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RAPTORS VIEW HOME OWNERS ASSOCIATION

ENVIRONMENTAL MANAGEMENT PLAN

FOR THE

CONSTRUCTION OF A DAM AND ASSOCIATED ATTENUATION PONDS IN THE RAPTORS VIEW WILDLIFE ESTATE REMAINDER OF PORTION 1 OF THE FARM HAPPYLANDS 214 KT

LEDET REF: (12/1/9/S24G-M11)

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1. INTRODUCTION

Tellurian Environmental was commissioned to compile an Environmental Management Plan for the constructed dam and associated attenuation ponds on the Raptors View Wildlife Estate, Hoedspruit, Limpopo.

The EMP can be seen as a life cycle document and constitute in a 'Cradle to grave' principle. This requires that the document complies with NEMA principles and make it therefore legally binding.

The objectives of this EMP are as follows:

- To minimise disturbance to the environment – biological, physical and socio-economic.
- To identify impacts and propose measures for their mitigation.
- To address impacts in terms of their spatial and temporal aspects.
- To identify potential environmental benefits, such that the development may enhance the greater environment of the area.
- To identify the actions to be taken and related responsibilities to ensure that environmental management is effected.
- To be a "cradle to grave" document. That is, the document is considered to be a live document that can be reviewed and updated over time to ensure optimal environmental management across the life of the development.

The focus of the EMP is on the identification of impacts, proposed mitigation measures and the establishment of actions and responsibilities in terms of the development activities.

1.1. Project Background

Tellurian Environmental was appointed by the Raptors View Home Owners Association (RVHOA) to conduct an S24G Rectification Application and Environmental Assessment for the construction of a dam wall in the draining line emanating from the storm water runoff from the town of Hoedspruit and upstream of the Sandspruit River. The dam wall was constructed on the Remainder of Portion 1 of the farm Happylands no 241, Registration Division KT. Small attenuation ponds upstream of the dam have also been constructed outside the drainage line. These two ponds are used to attenuate grey water and storm water leaving the school grounds. The reference number for the S24G rectification application for the construction of the dam is 12/1/9/S24G-M11.

These have been constructed without prior environmental authorisation. However the entire Raptors View Wildlife Estate has been constructed with an environmental authorisation in place. The original estates authorisation was issued under ECA (1989). The Record of Decision (RoD) is dated 25/08/2001 with the reference number: 16/1/10/3-27. The purposes of this management plan is to ensure that the specific areas including the dam and attenuation ponds are properly managed. Focus is given to the proper management of upstream and downstream areas as well as the structures themselves. All other areas on the property are excluded from this management plan as it is not relevant to this application.

Potential problems facing the site due to the construction of the dam and attenuation ponds includes the following:

- Interference in the flood regime of the drainage line.
- Breakage or damaging the dam wall or gabion structures will result in erosion and silting of downstream reaches.
- Disturbance of localised area induces encroachment of alien invasive species.
- Release of water downstream may release alien invasive species into downstream water.

Potential improvements due to the construction of the dam include the following:

- Prevention of silt entering the Sandspruit and siltation downstream of the constructed dam due to collection and attenuation of storm water, the constructed attenuation ponds, the constructed dam and the larger dam (constructed in the 1970"s) downstream of the constructed dam.
- Attenuation of floods produced by excess storm water runoff.
- Preventing polluted water emanating from storm water runoff from the town of Hoedspruit entering the Sandspruit and the larger dam, directly adjacent to the Sandspruit, downstream of the constructed dam.
- Prevention of erosion of banks by means of slowing water.
- Preventing potential spills from the town Waste Water Treatment site from entering the downstream areas. Acting as vegetated bioswale and filtering water.
- Potential for re—use of grey water stored in the attenuation ponds for irrigation of the sport fields, therefore saving water.

The dam and attenuation structures must be properly managed to prevent the potential problems from arising and to enhance the positive impact associated with it. This EMP outlines the proper management of the structures and allows for ease of implementation.

2. COMPLIANCE WITH THE EMP

The EMP is a lifecycle document for the project and considers the mitigation of detrimental impacts as per NEMA principles. This document can act as a legally controlling document to contractors working on site. This document should be implemented by the Applicant and contractors should be obliged to apply the principles set out in this document.

3. IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PLAN (EMP)

This Environmental Management Plan (EMP) will be issued to the client and contractors for use during the implementation of the project. A recommendation could be to appoint an official to act as Environmental

Control Officer (ECO) that will ensure smoother reporting and direct responsibility of the environmental management programme.

Steps to be followed:

Appointment of an Environmental Manager / Environmental Controlling Officer responsible for ensuring that the EMP is implemented and submitting six monthly reports for the duration of the operation period, or as required.

2.1. Appointment of Environmental Officer

During the rehabilitation and maintenance period, the Developer shall appoint an Environmental Control Officer (ECO) (an Official from a private company), who shall be a senior member of the construction team and have overall environmental management responsibilities on site. The site already makes use of the services of the Agricultural Research Council (ARC) on a permanent basis. The monitoring of the rehabilitation and maintenance work on the dam and attenuation ponds can be undertaken by the ARC as the designated ECO.

The ECO will have the following responsibilities:

- Monitor activities of the main contractor and all subcontractors, and ensure that mitigation measures contained in this document are adhered to.
- The ECO must submit six monthly reports to the Limpopo Department of Economic Development, Environment and Tourism (LEDET) on the status of the environmental compliance on site. Until such time that the Department is satisfied with the status of the dam and attenuation ponds on site.
- The ECO will be responsible for maintaining communication channels with Interested and Affected Parties (I&APs) and the surrounding community throughout the construction phase. A record of all correspondence (if any) should be kept noting date, details of I&AP, details of correspondence, issues discussed and follow-up action taken.

During the operational phase, the developers will be responsible for environmental management of the development. A responsible person should be appointed/ selected to be responsible for the following:

- Ongoing environmental management
- Compliance with this report
- Controlling where required

3.1. EMP compliance monitoring and audits

The ECO appointed will conduct regular monitoring inspections to ensure compliance with this EMP and keep records of such monitoring as these may be requested by LEDET.

The results of the monitoring inspections must be reported to the site manager and duly appointed managing member of the RVHOA, in the form of a regular six monthly report. The ECO shall also keep records of non-

compliance and how this was rectified. This should be included in the six monthly report. The rehabilitation and maintenance of the dam and associated attenuation ponds will be referred to as the "project" in the EMP action plan table below.

MANAGEMENT OF THE DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
	• The Proponent must appoint an Environmental Control Officer (ECO) to oversee the environmental aspects of the project if so required.	The Proponents	Once-off
General	• The ECO should form part of the project management team and should attend all project meetings. • An incident Log should be used to keep a record of non-compliance. • In the event of repeated non-compliance, a report, including the incident logs, should be forwarded to LEDET for review.	ECO, Proponent.	Continuous
Surface Water	• Clean out silt build-up in the dam and attenuation ponds on a quarterly basis. This will prevent the overflow of these structures and therefore erosion. • Conduct maintenance construction activities during the winter months. • Water must be monitored on a six monthly basis for ensure that water quality is maintained at a suitable level. • Ensure that pollution sources upstream of the dam and attenuation ponds are maintained, including the WWTW upstream of the structures. • Utilise water from the dams and attenuation ponds responsibly. Ensure that quality of the water being used for irrigation is suitable for distribution. If polluted water is used to irrigate, this may leach into the soil and cause contamination. Using water contaminated with faecal coliforms may be detrimental to the health of the student at the school as this will be spread across their school field.	Site Manager	As prescribed
Community participation and labour force for maintenance and rehabilitation work	• Employment of local labour for the purposes of maintenance and rehabilitation works, from the surrounding communities and the implementation of training is to be instituted for any maintenance or rehabilitation work. • The appointment could be combined with the requirement for the appointment of an ELO, i.e. the CLO and ELO may be one person with dual functions, and or the appointee may form part of the local labour procurement mentioned above. • It is recommended that the CLO should be a member of the community affected by the contract.	Contractor	As necessary
Storm water	• Quality, quantity and flow direction of surface water should be assessed and mitigated to protect	Site Manager	Once-off

MANAGEMENT OF THE DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
	watercourses and existing stormwater facilities from undue flooding, damage and erosion. • It should be ensured that all stormwater that results from the town of Hoedspruit is contained adequately in the stormwater system, and does not become a source of flooding to residences or cause breaks in the dam wall or natural water bodies. • Stormwater on the site must be managed, including measures to ensure that the energy of stormwater that is to be released into the drainage area is dissipated. Measures must be implemented to distribute stormwater as evenly as possible to avoid point sources of erosion. • Silt traps (interceptors) should be incorporated into the drainage system, where pollution risk is high from stormwater run-off. This has been done by means of the dam being built. This must however be properly managed. • Where the receiving environment needs to be protected from spillage events, spillage containment should be considered if water accidentally enters the drainage line and dam from the Waste Water. • Treatment Works (WWTW). Such a facility should have a minimum capacity equivalent to the capacity of bulk tankers and the dam should be sized in order to facilitate the storage of a major flood event. • Detention basins should be incorporated into the design as well as retention basins. In case of spillage or overflow. • The introduction of swales should be implemented to reduce flow velocity of runoff water, prevent erosion, and remove chemical and particulate pollutants in runoff. This is essential to protect the downstream areas from potential sewage discharge from the WWTW upstream.		
Environmental Disturbance	• Disturbance of natural vegetation should be minimised. • Vehicles working on the dam for the purposes of maintenance and rehabilitation must stick to designated paths.	Contractor	Once-off, monitor daily
Community participation and labour force	• Employment of local labour for the purposes of maintenance and rehabilitation, from the surrounding communities and the implementation of training is to be instituted during the time period of the contract. • The original vision of community participation of the project proposed that a Community Liaison Officer (CLO) be appointed by the contractor. This person should provide a bridge between the local	Contractor	As necessary

MANAGEMENT OF THE DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
	community, their community councillors and the consultant and contractor. • It is recommended that the CLO should be a member of the community affected by the contract.		
Flora and Fauna	• Indigenous vegetation must be used during rehabilitation of the site. • No exotic/invasive plants are to be planted on common ground of the site. • No listed invasive are to be planted in the residential areas during the operational phase of the dam. • Alien invasive species must be removed from the dam and attenuation pond areas. These must not be disturbed during their seeding phase as this will cause their seeds to spread downstream of the dam. Removal must be carried out before the plants seed. • Complete a visual survey of the site for protected species prior to rehabilitation and maintenance. These, if found, must be relocated if possible.	Contractor/ Site Manager	On-going
Riparian zone management plan	• No rubber, litter, solid waste, empty drums and chemicals may be disposed of or temporarily stored near the dam and attenuation ponds. • All rubble, litter, etc., must be removed by hand. • Soil retention measures should be implemented where invasive vegetation has been removed.	Contractor/ Site manager	On-going

MANAGEMENT OF THE DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
Access Roads	• Existing roads shall be used as far as possible. • No Deviation from approved access roads shall be allowed.	Contractor	As necessary
Solid Waste Control and Litter	• No littering by construction workers may be permitted during rehabilitation or maintenance. • Rubble and upgrading refuse should be collected and removed weekly.	Contractor/ Site Manager	Once off, Monitor weekly
Concrete and Chemicals	• Concrete shall be mixed only in areas, which have been specially demarcated for this purpose. • All concrete that is spilled outside these areas shall be promptly removed by the Contractor and taken to an approved dumpsite.	Contractor, or ELO	Continuous, Monitor daily during maintenance of structures

MANAGEMENT OF THE DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
	• After all concrete mixing is complete; all waste concrete shall be removed from the batching area and disposed of at an approved dumpsite. • Stormwater shall not be allowed to flow through the batching area.		
Landscaping	• No burning of the vegetation is allowed especially in winter months as veld fires can ensue and cause catastrophic consequences by burning masses of dry grass. • Only indigenous planting may be used on site and surrounding the dam and attenuation ponds. Only indigenous hydroseeding can be used for erosion control. The Veld Mix seed mix can be bought from Sakata Seeds for use on the site.	Site Manager	Once off, monitor regularly as necessary
Information Flow	• Information on any unforeseen circumstances or disasters must be made available to residents in a timeous manner.	Site Manager	As necessary

OPERATION AND MAINTENANCE OF DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
Maintenance	• All drainage structures must be regularly cleared of organic and inorganic debris and silts. • All constructed elements of the dams and attenuation ponds should be checked and maintained, to ensure they are in working order. • Waste and disposal structures should be maintained and emptied regularly. • Community awareness programmes and posters should be implemented to try to reduce litter and pollution. • Keep open storm water drain free of litter and rubble. • Make sure that the stormwater retention basins are in accordance with the Management plan dated 2 October 2011 and approved designs.	Proponent/ Site Manager	Yearly
Waste Management	• Ensure proper training of personnel and audit operations periodically. • Ensure that any sewage entering the dam from spillage experiences upstream at the WWTW are mitigated. • Conduct regular water quality testing to ensure the water entering the site is free of sewage.	Proponent	Daily

OPERATION AND MAINTENANCE OF DAM AND ATTENUATION PONDS			
POSSIBLE IMPACTS	**ACTION**	**RESPONSIBILITY**	**FREQUENCY OF ACTION**
	• If water entering the dam contain faecal coliforms, the necessary measure must be taken by the Municipality to prevent spillage at the WWTW upstream of the dam. • Regular inspection of the WWTW must be undertaken by the Municipality to prevent leakage.		
Health Safety	• The dam must be inspected for leaks or potential for breaching of the dam wall on a regular basis. • An outlet pipe should be installed at the base of the dam to prevent overtopping of the embankment leading to the dam failure. • The dam wall must be built at an angle of approximately 45 degrees with a ratio of 2:1 horizontal to vertical slope. This will prevent collapse.	Site manager / Construction Manager	Monthly