

	Guideline	Document Classification : PUBLIC
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Title: **BIRD NESTING GUIDELINES**

Reference: **TGL41-333**

Revision: **0**

Effective date: **November 2006**

Total pages: **1** Of **19**

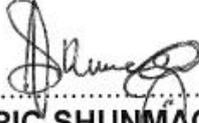
Revision date: **November 2009**

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1. Introduction

Birds use electrical structures on which to roost and nest for a variety of reasons. The purpose of this document is to enable the reader to correctly identify birds and their nests and provide guidelines to the user on ways of dealing with this phenomenon in a manner that will reflect Eskom’s stance on the environment as well as to prevent disruption of power to customers.

2. Requirements for the management of nests on power lines.

There are a variety of reasons for birds using electricity structures for nesting. The most likely reasons being:

- Lack of alternative nesting sites such as trees and cliffs. Large trees do not occur in many areas of South Africa. In these areas, many birds take advantage of electrical structures as they offer a very suitable alternative.
- Safe and sturdy substrate. Electricity structures offer a sturdy platform for birds to build their nests, especially in areas where the natural substrate is unsuitable or scarce. In these circumstances, birds often deliberately choose electricity structures over natural sites.

3. Description of species known to breed on powerlines

3.1. Crows

3.1.1. Black Crow



Nesting habits: Black Crows make sturdy, basket shaped nests (400-600mm in diameter) on a variety of man-made structures, including electricity towers and in substations. In common with many crow species, it may incorporate many man-made objects into the nest like strips of plastic, cloth, wire, metal strapping, rope and bale twine. Black Crow nests are usually easily recognized by the amount of foreign objects woven into the nest substrate. They breed from September to April. Four pink eggs are usually laid. Other species, like Lanner Falcons and Greater Kestrels, often make use of an abandoned crow's nest to breed in. The Black Crows is a territorial species.

3.1.2. Pied Crow



Pied Crows are highly adaptable birds and thrive in close association with humans. Their numbers have increased to pest proportions in areas where the degradation of the habitat is severe.

Nesting habits: See discussion under Black Crow. Pied Crows (even more so than Black Crows) often incorporate lots of wire in their nests, and even make them

entirely out of wire. This wire collecting habit poses a flashover threat. Four blue eggs are usually laid. The Pied Crow is a territorial species.

4. Raptors

4.1. African Whitebacked Vulture



Often confused with the larger Cape Griffon, but distinguished by black neck and dark eye. Cape Griffons, however, do not breed on powerlines.

Nesting habits: Normal nesting site is in the top of an *Acacia* tree, but also breeds extensively on powerlines in loose colonies. Nest is small for a bird of this size, only 650mm in diameter and made of sticks. They are not territorial and will often leave an area if food supplies are low, and settle and breed in another area where more

favourable conditions exist. However, many breeding colonies become semi-permanent sites and will persist for years. Breeding takes place from June to November. A single egg is laid. Not territorial.

4.2. Martial Eagle



Often confused with the smaller Blackbreasted Snake Eagle, but distinguished by their spotted (not plain white) bellies and feathered (not bare) legs.

Nesting habits: Martial Eagles are the largest eagles in Africa and build an enormous nest (2m in diameter) usually in a fork of a large tree. In treeless habitats, Martial Eagles often breed on transmission and sub-transmission structures. The nest is made of large sticks and is a sturdy structure that will last for years. Pairs are very territorial and often use more than one nest. Breeding usually takes place from May to November. Usually two eggs are laid, but only a single chick is raised. Prey remains (steenbok, meerkat) often accumulate below nest. Highly territorial.

4.3. Black Eagle



Nesting habits: Black Eagles normally nest on cliffs and (rarely) in tall trees. They also breed successfully on transmission and sub-transmission structures. The nest is huge (2m across and up to 4.1m high), sturdy and made of sticks. Alternate nests may be used. Pairs are territorial. Breeding takes place from May to November. Usually two eggs are laid, but only a single chick is raised. Active nests are easy to identify from dassie skulls that accumulate below the

nest below the nest. A highly territorial species.

4.4. Blackbreasted Snake Eagle



Blackbreasted Snake Eagles are often confused with the larger Martial Eagle, but they can be distinguished by their plain white (not spotted) bellies and bare (not feathered) legs.

Nesting habits: Blackbreasted Snake Eagles usually build their nests on top of small thorn trees. The nest is relatively small for an eagle (600-700 mm in diameter) and made of sticks. They breed successfully on transmission and sub-transmission structures. Pairs are territorial and

breeding takes place from July to April. One egg is laid.

4.5. Brown Snake Eagle



Nesting habits: Basically similar to Blackbreasted Snake Eagle

4.6. African Fish Eagle



Nesting habits: Builds large nest (up to 1.5 metres in diameter) made of large sticks and is a sturdy structure and will last for years. Pairs are very territorial and often use more than one nest. Breeding usually takes place from May to November. Usually two eggs are laid and usually a single, but sometimes two, chicks are raised. Highly territorial.

4.7. Tawny Eagle



Nesting habits: Builds a large nest (1 metre in diameter) usually on the top of a large thorn tree. Breed successfully on transmission and sub-transmission structures. Alternate nests may be used. Pairs are territorial. Breeding takes place from May to November. Usually two eggs are laid, but only a single chick is raised. Highly territorial.

4.8. Jackal Buzzard

Nesting habits: Builds a medium sized nest (600-700mm in diameter) usually in a tree on a cliff ledge, or on the cliff itself. Breed successfully on transmission, sub-transmission and even reticulation structures. Pairs are very territorial. Breeding usually takes place from May to November. Usually two eggs are laid and a single, but sometimes two, chicks are raised.

4.9. Pale Chanting Goshawk

Nesting habits: Normally breeds in thorn trees, but also on powerlines. Nest is about 400 mm in diameter and often lined with sheep wool. Breeds July to April. Two eggs are laid, but usually only one chick is raised. A territorial species. The photos above highlight the fact that raptor chicks and adults differ considerably

4.10. Lanner Falcon

Nesting habits: Breeds June to November (peak July-August). No nest is built; but makes use of a scrape on the ledge of cliff or building, or in old nest of crow, raptor or heron in tree, on cliff or on power pylon. A territorial species.

4.11. Greater Kestrel

Nesting habits: Makes use of the nest of a crow or raptor in tall trees, telephone pole or power pylon. Breeds July to January (peak in October); time of laying positively correlated with rainfall in immediately preceding months. A territorial species.

4.12. Blackshouldered Kite

Nesting habits: Breeds all months. Nest is a small platform of sticks, about 300mm diameter and 100 mm thick, lined with grass may use old nest of another species such as a crow's nest on a powerline.

5. Other**5.1. Sociable Weaver**

Nesting habits: Sociable Weavers build the biggest nests in the world. The nest consists of a mass of dry grass with as many as 50 nest chambers. The nest is continuously added to with the result that it can grow to enormous proportions. Other birds often nest on top of a Sociable Weaver nest, like Martial Eagles and Giant Eagle Owls. Pigmy Falcons utilise nesting chambers for nesting.

In areas where large trees are absent, electricity structures are the favoured, even wood poles without cross-arms. Breeding is linked to rainfall, but the nests are occupied year-round.

5.2. Redbilled Buffalo Weaver

Nesting habits: They breed communally and build large untidy nests of sticks that tend to merge into one mass of nesting material eventually. This mass of nests can with time cover the hardware of an electricity structure. Breeding takes place in summer and is linked to rainfall.

Egyptian Goose

Nesting habits: Sometimes breed on transmission and sub-transmission structures in the unoccupied nest of a large raptor or a crow. Breeding takes place from July to April. Very aggressive at the nest.

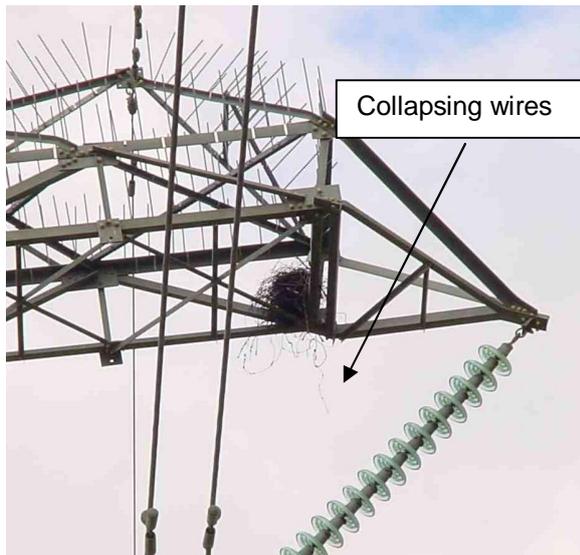
Hadedda Ibis

Nesting habits: Breeds November to January in Eastern Cape, July to January in former Transvaal and KwaZulu-Natal (mainly October-November). The nest is a flimsy platform of sticks, lined with grass and lichens; 20-45 cm diameter, about 15 cm thick, bowl up to 10 cm deep; on horizontal branch of tree 1-12 m above ground (usually 3-6 m), but often much higher in trees growing from cliff face; usually on steep hillside or river bank; sometimes on transmission structure. Sometimes uses crow's nest.

6. Problems associated with birds nesting on transmission structures

6.1. Flashovers caused by nesting material

Large birds such as eagles and vultures use large sticks to build their nests. These sticks can exceed 1 metre in length in the case of large species like Black Eagles and Martial Eagles. These nests are very sturdy and can stay in shape for many years, if used annually by the birds. However, it sometimes happens that large sticks protrude below the nest. These sticks can constitute an air gap intrusion between the conductor and the earthed structure, which causes a flashover during wet conditions.



Crows often incorporate wire and other conductive material into their nests. This could constitute a flashover risk if it protrudes into the air gap, or when a bird arrives with a piece of wire in its bill and flies through the air gap. Crows tend to opportunistically use a lot of man-made material when building their nests. Crows have been known to construct their nests entirely from pieces of wire that can cause an air gap breakdown resulting in a phase to earth flashover if they infringe the phase-earth air gap. Pieces of rope and baling twine also get woven into crows' nests. When the rope or twine gets wet, it becomes conductive and causes

flashovers in the manner described above. It was recently discovered that nest building crows can also cause flashovers when they fly into the air gap with pieces of wire in their bills.

Sociable Weavers build massive colonial nests, with a diameter of up to 7 metres. The nests are made of stiff grass and can weigh up to 1000kg. Redbilled Buffalo Weavers live in colonies and build large untidy nests of sticks with several entrance chambers. These nests are smaller than sociable weavers, but with time they can cover large areas of the structure. To date, no flashovers caused by nests of these species have been reported on transmission structures, but the situation requires monitoring.

6.2. Flashovers caused by bird streamers from the occupants of the nest

Raptors and other large birds such as herons and hadedas defecate by projecting a stream of excreta clear of the nest. If the nest is situated in a critical area above the conductor, a streamer by a bird on or near the nest can cause an air gap breakdown and result in a flashover.

6.3. Flashovers caused by bird pollution from the occupants of the nest

Another problem associated with bird nests is pollution of the insulator strings with excreta. If the nest is situated above an insulator string, the disks may get polluted and experience breakdown in insulation.

6.4. Fire

When nests cause flashovers, the nesting material may catch fire. This in turn can lead to equipment damage or a general veld fire. Apart from the cost of replacing damaged equipment, the resultant veld fire can lead to claims for damages from landowners.

7. Distinguishing between active and deserted nests

Refer to the definitions above.

An active nest can be recognized by a combination of the following:

- Whitewash on the nest, the infrastructure around and below the nest, and on the ground below the nest.
- Prey remains (skulls, feathers, skin, bones) and regurgitated pellets in and below the nest (in the case of raptors)
- The presence of nestlings or eggs (only during the breeding season)
- Nest cup containing greenery
- The presence of birds on and in the immediate vicinity of the nest

A deserted nest lacks all of the above and is often in a state of disintegration.

8. Legal implications

Actions that are taken with regard to nesting birds on powerlines could have legal implications. The legal position with regard to the protection of birds is governed mainly by various provincial ordinances and nature conservation acts, all of which broadly concur. The situation with regards to birds nesting on powerlines could be summarized as follows:

- All birds are protected by law, except those specifically excluded from this protection.
- Of birds commonly nesting on powerlines, only Pied Crows, Black Crows and Egyptian Geese are excluded from the protection of the law.
- No protected bird species (breeding or non-breeding) may be willfully disturbed in any way, without a permit from the relevant provincial authority. In some instances, this permit may only be requested by the owner of the land where the activity will take place.
- The meaning of “willfully disturbed” is not explained in the various ordinances. The destruction of an active nest (see definition above) of a protected species, would most likely fall within the ambit of the term “willfully disturbed”, especially if the nest contained eggs or nestlings. The destruction of a **deserted** nest should not fall within the ambit of the term “willful disturbance”.

- Contravention of these regulations constitute a criminal offence and the offender is subject to a fine or imprisonment if found guilty.

The implications of the above legislation are that a permit is required for any activity that wilfully disturbs protected bird species on powerlines. This is especially relevant for activities that will take place during the breeding season when most of the nests are occupied.

9. Management of nests on power lines

9.1. Raptor Nests on power lines posing a risk of flashovers

9.1.1. Nest removal

In the case of active raptors nests, nest removal is not a very desirable option, for various reasons:

- In order to remove an active raptor nest, a permit must be obtained from the relevant provincial authorities. It is unlikely that permission will be granted easily for removal without any alternative mitigation measures to accommodate the birds.
- Nest removal is not a permanent solution, because the birds could rebuild the nest in the same place or elsewhere and cause fresh problems.
- Several raptor species are threatened, and the removal of their nests could result in breeding failure or abandonment of the area.
- Bad public relations. Many landowners cherish their raptors and are very protective of them.
- If the nest is **deserted**, nest removal could be an effective remedy, and no permit will be required.

9.1.2. Nest trimming

When an active raptor nest poses a problem to the power supply because of nest material intruding into the air gap, future problems can be avoided by trimming any sticks from time to time that could potentially cause flashovers. The advantages of this approach are:

- Minimum interference with the birds' breeding activities **(if performed outside the breeding season)**
- Less invasive than nest relocation, therefore less chance of birds deserting the nest.
- The potential problem is contained on the structure where the nest is located
- Good public relations

NB. If the activity takes place during the breeding season, a permit will be required from the provincial authorities.

9.1.3. Nest relocation

If an active nest poses a chronic and serious risk to the power supply, either through nest material or streamers from the occupants of the nest, it may be necessary to shift the nest to a different structure or to a different place on the structure. Relocation

of raptor nests can be successful if is used in conjunction with a nesting platform and bird guards is placed in the area from where the nest was removed to prevent them from rebuilding the nest at the same spot. Ideally the nesting platform must be placed in an area that has plenty of shade and leaves the bird sufficient space to access the nest. The advantages of this approach are:

- Long term solution
- Minimum interference with the birds' breeding activities, **if done outside breeding season**
- The potential problem is removed, without impacting on the birds' breeding success.
- Good public relations

NB. A permit will be required from the provincial authorities to perform a nest relocation.

Research is currently underway in the Western Cape to determine how raptor nests can be successfully shifted to locations on the poles where the nests will not interfere with the electricity supply. Prototypes of nesting platforms have been developed and are currently being tested for effectiveness.

9.1.4. General guidelines with regard to work performed on a structure containing an active raptor nest.

Breeding raptors generally are known to be very sensitive to disturbance at their nests and readily desert a nest if disturbed beyond their threshold of tolerance. Some species can be remarkably tolerant of extended periods of disturbance for example certain falcon species. Others, especially large eagles such as Martial Eagles are the very opposite and will readily desert an active nest (even outside the breeding season) at the slightest provocation, as has recently happened in 2001 in the Western Cape. The greatest risk is at the beginning of the breeding season when eggs have not yet hatched, and at the end of the breeding season when the chick might be frightened into premature flight and injure or kill itself.

When any form of work (maintenance, nest trimming, nest relocation) is required on a transmission tower containing an active raptor nest, eggs or nestlings, a conflict of interest between the utility crew and the breeding raptors is more than likely.

The following steps shall be taken to accommodate the interest of both parties:

- If the work is not urgent, it should be postponed until after the breeding season
- If work has to be performed in the breeding season, a relevant permit must first be obtained from the provincial authority beforehand.
- A suitably qualified and experienced ornithologist should be present to assist with on site advice during the work operation. Depending on the situation on site, suitable mitigation measures could include:
 - Restrict the activity time on the tower to a minimum

- If necessary, lowering of the eggs or nestling(s) to the ground for safekeeping by a suitably qualified person until the work has been finished.

9.2. Crows nests posing risk of flashovers

9.2.1. Nest removal

Field staff report that flashovers resulting from crows nests are often associated with flashmarks on the bottom two insulators. Crows are not protected by law and their nests may be removed without a permit. However, this is not recommended for active nests for the following reasons:

- Some raptor species make use of crow's nests. In such a case, the nest is regarded as a raptor nest and may not be removed, unless a permit is obtained from the relevant provincial authority.
- Removal of the nest will trigger nest building behaviour from the crows and the problem will soon re-appear in the same spot or elsewhere if no additional mitigation measures are taken.
- If the nest is **deserted**, nest removal could be an effective remedy.

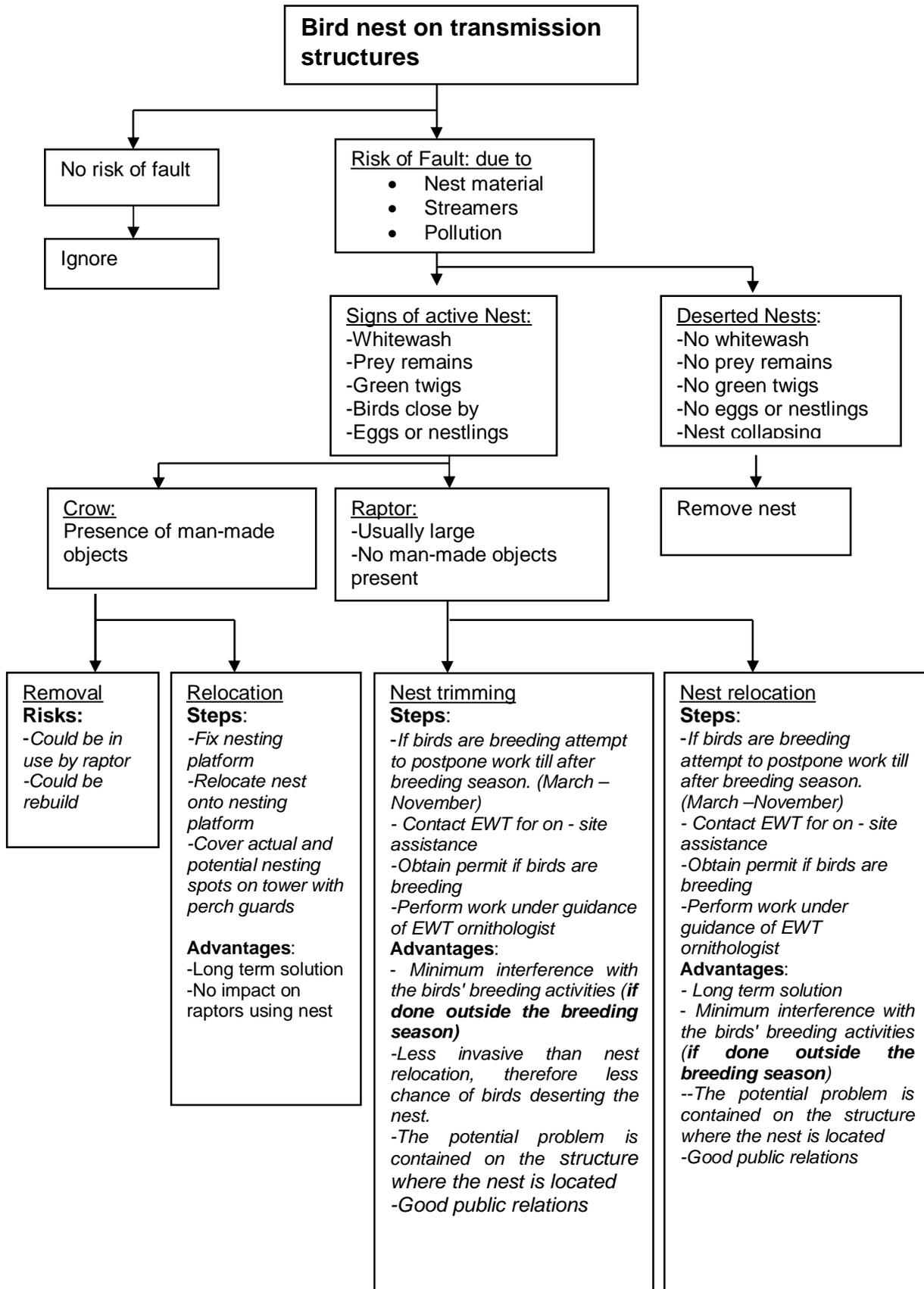
9.2.2. Nest relocation

Relocation of crow's nests to a nesting platform can be successful if is used in conjunction with a nesting platform and bird guards are placed in the area from where the nest was removed to prevent them from rebuilding the nest at the same spot. The nest should be relocated to an area away from the conductors to prevent pieces of metal falling into the air gap. Ideally the nesting platform must be placed in an area that has plenty of shade and will not tempt the crows to fly into the window between the conductor and the earthed steel beams of the tower, but leaves them enough space to access the nest. Crows are territorial; therefore it is unlikely that another pair of crows will build their nest on the same structure. It may however happen that a resident pair builds more than one nest on the same structure. It is therefore advisable to cover all high risk nesting areas on the structure with bird guards to prevent any nest building in high risk areas.

Advantages:

- Long term solution
- No impact on protected species that use crow's nests for breeding purposes e.g. Lanner Falcons and Greater Kestrels

10. Flow diagram for suggested procedures for dealing with nests on transmission structures



11. Supporting Clauses

NOT APPLICABLE.

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12.1. Scope

This guideline describes the important species that nest on Transmission structures, the identification of the birds and their nests as well as their management.

12.1.1. Purpose

The purpose of this document is to guide the management of bird nests found on Transmission structures within the Law and good environmental management principles.

12.1.2. Applicability

This document shall apply to all Transmission structures where bird nests are found.

12.2. Normative/Informative References

Parties using this guideline shall apply the most recent edition of the documents listed below:

12.2.1. Normative

ISO 9001:2000 Quality Management Systems

12.2.2. Informative Various Provincial Nature Conservation Ordinances**12.3. Definitions**

For purposes of this document, the following definitions will be used:

Active nest: The nest forms the core of the territory occupied by a resident pair of birds and it is used by them for breeding purposes. The nest may or may not contain eggs or nestlings, depending on the stage in the breeding cycle.

Deserted nest: The nest is located within a vacant territory and is *not used at all*. NB: A NEST WITHOUT EGGS OR NESTLINGS DOES NOT MEAN IT IS PER DEFINITION DESERTED.

12.4. Abbreviations

none

12.5. Roles and Responsibilities

The Line and Servitude Managers shall be responsible for the implementation of these guidelines.

12.6. Implementation date

The implementation date is November 2006.

12.7. Process for monitoring

The Line and Servitude Managers shall be responsible for monitoring compliance to this document in their respective Grids.

12.8. Related/Supporting Documents

N/a

13. Authorisation

This document has been seen and accepted by:

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14. Revisions

Date	Rev.	Remarks
November 2006	0	Review document and update to new format – remain rev. 0 because of the new reference number

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