



10 Biodiversity



South Africa is home to rich terrestrial and marine biodiversity. Biodiversity refers to the variety of life which includes the number of different species of plants, animals and birds and the relationships between them that are found in an area of land or ocean. Rich biodiversity is supported by healthy ecosystems where land, water and air systems are functioning well.

Healthy and well-functioning local ecosystems can provide services “free of charge” to support the municipality that have a positive effect on curbing climate change. This includes supporting soil formation and agricultural and resource production; providing freshwater, food and fuel sources; regulating the climate, floods and disease; and providing cultural value for aesthetic, spiritual, recreational and educational purposes. This, in turn, can benefit the well-being of residents in the municipality by improving security and ecological resilience, providing for basic human rights, improving and sustaining health and promoting good social relations. Therefore, building sites and the municipality can reduce the cost of service provision by using ecosystem services to support and supplement the use of engineered infrastructure solutions.

The inland and coastal areas in KwaDukuza are areas of high biodiversity in South Africa, second only to the fynbos in the Western Cape Floral Kingdom. However, the vast majority of land is modified with agricultural and urban development, leaving little natural habitat which is now critically endangered. Key areas of biodiversity that remain are along the coast and along rivers in the municipality and should be protected.

Currently, due to population growth, urban sprawl, rapid urbanisation and harmful land use practices,

biodiversity and the ecosystems services provided are being damaged and undermined.



Green Economy Enabler

Natural resource management

Natural resource management involves the conservation, restoration and maintenance of natural resources in the municipality such as biodiversity corridors, rivers and wetlands with their associated riparian buffers, coastal dune systems, and the removal of invasive vegetation. Already there are national projects supporting these activities for job creation such as Working on Water, Working on Fire and Working on Wetlands. These form part of the Expanded Public Works Programme and can be used as mechanisms by the municipality to fund decent green jobs.

10.1 What changes do we need?

As KwaDukuza transitions to low emission development, there will be an increasing reliance on ecosystem services. These require healthy and well-functioning ecosystems. These guidelines promote the conservation and enhancement of natural systems on individual building sites and throughout the larger municipal area. This includes promoting biodiversity by protecting and planting indigenous vegetation, the conservation of nutrient-rich topsoil, managing invasive species,



rehabilitating high-value ecological areas that are degraded and adhering to national guidelines with regard to Critical Biodiversity Areas in the municipality to promote ecological connectivity and areas for wildlife in natural, undisturbed habitats.

10.2 How do we design our buildings

Well-informed and thoughtful building location and design can assist in both slowing the speed of ecological degradation and assist in reversing it. We need to both protect prime agricultural land from loss due to development, as well as develop a network of protected interlinked spaces of undisturbed or untransformed vegetation. Wherever possible, wetlands should be protected or reinstated, due to their important role in maintaining water quality, reducing the impact of floods, in controlling erosion and sustaining river flows.

10.2.1 Choose development sites with limited ecological value

A critical element to green building is site choice, as this is something which cannot be changed later. Preference should be given to sites within the urban edge which have been previously developed (brownfield sites), or which have been deemed to have no ecological value. This includes not building on wetlands or too close to watercourses, avoiding land within the 100m flood line of rivers, and preserving sites which are home to protected red data species.

10.2.2 Improve the ecological value of a site

Every effort should be made to affect some form of ecological restoration, thus improving the ecological

value of the site through development. This can be done through the removal of existing contaminants, the planting of local endemic species, and using a green spine on the property to allow the continuation of an ecological corridor across the site and so link other green buffers on adjoining properties. Where appropriate, consideration should be given to the planting of water-wise or edible plants as part of the landscaping for the site.

10.2.3 Well-informed site layout and building location

As with the initial site choice, site layout and building location tend to be fixed at the onset of a development, and remain static for the rest of that building's life. It is important that due care is taken in this design. Therefore, it may be possible to work around existing wetlands or direct stormwater runoff in such a way as to restore ancient wetland areas.

Existing mature trees on a site should be identified and preserved, while the built fabric should be designed so as to honour or celebrate these. Where they cannot be retained, they should be carefully removed and relocated by a suitably trained person.

A good way to ensure that a landscaped or planted area is valued in the long term as a key element of the site, is to ensure that it has multiple uses. For instance, an edible garden could be planted in a quiet corner of the site, and with a little screening double as a meditation or quiet space for staff. A green roof is also an innovative way to manage heavy rainfall and stormwater runoff, prevent the heat island effect and add thermal insulation to the building, while creating an attractive and useable space on top of the building (an area all too often lost to hard surfaces for HVAC plant rooms and inaccessible to building users).



Case Study

New Sisonke District Office KwaZulu Natal

New Sisonke District Office is a provincial government office building in Ixopo, KwaZulu Natal. The building is on a site that was previously developed and full of alien vegetation. Through development the site was cleaned up and a green roof (shown in the image) both contributes to the thermal performance of the building and increases the ecological value of the site. This planted area boasts a variety of water-wise endemic vegetation, and provides both an aesthetically pleasing space and a habitat for insect and bird life.

Figure 20: Rooftop Garden at the new Sisonke District Office, KZN



Source: <https://kzniajournal.wordpress.com/2013/06/10/sisonke-district-offices/>

10.2.4 Consider biodiversity corridors and linked viable open spaces

The design should best encapsulate ways to create, or link up with, ecological corridors on the site, which

can be both ecologically and socially beneficial. This may include a planted ribbon with a path, which can double as a running, pedestrian or cycling track, whilst allowing natural movement of fauna and flora along it. A green space with carefully chosen plants



can provide habitat to reptiles, amphibians, birds and insects and make actual physical links between existing habitats, known as ecological corridors. As global warming changes the range of more and more species, these corridors will become increasingly valuable to allow the free movement of animals to more suitable places, thereby improving resilience.

10.3 How do we construct our buildings?

10.3.1 Implement a construction environmental management plan (EMP)

The appointment of an **ISO14001 contractor** ensures that the development is done in an ecologically sensitive way. This is, however, not always practical as many contractors in South Africa have not yet attained this accreditation, but it should be encouraged wherever possible.

An alternative would be for the client to appoint an **environmental officer** for the development, who would draw up such a plan and track and enforce its implementation with the contractor. An environmental management plan would include strategies for how to manage water, waste, topsoil, leaks and contact with hazardous materials such as oil or asbestos, the provision of toilet and washroom facilities and the protection/incorporation of flora and fauna on site.

10.3.2 Protect ecologically sensitive areas

Top soil is a valuable resource. During development care should be taken to conserve as much of the existing top soil as possible. This can be stockpiled and reused on site later (preferred) or it can be carefully harvested and used on a different site (rather than sending it to landfill).

Part of the development strategy should also revolve around the **protection of existing flora** on site. In particular, the site's environmental plan should include a strategy for the protection of all existing mature trees on site which are to be retained. The advice of a horticulturalist may be obtained, who can make recommendations as to how best to protect the areas under the tree's drip zone, and to ensure that soil compaction, particularly within this area, is kept to a minimum (no storage). This advice would also extend to the best watering and mulching protocols for the tree type and area.

10.3.3 Rehabilitate damaged land

The very nature of construction means that it is a high impact activity. And even the most careful contractor is going to have some negative impact on the site through construction activities. Time and budget should be allocated to enable rehabilitation of the damaged land once construction is complete.

10.4 How do we manage our buildings?

The ongoing and correct management of fauna and flora on site will contribute to improved biodiversity over time.

10.4.1 Manage invasive vegetation on site: compliance with NEM:BA AIS

The Department of Environmental Affairs manages alien and invasive species in South Africa under the National Environmental Management: Biodiversity Act (NEM:BA), Act 10 of 2004. The Alien and Invasive Species Regulations for this Act were published on 1 August 2014 and put into effect on 1 October 2014, and can be found at <http://www.invasives.org.za/legislation.html>.



The regulations control **both alien and invasive fauna and flora**, and require landowners (including the public sector) to manage invasive species on their land. The onus is on the landowner to check for the presence of these species on their site, and take the appropriate action. Furthermore, homeowners selling their property must notify potential buyers of any listed invasive species on their properties. This should take the same form as getting a beetle, electrical or plumbing certificate from the relevant contractor.

10.4.2 Implement good landscaping practices

Property owners or managers are encouraged to contribute positively to enhanced biodiversity in the long term through implementing good landscaping practices. A site management plan should be implemented for the landscaped areas with a focus on water-wise, endemic (or edible) plants. Preference should be given to drip irrigation regulated by a timer or water sensors in the soil, to ensure watering takes place in the cooler hours and prevent unnecessary watering if it has rained.

Where possible the on-site shredding of prunings is encouraged, which can then be composted on site with other garden waste like leaves or grass cuttings, or used as mulch. Regular mulching of garden beds can help control evaporation and prevent topsoil removal from heavy rains.

A further element of good landscaping practices is the use of organic not chemical fertilisers.

10.4.3 Implement an integrated pest management plan

Integrated pest management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimises economic, health, and environmental risks. An IPM plan should be established for both indoor and outdoor pests and invasive species, and should detail recommendations for both monitoring and management. This approach emphasises the reduction of pesticide use and the implementation of preventative and alternative control methods.





A first step would be the choice of a variety of plants that are endemic to the area and hence more likely to be resistant to weather-related stresses and local diseases. Regular observation and monitoring allows for early intervention in the case of pests, and wherever possible these should be controlled primarily through physical and biological control methods (such as the encouragement of local predators such as birds for aphids, crop rotation, companion planting or the use of physical barriers).

need to be respected and celebrated. Depending on the nature of each space, it may be best suited to a low impact activity, such as the establishment of a small nature reserve (which could be as small as a single residential erf fenced and preserved as a wetland or fauna or flora sanctuary), or be able to handle contained traffic (a biodiversity ribbon with a path for active movement) or even heavy traffic (such as a water body designed for water sports and an associated picnic area).

Fast Fact:

Irrigating drought-tolerant plants

The benefits of drought-tolerant plants are not achieved unless they are watered through a water-conserving irrigation system. Plants and trees watered through standard sprinklers will develop shallow root systems and therefore lose their drought-tolerant qualities.

10.5.2 Rehabilitate and enhance local green spaces to increase biodiversity

An important aspect of this is recognising that through decades of non-management, many potentially viable biodiversity areas have been degraded or functionally changed. These need to be rehabilitated. This can be a very good community building exercise, promote short- and long-term job creation, and through the buy-in of the community ensure better preservation of the space into the future.

10.5 How do we enhance our precincts

10.5.1 Identify and conserve critical biodiversity areas in the precincts

In order to make a real difference to biodiversity via impacts on individual properties, it is essential that these be linked and managed in a cohesive and holistic fashion. The critical biodiversity areas as identified in the spatial development framework