

CHAPTER FIVE: IDENTIFICATION AND ASSESSMENT OF ALTERNATIVES

5.1 APPROACH TO THE ASSESSMENT OF ALTERNATIVES

Chapter One of the EIA Regulations 2014 (as amended), GN R326, provides the context for the “*Interpretation and Purpose of Regulations*”, and with regards to “*alternatives*” (page 217), the following is provided:

““*alternatives*”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the –

- (a) *property on which or location where the activity is proposed to be undertaken;*
- (b) *type of activity to be undertaken;*
- (c) *design or layout of the activity;*
- (d) *technology to be used in the activity; or*
- (e) *operational aspects of the activity; and includes the option of not implementing the activity;”*

In line with the above and as a baseline, the assessment of alternatives must include the assessment of the No-Go alternative (not implementing the activity).

The objectives of the Scoping Process are provided in GN R326, Appendix 2, Section 1. In relation to the assessment of alternatives the following, amongst others, are provided (page 260):

- “(c) *identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;*
- (d) *identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;”*

The content requirements for a Scoping Report is given in GN R326, Appendix 2, Section 2. In relation to the assessment of alternatives the following, amongst others, are provided (page 260):

- “(1) (g) *a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including-*
- (i) *details of the alternatives considered; ...*
- (ix) *the outcome of the site selection matrix;*
- (x) *if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such;*
- (xi) *a concluding statement indicating the preferred alternatives, including preferred location of the activity;”*

The Scoping Report must, therefore, at a minimum provide a description of the process followed to reach an alternative and if no location alternatives were investigated, the reason for not considering such.

The NEMA (as amended) requires an Environmental Impact Assessment (EIA) Report to include the investigation and assessment of impacts associated with alternatives to the proposed project, including the option of not implementing the activity (Sections 24 (4)(b)(i) and 24(4A)).

Section 24O (1)(b)(iv) of the NEMA (as amended), requires that the competent authority, when considering an application for Environmental Authorisation, considers: “*where appropriate, any*

feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment".

Within the legislative context outlined above, the assessment of alternatives should at a minimum include the following:

- The assessment of the No-Go alternative as a baseline scenario;
- The reasoning/ motivation for the elimination of an alternative; and
- The assessment of reasonable and feasible alternatives.

As is outlined below the following alternatives are being considered in this assessment process:

- No-Go alternative
- Property/ Location alternatives
- Land-Use alternatives
 - Grazing/ game
 - Crop cultivation and citrus orchard establishment
- Layout alternatives (development footprints)

5.2 NO-GO ALTERNATIVE

The option of not implementing the activity, the No-Go option, must be assessed as a baseline. Based on a site visit to Umgcambo, as well as preliminary specialist input, the vegetation on Umgcambo is Sundays Spekboom Thicket.

The condition of the vegetation is considered highly degraded in some areas, specifically towards the southern boundary of the farm, and is likely due to past wildlife and domestic livestock grazing and browsing. This is evidenced by several grassy areas dominated by *Cynodon dactylon* (Bermuda Grass), patches of *Pentzia incana* (Karoobossie) and *Mesembryanthemum aitonis* (Brakslaai). Additionally, some trees, such as *Pappea capensis* (Pruimbessiebos) and *Portulacaria afra* (Spekboom), showed visible signs of browsing (i.e. umbrella shaped). *Opuntia ficus-indica* (Prickly Pear) and *Opuntia aurantiaca* (Jointed Cactus), possible indicators of a degraded vegetation state, occurred throughout the farm. Modified areas on the farm are represented by various cut lines and existing vehicle tracks, as well as footpaths.

The condition of the vegetation is in a relatively good ecological state to the west of the farm, with moderate degradation levels based on species diversity, intactness and a high level of impenetrability, despite the presence of *Opuntia ficus-indica* (Prickly Pear) and *Opuntia aurantiaca* (Jointed Cactus), as well as existing vehicle tracks and footpaths. Towards the northern boundary of the farm, including the steeply sloped areas, the condition of the vegetation is mostly intact, with a higher level of impenetrability (i.e. fewer grassy areas, lower prevalence of *Cynodon dactylon* (Bermuda Grass) and decreased levels of visible browsing).

The site visit, together with the review of relevant aerial imagery, as well as the NFEPA planning framework, have assisted in the identification of aquatic features on Umgcambo. The NFEPA Wetlands Map delineates one Unchanneled valley-bottom wetland, in this case a farm dam (artificial wetland) within 500m of the southern boundary of the farm. No additional aquatic features have been identified on Umgcambo at this time.

Refer to Chapter Three of this report for more detailed information on the affected environment.

These on-site findings supplement the information obtained from the various conservation and planning frameworks consulted for the area, and are subject to verification by a vegetation, as well as an aquatic specialist during the EIA phase of the assessment.

The No-Go option would entail not clearing the site for the cultivation of citrus and vegetables, whilst retaining the Sundays Spekboom Thicket. However, this will include the continued encroachment of exotic and invasive vegetation, if not actively controlled, and the continued degradation of the vegetation over time. Conversely the No-Go option would result in several temporary construction, permanent, as well as seasonal employment phase opportunities not being realized. Lastly, given that this proposed agricultural development is an empowerment project, the benefits to the potential beneficiaries will not be realized.

While the No-Go option will have no significant negative biophysical environmental impacts, it will result in the loss of positive social and economic benefits which are associated with the Go option. Finally, the No-Go option will result in the farm not being optimally utilized for agriculture, for which it is zoned. Therefore, the **No-Go option is not the preferred alternative**.

5.3 PROPERTY/ LOCATION ALTERNATIVES

Regarding the content of the scoping report, Appendix 2, Section 2 (1) (g) (x) requires that, if an alternative is not considered, the reasoning/ motivation for such is provided.

5.3.1 Reasoning/ Motivation for the Elimination of an Alternative

Chapter One of the EIA Regulations 2014 (as amended), provides for the interpretation and purpose of the regulations, including, amongst others the assessment of alternatives, which may include the property or location upon which an activity is proposed to take place. This should not be confused with layout/ development footprint alternatives within a specific site, which will be included in this assessment process (see Section 5.5 below).

The owner of Portion 413 of Farm No. 42 Strathsomers Estate, upon a willing buyer/ willing seller basis, entered into an agreement with the project applicant to sell a portion of his property. In order to identify a suitable portion to purchase (i.e. an area suitable for the establishment of citrus orchards), an Environmental Risk Assessment was undertaken for ~350ha on Portion 413. The area identified as suitable, now Portion 525 of Farm No. 42 Strathsomers Estate (Umgcambo), was subsequently purchased by the project applicant.

Umgcambo was considered suitable for an agricultural development of this nature due to amongst others, the availability of the land, distance to existing farming operations owned by the project applicant, soil suitability, and biophysical attributes (vegetation and aquatic) which would allow for cultivation, as well as conservation. In addition, Umgcambo was identified due to its close proximity to existing irrigation infrastructure on the adjacent farm, Portion 523, also owned by the project applicant, and access to the LSRWUA canal system.

Umgcambo is zoned Agriculture I and is situated in the vicinity of existing farming operations which include commercial agricultural activities, as well as livestock/ game grazing. Aside from domestic livestock and wildlife grazing, no intensive agricultural activities have taken place on the farm. Subject to recommendations by the various specialists (e.g. aquatic features and associated buffers, biodiversity conservation target areas, soil suitability, slope etc.), as well as technical input, it is anticipated that a portion of Umgcambo will not be suitable for development. The preferred

development footprint will be informed by the various specialist assessments and technical input proposed to take place through the assessment process.

Prior to commencing with the Scoping and EIA Process the project applicant, Umgcambo Trading (Pty) Ltd, applied for and was granted a Water Use Licence from The Department of Water and Sanitation for the taking of water from a water resource in terms of Section 21(a) of the National Water Act, which entitles them to utilise 100ha (900 000m³ per annum) of water from the LSRWUA canal system. The aforementioned licence is issued in respect of a particular property (i.e. Portion 525 of Farm No. 42 Strathsomers Estate (Umgcambo), previously Portion 413 of Farm No. 42 Strathsomers Estate). Given the requirement of available water for the proposed development, as is available on Umgcambo, it is not deemed feasible to assess other property alternatives.

Based on the experience of the EAP, land available for cultivation and which is zoned Agriculture I, which is situated adjacent to existing agricultural areas, have existing water use rights, suitable soils, and is near the LSRWUA canal system, is becoming increasingly scarce in the Sundays River Valley. Umgcambo meets the abovementioned requirements and thus, **no other reasonable or feasible property/ location alternatives are proposed to be assessed.** Layout/ development footprint alternatives within the farm will, however, be assessed (see Section 5.5 below).

5.4 LAND USE/ ACTIVITY ALTERNATIVES

5.4.1 Grazing (not preferred)

As noted in Chapter Three of this report, the vegetation on the farm is a combination of natural to degraded Sundays Spekboom Thicket. The species composition of Sundays Spekboom Thicket is not conducive to the sustainable grazing of domestic livestock. In general, Savannah type ecosystems are preferred when considering domestic livestock grazing as the primary farming activity. In order to sustainably graze livestock for commercial production on Umgcambo, fodder would need to be supplemented, aside from the forage available on the farm. Further, and in order to maintain a sustainable livestock enterprise, the farm would have to be divided into camps, to allow the veldt to recover. Alternatively, a portion of the farm would have to be cleared and irrigated to provide the necessary fodder. The negative biophysical environmental impacts that could potentially arise from the grazing of livestock on Umgcambo are; decreased species composition of the Sundays Spekboom Thicket vegetation type, soil erosion, continued alien invasion and modification of the vegetation on the site.

Regarding grazing capacity for domestic livestock and carrying capacity for game, PCV du Toit of the Grootfontein Agricultural Development Institute notes the following:

“However, there is a need to distinguish between domestic grazers and game animals. It has been advocated for some time that the term grazing capacity should be reserved to instances where the stocking rate grazing capacity relation of domestic stock is described. This relation is a simple question of the number of animals which can be accommodated sustainably on a given area without the deterioration of the natural resources.

The capacity of the land to carry game, should be referred to as carrying capacity. This stocking rate carrying capacity relation, should be reserved for the use of the land area to game relation. This carrying capacity is much more complex than the simple domestic stock: land area relation. Game, carrying capacity involves such factors as, inter alia: area of suitable habitat, sufficient foraging area, appropriate cover and a large enough area to cater for social needs (Furstenburg 2002). However, on account of the animal population growth rate, of the different species

occupying the land at the same time, this capacity of the land to carry game often becomes overstocked, resulting in the eventual over-grazing of the vegetation. When the area can no longer support the animal population, it crashes, leading to the inevitable, massive die-off of large numbers of game animals. The remainder starts to recover slowly at first on account of the poor vegetative cover and low available plant production resulting in the extremely low carrying capacity. Once the vegetation has recovered to such an extent that it attains its previous carrying capacity, animal numbers start building up again. The whole cycle of animal number build-up and the consequent overgrazing resumes. In order to combat over-grazing of the veld by game, expensive animal control measures have been instituted and such operations as culling and relocation of game are required, however, these practices seldom prove popular.”

While the vegetation on Umgcambo may be partially conducive to livestock and game grazing, it is important to note that the applicant's core business is citrus production, not livestock or wildlife production. The applicant, not having sufficient expertise in this regard, could potentially face the problems outlined in the reference above i.e. overgrazing, deterioration of the natural resources etc., if this activity were to be undertaken on the farm. The applicant's experience in citrus production, however, will positively benefit the sustainable and optimal use of the farm, as it is zoned Agriculture I. Thus, for the reasons outlined above, utilization of the farm for livestock and game grazing is not considered a feasible alternative and is, therefore, **not the preferred land-use alternative** and will not be assessed further in this assessment process.

5.4.2 Crop Cultivation and Citrus Orchard Establishment (preferred)

As outlined in Chapter One of this report, the area under assessment is located in the SRVM and is zoned Agriculture I. In terms of the Section 8 Zoning Scheme Regulations this “*means the cultivation of land for crops and plants or the breeding of animals, or the operation of a game farm on an extensive basis on the natural veld or land, and includes only such activities and buildings as are reasonably connected with the main farming activities of the farm, but does not include the consent uses applicable to agriculture zone 1.*”

The project applicant, Umgcambo Trading (Pty) Ltd, proposes to clear ~122.75ha on Portion 525 of Farm Strathsomers Estate No. 42 (~154.285ha in extent and hereafter known as Umgcambo), in the Sundays River Valley Municipality (SRVM), for the establishment of ~116ha of citrus orchards and vegetables (butternut and pumpkin), as well as to install associated infrastructure. The proposed development also includes a new irrigation water storage dam (~4ha footprint), a logistical services area (~2ha footprint), as well as internal roads and internal irrigation pipes. Irrigation water for the development is proposed to be supplied from the Lower Sundays River Water Users Association (LSRWUA) canal system, via a pipeline (ø500mm diameter; ~1.5km length; ~0.75ha footprint) to be installed in an existing vehicle track along the fenceline, on an adjacent property, Portion 523 of Farm Strathsomers Estate No. 42, which is owned by the same landowner. The pipeline is required to be installed across and underneath the DR01976. Therefore, area which forming part of this assessment process measures ~155ha in extent.

A new logistical services area is proposed to be constructed in order to provide administrative and logistical support for the development. The proposed logistical services area will measure ~2ha in extent and is proposed to consist of the following support infrastructure/ structures:

- Store (1000m²)
- Offices (200m²)
- Staff facilities (200m²)
- Manager's house (200m²)

- Loading/ collection zone, including upgrading of an existing access point and a new access road, as well as turning circles (6 000m²)
- Seven roof rainwater harvesting tanks (10 000L each)
- Foul sewer conservancy tanks:
 - Store and offices: 7.5m³
 - Manager's house: 13.2m³
 - Staff facilities: 56.25m³
- Stormwater detention facility (1 592m²/ 1 930m³)

The proposed workshop and storage area will include a fully enclosed bunded, roofed facility with a capacity to temporarily store ~30m³ of chemicals required for the proposed agricultural development.

The proposed infrastructure associated with the logistical services area will be confirmed by a suitably qualified engineer, in the form of a Roads and Wet Services Report, during the EIA phase of the assessment.

Water for the proposed agricultural development will be provided by the LSRWUA supply system. Water entitlements from the LSRWUA provide for 900mm/ha/yr (9000m³/ha/yr). The drip/ micro irrigation water delivery system which will be used in the orchards will use ~600mm/ha/yr (6000m³/ha/yr). With an effective irrigation area (number of trees) of ~116ha, this translates to an annual water requirement of 696 000m³ for the proposed agricultural development. In order to irrigate the proposed agricultural development, a new dam with a capacity of 80 000m³ and a wall height of 6m, will have to be constructed on Umgcambo. The proposed ø 500mm irrigation pipe to be installed on the adjacent property (Portion 523) will feed into the proposed new dam on Umgcambo. Thereafter, water will be pumped from the proposed new dam via a 315mm pipe and reticulated within the orchards through a network of underground pvc irrigation pipes and valves, with varying internal diameters (60mm to 160mm).

The applicant has obtained a Water Use Licence from DWS for the taking of water from a water resource in terms of Section 21 (a) of the National Water Act which entitles them to utilise 100ha (900 000m³ per annum) of water from the LSRWUA canal system. The applicant, therefore, has sufficient irrigation water for the proposed development of ~116ha of citrus. A copy of the Water Use License allocated to Umgcambo Trading (Pty) Ltd, is contained in Appendix G.

Umgcambo, as well as Portion 523, upon which the irrigation pipe is proposed to be installed, are located in a predominantly agricultural area, as indicated by the surrounding land uses (see Chapter Three). The vegetation on the properties surrounding Umgcambo to the north, west and east appears to be largely near-natural, although some modification (cut lines and vehicle tracks) is evident. In addition, these properties show various levels of degradation, presumably associated with domestic livestock grazing and game grazing. Portion 523, owned by the same landowner, is directly adjacent to the north eastern boundary of Umgcambo, and is currently engaged in commercial agricultural activities including citrus orchards, and vegetable production. Portion 523, upon which the irrigation pipe is proposed to be installed, is bound on its western, northern and eastern boundaries by cultivation. The Sundays River Valley area is located ~2.1km north of Umgcambo and is predominantly under intensive cultivation. Based on the surrounding land uses, the proposed agricultural development on Umgcambo is not likely to cause a significant change in character within the surrounding landscape, as the surrounding area is currently predominantly agricultural in nature.

Some of the key elements contributing to the sustainability of the agricultural potential of Umgcambo is access to arable land, suitable soils, the topography of the site and the availability of water. Based on the experience of the independent EAP in the area, access to such land in the Sundays River Valley, which meet the abovementioned requirements, is becoming increasingly scarce. The reason being that suitable land with sufficient access to water is already being utilized for commercial citrus and crop production. Potentially suitable land parcels do not always have ready access to canal water from the LSRWUA. Because of the distance to water, developments often require a larger capital investment, to ensure a reliable irrigation water supply. At present, Umgcambo meets the abovementioned criteria and is, therefore, considered to have a high agricultural potential and is potentially suitable for the proposed development.

The proposed agricultural development on Umgcambo will create several temporary construction phase, as well as permanent, operational and seasonal employment opportunities. In addition, a number of indirect employment opportunities associated with the fruit packing industry, transportation and logistical companies, purchasing, as well as hiring of various products (chemicals, pallets, cartons), are anticipated to be created.

Finally, the proposed agricultural development is an empowerment project, which will include additional benefits for beneficiaries associated with the project, and which is required be maintained at a minimum of 51%, in terms of the Water Use License.

Once the citrus trees are planted, a period of ~18months is required for them to reach maturity for harvesting. During this growing period, it is proposed that vegetables (butternut and pumpkin) be planted within the orchard rows. The vegetables produced will be predominantly for the local market, while the citrus will be predominantly for international markets, with some fruit to be processed (juiced) for the local market. International markets generate income from foreign currency, thus, contributing to local economic growth.

For the reasons outlined above, **this is the preferred alternative**, which will be assessed in detail during the EIA phase of the assessment, and which will include preferred layout/ development footprint alternatives within the preferred site. Chapter Six of this report provides an overview of the methodology for the identification, rating and assessment of impacts (both positive and negative) and the specialist studies to be undertaken during the EIA phase of the assessment.

5.5 LAYOUT ALTERNATIVES

The detailed specialist studies, as well as technical input proposed to take place during the EIA Phase of the assessment, will inform the preferred layout/ development footprint alternative on the site. These include:

- Soil suitability and slope analysis
- Vegetation – species of special concern, ecological corridors, biodiversity conservation targets
- Aquatic – buffer zones
- Heritage –Archaeological and Paleontological features
- Traffic – additional trip generation and access
- Irrigation - suitable dam design and irrigation infrastructure layout
- Roads and Wet Services - location and footprint of logistical services area, including bulk services

Prior to the commencement of this Scoping and EIA Process for Umgcambo, a Rapid Environmental Risk Assessment was undertaken for ~350ha on Portion 413 of Farm No. 42

Strathsomers Estate, in order to identify an area suitably for the cultivation of citrus, as well as areas for conservation. Included in the Rapid Environmental Risk Assessment was a Reconnaissance Soil Survey, as well as an Aquatic and Vegetation Specialist Assessment. This information was used in support of a Water Use License Application to the DWS.

The preferred layout/ development footprint for the proposed project will be determined by specialist, as well as technical input in the EIA phase of the assessment. **Layout/ development footprint alternatives are feasible and will be assessed in the EIA phase of the assessment.**

5.6 CONCLUDING REMARKS

On Umgambo, there are currently no other feasible or reasonable property or location alternatives to be assessed in the EIA phase. As a baseline, the No-Go alternative will be assessed in full in the EIA Phase of the assessment. The preferred activity to be undertaken on the property is the cultivation of vegetables and the establishment of a variety of citrus, which will be assessed in full in the EIA phase of the assessment. Layout/ development footprint alternatives are feasible and will be assessed in the EIA phase of the assessment.