

## N21 (R300) PROJECT: AMPHIBIANS AND REPTILES

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### SECTOR 1

#### Baseline description - herpetofauna

##### Species diversity:

A total of 10 amphibians and 30 reptiles (19 snakes, 9 lizards, 2 chelonians (= 1 land tortoise, 1 terrapin)) have either been recorded or are likely to occur in this area. However, mainly due to urban development, associated threats and general habitat degradation, this area no longer provides ideal habitat for some of these species and they therefore only occur in low numbers with poor long-term viability.

##### The relative importance of the Sector 1 area for the survival of the affected species:

No amphibian or reptile is endemic to this particular area, but two species are endemic to the region within a 100 kilometre radius of the proposed ring road area. The remaining species have wider distribution ranges. Amphibian and reptile species in the Sector 1 area therefore have relatively wide distribution ranges in relation to the extent of the road development area.

Nevertheless, the impact of the road development on local populations of these species and, in particular, three threatened species, needs to be assessed. The most significant areas of the route alignment for amphibians and reptiles are the area between the Main Road (M4) and Prince George Drive (M5), partly the area between Prince George Drive (M5) and the Cape Flats Waste Water Treatment Works (CFWWTW) (where it passes through undeveloped zones), and the area between the CFWWTW and Strandfontein Road (M17).

##### Threatened species:

Cape sand snake (*Psammophis leightoni leightoni*) - VULNERABLE category in most recent (1988) edition of the South African Red Data Book - Reptiles and Amphibians. This snake is restricted to the predominantly sandy western coastal lowlands between Muizenberg and Eerste River on the Cape Flats and the Darling district on the West Coast - a distribution range spanning a distance of about 80 kilometres. This is also a region undergoing rapid development and the survival of this snake depends to an ever increasing degree on the adequate conservation of the diminishing stretches of natural veld within its restricted distribution range. Owing to development pressure in particular, this snake is rarely seen on the Cape Flats.

Yellowbellied house snake (*Lamprophis fuscus*) - RARE category in most recent (1988) edition of the South African Red Data Book - Reptiles and Amphibians. This species has a wide but scattered distribution extending from the southwestern Cape northeastwardly into the eastern half of the country. There are relatively few Cape Flats records of this species and it is rarely seen.

Western leopard toad (*Bufo pantherinus* - formerly *B. pardalis*) - ENDANGERED in Conservation Assessment and Management Plan report for Southern African Frogs, published in 2001. The western leopard toad has a patchy distribution restricted to the southwestern Cape. Besides the Cape Flats and Cape Peninsula, it occurs in the Betty's Bay/Kleinmond region and in the region of Stanford and Gansbaai. It breeds in semi-permanent to permanent water bodies such as ponds, dams, vleis, and pools in sluggish rivers. However, it only enters these water bodies during the breeding season and, in fact, is often found far from water. One of the main problems for the species, besides the filling in or drainage of water bodies, is that during the breeding season adult

toads migrating to breeding sites are forced to negotiate walls and roads and general urban development. During this time many adults in prime breeding condition succumb to road traffic. In the long-term this could seriously threaten the survival of local breeding populations. This in particular needs to be taken into account with the development of this road. The most important areas for the leopard toad along the Sector 1 route are the area between the Main Road (M4) and Prince George Drive (M5), the area between Prince George Drive and the CFWWTW, and a two kilometre stretch beyond the sewer ponds (to the east and which crosses Strandfontein Road (M17)).

## Issues

The impact of the road development on issues pertaining to amphibians and reptiles are evaluated in the following tables using the standard criteria that the specialists have been asked to follow.

TABLE 1. EVALUATION *WITHOUT* MITIGATION MEASURES (SECTOR 1)

	Threatened species - mainly leopard toad	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	M-	L- to M-
Duration	H-	H-	H-
Intensity	M-	M-	M-
Probability	H-	H-	M-
Consequence	M-	M-	M- to H-
Significance	M-	M-	M- to H-
Confidence	HIGH	HIGH	HIGH

TABLE 2. EVALUATION *WITH* MITIGATION MEASURES (SECTOR 1)

	Threatened species - mainly leopard toad	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	M-	L- to M-
Duration	H-	M- to H-	M- to H-
Intensity	L-	M- to L-	M- to L-
Probability	H-	M-	M- to L-
Consequence	M-	M-	M-
Significance	M-	M-	M- to L-
Confidence	HIGH	HIGH	HIGH

## Recommendations

### Design:

The route alignment area between the Main Road (M4) and Prince George Drive (M5) should be positioned as far north as possible to minimize the impact on the Lakeside wetlands and adjoining habitats.

The route alignment between the CFWWTW and Strandfontein Road (M17) should also be positioned as far north as possible to minimize the impact on important natural habitats to the south (towards the Pelikan Park area).

Consideration should be given to the installation of culverts (tunnels under the road) to promote the interaction of terrestrial animal populations on either side of the road and help reduce road casualties. In suitable areas, culverts of more than 500 millimetres in diameter, and as many as possible, could be positioned at appropriate intervals. The priority areas for culverts would be in the vicinity of wetlands and natural habitats, especially where the road bisects these areas. In particular, this would apply to the important leopard toad areas between the Main Road (M4) and Prince George Drive (M5), a two kilometre stretch from the CFWWTW eastwards to beyond Strandfontein Road (M17), and, to a lesser extent, between Prince George Drive (M5) and the CFWWTW. Sections of road raised off the ground on supports in the form of flyover bridges would also potentially allow for the movement of terrestrial animals. The placement, number, design and size of the culverts needs to be decided upon with the road engineers.

No solid wall type barrier should be constructed alongside the road such as the one along the N2 between Cape Town and Khayelitsha. A solid concrete barrier would obviously restrict the movement of terrestrial animal life. If such walls are envisaged, regular gaps of more than 500 millimetres in diameter should be made at the base to allow for the movement of wildlife.

Ideally, road reserves should be wide enough to allow for a wildlife sanctuary area which will not be destroyed by future road widening projects. In an urban environment, road reserves can provide important sanctuary areas for wildlife and also serve as corridor areas for the movement of terrestrial animals linking them to more important conservation areas.

#### Construction:

Road construction can lead to the filling in or drainage of wetland sites and the general alteration of local drainage patterns. As far as possible, seasonally inundated areas and more permanent wetland types should remain intact to accommodate the habitat requirements of the species dependant on these respective habitat types. For example, some frog species only breed in permanent water bodies whereas others are dependant on seasonal wetlands.

During the construction phase, the top soil should be stored and used, where necessary, for the rehabilitation of the road reserve after road construction.

The larger and more visible snakes and other reptiles such as tortoises encountered during the construction phase should, as far as possible, preferably be translocated to the nearest suitable nature area in the surroundings. However, the translocation of indigenous plants and animals should not be done without the approval of the Western Cape Nature Conservation Board (Private Bag X100, Vlaeberg, 8018; Tel. 021-4832651). They will also supply the contact details of persons who are able to rescue such animals and designate places where they can be released.

#### Operation:

The road reserve must be suitably landscaped and rehabilitated (with indigenous vegetation) following on road construction, and any wetland areas should be maintained and not filled in or drained. This will help encourage recolonization by amphibians and reptiles.

## SECTOR 2

### Baseline description - herpetofauna

#### Species diversity:

A total of 9 amphibians and 28 reptiles (15 snakes, 10 lizards, 3 chelonians (= 2 land tortoises, 1 terrapin)) have either been recorded or are likely to occur in this area. However, mainly due to urban development, associated threats and general habitat degradation, this area no longer provides ideal habitat for a number of these species and they therefore only occur in low numbers with poor long-term viability.

#### The relative importance of the Sector 2 area for the survival of the affected species:

No amphibian or reptile is either endemic to this particular area or the region within a 100 kilometre radius of the proposed ring road area. Amphibian and reptile species in the Sector 2 road area therefore have relatively wide distribution ranges in relation to the extent of the road alignment area. Nevertheless, the impact of possible future road widening on local populations of these species needs to be assessed.

#### Threatened species:

The Sector 2 area does not appear to support any threatened species.

### Issues

The impact of possible future road widening on issues pertaining to amphibians and reptiles are evaluated in the following tables using the standard criteria that the specialists have been asked to follow.

TABLE 3. EVALUATION *WITHOUT* MITIGATION MEASURES (SECTOR 2)

	Road as barrier/hazard to species movement	Quality of road reserve habitat after road widening
Extent	M-	L- to M-
Duration	H-	H-
Intensity	M-	M-
Probability	H-	M-
Consequence	M-	M- to H-
Significance	M-	M- to H-
Confidence	HIGH	HIGH

TABLE 4. EVALUATION *WITH* MITIGATION MEASURES (SECTOR 2)

	Road as barrier/hazard to species movement	Quality of road reserve habitat after road widening
Extent	M-	L- to M-
Duration	M- to H-	M- to H-
Intensity	M- to L-	M- to L-
Probability	M-	M- to L-
Consequence	M-	M-
Significance	M-	M- to L-
Confidence	HIGH	HIGH

## Recommendations

### Design:

No solid wall type barrier should be constructed alongside the road such as the one along the N2 between Cape Town and Khayelitsha. A solid concrete barrier would obviously restrict the movement of terrestrial animal life. If such walls are envisaged, regular gaps of more than 500 millimetres in diameter should be made at the base to allow for the movement of wildlife.

Ideally, road reserves should be wide enough to allow for a wildlife sanctuary area which will not be destroyed by future road widening projects. In an urban environment, road reserves can provide important sanctuary areas for wildlife and also serve as corridor areas for the movement of terrestrial animals linking them to more important conservation areas.

### Construction:

Road widening can lead to the filling in or drainage of wetland sides and the general alteration of local drainage patterns. As far as possible, seasonally inundated areas and more permanent wetland types should remain intact to accommodate the habitat requirements of the species dependant on these respective habitat types. For example, some frog species only breed in permanent water bodies whereas others are dependant on seasonal wetlands.

During possible future road widening operations, the top soil should be stored and used, where necessary, for the rehabilitation of the road reserve after road construction.

The larger and more visible snakes and other reptiles such as tortoises encountered during the construction phase should, as far as possible, preferably be translocated to the nearest suitable nature area in the surroundings. However, the translocation of indigenous plants and animals should not be done without the approval of the Western Cape Nature Conservation Board (Private Bag X100, Vlaeberg, 8018; Tel. 021-4832651). They will also supply the contact details of persons who are able to rescue such animals and designate places where they can be released.

### Operation:

The road reserve must be suitably landscaped and rehabilitated (with indigenous vegetation) following on road widening, and any wetland areas should be maintained and not filled in or drained. This will help encourage recolonization by amphibians and reptiles.

## SECTOR 3 – HIGHWAY SECTION 6 (HS6)

### Baseline description - herpetofauna

#### Species diversity:

A total of 7 amphibians and 23 reptiles (15 snakes, 6 lizards, 2 chelonians (= 1 land tortoise, 1 terrapin)) have either been recorded or are likely to occur in this area. However, mainly due to urban development, associated threats and general habitat degradation, this area no longer provides ideal habitat for a number of these species and they therefore only occur in low numbers with poor long-term viability.

#### The relative importance of the Sector 3 – HS6 area for the survival of the affected species:

No amphibian or reptile is either endemic to this particular area or the region within a 100 kilometre radius of the proposed ring road area. Amphibian and reptile species in the Sector 3 – Highway Section 6 area therefore have relatively wide distribution ranges in relation to the extent of the road alignment area. Nevertheless, the impact of the road development on local populations of these species needs to be assessed.

#### Threatened species:

The Sector 3 area does not appear to support any threatened species.

### Issues

The impact of possible future road widening on issues pertaining to amphibians and reptiles are evaluated in the following tables using the standard criteria that the specialists have been asked to follow.

TABLE 5. EVALUATION *WITHOUT* MITIGATION MEASURES (SECTOR 3 – HS6)

	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	L- to M-
Duration	H-	H-
Intensity	M-	M-
Probability	H-	M-
Consequence	M-	M- to H-
Significance	M-	M- to H-
Confidence	HIGH	HIGH

TABLE 6. EVALUATION *WITH* MITIGATION MEASURES (SECTOR 3 – HS6)

	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	L- to M-
Duration	M- to H-	M- to H-
Intensity	M- to L-	M- to L-
Probability	M-	M- to L-
Consequence	M-	M-
Significance	M-	M- to L-
Confidence	HIGH	HIGH

## Recommendations

### Design:

No solid wall type barrier should be constructed alongside the road such as the one along the N2 between Cape Town and Khayelitsha. A solid concrete barrier would obviously restrict the movement of terrestrial animal life. If such walls are envisaged, regular gaps of more than 500 millimetres in diameter should be made at the base to allow for the movement of wildlife.

Ideally, road reserves should be wide enough to allow for a wildlife sanctuary area which will not be destroyed by future road widening projects. In an urban environment, road reserves can provide important sanctuary areas for wildlife and also serve as corridor areas for the movement of terrestrial animals linking them to more important conservation areas.

Consideration should be given to the installation of culverts (tunnels under the road) in the Wellington Road (R302) area of the route alignment where there are noteworthy wetlands and natural habitats. This would promote the interaction of terrestrial animal populations on either side of the road and help reduce road casualties. The culverts should be more than 500 millimetres in diameter, and as many as possible should be installed. Sections of road raised off the ground on supports in the form of flyover bridges would also potentially allow for the movement of terrestrial animals. The placement, number, design and size of the culverts needs to be decided upon with the road engineers.

### Construction:

Road widening can lead to the filling in or drainage of wetland sites and the general alteration of local drainage patterns. As far as possible, seasonally inundated areas and more permanent wetland types should remain intact to accommodate the habitat requirements of the species dependant on these respective habitat types. For example, some frog species only breed in permanent water bodies whereas others are dependant on seasonal wetlands.

During possible future road widening operations, the top soil should be stored and used, where necessary, for the rehabilitation of the road reserve after road construction.

The larger and more visible snakes and other reptiles such as tortoises encountered during the construction phase should, as far as possible, preferably be translocated to the nearest suitable nature area in the surroundings. However, the translocation of indigenous plants and animals should not be done without the approval of the Western Cape Nature Conservation Board (Private Bag X100, Vlaeberg, 8018; Tel. 021-4832651). They will also supply the contact details of persons who are able to rescue such animals and designate places where they can be released.

### Operation:

The road reserve must be suitably landscaped and rehabilitated (with indigenous vegetation) following on road widening, and any wetland areas should be maintained and not filled in or drained. This will help encourage recolonization by amphibians and reptiles.

## SECTOR 3 – NORTHERN GREENFIELDS SECTIONS (NGS)

### Baseline description - herpetofauna

#### Species diversity:

A total of 11 amphibians and 33 reptiles (17 snakes, 13 lizards, 3 chelonians (= 2 land tortoises, 1 terrapin)) have either been recorded or are likely to occur in this area. However, mainly due to urban development, associated threats and general habitat degradation, this area no longer provides ideal habitat for some of these species and they therefore only occur in low numbers with poor long-term viability.

#### The relative importance of the Sector 3 - NGS area for the survival of the affected species:

No amphibian or reptile is endemic to this particular area, but one species is endemic to the region within a 100 kilometre radius of the proposed ring road area. The remaining species have wider distribution ranges. Amphibian and reptile species in the Sector 3 – Northern Greenfields Sections area therefore have relatively wide distribution ranges in relation to the extent of the road development area.

Nevertheless, the impact of the road development on local populations of these species and, in particular, three threatened species, needs to be assessed. The most significant area of the route alignment for amphibians and reptiles is the sandy coastal area between the National Route N7 and the Otto Du Plessis Road (M14).

#### Threatened species:

Cape sand snake (*Psammophis leightoni leightoni*) - VULNERABLE category in most recent (1988) edition of the South African Red Data Book - Reptiles and Amphibians. This snake is restricted to the predominantly sandy western coastal lowlands between Muizenberg and Eerste River on the Cape Flats and the Darling district on the West Coast - a distribution range spanning a distance of about 80 kilometres. This is also a region undergoing rapid development and the survival of this snake depends to an ever increasing degree on the adequate conservation of the diminishing stretches of natural veld within its restricted distribution range. Owing to development pressure in particular, this snake is rarely seen on the Cape Flats. In the Sector 3 – Northern Greenfields Sections area, it is associated with the sandy coastal flats between the National Route N7 and the Otto Du Plessis Road (M14).

Cape rain frog (*Breviceps gibbosus*) - NEAR THREATENED in Conservation Assessment and Management Plan report for Southern African Frogs, published in 2001. This frog has a restricted distribution range which extends from the northern Cape Peninsula and the region of Somerset West northwardly for about 140 kilometres to the Piketberg. It is a non-aquatic burrowing species associated with loamy soils in gently sloping to hilly terrain. Although it is a fairly adaptable species that survives in certain modified habitats, the effects of urban and agricultural development have destroyed a fair degree of its habitat. In general, the Sector 3 – Northern Greenfields Sections area does not contain ideal habitat for this species.

Cape caco (*Cacosternum capense*) - VULNERABLE in Conservation Assessment and Management Plan report for Southern African Frogs, published in 2001. This frog has a restricted and patchy distribution within a 190 kilometre, generally northward, radius of Cape Town. It inhabits seasonally flooded depressions and pans in low-lying areas where loamy to clay type soils are predominant. It is mainly threatened by urban expansion and the drainage of its breeding habitat in agricultural lands. In this general area at least four breeding sites have been destroyed by

urban expansion. In fact, the only currently known breeding site in this area is situated about three kilometres north-east of the planned road on "Spes Bona" farm.

## Issues

The impact of the road development on issues pertaining to amphibians and reptiles are evaluated in the following tables using the standard criteria that the specialists have been asked to follow.

TABLE 7. EVALUATION *WITHOUT* MITIGATION MEASURES (SECTOR 3 - NGS)

	Threatened species	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	M-	L- to M-
Duration	H-	H-	H-
Intensity	M-	M-	M-
Probability	H-	H-	M-
Consequence	M-	M-	M- to H-
Significance	M-	M-	M- to H-
Confidence	HIGH	HIGH	HIGH

TABLE 8. EVALUATION *WITH* MITIGATION MEASURES (SECTOR 3 - NGS)

	Threatened species	Road as barrier/hazard to species movement	Quality of road reserve habitat after road construction
Extent	M-	M-	L- to M-
Duration	H-	M- to H-	M- to H-
Intensity	L-	M- to L-	M- to L-
Probability	H-	M-	M- to L-
Consequence	M-	M-	M-
Significance	M-	M-	M- to L-
Confidence	HIGH	HIGH	HIGH

## Recommendations

### Design:

Consideration should be given to the installation of culverts (tunnels under the road) to promote the interaction of terrestrial animal populations on either side of the road and help reduce road casualties. In suitable areas, culverts of more than 500 millimetres in diameter, and as many as possible, could be positioned at appropriate intervals. The priority areas for culverts would be in the vicinity of wetlands and natural habitat, especially where the road bisects these areas. In particular, this would apply to the sandy coastal area between the National Route N7 and the Otto Du Plessis Road (M14). Sections of road raised off the ground on supports in the form of flyover bridges would also potentially allow for the movement of terrestrial animals. The placement, number, design and size of the culverts needs to be decided upon with the road engineers.

No solid wall type barrier should be constructed alongside the road such as the one along the N2 between Cape Town and Khayelitsha. A solid concrete barrier would obviously restrict the movement of terrestrial animal life. If such walls are envisaged, regular gaps of more than 500 millimetres in diameter should be made at the base to allow for the movement of wildlife.

Ideally, road reserves should be wide enough to allow for a wildlife sanctuary area which will not be destroyed by future road widening projects. In an urban environment, road reserves can provide important sanctuary areas for wildlife and also serve as corridor areas for the movement of terrestrial animals linking them to more important conservation areas.

#### Construction:

Road construction can lead to the filling in or drainage of wetland sites and the general alteration of local drainage patterns. As far as possible, seasonally inundated areas and more permanent wetland types should remain intact to accommodate the habitat requirements of the species dependant on these respective habitat types. For example, some frog species only breed in permanent water bodies whereas others are dependant on seasonal wetlands.

During the construction phase, the top soil should be stored and used, where necessary, for the rehabilitation of the road reserve after road construction.

The larger and more visible snakes and other reptiles such as tortoises encountered during the construction phase should, as far as possible, preferably be translocated to the nearest suitable nature area in the surroundings. However, the translocation of indigenous plants and animals should not be done without the approval of the Western Cape Nature Conservation Board (Private Bag X100, Vlaeberg, 8018; Tel. 021-4832651). They will also supply the contact details of persons who are able to rescue such animals and designate places where they can be released.

#### Operation:

The road reserve must be suitably landscaped and rehabilitated (with indigenous vegetation) following on road construction, and any wetland areas should be maintained and not filled in or drained. This will help encourage recolonization by amphibians and reptiles.

## **GENERAL EFFECT OF THE ROAD DEVELOPMENT ON AMPHIBIANS AND REPTILES**

Road reserves provide sanctuary areas for wildlife in an urban environment and can serve as useful/important corridor areas for the movement of species linking them to more important conservation areas. This encourages genetic interaction with surrounding populations which is important especially for the longer term viability of more isolated populations. In fact, in highly developed urban areas, corridor areas could be the only means of contact that some forms of wildlife have with surrounding populations.

Road construction can lead to changes in local drainage patterns. This could be to the detriment of some species.

Roads and traffic in general have a detrimental effect on wildlife populations. For example, many amphibians get killed on roads during breeding periods when they migrate to and from wetland breeding sites. The extent of this threat to reptile and amphibian populations varies from species to species and obviously depends on the design and size of the road and the volume of traffic it has to carry. This negative impact is difficult to curb but could be alleviated somewhat by the installation of special culverts (or tunnels) through which amphibians, reptiles and other forms of wildlife can move. The plight of the leopard toad (Sector 1 area) needs special consideration in this regard with roads being possibly its greatest threat on the Cape Flats.

Many reptiles and amphibians will be destroyed during the road construction phase. However, this is unlikely to affect the overall conservation status of affected species due to their relatively wide distribution ranges in relation to the development area. Furthermore, once the area has been rehabilitated, some reptiles and amphibians, especially the more adaptable species, should be able to re-colonize the road reserve area.

While the road is unlikely to destroy any breeding sites of the endangered leopard toad (Sector 1 area), it will present a hazard and barrier for toads migrating to and from breeding sites.