantial amount of power.

The gap between what Namibia generate locally and what is required for country’s economic activities production is imported from the neighbouring countries such as South Africa, Zambia, Zimbabwe and Mozambique to cover the supply gap of electricity.

As a responsible Company, Dezman Solar Investments is committed to enhancing positive biophysical and social environmental impacts of the project while mitigating negative impacts of the project. During the scoping exercise, Dezman Solar Investments through its officials indicated that they attach great importance to environmental sustainability and human well-being. Dezman Soar Investments also

recognizes the high correlation between environmental sustainability and human well-being through good health that depends on healthy ecosystems, clean water and air.

Therefore, this Environmental Management Plan (EMP) has been prepared with a view to comply with Namibia's Environmental Assessment Policy of 1995, the Environmental Management Act No. 7 of 2007 [Section 27(2)(a & h)], Government Notice No. 29 of 2012 (Listed Activities, No. 1 (a & b), No. 4 and the Government Notice No. 30 of 2012 (EIA Regulations).

The proposed site area is located at the following geographical coordinates:

- Latitude: -17.584368°S
- Longitude: 17.208283°E

1.1 Objectives

The objectives of this EMP are to:

- Promote sustainable development by encouraging conservation and mitigation of significant negative impacts to the natural and social environments.
- Inform the Okongo Village Council and their appointed Environmental Manager, and Dezman Solar Investments and their appointed Environmental Control Officer about their roles and responsibilities regarding environmental management in the project.
- Identify specific actions to be taken by the Dezman Solar Investments to prevent or minimise negative significant impacts to the natural and social environments.
- Identify laws, regulations and standards that are applicable to the environmental management of this project.
- Describe monitoring and verification procedures to be employed by the Environmental Manager to ensure that Dezman Solar Investments complies with all requirements of the EMP.
- Establish the procedures, fines and penalties that could be applied by the Okongo Village Council and Environmental Manager when the Dezman Solar Investments does not comply with the EMP.

1.2 Summary of the types of construction work to occur

Application for the Environmental Clearance from the Directorate of Environmental Affairs (DEA) is being made for the construction of the 2.75 MW PV Plant in Okongo Village.

Key project activities includes procurement of property rights and title, land clearing and levelling, removal of unwanted and hazardous materials, security infrastructure including fencing, lighting, motion detectors, unauthorized entry deterrents; construction of permanent structures including administration building, security and maintenance staff housing, water infrastructure, staff housing utility needs; construction of access road (already there), PV mounting system; point of connection to the electrical grid (11KV line about 350m long to the existing Okongo Sub-Station) including poles, conductors and safety terminals.

The following summary of plant construction describes the extent of environmental disturbance:

- Clearing of trees and vegetation from a 4.5 hectare area. Note that the clearest part of the 20 hectare site will be selected to minimize required clearing. Clearing is facilitated without burning.
- USA-Macertified Iron-Ridge solar mounting racks, built of aluminium, cast iron, and stainless steel, requiring shallow concrete peers of less than 1.5m of depth.
- Electrical trenching of less than 1 meter below surface, encased in PVC conduit, water piping as well uses standard available #10-25mm water pipe in 50cm depth trenches.
- Trenching and peer digging, as well as foundation construction of the out building performed manually.
- 11KV overhead high voltage line connects the utility to the plant via standard electrical poles supplied by NamPower.
- PV panels mounted at 20 degrees from horizontal, no panel glare expected to surrounding citizens (Figure 6 and Figure 7).
- Low voltage noiseless output string inverters supplying AC to the step up transformers (Kaco IEC approved).
- Two step-up transformers supplied by Rel-Trans Corp (South Africa) mounted on cement platforms at 1.5m above ground level.

- Minimum 2.4m high industrial security fence surrounding the plant site.
- Access roads constructed via 20cm compacted gravel topping over top of existing sandy soil.
- All high voltage lines and transformers encased and protected from possibility of contact to animals or people even when inside of plant compound.
- Clear water only used for plant maintenance i.e. removing dust from panels.
- Any rubbish or leftover construction material is immediately removed from plant site and delivered to an appropriate land fill site.

2. LEGISLATIVE FRAMEWORK

The proposed project is a listed activity in terms of the Namibia's Environmental Assessment Policy of 1995, the Environmental Management Act No. 7 of 2007 [Section 27(2)(a & h)], Government Notice No. 29 of 2012 (Listed Activities, No. 1 (a & b), No. 4 and the Government Notice No. 30 of 2012 (EIA Regulations). The table below summarises of some of the legislation and policy guidelines that are relevant to the proposed project.

Table 1: Relevant Legislation and Policy Guidelines

Title of legislation, policy or guideline	Implications for proposed development
The Namibian Constitution of 1990	The Constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.
Water Resources Management Act No. 11 of 2013	This Act protects all water resources in Namibia. The Act also laid down conditions to ensure that proper wastewater treatment is provided, including requirement for wastewater discharge permit from the Directorate of Water Affairs.
Forest Act No. 12 of 2001 and as amended	The purpose of this Act guides the use and management of forestry and related resources. The aims of the forest management as per the Act, is to achieve manage of forest "for which forest resources are managed and developed, including the planting of trees where necessary, to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is compatible with the forest's primary role as the protector and enhancer of the natural environment."
Environmental Management Act No. 7 of 2007	The Act provides a list of projects requiring an Environmental assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and control of activities which may have significant effects on the environment.
Electricity Act No. 2 of 2000 and as amended	The objectives of the Electricity Act is to establish the Electricity Control Board to: (a) exercise control over and regulate the provision, use and consumption of electricity in Namibia. (b) oversee the efficient functioning and development of the electricity industry and security of electricity provision. (c) ensure the efficient provision of electricity.

	(d) ensure a competitive environment in the electricity industry in Namibia with such restrictions as may be necessary for the security of electricity provision and other public interest. (e) promote private sector investment in the electricity industry.
Public Health Act, No. 36 of 1919 and as amended and Regulations	This Act makes provision for the prevention and control of infectious diseases, venereal diseases and epidemics. It also regulates sanitation, food and public water supplies.
National Waste Management Policy, 2010	This policy is focusing specifically on Waste Management and use of various technologies waste treatment and disposal to minimize health risks. It is also geared to have a unified waste management system country wide. This policy provides the necessary guidance on the processes related to waste management in the MOHSS, wider Namibia health and social welfare sectors, and other relevant stakeholders. It is taking into consideration the process of integrated waste management from generation to final disposal. This practice also focus on medical, household, mining, agricultural, and construction waste.
Pollution Control and Waste Management Bill of 1999	The Bill promotes sustainable development and the establishment of the Pollution Control and Waste Management Unit; to prevent and regulate the discharge of pollutants to the air, water and land; to make provision for the establishment of an appropriate framework for integrated pollution prevention and control; to regulate noise, dust and odour pollution; to establish a system of waste planning and management; and to enable Namibia to comply with its obligations under international law in this regard.
Local Authorities Act, 1992 (Act 23 of 1992) and as amended	This Act provides for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters.
Okongo Village Council Regulations, Bye-laws and Policies	The Council of the Village can under section 94(1) (k) of the Local Authorities Act, 1992 (Act No. 23 of 1992), set regulations. These regulations control the development of Village. Other instruments include Bye-laws and Policies.

3. ROLES AND RESPONSIBILITIES

The EMP requires the involvement of multiple stakeholders: Okongo Village Council and their appointed Environmental Manager, and Dezman Solar Investments and their appointed Environmental Control Officer. The following are the responsibilities of the different key stakeholders:

3.1 Okongo Village Council

- Review reports regarding the implementation of the EMP.
- Following the guidelines of the EMP, give warnings and impose fines and penalties on Dezman Solar Investments when Dezman Solar Investments neglects to implement the EMP satisfactorily.

3.2 Environmental Manager

Okongo Village Council will appoint an Environmental Manager during the construction of the PV Plant.

***Please note that due to the nature of this proposed development, and at the discretion of the Okongo Village Council, an experienced and qualified staff member of the Council or appointee may perform the duties of the Environmental Manager described below in lieu of independent Environmental Manager being appointed to perform such duties.**

The Environmental Manager should visit the construction site on a bi-monthly basis to perform environmental audits of Dezman Solar Investments' operations. The Environmental Manager will provide his/her findings to Okongo Village Council and to Dezman Solar Investments.

The following are the responsibilities of the **Environmental Manager**:

- Be familiar with all aspects of the EMP.
- Responsible for ensuring that Dezman Solar Investments complies with this EMP throughout the construction and operational phases.
- Review and approve Dezman Solar Investments' Management Plan based on guidance provided by the Environmental Manager.
- Monitor Dezman Solar Investments' compliance with the EMP on a daily basis.
- Discuss EMP issues at every monthly site meeting (with input provided by the Environmental Manager when he/she attends the site meeting).
- Communicate to Dezman Solar Investments, verbally and in writing, regarding any matters of non-compliance.
- Ensure that land areas are properly designated according to the approved construction site layout, including sensitive environments and “**No-Go**” areas.
- Undertake damage assessments where incidents, accidents and serious infringements have occurred.
- Inspect and approve all areas that have been rehabilitated by Dezman Solar Investments.
- Review complaints received and issue instructions to Dezman Solar Investments as necessary.
- Maintain a record of complaints from the public and communicate the complaints to Dezman Solar Investments.
- Enforce temporary work stoppages where serious environmental or health & safety infringements and non-compliances have occurred.

- Perform bi-monthly environmental audits to inspect the site and determine whether Dezman Solar Investments' operations are in compliance with the EMP.
- On a monthly basis, attend site meetings with Dezman Solar Investments and Okongo Village Council.
- Prepare a monthly environmental audit report to communicate findings of site visit to the Okongo Village Council.
- Provide guidance to the Okongo Village Council on matters of non-compliance.
- Undertake damage assessments where incidents, accidents and serious infringements have occurred.

3.3 Dezman Solar Investments (PTY) Ltd

The following are the responsibilities of Dezman Solar Investments:

- Fully implement the conditions stipulated in the Authorisation and Record of Decision issued by Environmental Commissioner/Directorate of Environmental Affairs (DEA) and any other competent regulatory body having authority over the project or the activities concerned.
- Fully implement the EMP and ensure compliance throughout the project duration.
- Appoint an Environmental Control Officer who is to oversee all aspects of the implementation of the EMP and communicate with Okongo Village Council on all EMP-related issues.

***Please note that due to the nature of this proposed development, an experienced and qualified Dezman Solar Investments staff may execute the duties described below for Environmental Control Officer, rather than the Dezman Solar Investments appointing an independent, full time Environmental Control Officer for the project.**

- Prepare and submit a monthly report concerning environmental management, health and safety to be reviewed on request by the Competent Authority (Environmental Commissioner) and monthly by the Okongo Village Council. The report content should cover: any training performed; status of training received by all staff and Dezman Solar Investments' Contractors staff; copies of Dezman Solar Investments' weekly Site Inspection Forms; summary of any issues or incidents concerning environmental management or health & safety,

and what Dezman Solar Investments has done to address the issues and incidents that have been identified by Dezman Solar Investments or by the Okongo Village Council.

- Ensure that all employees and Contractors on site are informed about environmental and health & safety responsibilities, practices and procedures.
- Perform daily inspections to monitor environmental management and health & safety performance.
- Notify the Okongo Village Council immediately in the event of any accident or infringements of the EMP and ensure appropriate remedial action is taken.
- Notify the Okongo Village Council at least 10 working days in advance of any activity s/he has reason to believe may have significant adverse environmental impacts, so that mitigatory measures may be implemented timeously.
- Identification and enforcement of environmental “No-Go” areas (to be approved by the Okongo Village Council).
- Ensure that stockpiles and construction waste is stored and disposed off according to the agreed upon plan.
- Undertake rehabilitation of all areas affected by construction activities to restore them to an acceptable state, as determined by the Okongo Village Council.

4. COMMUNICATION, RECORD KEEPING, DOCUMENT CONTROL AND COMMUNITY RELATIONS

Dezman Solar Investments will perform the following types of communication and record keeping:

- Dezman Solar Investments shall ensure that all his/her senior staff and Contractors staff are familiar with the contents of the EMP and other relevant Plans.
- Keep record of significant incidents (e.g. spills, impacts, complaints and illegal transgressions, as recorded in the Dezman Solar Investments’ weekly Site Inspection Forms) as well as corrective and preventive actions taken, for submission to the Okongo Village Council at the scheduled monthly meetings along with copies of the Site Inspection Forms. Dezman Solar Investments shall inform the Okongo Village Council immediately about any emergencies (including spillages) on site and along the transport routes. Dezman Solar Investments shall submit a full report on the handling of the emergency as soon as possible (i.e. within the following hours or days). The following details shall be discussed in the report:
 - Nature and cause of environmental damage.

- Type of material spilled and volume spilled.
 - Description of clean-up activities, and restoration actions taken and/or to be taken.
- Keep a register of public complaints in which all complaints are recorded, as well as action taken. Dezman Solar Investments shall notify the Okongo Village Council of any relevant complaints lodged by a third party and provide appropriate information for inclusion in Dezman Solar Investments' monthly environmental management and health & safety report.
 - Submit a monthly written report to the Okongo Village Council that provides details on Dezman Solar Investments' compliance with the EMP and environmental & health & safety performance. The monthly report on environmental management and health & safety shall include:
 - Findings of the weekly Site Inspection Forms.
 - Notice of any major incidents and complaints and follow up actions taken.
 - Documentation of variations to the EMP, non-compliances and corrective action.
 - Confirmation that appropriate environmental and health & safety training of personnel has been, and is being, undertaken.
 - Confirmation that emergency procedures are in place and have been effectively communicated to all personnel.

Dezman Solar Investments shall facilitate an ongoing and constructive relationship with communities. This will include the following actions:

- Where necessary, Dezman Solar Investments shall erect and maintain information boards in appropriate positions. Such boards shall also include contact details where members of the public may address any complaints or comments they may have.
- The public shall be kept informed of any activities that may cause a disturbance, such as dust, poor bypass roads, loud and noisy construction activities.
- The Dezman Solar Investments shall maintain a Public Complaints Register in which all complaints are recorded.

5. COMPLIANCE WITH EMP

Dezman Solar Investments shall ensure that all construction staff, suppliers, etc. are familiar with, understand, and adhere to this EMP. Failure by any employee of Dezman Solar Investments, Sub-consultants, Suppliers to comply with the EMP shall be considered sufficient cause for the Okongo Village Council to instruct Dezman Solar Investments to have the relevant employee removed from the site. The Okongo Village Council may also order Dezman Solar Investments to suspend part or all of the works if there is non-compliance with the EMP. Such suspension shall be lifted only when the offending procedure or requirement is corrected and/or if required remedial measures are put in place.

6. CONCLUSION

The Environmental Management Plan (EMP) will form a basic tool for reducing the magnitude of impacts and suggesting practical measures to attain this. It is also used to measure compliance by the applicant. It is this tool that gives guidance during monitoring, auditing and taking corrective actions during its implementation, thereby ensuring continuous monitoring of the environment. This EMP was developed after an environmental assessment was performed. Any conditions of the Authorisation received from the Competent Authority should be incorporated and implemented by the Dezman Solar Investments to complement this EMP.

Key sustainability principles to be emphasised include:

- Development must not irreversibly degrade the natural, built, socio-economic and governance resources on which it is based.
- Current actions should not cause irreversible damage to natural and other resources, as this potentially prevents the realisation of future sustainable options.
- Where there is uncertainty about the impact of activities on the environment, caution should be in favour of the environment.
- Land use and environmental planning need to be integrated.
- Immediate and long-term actions need to be identified and planned for, so that urgent needs can be met while still progressing towards longer-term sustainable solutions.

This EMP should be implemented throughout the project life-cycle, e.g. during pre-construction, construction, operation and decommissioning, in order to minimize negative impacts and enhance positive ones. It is intended that this EMP is a practical working document which sets out the guidelines for effective mitigation.

7. ASSESSMENT OF ENVIRONMENTAL ASPECTS AND PROPOSED MITIGATION MEASURES TO BE PERFORMED BY DEZMAN SOLAR INVESTMENTS DURING CONSTRUCTION AND OPERATIONAL PHASES

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Occupational Health and HIV and AIDS	Prevalence of HIV might increase due to the project. The immigration of mainly single persons to the construction site presents a perfect opportunity for local community members to engage in unsafe, sex-for-cash sexual relations.	<ul style="list-style-type: none"> HIV/AIDS awareness and prevention, and general hygiene training programmes should be developed and implemented before any construction commences. The main target group is the staff members, but the public may also be encouraged to attend. Follow up awareness raising and education should be conducted at least every six months. 	Dezman Solar Investments	Review of the presentation material used for the awareness raising/education session, interviews with construction staff/labourers, and general observations.
Environmental Health and Safety	As a result of increased human population on site and project associated activities, the risk for environmental pollution is high.	<ul style="list-style-type: none"> A health & safety and environmental management training session(s) prior to commencing work on site shall be conducted for all staff members and sub-consultants. A follow up session(s) shall be conducted as needed to ensure all staff members and sub-Contractors have received training. 	Dezman Solar Investments	Review of the presentation material used for the training, interviews with construction staff/labourers, and general observations.
Socio-economic well-being	This project has potential to increase local economic growth through employment opportunities and sub-contracting services.	<ul style="list-style-type: none"> Semi-skilled and unskilled jobs should target local community members. Dezman Solar Investments should meet with local leaders to discuss opportunities for employment of local residents. 	Dezman Solar Investments	Confirmation of Dezman Solar Investments' discussions with local leaders.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Materials/Borrow Pits	The establishment of borrow pits to obtain material to be used for layerworks can lead to serious land degradation, injuries to people and wildlife, and can also result in dust exposure.	<ul style="list-style-type: none"> Existing borrow pits should be used if possible. Borrow pits shall be rehabilitated to the satisfaction of the Okongo Village Council. Borrow pits must be trimmed to a low angle of repose to ensure that the site does not pose danger to people and animals. Borrow pits should not be immediately next to the roads or near areas with high human activities, but should be far away as possible from the sensitive areas, roads and residential areas as far as possible. The organic top soil (layer from above ground down to 20 cm below ground) will be stripped and stockpiled separately. After the excavations, this organic soil should then be spread back evenly on the trimmed borrow pits slopes during rehabilitation. The top soil piles must not be mixed with other horizon soils. The rehabilitated borrow pits slopes should be slightly compacted to reduce effects of wind and water erosion. 	Dezman Solar Investments	Visual inspection prior to excavation, regularly (at least weekly) during construction, and after closure and rehabilitation.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Dust	Dust may be produced during construction and may be worsened when strong winds occur, posing a nuisance and potential health risk to area users and staff members.	<ul style="list-style-type: none"> Excavation, handling and transporting of layer materials must be minimised under high wind conditions. Dust suppression measures may be required, such as sprinkling the construction site with water to suppress the dust. Dust protection masks must be provided to all staff members working in dust polluted environment. All vehicles speeds should be controlled to reduced dust production, hence appropriate road signs should be placed to control the traffic speed. 	Dezman Solar Investments	Regular visible inspections
Noise	Noise pollution due to heavy-duty equipment and machinery on site. Disturbance of the wildlife and staff members' exposure to noise in the vicinity of the construction area will have to be taken into account during construction.	<ul style="list-style-type: none"> Ensure engines of construction machinery are fitted with mufflers. Equipment and machinery operators should be equipped with ear protection equipment. Operations should be strictly between 07H00 to 19H00. 	Dezman Solar Investments	Regular inspections.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Safety and Security	Earthmoving equipment used on site may increase the possibility of injuries to both staff members and the public. The presence of equipment and materials not securely stored may encourage theft.	<ul style="list-style-type: none"> • Dezman Solar Investments must ensure that all staff members are briefed daily about the potential risks of injuries on site. • All staff members shall receive health and safety training prior to working on any construction work. • Flammable materials (e.g. fuel for construction vehicles) should be stored as far as possible from sensitive receptors. • Storage of hazardous materials and substances shall be strictly in accordance with the appropriate risk and fire prevention standards. • Material Safety Data Sheets (MSDS's) for all chemicals and any hazardous substance used on site should be readily available on site at all times. • The Dezman Solar Investments is urged to ensure that adequate emergency facilities, including first aid kits, are available on site. • Adequate traffic and safety signs must be placed at the construction site to warn and inform all stakeholders about the construction and traffic conditions. • Dezman Solar Investments must adhere to all relevant laws, regulations, guidelines and policies with regards to labour aspects, health and safety standards. 	Dezman Solar Investments	Regular inspections and interviewing of staff

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
General Nuisance of the Construction Activities	Aesthetics and inconvenience caused to persons trying to access/exit the construction site, or other general nuisances arising from the construction activities.	<ul style="list-style-type: none"> • Dezman Solar Investments should maintain tidiness on site at all times. • Site camps will be properly marked to allow for better controls over access to the area. • Dezman Solar Investments must ensure that all borrow pits are rehabilitated at the end of construction to reduce unwanted aesthetic impacts. • Dezman Solar Investments should at all times keep “an open door policy” towards the local community. This will encourage cooperation and strengthen relationships. 	Dezman Solar Investments	Daily inspections and incidents reports reviews
Groundwater Contamination	Groundwater contamination can be caused by leakages and spills of fuel and oils from machinery and heavy-duty vehicles during the construction phase. Care must be taken to avoid contamination of soil and groundwater.	<ul style="list-style-type: none"> • Prevent spillages of any grease, oils, chemical or fuel product. Use drip trays during maintenance of vehicles and machinery. • The maintenance area must be equipped with a concrete floor surface to prevent soil and groundwater pollution. • All areas used for storage and cleaning of machinery or equipment and vehicles must be bunded with prescribed height, and covered with an impermeable floor surface. • Polluted soil should be collected and stored into containers and disposed off at appropriate and licensed dumping sites. • Collected waste fuels and oils or waste water contaminated with oils must be stored in containers and disposed off to licensed and appropriate dumping sites. 	Dezman Solar Investments	Daily inspection.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Surface Water Contamination	Surface water contamination can be caused by leakages and spills of fuel and oils from machinery and heavy-duty vehicles during the construction phase. Care must be taken to avoid contamination of soil and surface water.	<ul style="list-style-type: none"> • A site which is properly demarcated and lined should be allocated for machinery servicing. • The use of drip trays is highly recommended to prevent soil and water pollution. All spills should be cleaned up as soon as possible, after the incident. • The maintenance area must be equipped with a concrete floor surface to prevent soil and surface water pollution. • All areas used for storage and cleaning of machinery or equipment and vehicles must be bunded, and covered with an impermeable floor surface. • Where concrete is mixed on site, such activities will be carried out to avoid environmental pollution. Thus mixing of concrete will not be done directly on the ground and used cement bags should be stored and disposed off in a manner, which prevent pollution of the surrounding environment. • Polluted soil and water should be collected and stored into containers and disposed off at appropriate and licensed dumping sites. 	Dezman Solar Investments	Daily visual inspection. Surface water quality and soil pollution monitoring.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Generation of Waste	This can be in a form of contaminated soil, rubble, domestic waste and stockpiles.	<ul style="list-style-type: none"> • Stockpiles should be stored and/or disposed in accordance to the relevant policies and guidelines. • Ensure that no excavated soil, refuse or building rubble generated on site are placed, dumped or deposited on adjacent/surrounding properties or land. • Wind and animal proof bins must be provided at demarcated areas. Waste must be disposed off at a licensed waste disposal site. • Ensure that hydrocarbon contaminated soil is bio-remediate before being disposed in the environment. • No littering or dumping of solid waste of any description is permitted on the site. All litter especially plastics and other materials capable of being dispersed by the wind and constituting hazard to public livelihoods' activities should be collected daily, properly stored before disposed off at an approved dumping site. • Construction waste should be recycled whenever possible, in accordance with the waste management plan. • Domestic wastewater should be collected into appropriate sewage tanks, and treated with appropriate chemicals. • Toilets should be provided to male and female staff members at a ratio of 1:10. • No burning of refuse shall be allowed. 	Dezman Solar Investments	Daily inspection and housekeeping procedure and monitoring programs.

Identified Aspect		Proposed Mitigation Measures	Responsible Party for Mitigation Measures	Proposed Monitoring to be Performed
Protection of Biodiversity and Cultural Heritage	As a result of motorised activities and human presence on site, disturbances can occur that could threaten biodiversity, ecosystems functions and services and cultural heritage.	<ul style="list-style-type: none"> • Site Management Plans depicting preferred site for construction camps, permanent way for materials collection and storage, no-go sensitive and protected areas, known materials/borrow pits, etc. need to be developed by the Dezman Solar Investments with the assistance of the Okongo Village Council. These plans need to be documented, refined, updated, and implemented prior to the commencement of work at any location. • There was no cultural heritage observed during the assessment. Dezman Solar Investments should regularly communicate with the Okongo Village Council to identify cultural heritage sites. If such sites are found or excavated, construction should immediately stop and relevant authorities should be informed. Construction works can only resume with written approval from the relevant authorities. • No water should be abstracted from any source without specific written approval from relevant authorities. • Staff members are not allowed to engage in illegal activities such poaching, illegal harvesting forest products including timber and non-timber productions. • To minimise land degradation, no off-road driving is allowed except on demarcated access and hauling roads. • The confines of the site, especially haul and access roads shall be clearly marked and signposted by the Dezman Solar Investments at the direction of the Okongo Village 	Dezman Solar Investments	Review of the Site Management Plans and daily inspection of the site.

		<p>Council.</p> <ul style="list-style-type: none">• Access and haul roads should be rehabilitated by ripping them so to facilitated water penetration and seed bank establishment.• All necessary measures should be implemented to minimise fauna displacement and flora destruction.• No fires are allowed on site at all times, unless dually authorised by the Dezman Solar Investments.• Soils from areas infested with invasive flora should not be hauled from those specific areas. The risk of such species dispersing and displacing natural vegetation is very high, thus the Okongo Village Council should be consulted at all times to ensure that invasive plants are not accidentally dispersed.• Any person or institution or company not complying with these specifications are liable to fines and penalties as indicated in this EMP and other relevant contracts conditions, relevant laws, and regulations.		
--	--	---	--	--

