Quality Management

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MALELANE SAFARI LODGE
ROADS & STORMWATER REPORT  Rev 1

2015/02/18

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Proposed Realignment Of Road S114 & Access To The Lodge
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1. Project Background and Scope

WSP Group Africa has been appointed as the Civil Engineering Consultants for the Roads and Stormwater design and supervision for the Malelane Safari Lodge, located near the Malelane gate and Crocodile River in the Kruger National Park.

The proposed development is envisaged to consist of a tented camp (Lodge site) with separate Conference facilities as well as a Park & Ride Facility near the existing Access into the park. The Lodge site and Park & Ride facility is being designed to have the least possible impact on the surroundings, which include roads and stormwater amongst others.

The objective of this report is to describe the design principles and proposed types of materials to be used for the Stormwater Drainage, Roads, Pathways, Walkways and Parking Areas. Please refer to the roads Drawing 335470_C_1000_Rev E.

Please see the Figure below for the Locality of the Site (Lodge) and the Park & Ride.
2. Stormwater Infrastructure

2.1 Existing Roads & Stormwater Infrastructure

There is only a gravel road through the area known as Road S114 or Rhenosterkoppies Road, which is an existing all-weather gravel road (Class B as per KNP categories) and which is in poor condition in some places. No stormwater infrastructure visible at the undeveloped site with very little implemented on the existing S114 / Rhenosterkoppies Road. The existing stormwater system will therefore have to be improved with pipe culvert crossings and additional side drains, where required within the development footprint, and as per standard maintenance procedures, along a road of this class as discussed in the next chapter.

2.2 Proposed Road & Stormwater Infrastructure

The proposed roads including Road S114 (Rhenosterkoppies Road) will be a combination of road layers, camber shaped and gravel wearing course roads, with the roads and pathways around the Infrastructure areas envisaged to be paved. Please refer to Drawing 335470_C_1000_Rev E.

The re-aligned portion of road S114 is approximately 3.25km long consisting of a 4m wide all weather gravel road with 3m wide reserve space on both sides. The existing S114 will be upgraded for a length of 3.547km, with an additional upgrade for the last portion to the lodge of 1.26km.

The proposed stormwater infrastructure will include side drains, pipe culverts with headwalls, surface protected road crossings and erosion protection, where required.

The surfacing materials for the roads, pathways, walkways and parking areas are as follows:

Roads – mainly 4m -5m wide gravel with surfaced (paved) roads near the lodge and infrastructure area within the development footprint only. Road S114 is a class B road, which is a 4m wide, all weather gravel road with approximately 3m wide road reserve space on both sides.

Pathways and Walkways – narrow paving and
Parking areas – combination of paving and gravel / stone aggregate in paces.

The Stormwater Management Principles for the different surfaced areas will be a natural based approach, with surface run-off being dispersed into a number of wider areas rather than concentrated in a few places. This will reduce erosion and damage to the infrastructure and surrounding areas. The water run-off from hard roof surfaces will be harvested and stored in tanks near the buildings

The list below summarises the different areas and envisaged dispersion methods:

- Tented Camp / Rooms’ Pathways and Walkways – gabion mattresses only in areas where necessary
- Main Lodge (including Boma, Offices, Covered entrance Deck area) – Combination of open drains, with gabion stones & gravel aggregate. No Attenuation ponds planned.
- Conference Centre – Combination of wide stone pitched drains and gabion mattresses
- Family Centre – Open stone pitched drains with gabion mattresses
- Wellness Centre – Open stone pitched drains with gabion mattresses
- Back of House area – Paving, open stone pitched drains with gabion mattresses
- Education Centre - Open stone pitched drain with gabion mattresses
- Park & Ride Facility – Paving, stone pitching and gabion mattresses in dedicated drainage areas
3. Traffic Volumes & Trip Generation

The expected peak hour traffic volumes (vph) and AADT (Ave Annual Daily Trips - vpd) was calculated and divided into the different categories below:

**Internal Traffic only within the Lodge Site area (Golf Carts type vehicles):**
- Main Lodge – Internal traffic only to and from tented rooms – 25vph : 185vpd
- Family Centre only Internal – 7vph / 50vpd
- Wellness Centre only Internal – 3vph / 25vpd
- Back of House area only Internal – 5vph / 35vpd
- Education Centre – nil traffic only pedestrians envisaged

**External (Shuttle) Traffic from Park & Ride into the Kruger National Park is estimated at:**
- 20vph during morning and afternoon peak hours
- 105vpd AADT (Average Vehicles per day)

**Outside External Traffic from Malelane up to the Park & Ride Facility is estimated at:**
- 30vph during morning and afternoon peak hours
- 160vpd AADT (Average Vehicles per day)

**Please note:**
- The estimated Internal only traffic is traffic that will circulate within the Safari Lodge Area and will not exit or enter the Malelane Gate.
- Other internal traffic will include Game Viewing trips to the north, SANParks traffic, etc on the northern remainder of road S114 / Rhenosterkoppies Road towards the north and back towards the Lodge site. This Game Viewing and SANParks traffic is estimated at not more than 5 vehicles an hour or 40 vehicles a day.
- The internal and external traffic include staff transport and any related Lodge deliveries.
4. Conclusions

- The proposed roads, pathways, parking areas and walkways will take the surrounding topography, materials and environment into account during the design and construction phases.

- During Construction, all the work will be done in accordance with the EMP (Environmental Management Programme), and will be monitored by the project management team for compliance requirements.

- In my Professional opinion and with the initial run-off calculations, the run-off from the hard surfaces will be able to be catered for using these methods as the areas are fairly small and the parking areas will be covered with Solar panels with the roof run-off water being harvested and placed in large tanks, as proposed by the Utility Engineering Specialist.

- For the different areas, as well as different travel ways (roads, pathways, walkway, etc) the construction materials and finishes will be chosen carefully including the colours of these hard surfaces to blend into the environment, as much as is practically possible.

- The planned roads and stormwater services will be provided and designed in such a way, that they will have the least impact on the natural surroundings, the ground/soils, especially sensitive enviroments such as lily sites, sodic soils and riverbanks, with the least interference with the existing overland surface run-off of stormwater.

- The river crossing (Drift) will be a low level concrete slab structure with the required erosion protection (gabions) to prevent scouring and erosion of the river bed and embankments.

- The roads and stormwater management will therefore be done with the required imported materials and in such a way, that the smallest footprint and least disturbance to the natural environment is ensured.

- The expected new peak hour traffic volumes will be low by Class B road standards (due to the Park & Ride Shuttle service vehicles) and will not impede significantly on the existing gate access.

- It is however proposed that an assessment be done on the current peak hour capacities of the existing Malelane Gate before construction takes place to evaluate in detail if any upgrades will be required.
NEW CONCRETE DRIFT CROSSING RIVER BED

Road S114
Realignment
approx. 3.25km

Upgrade Existing Road S114
approx. 3.547km

Upgrade Existing Road
as Resort Access
approx. 1.260km