

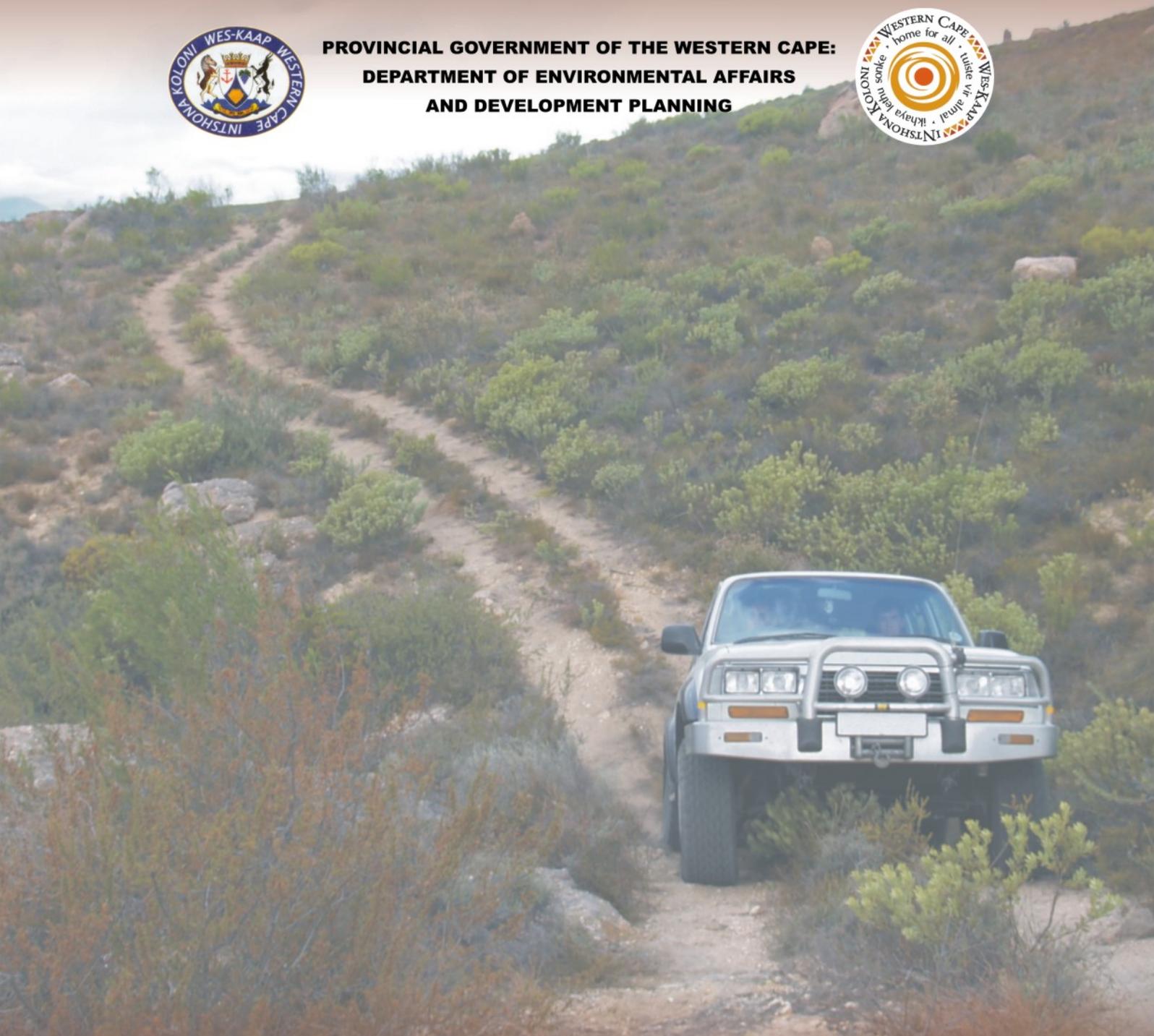
# Assessment & Evaluation of Proposed & Existing Off-road Routes:

A GUIDE FOR ENVIRONMENTAL ASSESSMENT PRACTITIONERS,  
AUTHORITIES & ROUTE PLANNERS

PROVINCIAL GUIDELINES FOR THE WESTERN CAPE



**PROVINCIAL GOVERNMENT OF THE WESTERN CAPE:  
DEPARTMENT OF ENVIRONMENTAL AFFAIRS  
AND DEVELOPMENT PLANNING**



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& ROUTE PLANNERS

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## ***Assessment & Evaluation of Proposed & Existing Off-road Routes:***

**A GUIDE FOR ENVIRONMENTAL ASSESSMENT PRACTITIONERS, AUTHORITIES  
& ROUTE PLANNERS**

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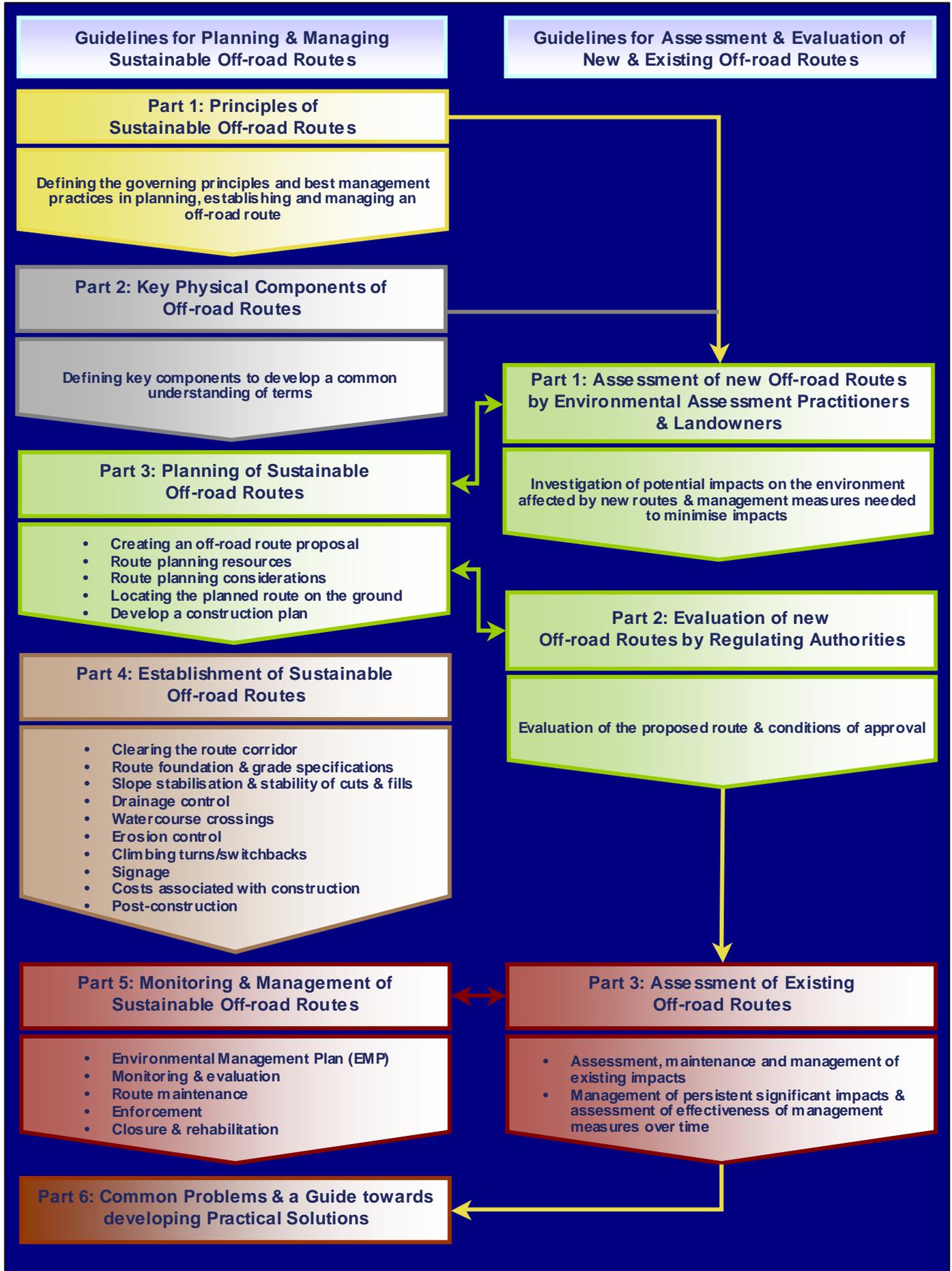
### ***The complete Guideline Series:***

1. Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*
2. Assessment and Evaluation of Proposed and Existing Off-Road Routes: *A Guide for Environmental Assessment Practitioners, Authorities and Route Planners*
3. Environmental Ethics and Sustainable Use of Off-Road Routes and Trails: *A Practical Guide for Recreational Trail Users*

### ***Disclaimer***

The National Environmental Management Act (NEMA; Act No. 107 of 1998) and other environmental legislation provide the overarching legal requirements for the development and operation of off-road routes. Information contained in this document has been developed for the guidance of environmental assessment practitioners, regulating authorities and off-road route owners, managers and users within the Western Cape in order to assist in the establishment and maintenance of cost-effective off-road routes that minimise adverse environmental impacts through erosion control, water quality protection, the reduction of habitat degradation and potential impacts on environmental resources. This document cannot replace site-specific specialist input. The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) cannot assume any responsibility for the misinterpretation of this information.

Use of Guideline Series during different stages of the off-road route development process



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## *Assessment & Evaluation of Proposed & Existing Off-road Routes:*

### A GUIDE FOR ENVIRONMENTAL ASSESSMENT PRACTITIONERS, AUTHORITIES & ROUTE PLANNERS

#### **PURPOSE AND STRUCTURE OF THESE GUIDELINES**

This guideline was developed by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP), in collaboration with key stakeholders. Its purpose is to ensure consistency in the assessment and evaluation of applications for the planning, construction and maintenance of new off-road routes, as well as the evaluation of existing off-road routes. This guideline presents key criteria and questions which should be considered in the assessment of new and existing off-road routes, and includes:

- Part 1: Assessment of New Off-Road Routes by Environmental Assessment Practitioners and Landowners
- Part 2: Evaluation of New Off-Road Routes by Regulating Authorities
- Part 3: Assessment of Existing Off-Road Routes
- Part 4: Glossary of Useful Terms

#### **INTRODUCTION**

Motorised off-road<sup>1</sup> vehicles (which include 4x4s, 2x4s, all terrain vehicles (ATVs), quadbikes and off-road trailbikes) have become an integral part of the South African lifestyle, with the off-road vehicle (ORV) industry having experienced phenomenal growth since the start of the 1990s. This has given rise to an increase in the development and use of off-road routes, 4x4 tracks and trails in a range of environments throughout the country, with a particular focus on tourism opportunities. Off-road routes are established for a particular purpose and built to suit the local environment (either for landowner farming or management activities, access purposes, or recreation - or a combination of these activities), as opposed to the predetermined and strict design requirements and alignment of public roads. This highlights the need for off-road routes to be developed and maintained in a sustainable manner, bearing the environment in mind, in order to ensure continued benefits to the user and the regions within which they occur.

#### **DEFINITION: OFF-ROAD ROUTE**

In the context of this guideline, an off-road route is any road, route, trail or track, other than proclaimed roads, which can be used by motorised vehicles, including 4x4s, 2x4s, all terrain vehicles, quadbikes and off-road motorcycles for recreation or any other use. The term "route" is used to encompass all kinds of off-road routes and trails on private or public property, including graded roads used for management purposes and access, double tracks (4x4, 2x4, and quadbike trails) and single-tracks (off-road trailbike tracks).

<sup>1</sup> In the context of these guidelines, the term 'off-road' is synonymous with the term 'off highway' which is being adopted by the 4x4 industry.

## Off-road Route Impacts

The unsurfaced tread of an off-road route is susceptible to a variety of impacts, these being influenced by the nature and level of use, the local environment within which the route is located, as well as the planning and management actions that are implemented. Motorised ORVs, including 2- and 4-wheel drive vehicles, all-terrain vehicles (including quadbikes) and trailbikes, have a greater potential for environmental impact on unsurfaced routes than non-motorised uses. Tyres spin at higher rates of speed and cause substantial abrasion damage to vegetation, roots and soils. The weight and ground pressure of vehicles can also cause significant soil compaction and displacement – actions that lead to soil rutting and which may result in erosion.

Primary ecological changes arising from off-road routes are associated with their construction. The principal challenge for route owners is, therefore, to minimise the potential for impacts through a robust planning phase, and subsequently prevent further secondary (post-construction) degradation and impacts arising from both use by ORVs, as well as from natural processes (such as rainfall, water runoff and erosion). Control of water runoff is undoubtedly the most important constraint to manage to ensure ecological sustainability and drivability of the route.

Poorly planned off-road routes can result in high maintenance and repair costs, contribute to excessive environmental degradation, and fail to meet the needs of the users. Proper planning and design, as well as minimising the need for maintenance, are critical in avoiding environmental degradation, and in minimising long-term expenses associated with constant rehabilitation and rebuilding of degraded route sections.

The potential for environmental impacts to result from actions or activities associated with off-road routes and their use are summarised in Table 1. While the majority of these impacts are limited to a linear disturbance corridor, some impacts, such as alterations in surface water flow, sedimentation of watercourses, introduction of invasive plants, and disturbance of wildlife, can extend considerably further into natural landscapes. Even localised disturbance can harm or damage sensitive resources, particularly in environments with slow recovery rates, such as are prevalent in some areas of the Cape Floristic Region (CFR). More detail regarding the summarised information in Table 1 is provided in Appendix A of the guidelines for Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*.

**TABLE 1:** Summary of the potential for environmental impact to result from actions or activities associated with off-road routes and their use.

Activity or Action	Consequence of Activity	Key Resulting Impact on Environment
Clearing of route corridor	Reduction of vegetation cover	Accelerated erosion and loss of soil; Visual degradation
	Alteration of habitat conditions and habitat fragmentation	Impacts on fauna and flora populations; Alteration of the composition of species by damaging existing plants, creating bare spots that favour exotic and alien species, the seeds of which are introduced by route users and their vehicles
	Alteration of habitats known to be sensitive to disturbance and habitat fragmentation	
Routes established on poorly drained (cohesive) soils	Wet muddy patches along route	Tread braiding and widening as users avoid mud holes; Accelerated erosion and loss of soil, particularly where route grades are steep
Routes established on fine and poorly consolidated soils	Gravelly and rough road surface; Dust bowls in road surface	Accelerated erosion and loss of soil (usually by wind); Tread incision; Wash away of materials during wet periods; Poor quality driving surface
Routes established on soils with a high granular component but insufficient fines	Poor compaction; Corrugated effect to the tread surface	Wash away of materials during wet periods; Accelerated erosion and loss of soil; Poor quality driving surface
Cut and fill on steep slopes	Increase in the footprint of a route; Increased velocity of runoff	Erosion potential increases with the steepness of slope and the length of exposed slope; Accelerated erosion and loss of soil; Visual degradation
Channelling of water	Increased water flow in a focussed area	Accelerated erosion and loss of soil; Tread incision
Alteration of surface and sub-surface water flow	Alteration of natural drainage patterns	Surface water ponding; Increased potential for the formation of headcuts and erosion gullies
	Development of mud holes along the route	Tread braiding and widening as users avoid mud holes; Deepening of mud holes where crossed by users

Activity or Action	Consequence of Activity	Key resulting Impact to Environment
Alteration of channel flows at causeways and bridge structures	Sedimentation of watercourses	Increased turbidity, decreased water quality, and associated impacts on aquatic fauna and flora
	Alteration of in-channel habitat and loss of riparian vegetation	
	Impounding of streams	Increased potential for the formation of headcuts and erosion gullies which can create a physical barrier to migration of aquatic fauna;
	Alteration of flow patterns	
	Eddying around engineered structures and associated undercutting of structures, especially where engineered solutions (such as bridges and causeways) are not engineered directly onto competent bedrock.	
Washing away of road surface at drainage crossing during high intensity rain events (such as are experienced in drier areas)	Potential threat to infrastructure upstream (e.g. farm dams, causeways, etc);	
Soil compaction	Increased runoff and reduced infiltration	Accelerated erosion and loss of soil
Soil displacement	Deepening of tread over time	Accelerated erosion and loss of soil; Formation of ruts
	Increased sedimentation of watercourses downstream	Increased turbidity, decreased water quality, and associated impacts on aquatic fauna and flora

**Note:** The purpose of the information presented in this table is to highlight why responsible management of off-road routes is needed to minimise environmental impact. It should be remembered that every off-road route is unique and the important ecological issues to be considered will vary widely according to the type of route, and the environment within which the route is established (i.e. consideration of local habitats). Therefore, this summary may not present an exhaustive list of activities, consequences and impacts, but can serve as an initial guide (also refer to Appendix A of the guidelines for Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*).

Effective management of off-road routes requires best practice for all aspects of route planning, construction and maintenance. Many off-road routes have been constructed without landowners and/or route owners having assessed the ideal layout of such a route in the context of the local environment, without due consideration of the long-term financial requirements associated with the maintenance of the route, and/or without having obtained the necessary approvals in terms of the relevant environmental and planning legislation. Most routes currently used for recreational purposes were originally developed as access routes to private property; for harvesting, fire-fighting or alien species clearing; for game viewing; or to provide access to remote fishing, hunting or camping sites. Other routes have been established to provide access to telecommunication installations, Eskom infrastructure and forestry plantations. However, many of these routes cross soils and sites poorly suited for the level of use occurring on them today. In some instances this has resulted in irreversible damage to sensitive environments and landscape features. The level of impact on the environment is not always attributable to the level of use, but usually to the level of non-compliance by the route developers and route users, as well as the adoption of inappropriate management measures.

In terms of Section 28 of the National Environmental Management Act (NEMA; Act No. 107 of 1998), landowners have a responsibility to ensure that any development on their property is consistent with the 'Duty of Care' principle (i.e. that reasonable measures have been taken to prevent significant environmental degradation). Landowners are therefore responsible and accountable for the maintenance of any development on their property in the long-term. For landowners and route managers, degraded routes are a significant environmental problem due to their direct effects on vegetation, soils, erosion potential, and site hydrology. In addition, degraded routes may have indirect effects on biodiversity, ecological functions, site aesthetics, heritage sites, and sensitive environments such as rivers and wetlands. For route users, degraded routes reduce the level of use of the route, and lead to a less enjoyable and attractive recreational off-road experience. In addition, once degraded, a route can quickly become impassable, resulting in increasing negative impacts if not repaired, or closed and appropriately rehabilitated.

### **Purpose of the Guideline Series**

The total number of off-road routes in South Africa is unknown. Estimates indicate that there may be as many as 90 routes and trails for recreational use located in the Western Cape alone. This, together with the sensitivity of the Western Cape environment (largely due to highly diverse ecosystems, including the presence of the Cape Floristic Region (CFR) and associated biodiversity) resulted in the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) taking a particular interest in guiding route planners and operators in sustainable off-road route establishment and management, and in off-road route regulation. Only a small percentage of all off-road routes in South Africa are currently regulated, with the vast majority being in contravention of environmental and planning legislation to some degree.

At a national level, the off-road industry is developing self-regulation mechanisms which aim to address concerns over the increasing impact of off-road activities on the South African environment (a concern also expressed by the Minister of Environmental Affairs and Tourism in April 2005).

The guideline series draws on industry and environmental best practice, as well as input from key role-players in order to highlight the constraints associated with the planning, establishment, operation and management of off-road routes, and to provide a checklist for evaluation and regulation of these routes. In essence, the guideline series aims to:

- Provide guidance on the planning, design, establishment and on-going management of off-road routes.
- Promote best practice, and give effect to relevant and applicable legislation and regulations.
- Promote consistency of assessment, decision-making and management regarding off-road routes amongst EIA practitioners and regulating authorities by promoting understanding of off-road route construction and management goals.
- Provide guidance to route owners and users of off-road routes within the Western Cape to promote responsible ORV use and environmental protection through the reduction of habitat degradation and potential impacts on environmental resources.

These guidelines do not replace legislative requirements, but provide decision-making support in the application of existing legislation.

The following guidelines make up the three parts of this series:

1. Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*
2. Assessment and Evaluation of Proposed and Existing Off-Road Routes: *A Guide for Environmental Assessment Practitioners, Authorities and Route Planners*
3. Environmental Ethics and Sustainable Use of Off-Road Routes and Trails: *A Practical Guide for Recreational Trail Users*

In using this guideline series, it should be remembered that every off-road route is unique and the important ecological issues to be considered will vary widely according to the type of route, and the environment within which the route is established (i.e. consideration of local habitats). The type of vehicle used on a route (i.e. 4x4 or 2x4 use vs quadbike use vs trailbike use) is also a significant determinant of the nature and extent of impacts. In addition, behavioural differences between users may in turn lead to, or exacerbate the extent of degradation on any given route. As all of the detailed steps and questions in this guideline will not be relevant to each project, it is important to adapt the information to suit individual situations.

## **PART 1: ASSESSMENT OF NEW OFF-ROAD ROUTES BY ENVIRONMENTAL ASSESSMENT PRACTITIONERS AND LANDOWNERS**

In terms of Section 28 of the National Environmental Management Act (NEMA; Act No. 107 of 1998), landowners have a legal obligation to ensure that any development on their property is consistent with the 'Duty of Care' principle (i.e. that reasonable measures have been taken to prevent significant environmental degradation). The onus is on the landowner and the environmental practitioners to be well informed about the most recent legislation to ensure that all applicable legislation is complied with. Advice regarding applicable legislation and legal requirements can be obtained from relevant environmental departments. As a guide, legislation under which permits may be required to be obtained, as well as contact details for Western Cape Regulating Authorities are provided in Appendix A.

Depending on the nature of the development and the environment within which the development is proposed, reasonable measures to prevent significant environmental degradation may include:

1. Understanding the environment likely to be affected by the proposed activity and any alternatives identified
2. Investigation of the potential impact of the activity and its alternatives on the environment and assessment of the significance of that potential impact
3. Investigation of mitigation and management measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity
4. Public information and participation by all interested and affected parties, including all applicable organs of state
5. Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information
6. Investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation.

These are discussed in further detail in the sections which follow:

### **1.1. Understanding the environment likely to be affected by the proposed activity and any alternatives identified**

The relationship of an off-road route to the surrounding natural, social and cultural environment is unique, and therefore it is important to gain an understanding of route-specific conditions. In understanding the environment likely to be affected by the development of a route, information regarding the geographical area, the landscape features (e.g. mountains, ridges, rivers, wetlands), the soils and geology, the biodiversity and ecological systems affected, and the social environment must be obtained and evaluated in order to determine the potential for significant environmental impacts. Key information which should be considered in obtaining an understanding of the area which may be affected by the establishment/presence of the route and/or associated activities includes:

## 1. *Characteristics of Topography, Geology and Soils*

- a. Steep slopes. Slopes may vary along the proposed route. It is important to identify where key triggers are located which may influence planning and design (such as slopes steeper than 1:4, depending on constraints which may be imposed by the nature of the surrounding environment and local soil conditions<sup>2</sup>). It may be necessary to consider alternatives in these areas.
- b. Terrain consisting of any of the following:
  - \* Rocky outcrops (residual or transported material such as scree)
  - \* Rocky shores
  - \* Calcified dunes (unconsolidated, semi-consolidated and consolidated aeolian bedforms)
  - \* Ridges/cliffs/mountainous terrain.
- c. Soil consisting of any of the following types: (the suitability of these soils for an off-road route will be dictated by the geomorphological setting, with the most significant determinant being moisture and slope):
  - \* Clay
  - \* Mud
  - \* Silt
  - \* Sand
  - \* Gravel (completely weathered residual material or transported soil).

Soils generally occur as a combination of all of the above so they are frequently grouped into granular (dominated by sand or gravel) or cohesive (dominated by silt or clay) soil types. Cohesive soils would provide very hard and smooth rides in arid conditions, but would be totally unsuitable in wet areas where rutting and erosion would destroy the drive surface/tread. Granular soils, on the other hand, would be soft with deep ruts in dry climates, but in the wetter areas would be free draining and provide for a better drive surface than cohesive materials.
- d. Unique geological or physical features (geosites), including:
  - \* Fossiliferous sediments (palaeontological lithologies/deposits)
  - \* Mineralisation
  - \* Stratotype locality
  - \* Unique geomorphological terrains
  - \* Dune fields.

## 2. *Climate*

- a. Regional climatic conditions.
- b. Rainfall, frequency of floods, flash-flood events, etc.
- c. Wind direction and speed.
- d. Weathering rates (Weinert's Climatic N number (refer to Appendix D of the guidelines for Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*) should be borne in mind when determining weathering rates, which ultimately dictate whether chemical or mechanical weathering predominates in an area).

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<sup>2</sup> For example, an unconsolidated sandy environment displays very different physical constraints (and by implication management requirements) to competent bedrock substrate.

### **3. Characteristics of Catchment and Riverine Features**

- a. Position within the river catchment area.
- b. Position in relation to 1:50 year floodline or floodplain of any watercourse.
- c. Presence of a river system (watercourse and river banks). If yes, indicate type of watercourse, i.e.
  - \* perennial river
  - \* non-perennial river
  - \* permanent wetland
  - \* seasonal wetland
  - \* artificial wetland
  - \* estuarine/lagoonal wetland.

### **4. Characteristics of Ecological Features**

- a. Biodiversity value of the land and immediate surrounding area (in terms of published biodiversity targets in terms of relevant environmental legislation).
- b. Areas occupied by indigenous vegetation (including estimated % cover) including:
  - \* Coastal vegetation (including estuaries)
  - \* Lowland fynbos
  - \* Midland and mountain fynbos
  - \* Renosterveld
  - \* Succulent karoo
  - \* Nama karoo
  - \* Mainland and thicket
  - \* Riparian vegetation
  - \* Natural forests.
- c. Presence of localised quartz and other pebble patches. These must be avoided as they are centres of diversity for many succulent and bulb plant species, and are the only habitat of many localised, endemic or rare plant species. These occur primarily in the Succulent Karoo biome, but may also be found in the Fynbos biome.
- d. Presence of rocky refuges. These are well-documented sources of localised occurrences of both sensitive/endemic faunal and floral communities. Rocky refuges are frequently targeted by ORV users as a “challenge” or obstacle along the route, but should be avoided, especially where biodiversity impacts are potentially significant.
- e. Presence of habitats in which any Red Data or protected birds, animals and/or plants in terms of National and/or Provincial legislation are found on the property.
- f. Presence of unique localised habitats such as limestone (or calcrete) and granite outcrops in any coastal areas. These areas must be avoided as they are home to many rare and localised plant species.
- g. Presence of a habitat that is essential for the conservation of a protected or threatened plant or animal species.
- h. Presence of sensitive areas, such as estuaries, salt marshes and the coastal zone. These areas must be considered as exclusion zones.
- i. Description and location of any invasive plant species<sup>3</sup>.
- j. Breeding/nesting/roosting sites or migration routes of animal/bird species.

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<sup>3</sup> Invasive plants can be indigenous or alien plants that aggressively displace other plants. Disturbances to the environment due to off-road activities often create opportunities for alien infestation.

## **5. Features of Landscape**

- a. Location in the landscape, i.e.
  - \* Ridgeline
  - \* Plateau
  - \* Side slope of hill/mountain
  - \* Closed valley
  - \* Open valley
  - \* Plain
  - \* Undulating plain/low hills
  - \* Dune
  - \* Sea front<sup>4</sup>
  - \* Other.
- b. Groundwater, soil and geological stability of the site.
- c. Presence of areas or sites of special attraction or uniqueness.
- d. Presence of any protected sites or features of archaeological, cultural or historical significance (in terms of National and/or Provincial legislation) found on the property (including burial sites, sites used as places of worship, palaeontological and archaeological sites).
- e. Aesthetics and visual quality of the area.
- f. Gradient of the site.

## **6. Land Use Characteristics**

- a. Is the property (or part thereof) privately-owned, or is it under the control of a national or provincial body?
- b. Is the property or part thereof a World Heritage Site/National Heritage Site/Provincial Heritage Site, or does it fall within an area which forms part of a buffer zone?
- c. Are there any cultural or heritage resources on the property?
- d. Is the property or part thereof within the boundaries of an official Biosphere, National/Provincial or private Nature/Game Reserve? (the potential for an off-road route to impact on potential ecological corridors should always be kept in mind)
- e. Is any other official conservation/protection status applicable (e.g. declared mountain catchments)?
- f. What is the property zoning and current land use?
- g. Character and nature of the land use surrounding the route and the property.
- h. Nearest settlement/human occupation.
- i. Characteristics of the socio-economic environment.
- j. Proximity to and visibility from public roads.

### **1.2. Investigation of the potential impact of the activity and its alternatives on the environment and assessment of the significance of that potential impact**

In areas where potentially significant impacts are likely to occur as a result of the development of the off-road route and/or associated activities (or secondary activities), potential environmental impacts (positive and negative) resulting from the proposed development must be identified and assessed for all phases of the project (i.e. planning, construction, operation

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<sup>4</sup> It should be noted that driving in the coastal zone is illegal.

and maintenance, and closure) and on a holistic level (i.e. for the project as a whole, including secondary activities and any associated infrastructure).

### **Secondary Activities which may be Associated with Off-Road Routes**

Rest camps and support facilities may be required to provide necessary services such as ablution facilities, access to potable water, and demarcated areas for building fires, parking vehicles and trailers (to unload quadbikes or trailbikes). Overnight camping facilities should only be developed in appropriate areas.

The sustainable planning, design and management of these activities is required in order to ensure the sustainability of the off-road route. Criteria for the planning, design and management of these activities are guided by other relevant provincial legislation, policies and guidelines, and are not repeated within this guideline document. Applicable reference documentation includes, for example, the Guidelines for Resort Developments in the Western Cape, and the Environmental Impact Assessment Regulations.

Impacts may include impacts on sensitive landscape features, biodiversity, ecological systems, heritage resources, and the socio-economic environment. An independent environmental assessment practitioner should be employed to conduct the assessment/s. Assessing a potential route entails consideration of the proposed route alignment as well as the surrounding natural and social environment. An investigation of the primary (or direct) impacts as well as secondary (or indirect) impacts should be undertaken. For example, vehicle use has direct physical impacts on the environment such as erosion or soil compaction. Secondary (or indirect) impacts may include, for example, an increase in siltation of watercourses due to soil displacement and increased surface runoff. Cumulative effects<sup>5</sup> must also be investigated, particularly in areas where other off-road routes are known to exist.

The environmental and socio-economic impacts likely to result from the proposed route should be compared with the impacts which would result if the off-road route was not to be developed (i.e. the 'no development' option), and where relevant, to the impacts resulting from feasible alternative activities and/or route alignments.

The assessment of potential impacts may require specialist input. Broadly speaking, specialist involvement is needed when the environment could be significantly affected by the proposed activity, where that environment is valued by or important to society, and/or where there is insufficient information to determine whether or not unavoidable impacts would be significant. The requirement for and extent of specialist input should be guided by DEA&DP's guidelines series on the involvement of specialists in environmental assessments.

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<sup>5</sup> Impacts which can arise from one or more activity, and may result in an additive impact (i.e. where it adds to the impact which is caused by other similar impacts), or an interactive impact (i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact). Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

The following are viewed as key considerations in the assessment process:

1. What is the proposed width of the route and/or the width of the road reserve? If the route is proposed to be wider than 4 m or has a reserve wider than 6 m, a Basic Assessment will be required to be undertaken by a suitably qualified independent environmental assessment practitioner (in terms of the EIA Regulations).
2. What is the length of the route? If a route of more than 300 m in length is proposed, the South African Heritage Resources Agency (SAHRA) and/or Heritage Western Cape must be informed of the proposed activity in terms of the requirements of Section 38 of the National Heritage Resources Act (Act No. 25 of 1999). In terms of this legislation, SAHRA and/or Heritage Western Cape will determine whether a Heritage Impact Assessment should be undertaken.
3. What is the anticipated level of use and intensity of use of the off-road route?
4. What is the intended purpose of the off-road route? (e.g. would this route be used for access purposes only, for recreational use, a commercial venture etc?).
5. What is the anticipated type of use of the off-road route? Is a single-use or mixed-use type route planned? (i.e. 4x4 and/or 2x4 vehicles, quadbikes, and/or off-road motorcycles).
6. Is there the intention for this route to be used for events, races or other high-volume activities, and what would the frequency of such planned events be? Events such as racing of motor powered vehicles may require a Basic Assessment to be undertaken by a suitably qualified independent environmental assessment practitioner (in terms of the EIA Regulations).
7. Would the route be utilised on a continuous basis throughout the year, or would seasonal restrictions be applied?
8. How have environmental factors been considered in the planning, siting and design of the route? Have alternatives been identified for potentially sensitive sections of the route?
9. Does the nature of the topography, soils and slopes render the area susceptible to slope instability (i.e. slope failure) and erosion? Would ORV use increase or exacerbate the risk of significant soil erosion?
10. Is existing physical degradation of the local ecological environment present at or near the site?
11. Could water resources be significantly affected by siltation or increased turbidity resulting from soil erosion?
12. Will a wetland, riparian area, riverbank or watercourse be affected by the construction/presence of the route and/or associated activities? Are there wet/seasonally-wet areas such as seeps? If yes, the following authorisations may be required:
  - a. An authorisation from the relevant competent authority, as a Basic Assessment is required (in terms of the EIA Regulations) for the dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 m<sup>3</sup> from a river, riparian floodplain or wetland, as well as for the construction of a bridge in the 1:10 year floodline. In terms of the legislation, a Basic Assessment must be undertaken by a suitably qualified, independent environmental assessment practitioner.
  - b. A permit from the Department of Water Affairs and Forestry (DWAF) is required for the crossing of a watercourse; or encroachment on or destruction of a wetland. As part of this permit application, an EIA is required to be undertaken.

- c. A permit from the Department of Agriculture will be required for any disturbance and/or destruction of riparian vegetation.
13. Are there any variations in impact as a result of seasonal changes (e.g. perennial streams, wetlands, wet season vs dry season, dust, etc.)?
14. Are there seasonal constraints in some habitat or terrain types? Should the route, or part thereof, be closed for certain months of the year due to nesting, flowering, breeding cycles, or the potential for flooding, excessive dust?
15. Does any part of the route follow close to the high water mark? No driving may be considered close to the high water mark, as driving in the coastal zone is illegal in terms of the ORV Regulations published in terms of NEMA.
16. What is the impact on biodiversity at the site and in the broader area (in terms of published biodiversity targets in terms of relevant environmental legislation)?
17. Will any threatened, protected and/or localised animal and/or plant species, or habitats within which these species may be found be impacted on by the construction and/or presence of the off-road route and/or associated activities? If yes, describe and record the location. A permit will be required from CapeNature if these species are to be disturbed or destroyed. In addition, a Basic Assessment (in terms of the EIA Regulations) is required to be undertaken for the transformation or removal of vegetation of 3 hectares or more, or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem in terms of the National Environmental Management: Biodiversity Act.
18. Will there be a degree of trampling/disturbing/destroying or clearing of vegetation during the construction phase? If yes, provide estimated % loss of cover.
19. Will surrounding ecological systems or riverine habitat be affected by the off-road route and its associated activities in any way (considering direct/primary impacts and indirect/secondary impacts)?
20. Will the site for the off-road route and/or associated activities significantly impact on the aesthetic quality or sense of place of the landscape? If yes, why this impact cannot be mitigated through redesign and/or resiting of the route must be motivated.
21. Will the proposed route be visible from public roads, residences, residential areas, etc.?
22. Will any form of archaeological/palaeontological/cultural/historical feature be disturbed or destroyed by the construction and/or presence of the off-road route and/or associated activities? If yes, a permit from Heritage Western Cape or the South African Heritage Resources Agency (SAHRA) is required, depending on the significance of the site being affected.
23. Will the off-road route and its associated activities negatively impact on any existing:
- Economic activity
  - Recreational activity
  - Rights of individuals.
24. Does the proposed off-road route impact on any community/human settlement?
25. Does the proposed off-road route impact on, or conflict with other eco-tourism initiatives in the area such as hiking trails, resort developments, scenic routes, etc.? Off-road routes, ORV use and associated activities generally take place in rural or wilderness areas, and may result in a conflict of land use with tourism initiatives or activities undertaken by wilderness enthusiasts.

26. Are there any cumulative effects associated with the proposed development? In areas where other off-road routes are known to occur, there is a need to address the cumulative impact on all aspects of the environment, in particular: resource damage; impacts on threatened or endangered, and sensitive species and their associated habitats; public safety; and impacts on the social and economic environments. The nature and extent of the impact/s must be specified.
27. Has any fixed and/or ancillary infrastructure (such as ablution facilities, parking areas, rest camps, camping areas, etc.) been proposed? If so, is it located in a sensitive area such as within 30 m of any wetland or seep, on a sandy plateau, or on a ridge or mountain peak? The assessment of the ancillary infrastructure must be guided by DEA&DP's Guidelines for Resort Development. A Basic Assessment (in terms of the EIA Regulations) will be required to be undertaken by a suitably qualified environmental assessment practitioner for the construction of facilities for the treatment of wastewater or sewage with an annual throughput capacity of between 2 000 m<sup>3</sup> and 15 000 m<sup>3</sup>. Systems with an annual throughput of more than 15 000 m<sup>3</sup> require an EIA. A water use permit for the discharge of sewage effluent is required to be obtained from the Department of Water Affairs and Forestry (DWAf). The DWAf protocol to determine the impact of ventilated improved-pit (VIP) latrines or shallow sewer systems on groundwater must be borne in mind.
28. Does the proposed activity result in the degradation of resource conditions to such an extent that the resource would be irreparably damaged or lost?
29. Will any road building/fill material be required in establishment of the route? If so, will road construction material (gravel and crushed rock) be sourced from an existing supply, or will a borrow pit be needed to supply the necessary road building material? Will the material be free of alien/weed seeds? If a borrow pit is required to be opened, a permit/licence will be required from the Department of Minerals and Energy (DME).
30. Is any formal road construction design required or being implemented for the project? Civil engineering input for stormwater management, erosion control, culvert structures and slope stability along roadways (cut and fill) may need to be obtained in certain circumstances.
31. Is the off-road route and/or associated activities subject to any national, provincial or local authority authorisations and/or conditions and/or by-laws (e.g. under the administration of the jurisdictional area of a municipality/local authority or in a designated protected natural area)? If yes, provide a summary of permits, licences or approvals applied for or issued by local authorities, if any.

Motivation for the project, including the need and desirability of the development and the reasons for the siting of the route within the affected area or environment in preference to other areas or environments must be developed. Reasonable and feasible alternatives<sup>6</sup> must also be investigated and described, particularly in areas which may contain sensitive natural or social environmental features, and/or resources. Guidance on the identification and assessment of alternatives can be obtained from the DEA&DP's Guideline on Alternatives compiled in terms of the NEMA Environmental Impact Assessment Regulations.

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<sup>6</sup> Alternatives are different means of meeting the general purpose and need of a proposed activity. Feasible alternatives are those which are considered to be technically, economically and environmentally feasible.

Photographs and maps showing the site location and the extent of the proposed development must be provided with the assessment. Maps must be at an appropriate scale to provide sufficient detail (e.g. at a scale of 1:10 000, where available).

The assessment must provide sufficient information to demonstrate the nature, extent and significance of the potential environmental impacts, as well as the degree of confidence in the assessment. The assessment must indicate what practical and feasible management measures are needed in order to minimise environmental degradation for all phases of the proposed activity, i.e. at the planning and siting phase, during the construction phase, for the duration of the use of the route by ORVs, and for closure and decommissioning.

### **Significance Ratings for Impact Assessment**

In order to assess the significance of the identified impacts, the following characteristics of each potential impact must be identified:

- the nature, which shall include a description of what causes the effect, what will be affected and how it will be affected;
- the extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional;
- the duration, wherein it will be indicated whether the lifetime of the impact will be of a short duration (0–5 years), medium-term (5–15 years), long-term (> 15 years) or permanent;
- the probability, which shall describe the likelihood of the impact actually occurring, indicated as improbable (low likelihood), probable (distinct possibility), highly probable (most likely), or definite (impact will occur regardless of any preventative measures);
- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the status, which will be described as either positive, negative or neutral.

In assessing a proposed route, use should be made of existing information regarding the local area, as far as possible, in order to obtain an understanding of the current situation. Information is available in various forms from planning authorities, academic and research institutions, and from local communities and stakeholders. The level of detail of information does, however, vary depending on the area under consideration. Information which is available and should be sourced includes:

- Mapping information
- Soil information
- Information regarding the presence of wetlands in certain areas
- Information regarding localised, protected and red data plant and animal species
- Planning information regarding local and regional land use
- Landowner management fact sheets produced by CapeNature on fire management, soils, biodiversity and alien plant species

Relevant contact details for the Western Cape regulating authorities and information sources are included in Appendix A.

### **A. Mapping information**

Topographical maps and aerial photographs available from the Chief Director: Surveys and Mapping situated in Mowbray are useful and comprehensive reference tools for the planning, establishment or maintenance of an off-road route. They provide valuable data regarding elevation, contour, large wetlands areas and existing routes. Typically, the maps are scaled at 1:50 000. Orthophotos and aerial photography for areas may also be available from the Surveyor General. These would typically be available at a 1:10 000 or smaller scale. All of this information is also available from Surveys and Mapping in digital format.

### **B. Soil information**

Soil information, hydrological data, and topographical and soil survey maps are valuable tools which should be used in route planning. Soil maps developed by the Institute for Soils, Climate and Water (ISCW) at the Agricultural Research Council help to identify an area's predominant soil type. This data can be purchased in digital format. These maps can be useful when attempting to identify appropriate areas to locate the route. Due to the scale on which the maps are produced and the accuracy of soil boundaries, soil maps are useful for planning, but not for site-specific purposes. It may be necessary to approach a soil science specialist for an accurate survey of the soil types and conditions along the proposed route.

### **C. Wetland information**

Various institutions and authorities (e.g. the Department of Environmental Affairs and Tourism (DEAT) and Working for Wetlands) are investigating, designating and mapping wetland areas throughout the country. Maps delineating wetlands have been prepared for selected areas, and have been used to assess and prioritise wetlands for rehabilitation as part of the Working for Wetlands programme. As wetlands are not always indicated on maps, an on-site survey/review would be required while planning route alignments. Information on the conservation importance of a wetland is available through Working for Wetlands, or the Western Cape Wetlands Forum at SANBI (Kirstenbosch). The Western Cape Wetlands Forum (WCWF) is an excellent resource and contact base for wetland-related issues in the Western Cape.

### **D. Information regarding localised, protected and Red Data plant and animal species**

Information on Red Data species can be obtained from geographical areas maps prepared by DEA&DP. Information may also be available from the South African National Biodiversity Institute (SANBI) and CapeNature. Information on distribution of specific listed flora and fauna taxa may also be available from museums and local universities.

### **E. Legislation, policies, guidelines and bioregional planning Information**

In assessing the potential impacts associated with an off-road route, all relevant national and provincial legislation, policies, guidelines and bioregional planning must be considered, where these apply in the Western Cape Province.

Information regarding relevant environmental legislation and policies, as well as that regarding local land use planning frameworks, land use zoning and development planning can be obtained from DEA&DP (on a provincial scale), or from the relevant local authority.

#### ***F. Landowner management fact sheets***

Landowner fact sheets have been produced by CapeNature, and include:

- A landowner's guide to Fire Management
- A landowner's guide to soils in Renosterveld areas
- A landowner's guide to biodiversity in agricultural landscapes
- A landowner's guide to alien grasses, and the prevention of their spread

These fact sheets are useful tools in land management practices.

### **1.3. Investigation of mitigation and management measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity**

The best approach in planning routes is always to avoid impacts to the environment. The next best is to minimise the impacts. The last resort is to mitigate for impacts.

Where potentially significant negative impacts are identified as likely to occur as a result of the development of the off-road route (as determined in section 1.2 above), and where these potential impacts cannot be avoided through the adoption of alternatives, appropriate measures for mitigating and/or managing each potentially significant impact must be specified. If it is not possible to mitigate certain impacts, this must be clearly indicated. The anticipated effectiveness of specific mitigation measures must be evaluated, and the impact after the implementation of appropriate mitigation (i.e. the residual impact) must be estimated and compared to the 'no development' option. In order to inform planning, identified mitigation measures should be detailed within an Environmental Management Plan (EMP) for the construction phase. Guidance on the compilation of an EMP can be obtained from the DEA&DP Specialist Guidelines series – Guideline for Environmental Management Plans.

### **1.4. Public information and participation by all interested and affected parties, including all applicable organs of state**

In accordance with the requirements of NEMA, an appropriate public information and participation process must be developed and implemented in order to obtain public inputs regarding the proposed off-road route development and associated activities. The exact nature of each process must be informed by:

1. The size and type of area affected by the application.
2. Which communities are affected by the application.
3. Which stakeholders are affected by the application.

Issues raised and input received during this public consultation process must be clearly summarised in order to reflect the positions of the various parties involved. Where necessary, appropriate recommendations must be made in order to address specific issues raised regarding the proposed development. Guidance on the public participation process can be obtained from DEA&DP's Guideline on Public Participation compiled in terms of the NEMA Environmental Impact Assessment Regulations.

### **1.5. Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information**

The investigation and assessment of environmental impacts associated with the proposed development must take gaps in knowledge, the adequacy of predictive methods, underlying assumptions and uncertainties into account. These gaps, assumptions and uncertainties must be brought to the attention of the regulating authorities through the application process in order to assist in the decision-making process. Apply the precautionary principle in planning, establishing and operating off road routes when there is insufficient information to determine with confidence the consequences of an action.

### **1.6. Investigation and formulation of arrangements for the monitoring and management of impacts, and the assessment of the effectiveness of such arrangements after their implementation**

Applications for off-road routes should be supported by an Environmental Management Plan (EMP) for all phases of the development (i.e. planning, establishment, operation and maintenance, and closure and decommissioning). The EMP should include measurable goals and objectives that can be audited, and should detail measures adopted to:

1. Ensure that the mitigation recommended for potentially significant environmental impacts associated with the construction and/or use of the off-road route is implemented.
2. Ensure that sensitive indigenous fauna and flora, archaeological and cultural/historic features are appropriately protected and monitored.
3. Regulate and control vehicle access to and use of the route and the surrounding area.
4. Ensure vehicle users comply with any control measures and standards set for the route and surrounding area.
5. Ensure that environmental impacts of vehicle use are monitored in order to ensure that use of the off-road route is environmentally sustainable.
6. Ensure that all disturbed areas are appropriately rehabilitated and alien vegetation is appropriately managed.
7. Maintain a complaints register so that regular inspection by officials or an Environmental Control Officer (ECO) can ensure compliance and EMP modification within the above measures/guidelines.

Guidance on the compilation of an EMP can be obtained from the DEA&DP Specialist Guidelines series – Guideline for Environmental Management Plans.

## **PART 2: EVALUATION OF NEW OFF-ROAD ROUTES BY REGULATING AUTHORITIES**

The relevant authority or authorities are responsible for ensuring that decisions are made in terms of the objectives of Integrated Environmental Management and the Principles of NEMA in order to minimise the impact and maximise the benefits to the environment. All relevant national and provincial legislation, policies and guidelines must be considered in the decision-making process, where these apply in the Western Cape Province. Where an activity falls under the jurisdiction of more than one authority, co-ordination and co-operation between Departments is required in the consideration of assessments.

The relationship of an off-road route to the surrounding natural and cultural environment is unique, and therefore it is important to understand route-specific conditions and the significance of these in the local context. The evaluation of the potential impact of the proposed activity on the environment should consider:

1. The affected biophysical, social and economic environment
2. The potential impact and benefits of the activity on the environment (and the assessment ratings/significance of such impacts)
3. Possible mitigation and management measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity
4. Feedback from a process of public information-sharing and participation
5. The adequacy of the assessment undertaken as well as gaps in knowledge and uncertainties in information
6. Possible arrangements for the monitoring and management of impacts

This information should be provided through the assessment process by environmental assessment practitioners or landowners, which is detailed in Part 1 of this Guideline. The evaluation of the potential impact of the proposed activity on the environment, as well as issues to be considered when compiling conditions of approval are discussed in further detail in the sections which follow:

### **2.1. Evaluation of the potential impact of the activity and its alternatives on the environment within the decision-making process**

In evaluating the potential impacts associated with an off-road route, all relevant legislation, policies, guidelines and bioregional planning must be considered, where these apply in the Province. The following environmental characteristics will serve as key indicators of areas where potentially significant environmental impacts may arise:

1. Presence of unique or sensitive topographical or landscape features such as springs, river catchments areas, non-linear wetlands (such as seepages, marshes, pans, vleis (seasonal or permanent), springs, saltmarshes, estuaries and bogs) and/or riparian areas within the proposed area of development, particularly along the proposed off-road route.
2. The coastal zone and/or areas close to the high water mark<sup>7</sup>.

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<sup>7</sup> Driving in the coastal zone is illegal in terms of the ORV Regulations

3. Occurrence of unique geological, cultural or biological features within the proposed area of development.
4. Steep slopes (i.e. steeper than 1:4) within the proposed area of development.
5. The presence of sensitive fauna or flora (such as endemic, protected and/or Red Data plant and animal species) and high biodiversity significance within the proposed area of development, particularly along the proposed off-road route.
6. Presence of quartz and other pebble patches (particularly in the Succulent Karoo biome), which may be centres of diversity for succulent and bulb species, and the habitat of many localised, rare plant species.
7. Presence of limestone (or calcrete) and granite outcrops in any coastal areas which are habitats for rare and localised/endemic plant species.
8. Areas of cultural importance (including burial sites, sites used as places of worship, palaeontological, archaeological and historical sites) within the proposed area of influence of the development.

The following are key considerations in the evaluation process:

1. Has a need for the proposed development been established?
2. Proposed width of the route and the road reserve. If wider than 4 m (or with a road reserve wider than 6 m), has a Basic Assessment been undertaken in accordance with the requirements of the EIA Regulations?
3. Planned purpose, type and level of use of the off-road route.
4. Planned intensity of use of the route. If events such as racing are planned, has a Basic Assessment been undertaken in accordance with the requirements of the EIA Regulations?
5. Character and nature of surrounding land use. Will the off-road route result in significant conflict with other land uses?
6. Compatibility with relevant provincial and local planning policies, including spatial and non-spatial planning documents.
7. Information regarding the geographical area, the landscape features (e.g. ridges or mountainous areas), biodiversity, ecological systems and fauna and flora, and socio-economic environment affected by the application. Potential impacts resulting from the application on these aspects.
8. Biodiversity value of the land and immediate surrounding environment (in terms of published biodiversity targets in terms of relevant environmental legislation). What plans have been proposed to avoid, minimise and remedy impacts on biodiversity?
9. Does the route impact on any populations of threatened, protected and/or localised plant species or habitats within which these species are likely to occur?
10. What measures are taken to minimise impacts on fauna (e.g. avoiding sensitive habitats, nesting/roosting sites, etc.)?
11. How have environmental factors been taken into account in the planning and site layout of the route? Has the 'Duty of Care' principle been exercised?
12. Does the proposed activity result in the degradation of resource conditions to such an extent that the resource would be irreparably damaged or lost?
13. Will any form of archaeological/palaeontological/cultural/historical feature be disturbed or destroyed? If yes, has application for a permit from Heritage Western Cape or the South African Heritage Resources Agency (SAHRA) been made?

14. How have issues such as erosion potential and stability been taken into account, and have practicable solutions to minimise erosion impacts through all phases been provided, where required?
15. What measures are proposed to ensure that degradation of the environment is kept to a minimum during the construction phase of the route?
16. What measures are proposed to minimise environmental degradation resulting from the operation and maintenance of the route?
17. What measures are proposed to control ORV use on the route and enforce trespass prohibitions such that degradation of the environment is kept to a minimum?
18. Will the off-road route result in significant impacts on the social environment, such as communities or human settlements in the area?
19. What is the impact on aesthetics of the general area (associated with the design, scale, layout, etc. of the route)? Will the development as a whole alter the current sense of place?
20. What impacts are anticipated with regards to water resources (e.g. presence of springs, river catchments areas, wetlands, etc.)? Have applications been made to the Department of Water Affairs and Forestry (DWAFF), Department of Agriculture and DEA&DP for all relevant permits?
21. Does any part of the route propose an alignment close to or below the high water mark?
22. Are there any variations in impact as a result of seasonal changes (e.g. perennial streams, wetlands, rainy season vs dry season, dust, etc.)?
23. Are there seasonal constraints in some habitat or terrain types? Should the route or part thereof be closed for certain months of the year due to nesting times, flowering times, breeding cycles, or the potential for flooding, excessive dust?
24. How have alternatives been considered and assessed? Has the best practicable environmental option been selected?
25. How have cumulative environmental impacts been considered and assessed?
26. Has any fixed infrastructure been proposed? If so, has the location/s been adequately assessed? Has application been made to DWAFF for all relevant permits, including discharge of sewage effluent? Has a Basic Assessment or EIA been undertaken in accordance with the requirements of the EIA Regulations for proposed sewage treatment facilities?
27. Have the requirements of all relevant national and provincial legislation, policies and guidelines been considered in the assessment?
28. Have all relevant Organs of State (such as SAHRA and/or Heritage Western Cape, DWAFF, Department of Agriculture, local authorities, etc.) having jurisdiction in respect of any aspect of the proposed project been consulted?
29. Are there any factors from an off-road driving/tourism perspective that make the proposed route unique, offering opportunities to ORV drivers that are not offered anywhere else in the Western Cape (for example: a unique driving surface such as loosely packed gravels along the banks of a river)?

In reviewing an application for an off-road route, the route or a portion of the route should not be allowed where the following effects could result:

1. Significant damage to streams, wetlands or riverine/riparian habitat.

2. Damage to areas in close proximity to or below the high water mark. Driving is prohibited in this area in terms of the ORV Regulations.
3. Significant soil erosion resulting in excessive rutting, impairment of route drainage, and other forms of damage not correctable using standard route maintenance standards and techniques.
4. Significant disturbance of plants, animals or their habitats.
5. Damage to sites of significant archaeological, scientific or historical interest, or other significant resources, including rare natural features of interest.
6. Unacceptable levels of danger to the safety of users because of steep grades, steep terrain, sharp curves, slippery or unstable route surfaces, or limited visibility.
7. Unacceptable impacts as detailed in other national and provincial legislation, policies and guidelines.

The route, or a portion of the route, should not be allowed or approved where mitigation or management measures would prove to be inadequate to reduce environmental impacts to within acceptable levels.

## **2.2. Issues to be considered when compiling conditions of approval**

Depending on the outcome of the assessment and evaluation process, the regulating authority will either:

- Authorise the development with conditions of approval; or
- Request additional information before making a decision; or
- Refuse/turn down the development proposal.

Decisions from authorities must take cognisance of all the facts presented by the project proponent in support of its application, and must be supported by appropriate reasons. If the activity is authorised, the decision will include conditions required to protect human health and the environment that must be complied with. Decisions and condition of approval will aim to:

1. Avoid inappropriate development in sensitive areas taking into account the character of the existing environment. New off-road routes must only be allowed in Critically Endangered and Endangered vegetation types under very special, specified circumstances where the environmental benefit is shown to outweigh the disadvantages, such as by formal/legal conservation of the natural vegetation on the property and through formal guided routes.
2. Ensure the continued functioning of ecosystems, and maintain biodiversity through habitat protection; restrictions on periods of ORV use due to seasonal variation in impacts; and/or restrictions on the number of users at any one time, considering the sensitivity and carrying capacity of the environment.
3. Ensure that the planning, layout and design of proposed off-road routes take environmental constraints into account, thereby promoting sustainable and environmentally sensitive development.
4. Preserve landform features and places of interest through ensuring that the siting of off-road routes and associated infrastructure is related to the environmental resilience and visual screening capabilities of the landscape.

5. Adopt the 'precautionary principle' in decision-making where there is an absence of clear or definitive data regarding the environmental impacts associated with the proposed off-road route.
6. Ensure that the scale, density and nature of the proposed off-road route and associated infrastructure are in keeping with the sense of place and character of the area.
7. Ensure that the proposed development does not impose on the rights of communities or individuals in the area.
8. Ensure that appropriate and practical mitigation measures are implemented through the requirement for an Environmental Management Plan for all phases.

Standard conditions of approval could include:

1. Compilation of a site development plan.
2. Compilation of an Environmental Management Plan (EMP) for the construction phase of the off-road route, including site-specific recommendations for the mitigation of potentially significant impacts (if not already compiled together with the assessment). Clear and measurable objectives and management actions, which can be audited, will need to be detailed in the EMP.
3. Inclusion of resource management plans (for environmental resources such as indigenous vegetation and wetlands) within the EMP, where applicable. Direction for acceptable uses and protection measures for environmental resources will need to be included.
4. Compilation of an EMP for operation of the off-road route, including site-specific recommendations for the mitigation of potentially significant impacts, and recommendations for decommissioning of a section or the entire route. Clear and measurable objectives and management actions, which can be audited, will need to be detailed in the EMP. This EMP should be updated on a continual basis to include any relevant additional information and/or requirements. Specifications for decommissioning should be updated prior to decommissioning to include site-specific issues which may need to be addressed at that time.
5. Development and implementation of an on-going maintenance and monitoring programme for the operation and maintenance of the off-road route. Regular audits (preferably every 2 years) will be required to be undertaken by an independent external party in order to monitor the effectiveness of the maintenance programme.

### **PART 3: ASSESSMENT OF EXISTING OFF-ROAD ROUTES**

In terms of Section 28 of the National Environmental Management Act (NEMA; Act No. 107 of 1998), landowners have a legal obligation to ensure that any development on their property is consistent with the 'Duty of Care' principle (i.e. that reasonable measures have been taken to prevent significant environmental degradation). Therefore, existing off-road routes are regulated through this principle, and landowners must ensure that environmental degradation as a result of activities or developments is avoided or minimised through appropriate management measures.

Landowners, route owners and route operators must avoid or limit any form of environmental impact as a result of the type and extent of use of their off-road route and associated facilities (as far as possible) through taking reasonable measures. Existing routes must be reviewed to determine the suitability of the location of the route, the appropriateness of the management measures practised and the long-term sustainability of the route. Environmental constraints are required to be taken into account in order to promote a sustainable and environmentally sensitive development. The following key considerations should underpin the operation and maintenance of existing routes to ensure best practice:

1. Undertake regular routine route assessments to monitor/detect changes in route conditions.
2. Monitor areas where excessive maintenance is routinely required to maintain the off-road route in the desired state.
3. Undertake proactive rehabilitation in disturbed areas.
4. Undertake regular maintenance to prevent excessive erosion, rutting, impairment of route drainage and other forms of damage not correctable using standard route maintenance standards and techniques. Mechanisms implemented to control drainage and surface run-off from route surfaces (including cross drains, culverts, energy dissipaters and erosion prevention mechanisms (gabion structures)) are critical in this regard.
5. Apply techniques and criteria for sustainable planning and establishment in route sections which require reconstruction (as discussed in detail in Part 3 and Part 4 of the guidelines for Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*).
6. Ensure the prevention of pollution of water bodies and groundwater.
7. Identify the need for restrictions on periods of off-road route use, considering seasonal variations in impacts.
8. Offer areas of high biodiversity value some form of protection/security, thereby ensuring the continued functioning of ecosystems, and maintaining species diversity through habitat protection.
9. Limit public access to environmentally or culturally sensitive areas.
10. Provide for public access to known places of interest to avoid informal tracks being created by users.
11. Be prepared for fire fighting. In terms of national and provincial legislation, a landowner is responsible for ensuring that no down-wind damage occurs to crops, grazing, property, human and animal life, etc. as a result of a fire which started on or crossed his/her land. Therefore, adequate fire management measures must be implemented. Guidance can be

obtained from the principles outlined in CapeNature's '*A Landowner's Guide to Fire Management*'. Fire fighting equipment must be easily accessible, and all employees should be aware of where this equipment is kept and how it should be used.

12. Provide adequate facilities to attend to oil spills, towing of vehicles and evacuation of vehicles/drivers/passengers, medical facilities, air compressors (to inflate tyres) and vehicle wash-down facilities.
13. Adopt the 'precautionary principle' in decision-making where there is an absence of clear or definitive data regarding the environmental impacts associated with the off-road route.
14. Develop and adhere to an achievable and appropriate Environmental Management Plan (EMP). The EMP must include clear and measurable objectives and management actions which can be audited.
15. Develop and adhere to an achievable and appropriate monitoring programme to detect changes in route conditions. This monitoring should be undertaken through regular audits of the route by the route operator. Use can be made of, for example, fixed point photography at trouble spots and a route monitoring sheet to record the type of problem identified, location, etc. (an example of a route monitoring sheet is included within Appendix E of Guidelines for Planning and Managing Sustainable Off-Road Routes: *A Guide for Route Planners and Operators*).
16. Undertake independent audits of the route at regular intervals and after intensive use, through the appointment of a suitably qualified independent party.
17. Keep records of all incidents, procedures undertaken, etc. Photographs and comments from users should also be kept, where these are available.

Scientific studies and on-site observations can assist landowners, route owners and route operators in making objective assessments of environmental impacts associated with their routes, and can provide recommendations regarding management measures to minimise impacts through the provision of quantitative documentation of the type and extent of impacts on the natural and social environment.

### **3.1. Assessment of the impact of the existing activity on the environment**

Assessment of the condition of any existing route and the degree of environmental degradation is the responsibility of the landowner. A baseline condition assessment would assist to a) determine the degree of environmental degradation as a result of the existing activities or developments, and b) inform the monitoring programme and report on progress.

Monitoring to detect changes in route conditions, including a complete condition assessment, should (as best practice) be conducted by the route operator on a continuous basis. Route condition assessments must consider the entire route length, not just areas known to be 'problem sites', and must take note of what is happening in the surrounding area in order to obtain an overview of the land condition. This will ensure that the assessment provides a basis for evaluating condition trends along the route and of the surrounding environment during future monitoring efforts. Sites or locations identified as requiring more regular attention should be flagged and included as part of a regular maintenance routine. The identification of when and where individual routes may need to be open or closed to various types of use or

during specific seasons will be an important outcome of the on-going route assessment process.

An independent assessment of the route condition should be undertaken regularly (every 2 years), depending on levels of use and a route's soil and terrain characteristics. Sufficient time should pass between assessments to filter out changes due to seasonal effects or weather effects. Ideally, this independent assessment should be undertaken after the wet season.

Route condition assessment must consider all aspects of the route and highlight:

- Areas of significant impact on the environment.
- Areas of inappropriate/improper route location.
- Areas where excessive maintenance is required to maintain the route in the desired state
- The cause of problems (e.g. poor route location, over-use, deficient maintenance programme, etc.).
- Effectiveness of management interactions/mitigation measures.

Route condition assessment requires an investigation of the primary (or direct) impacts, as well as secondary (or indirect) impacts, and may include an increase in erosion potential, and/or impacts on sensitive landscape features, biodiversity, ecological systems, heritage resources, and the socio-economic environment. Cumulative effects should also be investigated, particularly in areas where other off-road routes are known to occur.

The identified environmental degradation as a result of direct and indirect impacts associated with an existing off-road route must be assessed in accordance with the requirements of all relevant legislation, policies, guidelines and bioregional planning applicable to the Province.

The following environmental characteristics are key considerations of the condition assessment, and serve as key indicators of areas where potentially significant environmental impacts may arise:

**1. *Tread/road surface:***

- a. Rutting, canalisation of water, impairment of route drainage, and other forms of damage not correctable using standard route maintenance standards and techniques.

**2. *Erosion:***

- a. Degree of visible signs of soil erosion, including erosion of the tread.
- b. Soils of high erosion potential and unstable soil conditions. Is the potential for soil erosion as a result of on-going use/ORV traffic adequately managed?
- c. Are there erosion control measures in place in steep sections, and are these maintained?

**3. *Water and drainage management:***

- a. Presence of areas subject to accumulation of water, poor drainage and requiring water runoff management.
- b. Evidence of poor drainage along the route (such as water pooling and mud holes).

**4. Route alignment:**

- a. Excessive grade and steep slopes (i.e. steeper than 1:4, depending on constraints which may be imposed by the nature of the surrounding environment and local soil conditions<sup>8</sup>).
- b. Presence of parallel/braided tracks.

**5. Fauna, flora and ecosystems:**

- a. Existing physical degradation or significant disturbance to the local ecological environment, plants or animals or their habitat, and in particular habitats characterised by sensitive fauna or flora (such as threatened, protected and/or localised plant and/or animal species) and high biodiversity.
- b. Degree of trampling/disturbing/destroying or clearing of vegetation during the operation and/or maintenance phases.
- c. Degree of impact on bird life and fauna (e.g. avoiding sensitive habitats or nesting sites).
- d. Degree of impact on biodiversity of the site and broader area (in terms of published biodiversity targets in terms of relevant environmental legislation).
- e. The need for the route or parts thereof to be closed for certain months of the year due to flowering, nesting, breeding cycles, or the potential for flooding, excessive dust.

**6. Sensitive areas:**

- a. Damage to or degradation of water resources, rivers, streams, wetlands or riverine habitat. Disturbance to riparian areas can include bank erosion or downcutting, impacts on vegetation, stream channelisation, and stream capture. A permit from DWAF and/or the Department of Agriculture (for disturbance to riverine vegetation) is required.
- b. Evidence of elevated levels of siltation or increased turbidity in watercourses and water bodies.
- c. Damage to archaeological, scientific, historical or other significant resources, including rare natural features of interest. A permit from Heritage Western Cape or SAHRA is required.

In addition, the following should be considered during the assessment of existing routes:

1. Safety of users due to steep grades, steep terrain, sharp curves, slippery or unstable route surfaces, or limited visibility.
2. Character and nature of surrounding land use, and compatibility with other existing economic and/or recreational activities.
3. Impact on the aesthetic quality or sense of place of the landscape. If relevant for a portion of the route, consider how this can be mitigated (through redesign or possible relocation).
4. Consideration and inclusion/exclusion of environmental factors in the site layout of the route.
5. Measures to ensure that degradation of the environment is kept to a minimum from the impact of vehicles utilising the off-road route.
6. Measures to control behaviour on the route and prevent trespassing.

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<sup>8</sup> For example, an unconsolidated sandy environment displays very different physical constraints (and by implication management requirements) to competent bedrock substrate. Slopes of 1:4 on quartzitic sandstone bedrock would be acceptable, but a 1:3 slope could potentially cause problems in saturated cohesive soils.

7. Degree of long-term environmental sustainability of the activity, ensuring that the degradation of resource conditions does not preclude future generations from enjoying the resource in as good, or better condition.
8. Mechanisms to reduce the impact (if any) on neighbouring landowners/land users. Off-road routes are a contributor of noise pollution, which can antagonise other wilderness users/neighbours in quieter areas.
9. Evidence of uncontrolled or unauthorised access and control measures.
10. Compatibility with relevant provincial and local planning policies, including spatial and non-spatial planning documents. Is the off-road route and associated infrastructure subject to any national, provincial or local authority authorisations and/or conditions and/or by-laws (e.g. under the administration of the jurisdictional area of a municipality/local authority or in a designated protected natural area)? If yes, permits, licences or approvals could be required from the local authorities.

The assessment guidelines contained within Part 1 of this document should also be used as a guide for the assessment of existing routes. Specialist input may be required if an issue of potential significance is identified during route assessment.

### **3.2. Using an EMP to effectively manage and monitor impacts**

Where significant negative impacts are anticipated to occur as a result of the presence of an off-road route, appropriate measures for mitigating each significant impact should be determined, and appropriate maintenance measures adopted and monitored. Existing off-road routes should be supported by an Environmental Management Plan (EMP), which should provide details in respect of measures adopted to:

1. Ensure that the mitigation measures recommended for potentially significant environmental impacts associated with the use of the off-road route are implemented.
2. Regulate or control vehicle access and use in the affected area.
3. Ensure that vehicle users comply with control measures and standards.
4. Ensure that environmental impacts of vehicle use are monitored in order to ensure that such use is environmentally sustainable.

The EMP should include:

- Management measures for the operation and use of the off-road route, including site-specific recommendations for the mitigation of potentially significant impacts.
- Details of an on-going maintenance and monitoring programme for implementation.
- An alien vegetation control strategy, as off-road activities often trigger weed and alien species infestation within the disturbed footprint.
- Approach and management measures for the decommissioning of an off-road route or portion thereof, including site-specific recommendations for the mitigation of potentially significant impacts.
- Clear and measurable objectives and management actions, which are able to be monitored and audited.

### 3.3. Managing persistent problem areas

When numerous portions of an off-road route have been determined to be significantly degraded as a result of the level of use or maintenance, the most appropriate management method must be determined to successfully reduce the impacts. Where it is not considered possible to mitigate or ameliorate impacts, alternatives such as partial or full route closure should be considered. Management options include:

1. Closure of a portion of the route in response to the degree of degradation. This would halt direct route impacts, but not necessarily secondary impacts such as erosion and sedimentation. The route portion identified for closure needs to be assessed and stabilised, or reclaimed and rehabilitated as necessary.
2. Seasonal-use restrictions. As soils are most sensitive to impact when they are wet, restricting use of sensitive routes during periods of high rainfall may significantly reduce route surface degradation. The closure of routes during the wet season may also be a management tool where rainfall is highly seasonal.
3. Controlled use (traffic volume restrictions). Route degradation occurs when use exceeds the ability of the route surface to resist impact. Determining the appropriate level of use can be difficult, especially since a route's resistance to impact can change with weather and type of use. If route conditions are noted to be deteriorating, traffic volume should be decreased, or route surfaces should be modified to support the use.
4. Control as to the type of vehicle allowed on the route. For example, a quadbike has a narrower track width than a 4-wheel drive vehicle, and could erode the "middel mannetjie"<sup>9</sup> of a route designed for 4-wheel drive vehicle use. There may be a requirement to restrict certain vehicles depending on the route's conditions and susceptibility to degrade, should such multi-footprint vehicles use the course.
5. Use of route hardening techniques in order to support use without unacceptable environmental impacts to vegetation, soils, hydrology, habitat or other resource values. Route hardening should only be considered under the following conditions:
  - a. Existing off-road route impacts are causing, or are projected to cause, unacceptable direct (on-site) or indirect (off-site) impacts.
  - b. More suitable alternative route locations are not available.
  - c. Alternative route locations are not environmentally acceptable or economically feasible.
6. Closure of a portion or the entire route in order to protect threatened resources as a result of degradation. This would halt direct route impacts, but might not halt secondary impacts, such as erosion and sedimentation. A route identified for closure needs to be assessed and stabilised, or reclaimed and rehabilitated as necessary.

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<sup>9</sup> The "middel mannetjie" is the vegetation naturally occurring in the centre of the route, such that the route appears as a narrow two spoor track.

### **3.4. Investigation and formulation of arrangements for the monitoring and management of impacts**

The management, assessment and monitoring of off-road routes should be supported by an Environmental Management Plan (EMP) for all phases of the development. The EMP should include details in respect of measures adopted to:

1. Ensure that the appropriate management measures for potentially significant environmental impacts associated with the use and maintenance of the off-road route are implemented.
2. Regulate and control vehicle access and use on the route and surrounding area.
3. Ensure that vehicle users comply with any control measures and standards set for the route and surrounding area.
4. Ensure that environmental impacts of vehicle use are monitored in order to ensure that use of the off-road route is environmentally sustainable.

Through observation and measurement of relevant variables such as rainfall, soil type, season of use, grade and number of users, it is possible to predict maintenance cycles and tread replacement needs.

### **3.5. Self-regulation and the formation of stewardships**

It is the intention of the ORV industry to become a self-regulatory industry, ensuring compliance with all relevant guidelines (such as these and Codes of Conduct - see [www.now.org.za](http://www.now.org.za) and associated links) and legislation which have been developed by the various industry roleplayers. In order to achieve this self-regulation, partnerships between the authorities and industry, as well as appropriate stewardships<sup>10</sup> must be established. A system of peer review has also been suggested. Co-operation between neighbouring route owners and operators is to be encouraged. This may include assistance being offered for problem areas, or poorly maintained areas being reported to industry or provincial role-players. Appeals are also being made to the telecommunications industry, Eskom and forestry to comply with these guidelines in order to minimise impacts from their access roads on the environment.

Key steps for monitoring and enforcement include:

1. Identify the impacts being monitored, including impacts on water quality, soils, wildlife, flora and other users (indicators such as accidents, injuries, enjoyment of the route by the user).
2. Establish quantitative and qualitative measurement scales for impacts.

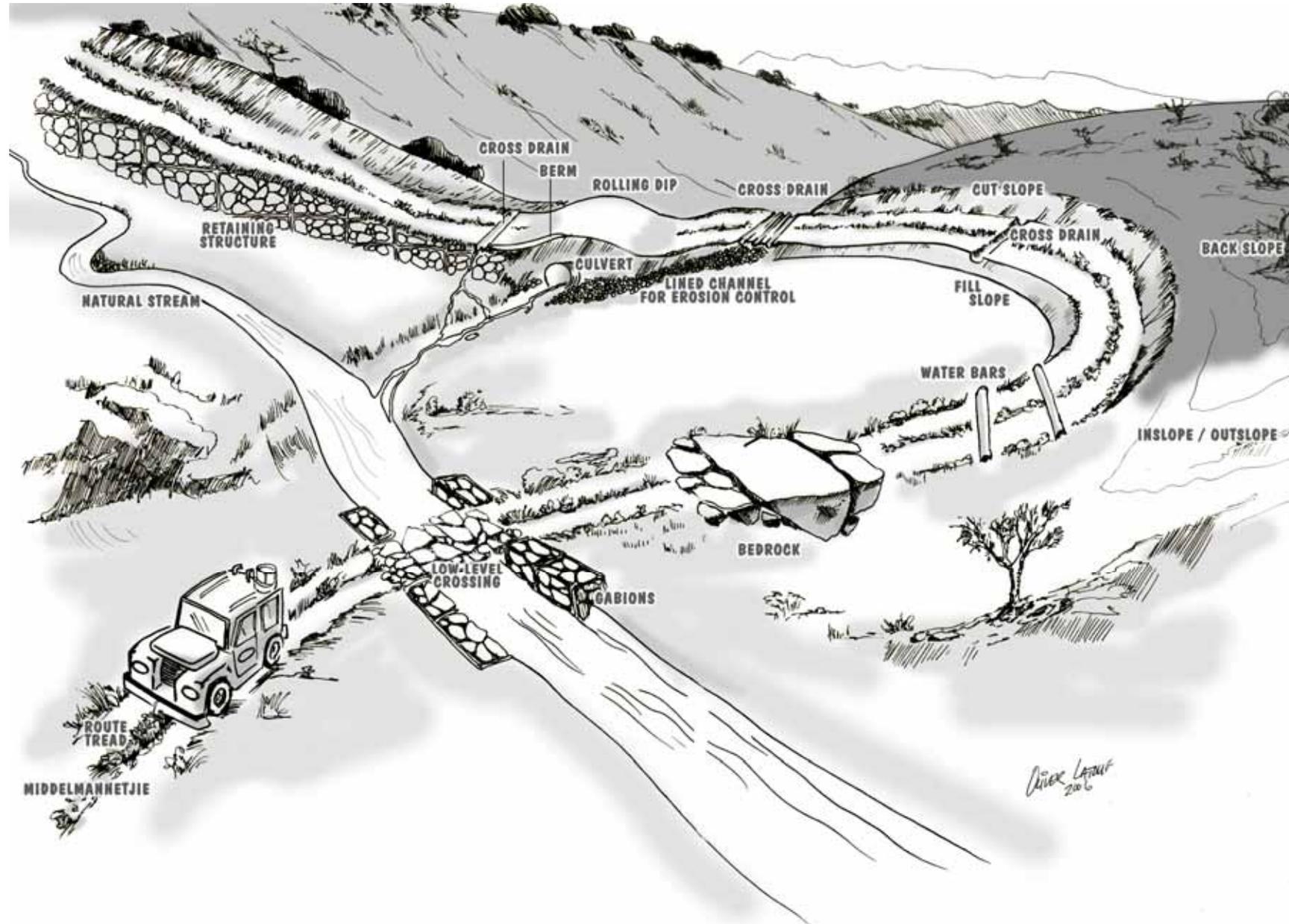
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<sup>10</sup> The wise use, management and protection of that which has been entrusted to somebody or is rightfully theirs. Within the context of conservation, stewardship means protecting important ecosystems, effectively managing invasive alien species and fires, and grazing or harvesting without damaging the veld.

3. Establish impact thresholds which, if reached, trigger correction or closure of the route to users.
4. Specify baseline inventories to allow for monitoring of trends.
5. Establish a schedule for monitoring activities.
6. Establish a written reporting system.
7. Train personnel to follow the monitoring programme.
8. Secure the resources to carry out the monitoring plan.

The best enforcement of regulations will come from regular patrolling combined with effective education and an active monitoring programme. It should be remembered that non-compliance will be to the detriment of the landowner and route operator, as well as to the route user and the industry as a whole.

**PART 4: GLOSSARY OF USEFUL TERMS**



***Aeolian environments:*** The erosion, transport and deposition of material by wind, and commonly associated with dry environments where vegetation cover is sparse, or absent.

***Aggregated soils:*** An aggregate is a mass of rock particles, mineral grains or both. An aggregated soil is a soil that generally contains a combination of the above, frequently referred to as a fine-grained aggregate or coarse-grained aggregate, depending on the size grains of the aggregate material.

***Alien species:*** Plant and animal species that occur in a given place, area or region as the result of direct or indirect, deliberate or accidental introduction of the species by humans, and for which introduction has permitted the species to cross a natural barrier to dispersal. Rooikrans is a good example of alien species in the Western Cape.

***Alignment:*** The configuration of the route in a horizontal plane, i.e. the bends, curves and tangents of the path.

***Alternative:*** Different means of meeting the general purpose and need of a proposed activity. Feasible alternatives are those which are considered to be technically, economically and environmentally feasible.

***Archaeological site:*** (a) material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures; (b) rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10 m of such representation; and (c) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

***Aspect:*** The particular direction a site faces and the amount of solar radiation it is subjected to.

***ATV:*** All Terrain Vehicle; a four wheeled vehicle which makes use of engine power.

***Backslope:*** The angle of the back wall of a route excavated into a hillside.

***Basic Assessment:*** A process contemplated in regulation 22 of the Environmental Impact Assessment (EIA) Regulations published under the National Environmental Management Act (NEMA).

***Bedrock:*** The solid rock (*in situ* or residual) that lies under the soil or that is exposed at the surface.

**Bench construction:** A bench is a section of tread cut across the side or contour of a hill/slope. A full bench is constructed by cutting the full width of the tread into the hillside. On a partial bench, only part of the hill/slope is cut away and the removed soil is placed at the lower edge of the tread to establish the desired tread width.

**Berm:** A low earth ridge constructed at the side of a route to divert the direction of flowing water.

**Best Management Practices (BMPs):** Best management practices are those practices that, when correctly applied in the establishment of off-road routes, provide the most effective, practicable means of preventing or reducing the likelihood of negative environmental impacts, and reduce the need for extensive on-going route maintenance. BMPs address the key planning, location, design, construction and maintenance requirements of routes.

**Biodiversity:** The variety of life and its processes; including the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting.

**Borrow pit:** An area where excavation takes place to produce materials for earthwork, such as a fill material for embankments. It is typically a small area used to mine sand, gravel, rock or soil without further processing.

**Carrying capacity:** The number of users that can be supported by a resource in a specific area based on ecological, physical, facility and/or social factors.

**Catchment:** Area of land that collects rain water into a river or stream, which then carries the water to a waterbody or the sea.

**Channel:** A waterway that contains moving water either periodically or continuously. A channel has a definite bed and banks that confine the water.

**Clearing:** The corridor from which vegetation is cleared. Within limits, wider clearing provides for easier travel.

**Climbing turn:** A turn of approximately 180 degrees resulting in a change of direction of the route. This feature is intended to lessen the grade of a route travelling up or down a steep slope.

**Cohesive soils:** A sticky soil, such as clay or silt, where its shear strength equals about half its unconfined compressive strength. Cohesive soils are also frequently referred to as soils that are made up of particles bound together by clay minerals. Sands and gravels are granular soil and generally considered as non-cohesive soil, whereas silt and clay are fine grained and are classified as cohesive soil.

**Compaction:** A result of the downward force of vehicles on the route surface. As a result, the route surface hardens and sinks relative to adjacent untravelled areas. Compaction hardens the surface by pressing particles into tighter contact and firmer bonding, reducing space for air and water.

**Consolidated material:** Material which has been compressed under a static load. Consolidated soils are usually formed when water is driven out of voids. Under these conditions the soil becomes firm or coherent.

**Contour:** Lines drawn on a plan that connect points having the same elevation. Contour lines represent an even value, with the contour interval being selected consistent with terrain, scale, and intended use of the plan/map.

**Cross slope:** The slope of a route perpendicular to the gradient of the route, either insloped towards the cutbank, or outsloped towards the fillslope.

**Culvert:** A drainage pipe (usually made of metal, concrete or plastic) set beneath the travel surface to move water from the inside to the outside of the route, or under the route. Culverts are used to drain ditches, springs, and streams that cross the travel surface.

**Cumulative impacts:** Impacts which can arise from one or more activity. A cumulative impact may result in an additive impact (i.e. where it adds to the impact which is caused by other similar impacts), or an interactive impact (i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact). Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

**Cut slope:** The artificial face or slope cut into soil or rock along the 'inside' edge of the route.

**Cut-and-fill:** A method of road construction in which a travel surface is built by cutting into the hillside and spreading the spoil materials in adjacent low spots and as compacted fill slope material along the route. A "balanced cut-and-fill" utilises all of the "cut" material to generate the "fill", resulting in no residual or excess waste material and no need for hauling additional fill material.

**Decommissioning:** Permanently closing a route to terminate the function of the travel surface and mitigate the adverse environmental impacts of the route. Use of techniques that include blocking the entrance, replanting vegetation, adding waterbars, removing fills and culverts, or re-establishing natural drainage patterns. However, the basic shape of the route will still be in place.

**Disturbance:** A discrete event, either natural or human-induced, that causes a change in the condition of an ecological system.

**Displacement:** Human-caused horizontal movement of route tread material (soil, gravel, stones, etc.). Displacement invariably deepens the tread over time.

**Drainage structure:** A structure installed to control, divert or move water off or across a travel surface, including but not limited to culverts, bridges and rolling dips.

**Ecological corridor:** Narrow continuous area of favourable habitat that allows the movement of animals, birds and plants.

**Ecosystem:** A system formed by the interaction of living organisms, including people, with their environment. Spatially, ecosystems are described for areas in which it is meaningful to talk about these relationships.

**Ecotourism:** Planning and managing tourism in a way that is sensitive to the natural environment. Ecotourism also involves helping the natural environment to be sustained by the economic benefits of tourist activities.

**Edge effects:** Tendency to have greater variety and density of organisms in the boundary zone between communities.

**Endemic / localised species:** A taxon limited in its range to a specific geographical area. This confinement may be due to historical (e.g. dispersal, evolution and longevity of taxon), ecological (e.g. a particular substrate or environmental modification resulting from competition with other plants or animals), or physiological (e.g. ability to tolerate aridity, excessive moisture or habitat alteration) reasons.

**Energy / flow dissipater:** Rock or other non-erodible material placed where water is concentrated to prevent erosion by dissipating the energy of the flowing water.

**Endangered species:** Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

**Endangered wild animal:** A wild animal of any species which is in danger of extinction and is specified in Schedule I or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973, provided that it shall not include a wild animal of any species specified in such Appendix and Schedule 2.

**Environment:** the surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and

- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

***Environmental impact:*** An action or series of actions that have an effect on the environment.

***Environmental impact assessment:*** A study which predicts and assesses/evaluates environmental impacts of specified, proposed activities, both positive and negative. The conclusions of the EIA report are used as a tool in planning and decision-making.

***Environmental management:*** Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

***Environmental management plan:*** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

***Erosive soils:*** Soils that are relatively prone to erosion and movement by rain drop impact and surface runoff. Fine granular, non-cohesive soils, such as fine sandy sand derived from decomposed granite, silts or fine sands, are known to be very erosive. Cohesive soils can also be very erosive, especially if they are dispersive in nature.

***Erosion:*** The process by which the surface of the earth is worn away and soil moved by the actions of wind, water or gravity.

***Erosion control:*** The act of reducing or eliminating on-going erosion caused by natural or man-made processes.

***Erosion prevention:*** Preventing erosion before it occurs. Erosion prevention is typically less expensive and more effective than erosion control. Erosion prevention is intended to protect a route, including its drainage structures, cut and fill slopes, and disturbed areas, and protect water quality.

***Extinct species:*** Taxa which are no longer known to exist in the wild after repeated searches of their type localities and other known or likely places. This category is used for a taxon which no longer occurs in the wild but survives in at least some form in cultivation or in a seed bank, but is probably so genetically impoverished or altered as to make it impossible to return it to a natural habitat. A plant may be listed as Extinct in one country while surviving in another (e.g. *Protea gagedi*). It is important to note that extinction can never be regarded as more than a probability, and rediscoveries are occasionally made, hence this category is sometimes referred to in the literature as "Presumed Extinct".

***Fill slope:*** The inclined slope extending from the outside edge of the travel surface shoulder to the toe (bottom) of the fill. This is the surface formed where material is deposited to build the route.

**Floodplain:** A level or gently sloping area on either side of a river or stream active (main) channel that is submerged at times during high water or periods of flooding. Silt and sand are deposited and accumulate in this area along the main channel.

**Flora:** Endangered flora, protected flora or indigenous unprotected flora and includes the whole or any part of the plant, whether live, dead or dried.

**Fynbos:** Low-growing and evergreen vegetation found mainly in the Western Cape. Fynbos is known for its rich biodiversity.

**Gabions:** Woven baskets (usually made of wire) filled with about 10 to 20 cm size rock (or broken pieces of concrete), used for building erosion control structures, weirs, bank protection, or retaining structures.

**Geotextile:** Water-permeable textile material (fabrics, etc.) used as an underlay to conserve gravel on travel surfaces and stabilise erodible surfaces. Textile allows for water to pass through it but contains the fine-grained size fraction behind the geotextile.

**Global positioning system (GPS):** A system to map route locations using orbital satellites and portable equipment. Digital data gathered can be placed directly into geographic information system (GIS) database systems.

**Grade:** The slope of the route in the direction of travel. The steeper the grade the more difficult the route is to drive.

**Guideline:** A broad plan or explanation of information to guide in setting standards or determining a course of action.

**Habitat:** A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

**Habitat fragmentation:** A process by which habitats are increasingly subdivided into smaller units, resulting in their increased restriction as well as an overall loss of habitat area and biodiversity.

**Hardening:** The manual, mechanical or chemical compaction of the route tread resulting in a hard, flat surface that sheets water effectively and resists the indentations that are created by use.

**Heritage resource:** Any place or object of cultural significance.

**Hydric soil:** Soil that is saturated or flooded during a sufficient portion of the growing season to develop anaerobic conditions in the upper soil layers.

**Hydrologic soil groups:** Soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration.

**Hydrology:** The science dealing with the properties, distribution and circulation of water on the surface of the land, in the soil, and below the ground surface in the underlying rocks, and in the atmosphere. Commonly used to describe the distribution and circulation of water in a particular area.

**Hydrophylic vegetation:** Plants which are adapted to growing in saturated, poorly, or very poorly drained soils.

**Indeterminate species:** Taxa known to be Extinct, Endangered, Vulnerable or Rare, but for which information is insufficient to decide which of the four categories is appropriate.

**Indigenous flora:** Any plant, shrub or tree or part thereof that occurs naturally in an area, excluding declared invasive and alien plants.

**Indigenous species:** Any species of flora or fauna that naturally occurs in an area.

**In situ:** Being in the original location; not having been moved.

**Inslope:** The inside cross-slope of a route surface. Inslope is used to facilitate the draining of water from a route surface to an inside ditch. An insloped route has the highest point on the outside edge of the route and slopes downward to the ditch at the toe of the cut slope, along the inside edge.

**Instream habitat:** The physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse.

**Insufficiently known species:** Taxa that are suspected but not definitely known to belong to any of the above categories, because of the lack of information (Note: most of South African literature has used the term "Uncertain" (U) for this category).

**Invader plant:** A kind of plant which has under section 2(3) of the Conservation of Agricultural Resources Act been declared an invader plant, and includes the seed of such plant and any vegetative part of such plant which reproduces asexually.

**Landscape:** A uniform land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout.

**Limits of acceptable change (LAC):** A planning framework that establishes explicit measures of the acceptable and appropriate resource and social conditions usually but not only in wilderness settings as well as the appropriate management strategies for maintaining or achieving those desired conditions.

**Low-level crossings:** These are constructed at a narrow stream location and are in an area of bedrock or coarse soil for good founding conditions.

**“Middel mannetjie”:** Vegetation naturally occurring in the centre of the route, such that the route appears as a narrow two spoor track.

**Mitigation:** Actions or a specific item used to avoid, minimise, reduce, eliminate or rectify the adverse impact of a management practice.

**Monitoring:** The collection of information to determine the effects of environmental management and to identify changing environmental conditions or needs.

**Mulch:** Material (including cut vegetation, grasses, wood chips) placed or spread on the surface of the ground to protect it from raindrop, rill and gully erosion, and retain moisture to promote growth of vegetation.

**NEMA:** National Environmental Management Act, 1998 (Act No. 107 of 1998).

**Not threatened:** This is used for taxa which are no longer in one of the other categories due to an increase in population sizes or to subsequent discovery of more individuals or populations.

**Noxious weed:** Plant that is invasive, displacing indigenous species.

**Obstacles:** Physical objects large enough to impede travel significantly, including logs or large rocks.

**Off-road vehicles (ORVs):** Motorised uses, including 2- and 4-wheel drive vehicles, all-terrain vehicles, quadbikes and off-road trailbikes and motorcycles.

**Off-road route:** any road, route or track, other than proclaimed roads, which can be used by motorised vehicles, including 4x4s, 2x4s, all terrain vehicles, quadbikes and off-road trailbikes for recreation or any other use.

**Outslope:** The outside cross-slope of a route surface. Outslope is used to facilitate the draining of water from a route directly off the outside edge. An outsloped route has the highest point on the uphill or inside of the route and slopes down to the outside edge of the route and the fill slope.

**Parallel and/or braided tracks:** A parallel route occurs when two routes run alongside each other. A braided route occurs when a new route is created and veers from the designated route for a short period of time (usually to avoid an obstacle) and then returns to join the original route.

**Precautionary principle:** Where the risk is unknown, provision will be made for the worst case scenario.

**Principle:** A principle addresses environmental, social and economic aspects through governing what *must* be achieved in order for a route to be sustainable in the long-term. Principles are supported by Best Management Practices (BMPs), which practically guide *how* the governing Principles can be achieved.

**Protected flora:** Any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3.

**Protected wild animal:** Any species of wild animal specified in Schedule 2 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of wild animal specified in such Appendix and Schedule 1.

**Public road:** A public road as defined in section 1 of the Road Traffic Act (Act No. 29 of 1989).

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Rehabilitation / reclamation:** Activities that reclaim, repair or improve part or all of an existing travel surface or disturbed area, and restore it to its original or some desired final condition.

**Retaining structure:** A structure designed to resist the lateral displacement of soil, water or any other type of material. It is commonly used to support a travel surface, or gain width on steep terrain. Such a structure is often constructed of gabions, reinforced concrete, timber or mechanically stabilised earth.

**Rill:** A steep-sided channel resulting from accelerated erosion in unstable soils (frequently associated with dispersive soils).

**Riparian habitat:** The physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are

inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

**Riverine:** Living in rivers.

**Rolling dip:** A surface drainage structure with a constructed break in the route grade, specifically designed to drain water from an inside ditch or across the travel surface, while also serving to reduce vehicle travel speed.

**Route:** Encompasses all kinds of off-road routes and trails on private or public property, including graded roads, double tracks (4x4, 2x4, and quadbike trails) and single-track trails (off-road trailbike tracks).

**Route tread:** The actual surface portion of a trail upon which users travel excluding backslope, ditch and shoulder. Common tread surfaces are native material, soil, or crushed rock.

**Rule of Thumb:** A method of procedure based on experience and common sense. It is a general practice considered as being correct, but is not intended to be scientifically exact.

**Runoff:** The part of precipitation that reaches streams by flowing over the ground surface.

**Rutting:** The creation of vehicle tracks/depressions in the travel surface is rutting. Rutting channels water, which leads to erosion, poor drainage and an uneven travel surface. Rutting is frequently a sign of poor compaction and/or the use of poor construction material.

**Sedimentation:** Soil, most commonly clay, silt and sand, which is eroded from the land or poorly constructed roads and reaches a stream or watercourse, commonly reducing water quality in rivers, streams and other waterbodies. Sedimentation can also take place in aeolian environments.

**Sheet erosion:** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff.

**Significant impact:** An impact that, by its magnitude, duration or intensity, alters one or more aspects of the environment.

**Single-track route:** A route wide enough only for one user to travel and which requires moving off the route to allow another user to pass.

**Sideslope:** The slope of the ground at its extreme angle, usually perpendicular to the direction of travel. As the sideslope becomes steeper, the perception of difficulty and exposure increase.

**Stewardship:** The wise use, management and protection of that which has been entrusted to somebody or is rightfully theirs. Within the context of conservation, stewardship means

protecting important ecosystems, effectively managing invasive alien species and fires, and grazing or harvesting without damaging the veld.

***Sustainable development:*** Development that is planned to meet the needs of present and future generations, e.g. the need for basic environmental, social and economic services. Sustainable development includes using and maintaining resources responsibly.

***Swale:*** Open channel used to collect and convey runoff (i.e. drainage system).

***Switchback:*** A turn of approximately 180 degrees resulting in a change of direction of the route. This feature is intended to lessen the grade of a route travelling up or down a steep slope.

***Temporary route closure:*** Closing vehicular access to a route through the use of barricades such as gates, barriers, earthen mounds, or other temporary structures. The end result is to restrict the use of the route for some period of time.

***Trailbike:*** A motorcycle constructed primarily for off-road use. Trailbikes can be distinguished from the street-legal motorcycle by their high-mounted mudguard and exhaust system and tyres with aggressive tread.

***Tread surface:*** The physical condition of the travelled portion of the route. A tread becomes more difficult to ride as it becomes loose, rough, slippery, etc.

***Tread width:*** The width of the travelled portion of the route. Wider tread provides for easier travel.

***Unconsolidated material:*** Materials which have not been exposed to compressive loads and can be considered loosely arranged or unstratified. This material is occasionally described as a loosely aggregated soil.

***Underdrain:*** A buried trench, filled with coarse aggregate, coarse sand or gravel, and typically placed in the ditch line along the route, which acts to drain subsurface water from a wet area and discharge it to a safe and stable location. Underdrains may use a uniform size of rock, be wrapped in geotextile, and have a perforated drainpipe in the bottom of the trench.

***Vegetation:*** The different types of plants occurring in an area.

***Vulnerable species:*** Taxa believed likely to move into the Endangered category in the near future if the factors causing decline continue operating. Included here are taxa of which most or all of the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

**Waterbar:** A low barrier, sometimes accompanied by a ditch, designed to divert water off a route surface. Usually installed after a route is already established.

**Watercourse:** A natural or manmade channel through which water flows, including:

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and
- (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse,

Reference to a watercourse includes, where relevant, its bed and banks.

**Watershed:** The entire area that contributes water to a drainage system or stream/river.

**Weed:** Any kind of plant which has under section 2(3) of the Conservation of Agricultural Resources Act been declared a weed, and includes the seed of such plant and any vegetative part of such plant which reproduces asexually.

**Wetland:** Land which is transitional between terrestrial and aquatic systems where the watertable is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

**Zone of influence:** The area influenced by a route, determined by many variables in a complex interaction.

## FURTHER READING AND RESOURCES

- A-Z Directory Western Cape, [http://www.drive-out.co.za/a2z\\_guide/wcape.html](http://www.drive-out.co.za/a2z_guide/wcape.html)
- Birkby, R.C. (1996) *Lightly on the Land: The SCA Trail-building and Maintenance Manual*. Student Conservation Association. Published by The Mountaineers, Seattle, Washington.
- Brand, W. (October 2005) T4A Submission to NOW. <http://www.now.org.za>
- Brownlie, S. (2005) *Guideline for involving biodiversity specialists in EIA processes: Edition 1*. CSIR Report No ENV-S-C 2005 053 C. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Critical Ecosystem Partnership Fund (CEPF) (2001) *Ecosystem Profile: The Cape Floristic Region, South Africa*. Final Version December 11, 2001.
- Croudace, J. (1999) *The alien clearing handbook for the Western Cape*. Bo-Kloof Fynbos Conservation and Environmental Information Trust, Scarborough.
- Demmer, G. (October 2005) NAAMSA Submission to NOW. <http://www.now.org.za>
- Department for Environment and Heritage; South Australian Association of Four Wheel Drive Clubs (2005) *Recreational Vehicles and Protected Areas in South Australia: A Handbook for Managers and Recreational Users*.
- De Villiers, C., Driver, A., Brownlie, S., Day, E., Euston-Brown, D., Helme, N., Holmes, P., Job, N., and A. Rebelo. (2005) *Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape*. Fynbos Forum, c/o Botanical Society of South Africa, Conservation Unit, Kirstenbosch, Cape Town.
- Duvenhage, W. (October, 2005) SAVRALA Submission to NOW. <http://www.now.org.za>
- Eaton, M. (April, 2005) NOW happening in George. <http://www.now.org.za>
- Great Old Broads for Monitoring (2004) *Healthy Lands Project Travel Corridor Monitoring – Volunteer Guide*.
- Guenther, K. *Low Maintenance Roads for Ranch, Fire and Utilities Access: A Practical Field Guide*. Published by Wildland Solutions, California, U.S.A.
- Hansen, T. (October 2005) GCBC Submission to NOW. <http://www.now.org.za>
- Hoosain, S. (October, 2005) Millennium Angling Club Submission to NOW. <http://www.now.org.za>
- International Mountain Biking Association. *Closing and Reclaiming Damaged Trails*. <http://www.imba.com>
- International Mountain Biking Association (2004) *Trail Solutions – IMBA's Guide to Building Sweet Singletrack*. Johnston Printing, USA.
- Joubert, B. (November 1999) *Guidelines for the management and ordering" of 4x4 vehicle issues*. Eco Solutions, November 1999. <http://www.4x4africa.com>
- Joubert, J. (August 2005) National Offroad Workshop (NOW) Aide de Memoire. <http://www.kleinkaroo-promotions.co.za>
- Keatimilwe, K. and Ashton, P.J. (2005) *Guideline for the review of specialist input in EIA processes: Edition 1*. CSIR Report No ENV-S-C 2005 053 B. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Keller, G and Sherar, J - USDA, Forest Service (2002) *Low-Volume Roads Engineering: Best Management Practices Field Guide*. Produced for US Agency for International Development

- (USAID) in Cooperation with USDA, Forest Service, International Programs & Virginia Polytechnic Institute and State University.
- Landcare and DEAT. CARA legislation made easy. Booklet distributed by Dept. Agriculture and by DEAT.
- Letter from Minister of Environmental Affairs and Tourism, Marthinus van Schalkwyk MP to Mr J Marais of NOW (13 February 2006) <http://www.kleinkaroo-promotions.co.za>
- Lochner, P. (2005) Guideline for Environmental Management Plans. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Marion, J.L. (2006) Assessing and Understanding Trail Degradation: Results from Big South Fork National River and Recreational Area. National Park Service, Final Research Report. United States Department of the Interior, U.S. Geological Survey, Patuxent Wildlife Research Center, Virginia Tech Field Unit.
- Meyer, K.G. (February 2002) Managing Degraded Off-highway Vehicle Trails in Wet, Unstable and Sensitive Environments. USDA Forest Service: Technology and Development Program, Missoula, MT. 2E22A68—NPS OHV Management
- Moore, B. (2004) Assistant Commissioner, Department of Natural Resources. Memorandum to Field OHV Project Teams: Additional Direction for OHV Trail Designation and Forest Classification Review.
- Münster, F. (2005) Guideline for determining the scope of specialist involvement in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 A. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Oberholzer, B. (2005) Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 F. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Outdoor Recreation Centre Inc. (2005) Adventure Activity Standards for Organisations, Guides and Leaders Conducting Adventurous Activities for Participants (Commercial or Non-Commercial): Four Wheel Driving. Edition 2.
- Parker, T.S. (2004) Natural Surface Trails by Design: Physical and Human Design Essentials of Sustainable, Enjoyable Trails. Book 1 in the Trail by Design Series. Natureshape LLC, USA. Printed in South Korea.
- Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning (July 2006) NEMA Environmental Impact Assessment Regulations Guideline and Information Document Series: Guideline on Alternatives.
- Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning (July 2006) NEMA Environmental Impact Assessment Regulations Guideline and Information Document Series: Guideline on Public Participation.
- Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning (November 2005) State of the Environment Report 2005: Year One.
- Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning (November 2005) Western Cape Provincial Spatial Development Framework: The Western Cape Province Today.

- Rouget, M., Reyers, B., Jonas, Z., Desmet, P., Driver, A., Maze, K., Egoh, B. & Cowling, R.M. (2004) South African National Spatial Biodiversity Assessment 2004: Technical Report. Volume 1: Terrestrial Component. Pretoria: South African National Biodiversity Institute.
- Saayman, I. (2005) Guideline for involving hydrogeologists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 D. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Smit, F. and Deal, J. (April 2005) SAROOF Established. <http://now.org.za>
- Smit, F. (October 2005) SAROOF Submission to NOW. <http://now.org.za>
- State of New Hampshire: Department of Resources and Economic Development, Division of Parks and Recreation, Bureau of Trails (1994) Best Management Practices for Erosion Control During Trail Maintenance and Construction. Printed in the USA. [www.nhtrails.org](http://www.nhtrails.org)
- Trails and Wildlife Task Force, Colorado State Parks; and Hellmund Associates (1998) Planning Trails with Wildlife in Mind. <http://www.dnr.state.co.us/parks/>
- Tread Lightly. <http://www.treadlightly.org/>
- Tee, J. (October 2005) LCCSA Submission to NOW. <http://www.now.org.za>
- The International Mountain Bicycling Association (2001) Building Better Trails - Designing, Constructing and Maintaining Outstanding Trails. Published by the International Mountain Bicycling Association, PO Box 7578, Boulder, CO 80306 USA. Website: [www.imba.com](http://www.imba.com)
- U.S. Department of the Interior Bureau of Land Management (January 2001) National Management Strategy for Motorized Off-highway Vehicle Use on Public Lands. Washington DC.
- United States Department of Agriculture; Forest Service; Technology and Development Program in cooperation with United States Department of Transportation: Federal Highway Administration (2004) Trail Construction and Maintenance Notebook. Produced by USDA Forest Service, Missoula Technology and Development Centre.
- Van Rooyen, A. (October 2005) AMID Submission to NOW. <http://now.org.za>
- Van Zyl, H.W., de Wit, M.P. & Leiman, A. (2005) Guideline for involving economists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 G. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Victorian Trails Co-ordinating Committee (2004) Victorian Trails Strategy 2005-2010. The State of Victoria, Parks Victoria.
- Wernex, J. (1994) Off-Highway Motorcycle and ATV Trails: Guidelines for Design, Construction, Maintenance And User Satisfaction. Second Edition. Published by the American Motorcyclist Association, Ohio.
- Western Cape Department of Environmental Affairs and Development Planning (2005) Guidelines for Resort Developments in the Western Cape.
- Western Cape Department of Environmental Affairs and Development Planning (2002) EIA Guideline Series: Guideline for the Management of Development on Mountains, Hills and Ridges of the Western Cape.
- Winter, S. & Baumann, N. (2005) Guideline for involving heritage specialists in EIA processes: Edition 1. CSIR Report No ENV-S-C 2005 053 E. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Zaayman, L. (October, 2005) AAWDC Submission to NOW. <http://now.org.za>

## **APPENDIX A: LEGISLATION UNDER WHICH PERMITS MAY BE REQUIRED, CONTACT DETAILS OF WESTERN CAPE REGULATING AUTHORITIES AND INFORMATION RESOURCES**

### **LEGISLATION UNDER WHICH PERMITS MAY BE REQUIRED TO BE OBTAINED**

1. Activities which may have a detrimental impact on the environment listed in terms of the EIA Regulations published in terms of the National Environmental Management Act (Act No. 107 of 1999) (*Department of Environmental Affairs & Development Planning*). Legislation makes provision for DEA&DP to include additional listed activities in identified sensitive areas. The establishment of off-road routes in identified sensitive areas within the Province is likely to be included as a listed activity which will require authorisation from DEA&DP.
2. Development of structures and lease of land below the high water mark. Refer to Sea Shore Act (Act No. 21 of 1935) (*Department of Environmental Affairs & Development Planning and CapeNature*).
3. Activities including earthworks, disturbance of vegetation, dredging and dune stabilisation. Refer to Outeniqua Sensitive Coastal Area (OSCA Regulations (Government Notice No. R879 of 31 May 1996 and Government Notice No. R1526 of 27 November 1998) - Applicable to South Coast Only (*Local Authority or Department of Environmental Affairs and Development Planning*).
4. Archaeological, cultural, historical and other resources related to national heritage - refer to the National Heritage Resources Act (Act No. 25 of 1999) (*Heritage Western Cape / South African Heritage Resources Agency* – Applies to projects where there are naturally and culturally significant features on or adjacent to the site where development is being proposed).
5. Removal and/or relocation of indigenous fauna and flora - refer to the Nature Conservation Legislation: Nature and Environmental Conservation Ordinance (Ordinance 19 of 1974) (*CapeNature*), as well as the Marine Living Resources Act (Act No. 18 of 1998) (*Department of Environmental Affairs and Tourism*).
6. Effluent disposal - Refer to Section 21 of the National Water Act (Act No. 36 of 1998) (*Department of Water Affairs & Forestry* – Applicable to projects where liquid waste is produced and will be disposed to a watercourse, wetland, dam or the sea. If effluent is to be discharged to a municipal sewer, application must be made to the relevant local authority).
7. National Environmental Management Act (Act No. 107 of 1999): Regulations: Control of Vehicles in the Coastal Zone ("the ORV Regulations") (*Manager of the coastal protected area, or Department of Environmental Affairs and Tourism*).

### **NATIONAL AND PROVINCIAL DEPARTMENTS OR SPHERES WHO MAY BE REQUIRED TO PROVIDE INPUT INTO THE DECISION-MAKING PROCESS**

1. *Department of Environmental Affairs and Development Planning*. In terms of Section 28 of the National Environmental Management Act (NEMA; Act No. 107 of 1998), landowners have a responsibility to ensure that any development on their property is consistent with

the 'Duty of Care' principle (i.e. that reasonable measures have been taken to prevent significant environmental degradation). Depending on the nature of the development and the environment within which the development is proposed, such measures may include the undertaking of an Environmental Impact Assessment (EIA). This EIA must be submitted to this Provincial Department for evaluation and decision-making. If the application is acceptable, in principle, from an environmental point of view, a Record of Decision (ROD) will be issued. A list of conditions, aimed at mitigating the effects of the development (if approved), will accompany the ROD.

2. ***Department of Water Affairs and Forestry.*** Development applications are usually referred to this Department for comment. Any abstraction and use of surface or groundwater must be undertaken in a sustainable manner. Applicable to projects where the water required for the project will be obtained from a source other than from an established municipal supply system. Sustainability of water supply is also required in terms of the Water Services Act (Act No. 108 of 1997). Approval for abstraction of water, disposal or treatment of sewage and prevention of pollution of water resources should be obtained from the Department and disposal must at all times comply with the requirements of the National Water Act (Act No. 36 of 1998).
3. ***Provincial Department of Agriculture.*** Applications are referred to this Provincial Department if the land proposed for development is zoned for agricultural purposes. If any development is to take place within 10 m of the edge of a river, permission for development should be obtained in terms of the Conservation of Agricultural Resources Act (Act No. 43 of 1983). If the application involves the subdivision of agricultural land, permission will also be required in terms of the Subdivision of Agricultural Land Act (Act No. 70 of 1970), which act is administered by the National Department of Agriculture.
4. ***Department of Health.*** Any conditions stipulated by the Department should be included.
5. ***District Roads Engineer / Provincial Transport Branch.*** An application is referred to this Branch if access is obtained from a provincial road, to ensure that it conforms to the Normal Standards (as per the Access Policy report of the Provincial Department of Transport).
6. ***National / Provincial Heritage Resource Agency.*** If any cultural or historic features are suspected to be present on the site, an archaeological investigation should be compelled to be undertaken and a permit for development be obtained in terms of Section 38 of the National Heritage Resources Act (Act No. 25 of 1999). Heritage Western Cape is the implementing authority in this regard.
7. ***CapeNature.*** Development applications are referred to CapeNature for comment if they occur in areas important for biodiversity conservation, or if the proposed negative impact on the ecological environment cannot be avoided or seem unacceptable. In addition, the EIA practitioner should determine if there are any issues relating to biodiversity that need to be addressed and this can be verified and/or the assessments reviewed by CapeNature. It is also important to determine if there are any other legally binding mechanisms e.g. title deed restrictions that will assist in protecting the biodiversity on the site prior to approaching CapeNature. If any red data or protected fauna or flora species are to be impacted on by the proposed ORV route, a permit is required from CapeNature in terms of the Nature Conservation Legislation: Nature and Environmental Conservation Ordinance (Ordinance 19 of 1974).

**8. Department of Environmental Affairs and Tourism: Marine and Coastal Management.**

The Department advises the Minister and the Department of Environmental Affairs and Tourism on the development and conservation of marine and coastal resources to ensure the sustainable utilisation of such resources, as well as to maintain marine ecosystem integrity and quality.

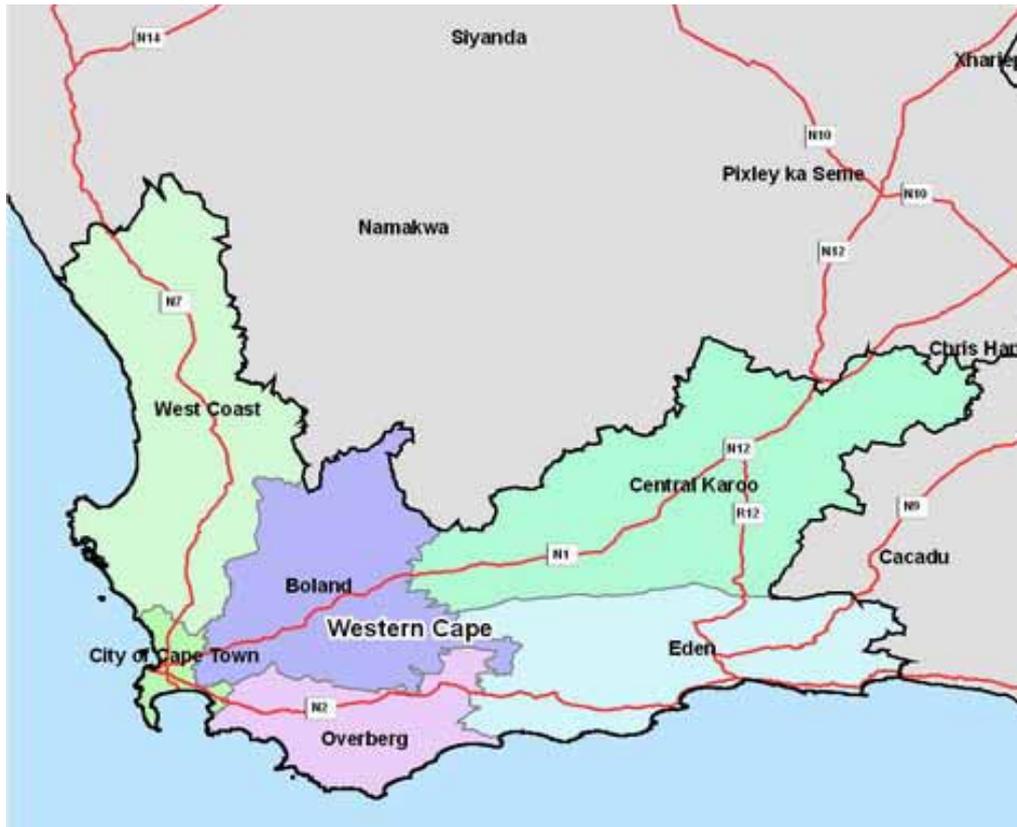
9. **Local municipalities** are responsible for handling development applications, such as applications for departures from building parameters or applications for rezoning or for the subdivision of land. Municipalities decide how to handle these applications according to legislation, policies and guidelines provided by the Department of Environmental Affairs and Development Planning.

**CONTACT DETAILS****Regulating Authorities:**

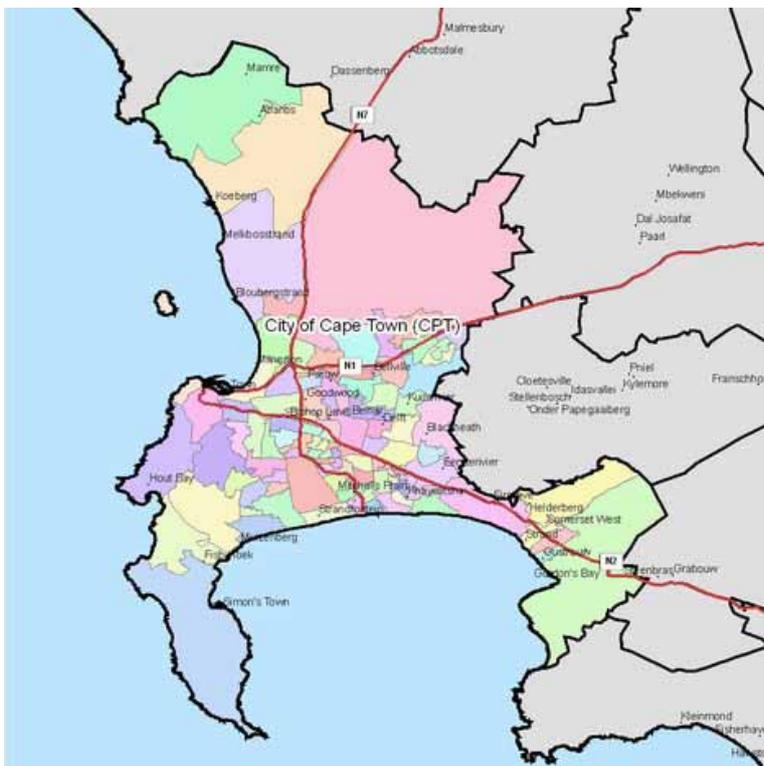
Department	Address	Contact numbers
Department of Environmental Affairs and Development Planning: Environmental Management	Private Bag X9086 Cape Town, 8000	Tel: 021 483 2994 Fax: 021 483 4372
Department of Water Affairs and Forestry (DWAF): Regional Cluster (Western and Eastern Cape)	Private Bag X7485 King Williams Town 5600	Tel: 043 604 5406 Fax: 043 604 5592
DWAF: Regional Office (Western Cape)	Private Bag X16 Sanlamhof 7532	Tel: 021 950 7100 Fax: 021 946 366 <a href="http://www.dwaf.gov.za">http://www.dwaf.gov.za</a>
Heritage Western Cape	Private Bag X9067 Cape Town, 8000	E-mail: <a href="mailto:hwc@pgwc.gov.za">hwc@pgwc.gov.za</a>
South African Heritage Resources Agency	PO Box 4637 Cape Town, 8000	Tel: 021 483 9695 Fax: 021 483 9842
Cape Nature: Western Cape Nature Conservation Board	Private Bag X29 Rondebosch, 7701	<a href="http://www.capenature.org.za">http://www.capenature.org.za</a>
CapeNature's permit office		Tel: 021 659 3416/8
CapeNature: Endangered flora		Tel: 021 659 3416/7/8
Western Cape Department of Agriculture (DoA): Beaufort West, Central Karoo	PO Box 66 Beaufort West, 6970	Tel: 023 414 2126 Fax: 023 414 4386
DoA: Caledon, Theewaterskloof	PO Box 43 Caledon, 7230	Tel: 028 212 1158 Fax: 028 212 1878
DoA: George, Eden	PO Box 249 George, 6530	Tel: 044 874 2047 Fax: 044 874 7730
DoA: Elsenburg, Cape Town (Head Office)	Private Bag X1 Elsenburg, 7607	Tel: 021 808 5111 Fax: 021 808 5120

<b>Department</b>	<b>Address</b>	<b>Contact numbers</b>
DoA: Ladismith, Kannaland	PO Box 19 Ladismith, 6885	Tel: 028 551 1017 Fax: 028 551 1017
DoA: Laingsburg, Central Karoo	PO Box 6 Laingsburg, 6900	Tel: 023 551 1034 Fax: 023 551 1637
DoA: Malmesbury, Swartland	PO Box 146 Malmesbury, 7299	Tel: 022 482 2265 Fax: 022 487 2331
DoA: Moorreesburg, Swartland	PO Box 138 Moorreesburg, 7310	Tel: 022 433 2272 Fax: 022 433 2102
DoA: Oudtshoorn, Eden	PO Box 351 Oudtshoorn, 6620	Tel: 044 272 6077 Fax: 044 279 1910
DoA: Piketberg, Bergrivier	PO Box 44 Piketberg, 7320	Tel: 022 913 1112 Fax: 022 913 2390
DoA: Riversdale, Langeberg	PO Box 33 Riversdale, 6770	Tel: 028 713 2442 Fax: 028 713 3457
DoA: Swellendam, Overberg	PO Box 100 Swellendam, 6740	Tel: 028 514 1196 Fax: 028 514 1342
DoA: Vredendal, Matzikama	PO Box 130 Vredendal, 8160	Tel: 027 213 2000 Fax: 027 213 2712
DoA: Wellington, Drakenstein	PO Box 53 Wellington, 7655	Tel: 021 873 1135 Fax: 021 873 3522
DoA: Worcester, Breede Valley	PO Box 66 Worcester, 6849	Tel: 023 347 1121 Fax: 023 342 6779
National Department of Agriculture		Tel: 012 319 6000 <a href="http://www.nda.agric.za/">http://www.nda.agric.za/</a>
Cape Gateway (Single point of access to government information and services for the citizens of the Western Cape)		<a href="http://www.capegateway.gov.za">http://www.capegateway.gov.za</a> Tel: 0860 142 142
Department of Health: Head Office		Tel: 021 421 1124 Fax: 021 418 5685
Department of Health: Metro District Health Services		Tel: 021 918 1513/1559 Fax: 021 918 1513
Department of Health: Boland/Overberg Region		Tel: 023 348 1431 Fax: 021 342 8501
Department of Health: West Coast/Winelands		Tel: 027 213 4070 Fax: 027 213 3145
Department of Minerals and Energy	Private Bag X59 Pretoria, 0001 Mineralia Centre, 234 Visagie Street, Pretoria	Tel: 012 317 8000 Fax: 012 322 3416 Website: <a href="http://www.dme.gov.za">www.dme.gov.za</a>

**Municipalities:**



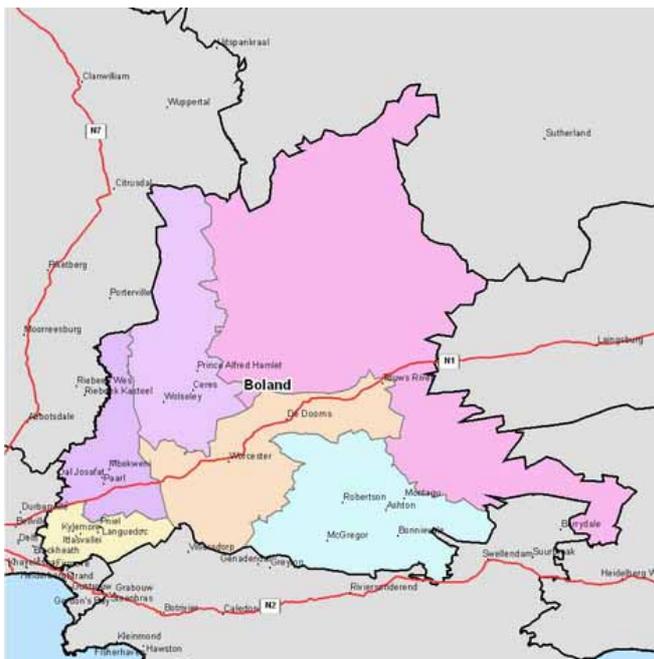
Municipal areas of the Western Cape. The details for each municipal area are provided below.



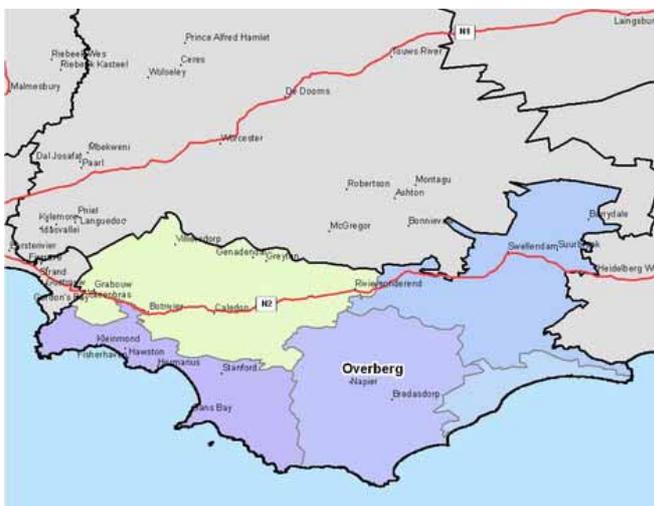
*City of Cape Town  
Municipality*  
Private Bag X9181  
CAPE TOWN  
8000  
Tel: 021 400 1330  
Fax: 021 400 1332



**West Coast District Municipality**  
 P O Box 242  
 MOORREESBURG  
 7310  
 Tel: 022 433 2380  
 Fax: 022 433 2172



**Cape Winelands District Municipality**  
 P O Box 100  
 STELLENBOSCH  
 7599  
 Tel: 086 1265263  
 Fax: 021 887 2271

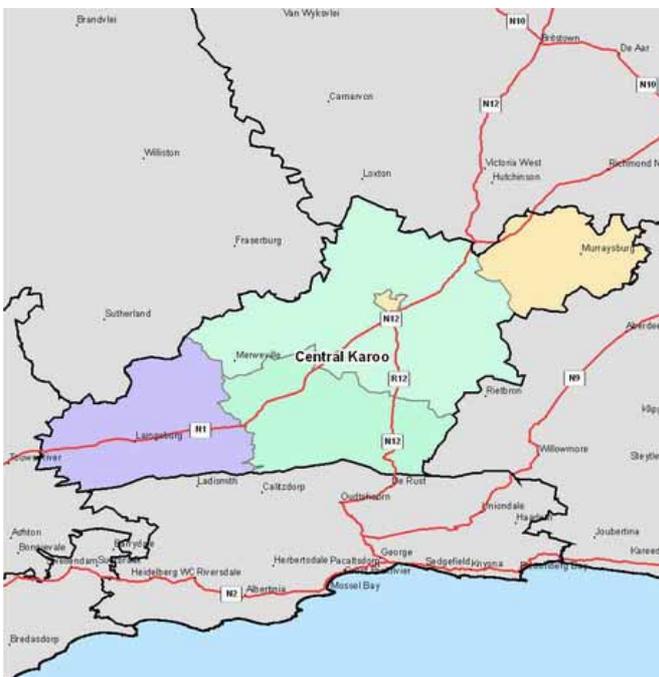


**Overberg District Municipality**  
 Private Bag X22  
 BREDASDORP  
 7280  
 Tel: 028 425 1157  
 Fax: 028 425 1014



**Eden District Municipality**

P O Box 12  
 GEORGE  
 Tel: 044 803 1300  
 Fax: 044 874 6626



**Central Karoo District Municipality**

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**Planning and Assessment Resources**

Organisation	Address	Contact numbers
Council for GeoScience (for digital and hard copy geological maps)	280 Pretoria Road, Silverton Private Bag x112 Pretoria, 0001	Data Sales Tel No: 012 841 1032
Department of Land Affairs Chief Directorate: Surveys and Mapping (for digital and hard copy topographical maps and aerial photographs)	Rhodes Avenue Mowbray	Tel: 021 658 4300 Fax: 021 689 1351 Map Sales Fax: 021 686 9884 <a href="http://w3sli.wcape.gov.za">http://w3sli.wcape.gov.za</a>

<b>Organisation</b>	<b>Address</b>	<b>Contact numbers</b>
Institute for Soils, Climate and Water: Agricultural Research Council (for soil maps)	Private Bag x79 Arcadia Pretoria, 0001	Tel: 012 310 2500
Western Cape Wetlands Forum (WCWF): Urban Conservation Unit; SANBI	Kirstenbosch Botanical Gardens; Rhodes Drive Private Bag X7 Claremont; 7735	Tel: 021 799 8800 Fax: 021 797 8390 E-mail: wetlandsforum@sanbi.org
Working for Wetlands		<a href="http://www.ccw.ac.za/wetlands">http://www.ccw.ac.za/wetlands</a>
District Roads Engineer Ceres	Ceres, Witzenberg Oosterlig, Ceres, 6835	Tel: 023 312 1120 Fax: 023 312 2633
District Roads Engineer Oudtshoorn	Vrede Road, Oudtshoorn Private Bag X617 Oudtshoorn, 6620	Tel: 044 272 6071 Fax: 044 272 7243
District Roads Engineer Western Cape	Main Road, Paarl Private Bag X6003 Suider Paarl, 7624	Tel: 021 863 2020 Fax: 021 863 3623
South African National Biodiversity Institute (SANBI): Head Office	2 Cussonia Ave Brummeria, Pretoria Private Bag X101 Pretoria, 0001	Tel 012 843 5000 Fax: 012 804 3211
SANBI: Kirstenbosch National Botanical Garden	Rhodes Drive, Newlands Private Bag X7 Claremont, 7735	Tel: 021 799 8899 Fax: 021 797 6570
SANBI Biodiversity GIS	Kirstenbosch Research Centre P/Bag X7 Claremont, 7735	BGIShelp@sanbi.org Tel: 021 799 8698/9 Fax: 021 797 6903 <a href="http://cpu.uwc.ac.za">http://cpu.uwc.ac.za</a>
Cape Action for People and the Environment (C.A.P.E.)	Private Bag X7, Claremont, 7735	Tel: 021 799 8790 Fax 021 797 3475 E-mail: <a href="mailto:info@capeaction.org.za">info@capeaction.org.za</a> <a href="http://www.capeaction.org.za/">http://www.capeaction.org.za/</a>
Succulent Karoo Ecosystem Programme (SKEP): Rufford Maurice Laing Institute, Centre for Biodiversity Conservation	Kirstenbosch Gardens Newlands, 7735 Private Bag X7 Claremont, 7735	Tel: 021 799 8872 Fax: 021 797 1940 <a href="http://www.skep.org">www.skep.org</a> <a href="http://www.sanbi.org">www.sanbi.org</a> <a href="http://www.conservation.org">www.conservation.org</a>
Western Cape Stewardship Association		Tel: 028 314 0185
Garden Route Initiative (SANParks)	29 Fichat Street Knysna 6570	Tel: 044 382 0479 Fax: 044 382 2095 E-mail: <a href="mailto:andrewb@sanparks.org">andrewb@sanparks.org</a>

<b>Organisation</b>	<b>Address</b>	<b>Contact numbers</b>
University of the Western Cape		<a href="http://www.uwc.ac.za/portal/index.htm">http://www.uwc.ac.za/portal/index.htm</a>
University of Cape Town: Faculty of Engineering & the Built Environment		<a href="http://www.uct.ac.za/">http://www.uct.ac.za/</a> Tel: 021 650 2699 Fax: 021 650 3782 E-mail: <a href="mailto:faculty@ebe.uct.ac.za">faculty@ebe.uct.ac.za</a>
University of Cape Town: Faculty of Science		<a href="http://www.uct.ac.za/">http://www.uct.ac.za/</a> Tel: 021 650 2712 Fax: 021 650 4511 E-mail: <a href="mailto:scifac@science.uct.ac.za">scifac@science.uct.ac.za</a>
National Off-road Workgroup		<a href="http://now.org.za/">http://now.org.za/</a>
Southern Africa Route Owners and Operators Association		<a href="http://www.saroorf.org.za/">http://www.saroorf.org.za/</a>
Southern Cape Route Owners Association (SCROF)		<a href="http://www.4x4ineden.co.za/">http://www.4x4ineden.co.za/</a>
National Association of Automobile Manufacturers of South Africa		<a href="http://www.naamsa.co.za/">http://www.naamsa.co.za/</a>
Association of All Wheel Drive Clubs of Southern Africa		<a href="http://www.aawdc.org.za/">http://www.aawdc.org.za/</a>