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ENVIRONMENTAL CONSTRUCTION GUIDELINES FOR NEW LODGES

PART 1: SITE CHOICE

INDEX AND CHECKLIST

1.	**CHOOSE THE RIGHT SITE**	**YES**	
1.1	It is a Brownfield rather than a Greenfield site		
1.2	Access roads are as short and level as possible.		
1.3	Service runs are as short as possible.		
1.4	Steep gradients have been avoided		
1.5	Water features have been avoided		
1.6	Wildlife movement patterns have been avoided		
1.7	Viewscapes have not been negatively affected.		
1.8	Other impacts avoided		

1. CHOOSE THE RIGHT SITE:

The tendency for developers of new establishments is to find the most beautiful site on their land and to build there, which is often the most damaging thing they can do. Here are some aspects that should be considered when choosing a site.

1.1. Brownfield versus Greenfield sites

A Brownfield site is a site that has been previously developed or destroyed by human activity. A Greenfield site is one that has had little human impact. If there is a choice available, a Brownfield site should be rehabilitated and used for development in preference to a Greenfield site. Not only does this make sound environmental sense, but it could be used as a marketing point and may have additional financial benefits such as compacted level ground, existing structures, services, and materials on site.

1.2. Access roads:

Consider the remoteness of the site from existing access roads and the amount of damage a new road will do to the environment if it is constructed (refer to the more detailed section on roads & parking, etc.). It may be more environmentally sound to move the site closer to an existing road (and will save future road maintenance and wear-and tear on vehicles.). This will also be more attractive to tour operators, particularly if large coaches are being used.

Avoid sites where roads need to go straight up steel hills or embankments, as road construction on these gradients are extremely damaging, interfering with the natural water flow and causing erosion. They are also often inaccessible to large coaches as well as supply trucks.

1.3. Power, sewerage and water supply:

Consider the location of the closest power and water supply points. Installing long pipelines, excavating for cables or overhead power lines can do a lot of physical damage to the environment, as well as destroy the view. Overhead power lines can be an obstruction to game such as giraffe and have been shown to destroy birds.

On a remote site, it may be better to use an on-site power supply such as solar panels, and to reduce water consumption extensively – this means less need for water as well as much less sewerage to get rid of. (Look at the more detailed section on services).

The choice of sewerage system is also inextricably linked to site, in that rocky sites and sites close to water features (even hidden underground ones) are not suitable for soakaways.

1.4. Gradient of sites:

Avoid locating new buildings on sloping ground, for example hillsides or koppies, as these are areas of high biodiversity. The buildings will also require additional excavation for foundations and fill to even up floor levels. This means that construction will be more damaging to the environment and cost more. The soil conditions are also often more rocky on steep sites and it is thus more expensive to excavate. Steep hillsides are often *refugia* and thus seed banks for plants that are heavily utilised on the plains. These *refugia* should be given high protection status.

1.5. Water features:

No construction should take place immediately adjacent to riverbeds, fountains, pans or waterholes, which are also areas of high biodiversity. An acceptable measure is at least 100 m away from the banks of a river although one can be cautious here – it depends on the profile of the valley flood, the size of the river system and its flow profile; and whether it is on a floodplain (e.g. Okavango / Zambezi). Look at the historic flood line and move safely above it. Development should also not obstruct main surface water drainage routes to these features.

1.6. Wildlife movement patterns:

Construction should also not be positioned close to habitual and migratory pathways of game that may interfere with their routes. It is worthwhile getting a wildlife expert to check the site for you, and not rely on your own experience of the site alone. A viewpoint to one side is all right, if noise does not impact on the wildlife habits.

1.7. Landscape views:

Although seemingly out of place in a list of environmental guidelines, location is also crucial from an aesthetic point of view. New lodges should not be located in clear view of any entrance to or roads in conservation areas, as this destroys the impression of an undisturbed natural landscape. We often refer to “sense of place” as a term to describe the feeling an environment creates, and in Namibia, this is mostly unspoilt wilderness.

The ‘’viewscape’’ of pristine sites should be protected so that a lodge does not dominate a previously natural area. Places to avoid are ridges, such as the edges of cliffs or on top of mountains. It is better to locate buildings below the skyline. In flat plains, it is better to locate buildings against a slight rise (not on top) rather than in the middle of the plain.

(Examples of how recent lodge construction has damaged viewscape can be seen east of Windhoek overlooking the Waldorf School, on the top of an escarpment at the Doros Crater, on the edge of the Fish River Canyon opposite the Hobas Viewpoint and on the east side of Etosha overlooking the Park.)

Lodges already within view should have mitigating actions undertaken, such as removing widely scattered unnecessary infrastructure, compacting the footprint and screening the development from view. Also, lighting at night should always shine downwards, not up or out. This reduces light pollution, makes the night sky more spectacular and saves on energy.

Part 2: PRE-DESIGN CHECKS

	CHECKLIST		NOTES
2.	**PRE-DESIGN CHECKS**		
2.1	EIA done in accordance with MET's legislation.		
2.2	Climate data researched & documented.		
	• Site latitude		
	• Seasonal temperature variations		
	• Diurnal temperature variations		
	• Prevailing wind direction, strength and period		
	• Secondary wind direction, strength and season		
	• Rain / fog		
	• Lightning		
2.3	Wildlife studies done.		
2.4	Soil survey and analysis done		
2.5	Water supply sources investigated		
2.6	Potential building materials audit done		
2.6	Power supply options investigated.		
2.7	Waste disposal options researched.		

2. PRE-DESIGN CHECKS:

Pre-design checks entail a proper survey and detailed research on the site as well as the requirements for the establishment before starting to design. Many people get carried away with nice ideas for glamorous designs, without looking at the important environmental and functional features first. As a result they end up with beautiful lodges that are completely inappropriate for their setting and damage the environment. Following the proposed checks below can help you to avoid this.

2.1. Environmental Assessment:

Recent legislation has made it mandatory for all new developments to have an Environmental Assessment done before construction that must be approved by the Ministry of Environment and Tourism. As the regulations for these have not been promulgated yet, many people think that it is not necessary to do it. However, any tourism organisation that is sincere about environmental sustainability, can benefit from the process, as it will prevent them from making serious mistakes that cannot be rectified later, as well as help them avoid decisions that may have large cost implications in future.

The process consists of the following: a thorough environmental scoping of each new site should be done in accordance with the Ministry of Environment and Tourism's latest legislation. A proper land use management plan and environmental development plan must be submitted and approved before any construction is put in hand. Because the development of tourism lodges are fairly common and because the environmental issues are considered to be well known and well understood, there is a fast-track EIA mechanism in place – more a questionnaire type of approach than a full EIA. This leads to an environmental agreement. The aspects covered in the fast-track approach are fairly basic.

It is a good idea to do this before the actual design of the Lodge is done and not as an afterthought to satisfy the legislation, as the results of the EIA can help to inform the design concept of the lodge. The right person to do the scoping and planning is an environmental consultant with specific experience. *(Attached please find a list of people that can do this).*

A proper EIA will also cover much of the following design checks, so that separate studies are not necessary. Be sure to choose and brief your environmental practitioner well.

2.2. Climate:

Some good pre-design research on the climate of the site can assist with doing a proper eco-friendly design, as well as prevent a lot of problems later (as many establishments which have had their tents blow away, can attest to!). The elements that must be considered are:

- Site latitude – the location of the site relative to the equator affects how the sun angles can change from winter to summer. Knowing this can help to keep spaces cool in summer and warm in winter.
- Temperature – The range throughout the year (Seasonal) as well as between day and night (Diurnal range),
    - Indicates the need for keeping people cool or warm at different times
    - Affects the behaviour of building materials
- Prevailing winds – their strength and direction (the soil conditions can also affect the impact of dust), whether they are dry and hot or cool and wet. Tents on the coast can be very unpleasant, and wind storms can blow them away. Hot dry winds can drop the water level of a pool very quickly.
- Rain and fog – how much rain/fog over the year, when it occurs, and the sizes and directions of storms. This can affect the type of roof material and shape of the building.
- Lightning prevalence – this has safety and fire implications. Another good reason not to build on top of a ridge or cliff, as exposure there tends to be higher.

2.3. Plants and Wildlife:

Many developers and management of tourism establishments have very little knowledge of the natural environment that they are planning to exploit. A sound knowledge of the area will not only make for a more sustainable establishment, but also reduce costly mistakes.

Plants can be divided between locally indigenous and not indigenous plants, or exotics. Exotics can be passive or invasive. The latter must not be planted, but even more so, must be eradicated when encountered, as they destroy habitat and can have a major negative impact on groundwater levels. A good way to get to know the local flora is to invest in some of the several excellent field guide books that have been published on Namibian flora.

2.4. Surface and sub-soil analysis:

A thorough investigation must be done of the subsoil conditions both for the building foundations and for sewerage disposal purposes if required. The traditional septic tank and French drain systems only work well where the soil can absorb liquid and must avoid contaminating local underground water, such as sandy situations. Continuous rock or clay soils are not suitable for French drains.

Surface soils can be very sensitive to damage, for example in the coastal deserts where a very fragile crust is held together by lichens and is permanently damaged by just one vehicle drive over it. Fertile topsoil layers can be very thin or localised, and the placement of an establishment should avoid fertile soils.

2.5. Water supply investigation:

Water availability must be investigated in order to check both the quantity and quality available, from either existing borehole or mainline supply, or a planned future supply. Liaison with authorities such as NamWater, Rural Water Supply and MAWF is required here to ensure a combined approach. The amount of water available for the running of the lodge must be determined, keeping in mind future expansion plans, as there might be a restricted supply and the resource might also be used by others in the vicinity. Keep in mind that during dry periods, water tables may drop dramatically, as well as recharge rates. Test-pumping in a period of good rainfall can give deceptive results.

It is also sensible to analyse the water for its corrosive properties so that the necessary filters can be installed to protect equipment from damage. Reverse osmosis systems can have a salty sludge residue and this can be problematic to dispose of safely.

2.6. Materials audit:

The availability of local building materials within respective radii of 50 km, 100 km, 250 km and beyond should be investigated and the designs should opt for the closest, most effective and cost efficient balance of material sources available.

The further away materials are sourced from for construction, the more transport energy is consumed in getting them to the site. This increases the combined 'embodied' energy of the building, which means energy 'fixed' in the structures, and this increases the development's carbon footprint.

By sourcing materials from nearby, the chances are also that they are more in a natural form (such as natural stone, clay or sand) and that less energy has thus been spent in processing them.

2.7. Power supply:

Power supply availability should be investigated to ascertain the closest grid connection point, compared with the opportunities for using renewable energy options such as solar photovoltaic, solar thermal, wind, biogas, liquid petroleum gas, wood, etc.

Future planning by MME, NamPower, Regional Electricity Distributors and Rural Electrification must be checked to enable an informed decision as to which would be the most environmentally sound, practical and cost efficient type of energy to opt for.

2.8. Waste disposal options:

Existing solid waste disposal options should be investigated for opportunities in terms of separation, removal, recycling and eventual disposal. Joint ventures with nearby local authorities or other tourism establishments that can be formed to create an economy of scale are often a good option in this regard.

Part 3 – Eco-friendly site layout design

CHECKLIST			NOTES
3.	**ECO-FRIENDLY SITE LAYOUT DESIGN**		
3.1	The footprint is very small and compact		
3.2	The layout fits into the landscape		
3.3	Vegetation has hardly been disturbed.		
3.4	Topography has almost not been changed at all.		
3.5	Circulation is mainly pedestrian & handicapped friendly.		
3.6	Guest & service areas are cleverly separated.		

3. Design an environmentally friendly establishment site layout:

3.1. The spread of the development

The overall extent (or "footprint") of establishments should be kept small and within a single perimeter boundary to ensure that as little of the natural landscape is destroyed as possible. This will require that the layout is compact and higher density is aimed at than with previous developments. (This will have additional benefits such as reducing extent of services, area to be maintained, etc.).

3.2. Fitting into the landscape

Get a good feel for the local living landscape, its character, shapes and textures. Explore ways of designing and fitting your development into the character of this landscape, so it becomes part of the setting, not imposed upon the setting.

3.3. Natural features - vegetation

Vegetation, especially large trees, should be retained and disturbed as little as possible. Care must be taken not to disturb the root area of trees (which may extend beyond the surface crown line of the trees itself). By digging foundation trenches or service trenches through the root zone, the tree might be damaged so that it cannot recover.

Care must be taken also not to compact the surface over the root area with vehicle traffic, stockpiling building materials, etc. during construction and after, as well as not to cover the root area with impermeable paving, as this will cut off essential water and oxygen supply to the roots.

Soil should not be filled against the trunk of the tree, as this may cause rotting and eventual death of the tree. If you want to build a solid platform that's higher than the soil level, create a retaining wall with an open planter and allow drainage through. A deck is better, as that has less impact on the soil.

Thick bush and shrubs also provide habitat and shelter for a diversity of fauna and should not be cleared for construction if more suitable open ground is available.

3.4. Natural features - topography

Natural rocky outcrops, heaps of stones etc. should not be disturbed, as these are a habitat for small fauna. Another reason to avoid sloping ground, as these may harbour snakes and scorpions – attractive and essential in the wild, but not comfortable to live with for most people, and very intimidating to most guests from outside Namibia.

3.5. Circulation

Pedestrian orientated - reduce the need for vehicular transport in order to save time and burning of fossil fuels. Design in such a way that it is easy for people, including staff, to reach the places they need to go, without extensive detours. Design walkways to reduce noise made by suitcase wheels of early departing or late arriving

guests. Avoid steps and, where unavoidable provide hand rails for the elderly and ensure that wheelchair access is provided.

3.6. Clever separation between work and living areas

Allow for retreat of guests away from the service and communal areas, but design these with closer distances to reduce commuting. Rather than using distance as a separator, screening through means of natural walling, earth berms, shrubbery and creepers can be used to ensure privacy.