Eco Route
ENVIRONMENTAL CONSULTANCY
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IMPACT AND RISK ASSESSMENT

Proposed Residential Development on Portion 91 of Farm Matjes Fontein 304, Keurboomstrand, Plettenberg Bay, Western Cape Province

Each potential environmental impact and risk identified was assessed according to specific criteria. These included the nature, extent, duration, consequence, probability and frequency of identified impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed or mitigated. The criteria are based on the EIA Regulations, published by the Department of Forestry, Fisheries and the Environment (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989. These criteria include:

Nature of the impact

This is an estimation of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

Mitigation Measures

Ways in which an impact can be avoided, minimised, or managed to reduce its environmental significance.

Extent of the impact - the scale of the impact	
Rating	**Definition of Rating**
Very Limited	Extending only as far as the development site area
Limited	Limited to the site and its immediate surroundings
Local	Extending across the site and to nearby settlements
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic.
National	National scale or across international borders

Duration of the impact - the lifespan or length of time the impact will last	
Rating	**Definition of Rating**
Brief	Impact will not last longer than 1 year
Short term	Impact will last between 1 and 2 years

Medium Term	Impact will last between 2 and 15 years
Long Term	Impact will last more than 15 years
Permanent	Impact may be permanent, or in excess of 20 years
Very High	Natural and/ or social functions and/ or processes are severely altered

Intensity - the severity of the impact	
Rating	**Definition of Rating**
Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Low	Natural and/or social functions and/or processes are slightly altered
Medium	Natural and/or social functions and/or processes are notably altered
High	Natural and/ or social functions and/ or processes are significantly altered
Very High	Natural and/ or social functions and/ or processes are severely altered

Probability of occurrence - the probability of the impact occurring	
Rating	**Definition of Rating**
Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Possible	Has occurred here or elsewhere and could therefore occur
Probable	It is most likely that the impact will occur
Definite	There are sound scientific reasons to expect that the impact will occur

Reversibility - the ability of the impacted environment to return to its pre-impacted state	
Rating	**Definition of Rating**
Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Partly reversible	the impact is reversible but more intense mitigation measures are required
Barely reversible	the impact is unlikely to be reversed even with intense mitigation measures
Irreversible	the impact is irreversible, and no mitigation measures exist

Irreplaceable loss of resources - the degree to which resources will be irreplaceably lost	
Rating	**Definition of Rating**
Negligible	No loss of resources
Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Medium	the resource is damaged irreparably but is represented elsewhere
High	Irreparable damage and is not represented elsewhere

Confidence - the level of confidence in the assessment rating	
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Significance - Significance of impacts are determined through a synthesis of the assessment criteria		
Rating		**Definition of Rating**
	Major negative (-)	The impact will have highly significant effects and are unlikely to be able to be mitigated adequately
	Moderate negative (-)	The impact will have medium significant effects and will require moderate mitigation measures to achieve an accepted level of impact
	Minor negative (-)	The impact will have low significant effects and will require minor mitigation
	Negligible negative (-)	The impact will have very low significant effects and would require little mitigation
	Neutral	The impact will have insignificant effects and would require no mitigation
	Negligible positive (+)	The impact will have negligible positive effects
	Minor positive (+)	The impact will have minor positive effects
	Moderate positive (+)	The impact will have moderate positive effects
	Major High positive (+)	The impact will have highly significant positive effects.

Impacts foreseen during the Construction Phase for the Preferred Alternative (60 Residential stands):

Project Phase	Construction			
Activity	**Loss of habitat within CBAs**			
Description of impact	Encroachment into and loss of CBA1 and CBA2 areas due construction.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Some form of offset or conservation servitude can be considered.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Medium	the resource is damaged irreparably but is represented elsewhere	Medium	the resource is damaged irreparably but is represented elsewhere
Significance	**Minor - negative**		**Minor - negative**	
Comment on significance	The site occurs entirely within CBA1 and CBA2 areas. The secondary vegetation ("pastures") in the southern part of the site does not have the properties consistent with protecting biodiversity patterns, but remaining areas are ecologically functional. The vegetation on site (within the proposed development footprint) is in relatively poor condition, and consists either of lawns or secondary vegetation with a species composition that is not representative of the natural habitat			
Cumulative impacts	The impact would result in insignificant cumulative effects as the significance of the impacts is low. The CBAs are designated for the protection of listed Garden Route shale fynbos, but this does not occur within these designated CBA1 areas, only forest.			

Project Phase	Construction	
Activity	**Clearance of vegetation for the construction of the dwelling and associated infrastructure**	
Description of impact	Loss of sensitive vegetation, habitat loss for terrestrial wildlife, mortalities to various species unable to evade the disturbance, loss of viable propagules, fragmentation of ecological infrastructure	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts

Potential mitigation	• Wherever there are sections of undisturbed natural habitat within the development area, they should not be impacted by the building activities and should be conserved as small islands of natural resources for the small wildlife of the area. • the removal and translocation of protected plants if found should be undertaken prior to construction clearing activities. A permit is required prior to removal. • Protected plants must either be moved to a safer, no-go area on the property or taken to a nursery for temporary storage until rehabilitation takes place. • Access by heavy machinery should be limited on the site. • Only areas necessary for the development footprint should be cleared and the remainder of the property should be left natural. • Laydown areas for construction materials must be contained within the clearing footprint of the proposed development. • A 20-meter buffer zone must be retained along the base of the slope to protect the forest margin.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are significantly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Probable	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Irreversible	the impact is irreversible, and no mitigation measures exist	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Medium	the resource is damaged irreparably but is represented elsewhere	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The forested area to the north of the development is excluded from the proposed development and will not be directly affected.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**	
Activity	**Loss of secondary vegetation within endangered ecosystem**	
Description of impact	Loss of habitat on site (within the proposed development footprint), modification of ecological processes, spillover effects into surrounding areas due mostly to secondary impacts such as boundary disturbance and alien invasive species spread.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. • Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan.	

	• Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Southern Afrotemperate Forest, which is not threatened, but is separately listed as protected under the National Forests Act. The forest areas on site fall within a CBA1. These forested areas are completely excluded from the proposed development (both options) and are not directly affected. The only remaining non-forest vegetation on site is considered to be secondary. However, on the basis that no legal soil disturbance has occurred during the preceding 10 years, it is legally considered to be natural vegetation that is within an Endangered ecosystem. It is, however, not representative of this vegetation unit and, being secondary, is not considered to be irreplaceable.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**			
Activity	**Loss of individuals of protected tree species**			
Description of impact	Loss of habitat on site (within the proposed development footprint), disturbance or loss of protected trees.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Retain existing large trees within proposed development. • If any trees need to be removed or pruned then a permit is required, according to the National Forests Act. • Plant additional milkwoods in the development as part of the final landscaping. These can be planted along with other appropriate coastal forest species, but the proportions and composition should reflect habitat that would have occurred naturally at this site.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Long Term	Impact will last between 16 and 30 years

Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The tree species affected is *Sideroxylon inerme*, protected under the National Forests Act. A total of 4 individuals were seen on site, all of them relatively large individuals. The species is widespread but is a key and dominant component of coastal forests in the Garden Route.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**			
Activity	**Loss of habitat for listed threatened animal species**			
Description of impact	Loss of habitat for threatened plant and animal species, spillover effects into surrounding areas due mostly to secondary impacts such as dust deposition and alien invasive species spread.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Protect natural forest vegetation adjacent to the proposed development site. • Rehabilitate and improve the small dam on site, including introducing pond margin vegetation typical of mountain ponds in forested areas. This will provide good habitat for various frogs, including potentially *Afrixalus knysnae*. • Forest habitats on the upland, steeply-sloping part of the site, have high biodiversity and conservation value, and are designated as sensitive. These areas must not be affected by the proposed development. A buffer zone should be retained along the base of the slope to protect the forest margin. For example, steps should be taken to rehabilitate these areas and encourage growth of species, such as *Pterocelastrus tricuspidatus* and *Sideroxylon inerme*, that are mesic and fire-resistant. • An open space management system should be developed to formalize steps for forest protection.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings

Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	• There is habitat on site that is suspected habitat for threatened plant and animal species. This is the forest habitat, which is outside the proposed development footprint and will not be affected by the proposed development. • The species that could potentially occur within this habitat are as follows: o Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas. o Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it. o Tunnelling Dung Beetle (Endangered). The type locality of the species is forest habitats in the Keurboomstrand area. o Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.			
Cumulative impacts	The potential impact affects a negligible proportion of the overall habitat available for these species and will not directly affect any individuals.			

Project Phase	**Construction**			
Activity	**Earthworks and vegetation clearing for construction activities**			
Description of impact	Sedimentation of the pond resulting in poor water quality. Destruction of vegetation around the pond and spring.			
Mitigable	High	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	❖ Pre-construction erect temporary fencing along the entire green corridor and open space to protect the pond as well as the corridor from impact during construction. ❖ Add signage to the fence indicating the area as No-Go. ❖ Site inductions for all staff must ensure contractors and works area aware they may not enter the pond and spring area.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered

Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	While a natural spring and pond are present on the site, they are very small in extent and can be adequately protected from the development by implementing the 10m buffer during the construction and operational phases as indicated in this report. The presence of this feature is not sufficient to increase the sensitivity of the site to Very High, and it has been excluded from the development area. **No stormwater should be put into this pond as the water is of high quality**.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**			
Activity	**Waste Pollution**			
Description of impact	Pollution of buffer zones and natural areas caused by waste generated by the construction process.			
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts		
Potential mitigation	• All construction waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported. • All construction waste materials must be collected and disposed of at a suitable waste facility. • No dumping of construction material within natural areas or buffer zones may take place. • The buffer and "no-go" areas must be monitored on a weekly basis to clean-up any waste that may have been blown from the construction site. • Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has

				rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	Construction activities are likely to generate significant quantities of solid waste that could pollute buffer zones and natural areas. In addition, the high numbers of construction workers present on site will generate a significant amount of human waste, which could pollute the environment.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**			
Activity	**Construction Vehicles**			
Description of impact	Pollution caused by the operation of vehicles and heavy machinery.			
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts		
Potential mitigation	• Construction activities must be confined to clearly demarcated areas so as to prevent unnecessary disturbance the surrounding environment. • No vehicles are to park or operate within "no-go" areas. • Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work on site. • No fuel storage, refuelling, vehicle maintenance or vehicle depots to be allowed near natural spring and dam. • Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, must be located on impervious bases and should have bunds around them (sized to contain 110 % of the tank capacity) to contain any possible spills. These areas must not be located within any natural drainage areas or preferential flow paths and must be located outside of buffer zones. • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	Operation of vehicles could result in spillages or leaks of hydrocarbons (fuel and oil) and could lead to unnecessary disturbance of natural areas.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**			
Activity	**Disturbance / removal of topsoil**			
Description of impact	Disturbance of topsoil, potential soil erosion and the loss of topsoil			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Areas that are disturbed through building activities (such as the excavations for pipelines) should be suitably rehabilitated without delay. Failure to do so will have a knock-on effect on biodiversity in the form of an increase in wind erosion, soil exposure and a loss of the soil micro-organisms that are essential for plant growth. • Organic matter, such as roots and humus/topsoil should be removed from the footprint of structures and stockpiled separately for landscaping purposes. • The stockpiling of topsoil for use in rehabilitation is required. • Stockpiles must not exceed 1.5m in height, must be covered with shade cloth or similar, to prevent erosion and any invasive alien species that begin to grow within it must be removed. • Soil disturbance during the removal of alien invasive plants must be minimised as much as possible. • The site must be stabilised where necessary using available materials, where possible. It is recommended that exposed soils are covered with wood chips, and tree branches used to create berms. Any cut alien vegetation on site can be utilised for this purpose if it is without seed.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	

Comment on significance	Clearing areas of the site in preparation for construction will expose bare soil which may lead to the potential loss of topsoil through runoff and incorrect storage. This is not envisaged to be a significant impact with mitigation measures in place. Topsoil can be reused on site for rehabilitation purposes.
Cumulative impacts	Without mitigation this impact could result in potential erosion downhill of the site caused by stormwater flow.

Project Phase	**Construction**			
Activity	**Pollution of groundwater**			
Description of impact	Spillages of diesel, petrol, oil, paints, clears and other harmful chemicals. These substances may potentially percolate into the groundwater and enter the surrounding environment			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Install the sewage and and wastewater infrastructure according to applicable national SANS standards (SANS1200 Part K:Civil Engineering Standard Specifications, SANS10400:The National Building Regulations and Building Standards Act, SANS 1913:Planning, Design, and Construction of Sanitation Systems), DWS Guidelines and adhere to municipal regulations & by-laws. • Site to be monitored regularly for contaminant spillages and if detected, contact spillage remediation companies. • Separate, tightly cover and monitor toxic substances to prevent spills and possible site contamination. • Cover stockpiles of building materials like cement, sand and other powders. • Regularly inspect stockpiles for spillages and store away from waterways or drainage areas. • Collect any wastewater generated from site activities during construction insettlement tanks then screen, discharge the clean water,and dispose of remaining sludge according to environmental regulations. • Install at least three monitoring piezometers into the water table, one upstream and two downstream of site.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the significance becomes negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	Construction			
Activity	Noise pollution			
Description of impact	Noise caused by machinery and staff			
Mitigable	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	• Construction activities must only take place during normal working times between 07:00-17:00 on weekdays. • Machinery may be fitted with silences to dampen noise. • Staff must be reminded that they are working within a residential area and noise levels must be kept low.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Not relevant		Not relevant	
Significance	Minor - negative		Negligible - negative	
Comment on significance	Some extent of noise pollution during construction is expected; however, with mitigation the impact will be reduced.			
Cumulative impacts	No cumulative impacts exist.			

Project Phase	Construction	
Activity	Visual impact	
Description of impact	Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource. During construction, earthworks would some visual scarring of the landscape.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• The Architectural Design Guidelines proposed for the development must be adopted to mitigate the colours, heights, disturbance areas, maximum footprint, vegetation, etc, which will all contribute to a smaller visual impact on the landscape. • The necessary measures be implemented during the construction phase to protect the natural vegetation, to control the noise, dust and visual intrusion. • Appoint a Landscape consultant to recommend and implement the introduction of an indigenous landscape plan to protect the existing indigenous vegetation	

	and to prepare a landscape plan for implementation in the private and common areas. • Implement external lighting restrictions and guidelines. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of the development layout option before mitigation are medium and low after mitigation.			

Project Phase	**Construction**			
Activity	**Employment**			
Description of impact	Empowerment of the local community members living in the area relating to temporary employment opportunities			
Mitigable	Medium	Mitigation only exists to ensure that the positive impact is followed through.		
Potential mitigation	• Use existing social structures and communication channels to ensure social representation. • Use local labour and source local materials as far as possible.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered

Probability	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Not relevant		Not relevant	
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Negligible - negative**		**Negligible - positive**	
Comment on significance	Due to the proposed development being on a small-scale, there is a low difference in impacts between without mitigation and with mitigation. However, as the impact would be positive for the local community to be employed during construction, mitigation is recommended to ensure this occurs.			
Cumulative impacts	Minor upliftment for the local community.			

Impacts foreseen during the Operational Phase for the Preferred Alternative (60 Residential Stands):

Project Phase	Operational			
Activity	**Visual / Sense of place**			
Description of impact	The development would result in a small change in visual character from a landscape covered in vegetation and without buildings to a low-density well landscaped built landscape.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Municipal by-laws need to be adhered to. • Re-vegetation and Landscaping of open space areas with suitable indigenous vegetation. • Systematic removal and follow-up operations of invasive alien plants. • Adhere to Architectural Design Guidelines and Landscape Plan. • Create a 10m wide buffer between the development and the Keurboom Road. This strip of land will be densely vegetated to obscure the development. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low. The well-positioned and designed development infrastructure allows for it to blend in very well with its surroundings and create minimal contrast in the landscape. The alternative 2 development layout option provides a slight advantage over the preferred and altenative 1 development layout options due to its lower density and more open space for landscaping to screen views from the road. But with the implementation of appropriate mitigation measures the preferred and alternative 1 development layouts can also be screened effectively from the road.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of the development layout option before mitigation are medium and low after mitigation.			

Project Phase	Operational			
Activity	**Inputs of stormwater from roofs and roads into the pond**			
Description of impact	Reduced physico-chemical water quality including the introduction of litter.			
Mitigable	High	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	❖ No stormwater infrastructure to be directed towards the pond. ❖ Routine maintenance inspections to clear windblow / discarded litter from the pond and spring. ❖ Stormwater should be diverted to detention ponds on the site which are indicated on various SDP layouts and are consistent with the SUDS approach to stormwater management.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	While a natural spring and pond are present on the site, they are very small in extent and can be adequately protected from the development by implementing the 10m buffer during the construction and operational phases as indicated in this report. The presence of this feature is not sufficient to increase the sensitivity of the site to Very High, and it has been excluded from the development area. **No stormwater should be put into this pond as the water is of high quality**.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	Operational	
Activity	**Landscaping, gardening and maintenance extending into the pond and buffer area**	
Description of impact	Transformation of indigenous vegetation through planting, removal and / or dumping.	
Mitigable	High	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	❖ Landscaping and gardening staff must not undertake any clearing of vegetation inside of the 10m buffer.	

	❖ A bird hide in the buffer to spot wildlife would be acceptable, but no additional recreational activities. The point is to create a quiet habitat with suitable vegetation cover for continued use by animals, birds etc. ❖ Indigenous plants found in adjacent thickets may be planted around the pond. Only indigenous plants found in the immediate surrounding area may be planted. ❖ A list of recommended wetland plants for that can be used to improve vegetation cover of muddy areas and marginal areas of the pond is provided in this report. ❖ Do not place any fish into the pond as only alien invasive fish to the area would survive and could be transferred to other waterbodies on the feet of animals or birds. ❖ The only plants that should be removed from the area are listed alien invasive species.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The purpose of the pond and spring is to provide a sustained water source for wildlife in the green corridor.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Operation**			
Activity	**Stormwater Management**			
Description of impact	Accelerated erosion / pollution into sub-surface water.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	❖ The storm water drainage system must be adhered to, and the system should lead runoff water away from sensitive areas to prevent soil erosion. ❖ Use rainwater collection tanks to serve as a retention vessel in downpours. ❖ Driveways can be constructed from grass blocks to allow for effective retarding of surface flow and facilitate percolation.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year

Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor – negative**		**Negligible - negative**	
Comment on significance	The development portion of the site is flat with no gradient along its southern boundary and has no defined drainage discharge points. The existing flat and permeable conditions allow for natural infiltration.			
Cumulative impacts	Without mitigation this impact could result in potential erosion on the site caused by stormwater flow.			

Project Phase	**Operation**			
Activity	**Stormwater Runoff**			
Description of impact	Alteration of surface flows caused by increased stormwater runoff.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	❖ Stormwater from erven must be attenuated on site as far as possible. ❖ Stormwater from access roads must be attenuated onsite (prior to any discharge into retention ponds). ❖ The runoff velocity of stormwater must be reduced with energy dissipaters prior to discharge into retention ponds. ❖ Stormwater management should encourage infiltration of water into the soil profile and other on site attenuation (i.e. using grass pavers etc.). ❖ The natural spring and small dam must be protected by a 10 m buffer throughout the operational phase. ❖ No stormwater should be put into this dam as the water is of high quality.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or

				processes are somewhat altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The development will result in an increase in the area of paved/hardened surfaces. This will generate increased volumes of stormwater runoff. Hardened surface and establishment of foundations for houses may increase sub-surface flows towards the natural spring and small dam. The dam water is of high quality, and pollutants from stormwater runoff entering the dam should be minimised. Adequate management of stormwater should therefore effectively minimise the intensity of this impact.			
Cumulative impacts	Without mitigation this impact could result in the water quality of the dam being compromised.			

Project Phase	**Operational**	
Activity	**Groundwater Contamination**	
Description of impact	• Leakage from underground sewage holding tank and associated pipework. • Leaks and leachate from the wastewater treatment plant. • Improperly treated effluent used for irrigation. • WWTP failure. • All of the aforementioned impacts could percolate into the groundwater.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• Ensure the WWTP comply with SANS1200 Part K: Civil Engineering Standard Specifications, NWA, Water Quality Guidelines (DWAF), SANS1913: Planning, Design, and Construction of Sanitation Systems, Wastewater Treatment Plant Design and Operational Guidelines (DWAF, 2008). • All areas where potential leachate may occur are to be paved and cemented. • Regularly service the WWTP and inspect the integrity and efficacy of the WWTP. • Ensure emergency procedures are in place to rapidly repair WWTP should failure occur. • Set up a comprehensive monitoring system to monitor the effluent quality. • Incorporate monitoring network as implemented during the construction phase into operational phase monitoring • Install shallow aquifer piezometers in close proximity to the WWTP to be monitored regularly for any leakages. • Should a leak be detected or the monitoring piezometers be contaminated, a baseline Phase 1 Contamination Assessment should be undertaken and the site remediated in consultation with a contamination remediation consultant and the Authorities.	
Assessment	**Without mitigation**	**With mitigation**

Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible and the significance, negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operational**			
Activity	**Groundwater Recharge and Flooding**			
Description of impact	Infrastructure limiting groundwater recharge and/or flooding risk.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Permeable pavement and green infrastructure (limit coverage of surface area by infrastructure as far as possible. • Rainwater Harvesting • Sustainable Urban Drainage Systems (SUDS) • Retention and Detention Basins • Design stormwater drainage systems to handle increased rainfall events by incorporating overflow pathways, sump pumps, and flow control structures. • Installation of piezometers to track groundwater level. • Inspect and maintain drainage systems, stormwater infrastructure, and mitigation features. • The site levels must be designed such that the floor levels will all be set higher than the level of the Road 394, the existing southern flood containment level.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very Limited	Extending only as far as the development site area
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible, and the significance remains as negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operation**			
Activity	**Impacts on ecological drivers**			
Description of impact	Effects of the development and activity on the underlying systems and processes that support ecosystems.			
Mitigable	Medium	Mitigation will reduce the significance of impacts		
Potential mitigation	❖ Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. ❖ Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. ❖ Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan. ❖ Restrict access to forested areas once the development is complete. An ecological management plan must be compiled and committed to by the future HOA. This should contain measures for protecting the forest from undue traffic and impacts.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Long Term	Impact will last more than 15 years	Long Term	Impact will last more than 15 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Possible	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Irreversible	the impact is irreversible, and no mitigation measures exist	Irreversible	the impact is irreversible, and no mitigation measures exist
Resource irreplaceability	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The most important ecological drivers on site that may be affected by the proposed development are related to maintenance of the forest ecosystem. The forest margins are important for maintaining forest integrity, and the forest canopy needs to be maintained for the health of the forest ecosystem. No development is proposed within the forest, and the secondary forest on the southern margin is also excluded from development.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Operation			
Activity	**Impacts on ecological corridors**			
Description of impact	Cut-off of natural dispersal and foraging movement by animals, impacts on suitable link or important corridor, fragmentation of ecological infrastructure			
Mitigable	Low	Mitigation will slightly reduce the significance of impacts		
Potential mitigation	❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Use clearVu fencing to separate the corridor from the development area. The spring must be incorporated into the corridor. The fence is to keep domestic animals (cats and dogs, etc) out of the wildlife corridor. ❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Provide open-space corridors through the development.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Goukamma /Mesic Dune Thicket (Cowling et al. 2023), which is not threatened, but is separately listed as protected under the National Forests Act. These forested areas are completely excluded from the proposed development (all options) and are not directly affected. The proposed development layout makes provision for a 20m buffer along the forest margin and also incorporated portions of the secondary vegetation area to form part of the open space system within the development, which will link up with the forest area.			
Cumulative impacts	The impact may result in cumulative effects through the landscape.			

Project Phase	Operation	
Activity	**Eradication of Alien Vegetation**	
Description of impact	Impacts on biodiversity / natural habitats / increased fire risk	
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts

Potential mitigation	❖ All invasive alien plants should be completely cleared from the property, and where a tree or bush cover is desired, replaced with suitable indigenous species. ❖ Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species. ❖ A suitable planting list of trees and shrubs must be compiled and incorporated into the Landscape Plan. ❖ An Alien Control Plan should be compiled to systematically remove and control alien plant species. ❖ Follow-up operations must be done. ❖ Minimise disturbance to the natural vegetation using low impact manual labour techniques. ❖ Reduce fire hazard on site			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Medium	Natural and/or social functions and/or processes are notably altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Moderate - negative**		**Moderate - positive**	
Comment on significance	An ongoing alien invasive management programme should take place on site. This will protect riparian habitats downslope from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.			
Cumulative impacts	Without mitigation the development would not be meeting design guidelines enforced by the municipality. Specifically design guidelines for the local area.			

Project Phase	**Operation**	
Activity	**Formal gardens**	
Description of impact	Habitat loss for terrestrial wildlife, fragmentation of ecological corridor	
Mitigable	Low	Mitigation will slightly reduce the significance of impacts
Potential mitigation	❖ Areas that are not required for development purposes should remain natural with indigenous vegetation. ❖ All alien invasive plants must be removed from the site on an on-going basis.	

	❖ Investing landowners within the proposed development should be encouraged to avoid planting exotic plants in favour of locally indigenous plants. ❖ Landscaping must be done with locally occurring indigenous vegetation.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Brief	Impact will not last longer than 1 year	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Highly unlikely / None	Expected never to happen	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Not relevant	
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Not relevant	
Significance	**Negligible - negative**		**Minor - positive**	
Comment on significance	With mitigation the impact is likely to have more beneficial impact to retaining natural biodiversity, than without mitigation.			
Cumulative impacts	Without mitigation this impact could result in the spread of alien invasive plants and the loss of indigenous vegetation.			

Project Phase	**Operational**	
Activity	**Package Plant Maintenance**	
Description of impact	Impacts associated with the maintenance of the sewage package plant and potential downtime or failures.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	❖ Assign an Estate maintenance manager responsible for daily inspections of the plant. ❖ Ensure the maintenance manager is trained specifically in plant operations and maintenance procedures. ❖ Install screening systems to remove non-biodegradable materials and prevent clogging or system damage. ❖ Dispose of screened non-biodegradable waste via incineration at a recognized waste disposal site. ❖ Install an emergency alarm system that activates if effluent levels rise in the emergency storage component. ❖ Design the plant with a 48-hour emergency effluent storage period to accommodate unexpected downtime or failures. ❖ Have a contract or arrangement with effluent removal tanker services for extended maintenance events. ❖ Conduct monthly testing of effluent to ensure compliance with quality standards.	

	❖ Power the plant using a Solar/Eskom battery system with a backup generator to mitigate Eskom power outages.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	**Moderate - negative**		**Negligible - negative**	
Comment on significance	The implementation of the proposed mitigation measures will significantly reduce the likelihood and severity of operational failures, environmental contamination, and service disruptions associated with the sewage package plant.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			

Impacts foreseen during the Decommissioning Phase (60 Residential Stands):

Project Phase	Decommissioning			
Activity	Package Plant			
Description of impact	Decommissioning of the package plant resulting in potential pollution of surface and groundwater sources, soil contamination, and health and safety risks.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	❖ Empty and clean tanks before dismantling. ❖ Remove all sludge and residue with certified disposal contractors. ❖ Conduct soil testing before and after decommissioning. ❖ Provide PPE and training for workers. ❖ Follow safe dismantling procedures. ❖ Prepare and follow a Health and Safety Plan. ❖ Ensure seamless transfer of services to municipal sewer connections to prevent public health issues.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 2 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	Minor - negative		Negligible - negative	
Comment on significance	The decommissioning requirements will only comprise the emptying and removal of the above ground containerized bio reactor plant. Sludge is recycled within the plant system and there will be no sludge accumulation requiring removal on decommissioning.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			

Impacts foreseen during the Construction Phase for Alternative 1 (73 Residential stands):

Project Phase	Construction			
Activity	Loss of habitat within CBAs			
Description of impact	Encroachment into and loss of CBA1 and CBA2 areas due construction.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Some form of offset or conservation servitude can be considered.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Medium	the resource is damaged irreparably but is represented elsewhere	Medium	the resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	The site occurs entirely within CBA1 and CBA2 areas. The secondary vegetation ("pastures") in the southern part of the site does not have the properties consistent with protecting biodiversity patterns, but remaining areas are ecologically functional. The vegetation on site (within the proposed development footprint) is in relatively poor condition, and consists either of lawns or secondary vegetation with a species composition that is not representative of the natural habitat			
Cumulative impacts	The impact would result in insignificant cumulative effects as the significance of the impacts is low. The CBAs are designated for the protection of listed Garden Route shale fynbos, but this does not occur within these designated CBA1 areas, only forest.			

Project Phase	Construction	
Activity	**Clearance of vegetation for the construction of the dwelling and associated infrastructure**	
Description of impact	Loss of sensitive vegetation, habitat loss for terrestrial wildlife, mortalities to various species unable to evade the disturbance, loss of viable propagules, fragmentation of ecological infrastructure	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Wherever there are sections of undisturbed natural habitat within the development area, they should not be impacted by the building activities and	

	should be conserved as small islands of natural resources for the small wildlife of the area. • the removal and translocation of protected plants if found should be undertaken prior to construction clearing activities. A permit is required prior to removal. • Protected plants must either be moved to a safer, no-go area on the property or taken to a nursery for temporary storage until rehabilitation takes place. • Access by heavy machinery should be limited on the site. • Only areas necessary for the development footprint should be cleared and the remainder of the property should be left natural. • Laydown areas for construction materials must be contained within the clearing footprint of the proposed development. • A 10-meter buffer zone must be retained along the base of the slope to protect the forest margin.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are significantly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The forested area to the north of the development is excluded from the proposed development and will not be directly affected.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**	
Activity	**Loss of secondary vegetation within endangered ecosystem**	
Description of impact	Loss of habitat on site (within the proposed development footprint), modification of ecological processes, spillover effects into surrounding areas due mostly to secondary impacts such as boundary disturbance and alien invasive species spread.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. • Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan. • Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species.	

Assessment	Without mitigation		With mitigation	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Southern Afrotemperate Forest, which is not threatened, but is separately listed as protected under the National Forests Act. The forest areas on site fall within a CBA1. These forested areas are completely excluded from the proposed development (both options) and are not directly affected. The only remaining non-forest vegetation on site is considered to be secondary. However, on the basis that no legal soil disturbance has occurred during the preceding 10 years, it is legally considered to be natural vegetation that is within an Endangered ecosystem. It is, however, not representative of this vegetation unit and, being secondary, is not considered to be irreplaceable.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Construction			
Activity	**Loss of individuals of protected tree species**			
Description of impact	Loss of habitat on site (within the proposed development footprint), disturbance or loss of protected trees.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Retain existing large trees within proposed development. • If any trees need to be removed or pruned then a permit is required, according to the National Forests Act. • Plant additional milkwoods in the development as part of the final landscaping. These can be planted along with other appropriate coastal forest species, but the proportions and composition should reflect habitat that would have occurred naturally at this site.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Long Term	Impact will last between 16 and 30 years
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings

Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The tree species affected is *Sideroxylon inerme*, protected under the National Forests Act. A total of 4 individuals were seen on site, all of them relatively large individuals. The species is widespread but is a key and dominant component of coastal forests in the Garden Route.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**			
Activity	**Loss of habitat for listed threatened animal species**			
Description of impact	Loss of habitat for threatened plant and animal species, spillover effects into surrounding areas due mostly to secondary impacts such as dust deposition and alien invasive species spread.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Protect natural forest vegetation adjacent to the proposed development site. • Rehabilitate and improve the small dam on site, including introducing pond margin vegetation typical of mountain ponds in forested areas. This will provide good habitat for various frogs, including potentially *Afrixalus knysnae*. • Forest habitats on the upland, steeply-sloping part of the site, have high biodiversity and conservation value, and are designated as sensitive. These areas must not be affected by the proposed development. A buffer zone should be retained along the base of the slope to protect the forest margin. For example, steps should be taken to rehabilitate these areas and encourage growth of species, such as *Pterocelastrus tricuspidatus* and *Sideroxylon inerme*, that are mesic and fire-resistant. • An open space management system should be developed to formalize steps for forest protection.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/or social functions and/or processes are somewhat altered

Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	• There is habitat on site that is suspected habitat for threatened plant and animal species. This is the forest habitat, which is outside the proposed development footprint and will not be affected by the proposed development. • The species that could potentially occur within this habitat are as follows: o Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas. o Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it. o Tunnelling Dung Beetle (Endangered). The type locality of the species is forest habitats in the Keurboomstrand area. o Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site.			
Cumulative impacts	The potential impact affects a negligible proportion of the overall habitat available for these species and will not directly affect any individuals.			

Project Phase	**Construction**			
Activity	**Earthworks and vegetation clearing for construction activities**			
Description of impact	Sedimentation of the pond resulting in poor water quality. Destruction of vegetation around the pond and spring.			
Mitigable	High	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Pre-construction erect temporary fencing along the entire green corridor and open space to protect the pond as well as the corridor from impact during construction. • Add signage to the fence indicating the area as No-Go. • Site inductions for all staff must ensure contractors and works area aware they may not enter the pond and spring area.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to

				result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	While a natural spring and pond are present on the site, they are very small in extent and can be adequately protected from the development by implementing the 10m buffer during the construction and operational phases as indicated in this report. The presence of this feature is not sufficient to increase the sensitivity of the site to Very High, and it has been excluded from the development area. **No stormwater should be put into this pond as the water is of high quality**.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**			
Activity	**Waste Pollution**			
Description of impact	Pollution of buffer zones and natural areas caused by waste generated by the construction process.			
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts		
Potential mitigation	• All construction waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported. • All construction waste materials must be collected and disposed of at a suitable waste facility. • No dumping of construction material within natural areas or buffer zones may take place. • The buffer and "no-go" areas must be monitored on a weekly basis to clean-up any waste that may have been blown from the construction site. • Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	Construction activities are likely to generate significant quantities of solid waste that could pollute buffer zones and natural areas. In addition, the high numbers of construction workers present on site will generate a significant amount of human waste, which could pollute the environment.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**			
Activity	**Construction Vehicles**			
Description of impact	Pollution caused by the operation of vehicles and heavy machinery.			
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts		
Potential mitigation	• Construction activities must be confined to clearly demarcated areas so as to prevent unnecessary disturbance the surrounding environment. • No vehicles are to park or operate within "no-go" areas. • Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work on site. • No fuel storage, refuelling, vehicle maintenance or vehicle depots to be allowed near natural spring and dam. • Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, must be located on impervious bases and should have bunds around them (sized to contain 110 % of the tank capacity) to contain any possible spills. These areas must not be located within any natural drainage areas or preferential flow paths and must be located outside of buffer zones. • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce

Significance	**Negligible - negative**	**Negligible - negative**
Comment on significance	Operation of vehicles could result in spillages or leaks of hydrocarbons (fuel and oil) and could lead to unnecessary disturbance of natural areas.	
Cumulative impacts	The impact would result in insignificant cumulative effects.	

Project Phase	**Construction**			
Activity	**Disturbance / removal of topsoil**			
Description of impact	Disturbance of topsoil, potential soil erosion and the loss of topsoil			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Areas that are disturbed through building activities (such as the excavations for pipelines) should be suitably rehabilitated without delay. Failure to do so will have a knock-on effect on biodiversity in the form of an increase in wind erosion, soil exposure and a loss of the soil micro-organisms that are essential for plant growth. • Organic matter, such as roots and humus/topsoil should be removed from the footprint of structures and stockpiled separately for landscaping purposes. • The stockpiling of topsoil for use in rehabilitation is required. • Stockpiles must not exceed 1.5m in height, must be covered with shade cloth or similar, to prevent erosion and any invasive alien species that begin to grow within it must be removed. • Soil disturbance during the removal of alien invasive plants must be minimised as much as possible. • The site must be stabilised where necessary using available materials, where possible. It is recommended that exposed soils are covered with wood chips, and tree branches used to create berms. Any cut alien vegetation on site can be utilised for this purpose if it is without seed.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	Clearing areas of the site in preparation for construction will expose bare soil which may lead to the potential loss of topsoil through runoff and incorrect storage. This is not envisaged to be a significant impact with mitigation measures in place. Topsoil can be reused on site for rehabilitation purposes.			
Cumulative impacts	Without mitigation this impact could result in potential erosion downhill of the site caused by stormwater flow.			

Project Phase	Construction			
Activity	Pollution of groundwater			
Description of impact	Spillages of diesel, petrol, oil, paints, clears and other harmful chemicals. These substances may potentially percolate into the groundwater and enter the surrounding environment			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Install the sewage and and wastewater infrastructure according to applicable national SANS standards (SANS1200 Part K:Civil Engineering Standard Specifications, SANS10400:The National Building Regulations and Building Standards Act, SANS 1913:Planning, Design, and Construction of Sanitation Systems), DWS Guidelines and adhere to municipal regulations & by-laws. • Site to be monitored regularly for contaminant spillages and if detected, contact spillage remediation companies. • Separate, tightly cover and monitor toxic substances to prevent spills and possible site contamination. • Cover stockpiles of building materials like cement, sand and other powders. • Regularly inspect stockpiles for spillages and store away from waterways or drainage areas. • Collect any wastewater generated from site activities during construction insettlement tanks then screen, discharge the clean water,and dispose of remaining sludge according to environmental regulations. • Install at least three monitoring piezometers into the water table, one upstream and two downstream of site.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Negligible - negative	
Comment on significance	After the implementation of mitigation measures, the significance becomes negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	Construction	
Activity	Noise pollution	
Description of impact	Noise caused by machinery and staff	
Mitigable	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts

Potential mitigation	• Construction activities must only take place during normal working times between 07:00-17:00 on weekdays. • Machinery may be fitted with silences to dampen noise. • Staff must be reminded that they are working within a residential area and noise levels must be kept low.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	Some extent of noise pollution during construction is expected; however, with mitigation the impact will be reduced.			
Cumulative impacts	No cumulative impacts exist.			

Project Phase	**Construction**			
Activity	**Visual impact**			
Description of impact	Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource. During construction, earthworks would some visual scarring of the landscape.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• The Architectural Design Guidelines proposed for the development must be adopted to mitigate the colours, heights, disturbance areas, maximum footprint, vegetation, etc, which will all contribute to a smaller visual impact on the landscape. • The necessary measures be implemented during the construction phase to protect the natural vegetation, to control the noise, dust and visual intrusion. • Appoint a Landscape consultant to recommend and implement the introduction of an indigenous landscape plan to protect the existing indigenous vegetation and to prepare a landscape plan for implementation in the private and common areas. • Implement external lighting restrictions and guidelines. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	

Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of this development layout options before mitigation are medium and low after mitigation.			

Project Phase	**Construction**			
Activity	**Employment**			
Description of impact	Empowerment of the local community members living in the area relating to temporary employment opportunities			
Mitigable	Medium	Mitigation only exists to ensure that the positive impact is followed through.		
Potential mitigation	• Use existing social structures and communication channels to ensure social representation. • Use local labour and source local materials as far as possible.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	Almost certain / Highly probable	It is most likely that the impact will occur

Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Not relevant		Not relevant	
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Negligible - negative**		**Negligible - positive**	
Comment on significance	Due to the proposed development being on a small-scale, there is a low difference in impacts between without mitigation and with mitigation. However, as the impact would be positive for the local community to be employed during construction, mitigation is recommended to ensure this occurs.			
Cumulative impacts	Minor upliftment for the local community.			

Impacts foreseen during the Operational Phase for Alternative 1 (73 Residential Stands):

Project Phase	Operational			
Activity	**Visual / Sense of place**			
Description of impact	The development would result in a small change in visual character from a landscape covered in vegetation and without buildings to a low-density well landscaped built landscape.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Municipal by-laws need to be adhered to. • Re-vegetation and Landscaping of open space areas with suitable indigenous vegetation. • Systematic removal and follow-up operations of invasive alien plants. • Adhere to Architectural Design Guidelines and Landscape Plan. • Create a 10m wide buffer between the development and the Keurboom Road. This strip of land will be densely vegetated to obscure the development. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low. The well-positioned and designed development infrastructure allows for it to blend in very well with its surroundings and create minimal contrast in the landscape. The alternative 2 development layout option provides a slight advantage over the preferred and altenative 1 development layout options due to its lower density and more open space for landscaping to screen views from the road. But with the implementation of appropriate mitigation measures the preferred and alternative 1 development layouts can also be screened effectively from the road.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of the development layout option before mitigation are medium and low after mitigation.			

Project Phase	Operational			
Activity	**Inputs of stormwater from roofs and roads into the pond**			
Description of impact	Reduced physico-chemical water quality including the introduction of litter.			
Mitigable	High	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• No stormwater infrastructure to be directed towards the pond. • Routine maintenance inspections to clear windblow / discarded litter from the pond and spring. • Stormwater should be diverted to detention ponds on the site which are indicated on various SDP layouts and are consistent with the SUDS approach to stormwater management.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	While a natural spring and pond are present on the site, they are very small in extent and can be adequately protected from the development by implementing the 10m buffer during the construction and operational phases as indicated in this report. The presence of this feature is not sufficient to increase the sensitivity of the site to Very High, and it has been excluded from the development area. **No stormwater should be put into this pond as the water is of high quality**.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	Operational	
Activity	**Landscaping, gardening and maintenance extending into the pond and buffer area**	
Description of impact	Transformation of indigenous vegetation through planting, removal and / or dumping.	
Mitigable	High	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Landscaping and gardening staff must not undertake any clearing of vegetation inside of the 10m buffer.	

	• A bird hide in the buffer to spot wildlife would be acceptable, but no additional recreational activities. The point is to create a quiet habitat with suitable vegetation cover for continued use by animals, birds etc. • Indigenous plants found in adjacent thickets may be planted around the pond. Only indigenous plants found in the immediate surrounding area may be planted. • A list of recommended wetland plants for that can be used to improve vegetation cover of muddy areas and marginal areas of the pond is provided in this report. • Do not place any fish into the pond as only alien invasive fish to the area would survive and could be transferred to other waterbodies on the feet of animals or birds. • The only plants that should be removed from the area are listed alien invasive species.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 2 years.	Brief	Impact will not last longer than 1 year.
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	The impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The purpose of the pond and spring is to provide a sustained water source for wildlife in the green corridor.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Operation**			
Activity	**Stormwater Management**			
Description of impact	Accelerated erosion / pollution into sub-surface water.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• The storm water drainage system must be adhered to, and the system should lead runoff water away from sensitive areas to prevent soil erosion. • Use rainwater collection tanks to serve as a retention vessel in downpours. • Driveways can be constructed from grass blocks to allow for effective retarding of surface flow and facilitate percolation.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year

Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The development portion of the site is flat with no gradient along its southern boundary and has no defined drainage discharge points. The existing flat and permeable conditions allow for natural infiltration.			
Cumulative impacts	Without mitigation this impact could result in potential erosion on the site caused by stormwater flow.			

Project Phase	**Operation**			
Activity	**Stormwater Runoff**			
Description of impact	Alteration of surface flows caused by increased stormwater runoff.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Stormwater from erven must be attenuated on site as far as possible. • Stormwater from access roads must be attenuated onsite (prior to any discharge into retention ponds). • The runoff velocity of stormwater must be reduced with energy dissipaters prior to discharge into retention ponds. • Stormwater management should encourage infiltration of water into the soil profile and other on site attenuation (i.e. using grass pavers etc.). • The natural spring and small dam must be protected by a 10 m buffer throughout the operational phase. • No stormwater should be put into this dam as the water is of high quality.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or

				processes are somewhat altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The development will result in an increase in the area of paved/hardened surfaces. This will generate increased volumes of stormwater runoff. Hardened surface and establishment of foundations for houses may increase sub-surface flows towards the natural spring and small dam. The dam water is of high quality, and pollutants from stormwater runoff entering the dam should be minimised. Adequate management of stormwater should therefore effectively minimise the intensity of this impact.			
Cumulative impacts	Without mitigation this impact could result in the water quality of the dam being compromised.			

Project Phase	**Operational**	
Activity	**Groundwater Contamination**	
Description of impact	• Leakage from underground sewage holding tank and associated pipework. • Leaks and leachate from the wastewater treatment plant. • Improperly treated effluent used for irrigation. • WWTP failure. • All of the aforementioned impacts could percolate into the groundwater.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• Ensure the WWTP comply with SANS1200 Part K: Civil Engineering Standard Specifications, NWA, Water Quality Guidelines (DWAF), SANS1913: Planning, Design, and Construction of Sanitation Systems, Wastewater Treatment Plant Design and Operational Guidelines (DWAF, 2008). • All areas where potential leachate may occur are to be paved and cemented. • Regularly service the WWTP and inspect the integrity and efficacy of the WWTP. • Ensure emergency procedures are in place to rapidly repair WWTP should failure occur. • Set up a comprehensive monitoring system to monitor the effluent quality. • Incorporate monitoring network as implemented during the construction phase into operational phase monitoring • Install shallow aquifer piezometers in close proximity to the WWTP to be monitored regularly for any leakages. • Should a leak be detected or the monitoring piezometers be contaminated, a baseline Phase 1 Contamination Assessment should be undertaken and the site remediated in consultation with a contamination remediation consultant and the Authorities.	
Assessment	**Without mitigation**	**With mitigation**

Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible and the significance, negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operational**			
Activity	**Groundwater Recharge and Flooding**			
Description of impact	Infrastructure limiting groundwater recharge and/or flooding risk.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Permeable pavement and green infrastructure (limit coverage of surface area by infrastructure as far as possible. • Rainwater Harvesting • Sustainable Urban Drainage Systems (SUDS) • Retention and Detention Basins • Design stormwater drainage systems to handle increased rainfall events by incorporating overflow pathways, sump pumps, and flow control structures. • Installation of piezometers to track groundwater level. • Inspect and maintain drainage systems, stormwater infrastructure, and mitigation features. • The site levels must be designed such that the floor levels will all be set higher than the level of the Road 394, the existing southern flood containment level.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very Limited	Extending only as far as the development site area
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible, and the significance remains as negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operation**			
Activity	**Impacts on ecological drivers**			
Description of impact	Effects of the development and activity on the underlying systems and processes that support ecosystems.			
Mitigable	Medium	Mitigation will reduce the significance of impacts		
Potential mitigation	❖ Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. ❖ Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. ❖ Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan. ❖ Restrict access to forested areas once the development is complete. An ecological management plan must be compiled and committed to by the future HOA. This should contain measures for protecting the forest from undue traffic and impacts.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Long Term	Impact will last more than 15 years	Long Term	Impact will last more than 15 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Possible	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Irreversible	the impact is irreversible, and no mitigation measures exist	Irreversible	the impact is irreversible, and no mitigation measures exist
Resource irreplaceability	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The most important ecological drivers on site that may be affected by the proposed development are related to maintenance of the forest ecosystem. The forest margins are important for maintaining forest integrity, and the forest canopy needs to be maintained for the health of the forest ecosystem. No development is proposed within the forest, and the secondary forest on the southern margin is also excluded from development.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Operation			
Activity	**Impacts on ecological corridors**			
Description of impact	Cut-off of natural dispersal and foraging movement by animals, impacts on suitable link or important corridor, fragmentation of ecological infrastructure			
Mitigable	Low	Mitigation will slightly reduce the significance of impacts		
Potential mitigation	❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Use clearVu fencing to separate the corridor from the development area. The spring must be incorporated into the corridor. The fence is to keep domestic animals (cats and dogs, etc) out of the wildlife corridor. ❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Provide open-space corridors through the development.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Goukamma /Mesic Dune Thicket (Cowling et al. 2023), which is not threatened, but is separately listed as protected under the National Forests Act. These forested areas are completely excluded from the proposed development (all options) and are not directly affected. The proposed development layout makes provision for a 20m buffer along the forest margin and also incorporated portions of the secondary vegetation area to form part of the open space system within the development, which will link up with the forest area.			
Cumulative impacts	The impact may result in cumulative effects through the landscape.			

Project Phase	Operation	
Activity	**Eradication of Alien Vegetation**	
Description of impact	Impacts on biodiversity / natural habitats / increased fire risk	
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts
Potential mitigation	• All invasive alien plants should be completely cleared from the property, and where a tree or bush cover is desired, replaced with suitable indigenous species.	

	• Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species. • A suitable planting list of trees and shrubs must be compiled and incorporated into the Landscape Plan. • An Alien Control Plan should be compiled to systematically remove and control alien plant species. • Follow-up operations must be done. • Minimise disturbance to the natural vegetation using low impact manual labour techniques. • Reduce fire hazard on site			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Medium	Natural and/or social functions and/or processes are notably altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Moderate - negative**		**Moderate - positive**	
Comment on significance	An ongoing alien invasive management programme should take place on site. This will protect riparian habitats downslope from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.			
Cumulative impacts	Without mitigation the development would not be meeting design guidelines enforced by the municipality. Specifically design guidelines for the local area.			

Project Phase	**Operation**	
Activity	**Formal gardens**	
Description of impact	Habitat loss for terrestrial wildlife, fragmentation of ecological corridor	
Mitigable	Low	Mitigation will slightly reduce the significance of impacts
Potential mitigation	• Areas that are not required for development purposes should remain natural with indigenous vegetation. • All alien invasive plants must be removed from the site on an on-going basis. • Investing landowners within the proposed development should be encouraged to avoid planting exotic plants in favour of locally indigenous plants. • Landscaping must be done with locally occurring indigenous vegetation.	

Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Brief	Impact will not last longer than 1 year	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Highly unlikely / None	Expected never to happen	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Not relevant	
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Not relevant	
Significance	**Negligible - negative**		**Minor - positive**	
Comment on significance	With mitigation the impact is likely to have more beneficial impact to retaining natural biodiversity, than without mitigation.			
Cumulative impacts	Without mitigation this impact could result in the spread of alien invasive plants and the loss of indigenous vegetation.			

Project Phase	Operational		
Activity	**Package Plant Maintenance**		
Description of impact	Impacts associated with the maintenance of the sewage package plant and potential downtime or failures.		
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts	
Potential mitigation	❖ Assign an Estate maintenance manager responsible for daily inspections of the plant. ❖ Ensure the maintenance manager is trained specifically in plant operations and maintenance procedures. ❖ Install screening systems to remove non-biodegradable materials and prevent clogging or system damage. ❖ Dispose of screened non-biodegradable waste via incineration at a recognized waste disposal site. ❖ Install an emergency alarm system that activates if effluent levels rise in the emergency storage component. ❖ Design the plant with a 48-hour emergency effluent storage period to accommodate unexpected downtime or failures. ❖ Have a contract or arrangement with effluent removal tanker services for extended maintenance events. ❖ Conduct monthly testing of effluent to ensure compliance with quality standards. ❖ Power the plant using a Solar/Eskom battery system with a backup generator to mitigate Eskom power outages.		
Assessment	**Without mitigation**		**With mitigation**
Nature	Negative		Low Negative

Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	**Moderate - negative**		**Negligible - negative**	
Comment on significance	The implementation of the proposed mitigation measures will significantly reduce the likelihood and severity of operational failures, environmental contamination, and service disruptions associated with the sewage package plant.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			

Impacts foreseen during the Decommissioning Phase (73 Residential Stands):

Project Phase	Decommissioning			
Activity	**Package Plant**			
Description of impact	Decommissioning of the package plant resulting in potential pollution of surface and groundwater sources, soil contamination, and health and safety risks.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	❖ Empty and clean tanks before dismantling. ❖ Remove all sludge and residue with certified disposal contractors. ❖ Conduct soil testing before and after decommissioning. ❖ Provide PPE and training for workers. ❖ Follow safe dismantling procedures. ❖ Prepare and follow a Health and Safety Plan. ❖ Ensure seamless transfer of services to municipal sewer connections to prevent public health issues.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 2 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The decommissioning requirements will only comprise the emptying and removal of the above ground containerized bio reactor plant. Sludge is recycled within the plant system and there will be no sludge accumulation requiring removal on decommissioning.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			

Impacts foreseen during the Construction Phase for Alternative 2 (19 Residential Stands):

Project Phase	Construction			
Activity	**Loss of habitat within CBAs**			
Description of impact	Encroachment into and loss of CBA1 and CBA2 areas due construction.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• Some form of offset or conservation servitude can be considered.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Medium	the resource is damaged irreparably but is represented elsewhere	Medium	the resource is damaged irreparably but is represented elsewhere
Significance	**Minor - negative**		**Minor - negative**	
Comment on significance	The site occurs entirely within CBA1 and CBA2 areas. The secondary vegetation ("pastures") in the southern part of the site does not have the properties consistent with protecting biodiversity patterns, but remaining areas are ecologically functional. The vegetation on site (within the proposed development footprint) is in relatively poor condition, and consists either of lawns or secondary vegetation with a species composition that is not representative of the natural habitat.			
Cumulative impacts	The impact would result in insignificant cumulative effects as the significance of the impacts is low. The CBAs are designated for the protection of listed Garden Route shale fynbos, but this does not occur within these designated CBA1 areas, only forest.			

Project Phase	Construction	
Activity	**Clearance of vegetation for the construction of the dwelling and associated infrastructure**	
Description of impact	Loss of sensitive vegetation, habitat loss for terrestrial wildlife, mortalities to various species unable to evade the disturbance, loss of viable propagules, fragmentation of ecological infrastructure	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Wherever there are sections of undisturbed natural habitat within the development area, they should not be impacted by the building activities and	

	should be conserved as small islands of natural resources for the small wildlife of the area. • the removal and translocation of protected plants if found should be undertaken prior to construction clearing activities. A permit is required prior to removal. • Protected plants must either be moved to a safer, no-go area on the property or taken to a nursery for temporary storage until rehabilitation takes place. • Access by heavy machinery should be limited on the site. • Only areas necessary for the development footprint should be cleared and the remainder of the property should be left natural. • Laydown areas for construction materials must be contained within the clearing footprint of the proposed development. • A 10-meter buffer zone must be retained along the base of the slope to protect the forest margin.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	High	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The forested area to the north of the development is excluded from the proposed development and will not be directly affected. Additional Private Open Space will not significantly mitigate the disturbance of vegetation as it will be in the transformed/lawned areas. Rehabilitation of these areas may offset loss of secondary vegetation. Some additional secondary vegetation near the forest margins will be retained with fewer stands.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**	
Activity	**Loss of secondary vegetation within endangered ecosystem**	
Description of impact	Loss of habitat on site (within the proposed development footprint), modification of ecological processes, spillover effects into surrounding areas due mostly to secondary impacts such as boundary disturbance and alien invasive species spread.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. • Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. • Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan.	

	• Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Southern Afrotemperate Forest, which is not threatened, but is separately listed as protected under the National Forests Act. The forest areas on site fall within a CBA1. These forested areas are completely excluded from the proposed development (both options) and are not directly affected. The only remaining non-forest vegetation on site is considered to be secondary. However, on the basis that no legal soil disturbance has occurred during the preceding 10 years, it is legally considered to be natural vegetation that is within an Endangered ecosystem. It is, however, not representative of this vegetation unit and, being secondary, is not considered to be irreplaceable. Additional Private Open Space will not significantly mitigate the disturbance of vegetation as it will be in the transformed/lawned areas. Rehabilitation of these areas may offset loss of secondary vegetation. Some additional secondary vegetation near the forest margins will be retained with fewer stands.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	**Construction**	
Activity	**Loss of individuals of protected tree species**	
Description of impact	Loss of habitat on site (within the proposed development footprint), disturbance or loss of protected trees.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Retain existing large trees within proposed development. • If any trees need to be removed or pruned then a permit is required, according to the National Forests Act. • Plant additional milkwoods in the development as part of the final landscaping. These can be planted along with other appropriate coastal forest species, but the proportions and composition should reflect habitat that would have occurred naturally at this site.	

Assessment	Without mitigation		With mitigation	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Long Term	Impact will last between 16 and 30 years
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are significantly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The tree species affected is *Sideroxylon inerme*, protected under the National Forests Act. A total of 4 individuals were seen on site, all of them relatively large individuals. The species is widespread but is a key and dominant component of coastal forests in the Garden Route. Additional Private Open Space will not significantly mitigate the disturbance of protected species as it will be in the transformed/lawned areas. Rehabilitation of these areas may offset loss of secondary vegetation.			
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Construction	
Activity	**Loss of habitat for listed threatened animal species**	
Description of impact	Loss of habitat for threatened plant and animal species, spillover effects into surrounding areas due mostly to secondary impacts such as dust deposition and alien invasive species spread.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Protect natural forest vegetation adjacent to the proposed development site. • Rehabilitate and improve the small dam on site, including introducing pond margin vegetation typical of mountain ponds in forested areas. This will provide good habitat for various frogs, including potentially *Afrixalus knysnae*. • Forest habitats on the upland, steeply-sloping part of the site, have high biodiversity and conservation value, and are designated as sensitive. These areas must not be affected by the proposed development. A buffer zone should be retained along the base of the slope to protect the forest margin. For example, steps should be taken to rehabilitate these areas and encourage growth of	

	species, such as *Pterocelastrus tricuspidatus* and *Sideroxylon inerme*, that are mesic and fire-resistant. • An open space management system should be developed to formalize steps for forest protection.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	High	Natural and/ or social functions and/ or processes are significantly altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Partly reversible	The impact is reversible but more intense mitigation measures are required	Partly reversible	The impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	• There is habitat on site that is suspected habitat for threatened plant and animal species. This is the forest habitat, which is outside the proposed development footprint and will not be affected by the proposed development. • The species that could potentially occur within this habitat are as follows: o Knysna Warbler (Vulnerable) has a moderate probability of occurring in forest margin areas. o Crowned Eagle (Near Threatened) - the forests on site may constitute part of the general foraging range but it is unlikely that they are resident on site, or are dependent on it. o Tunnelling Dung Beetle (Endangered). The type locality of the species is forest habitats in the Keurboomstrand area. o Small antelope (Vulnerable). There is a moderate to high probability of it occurring in the forests on site. • Additional Private Open Space will not significantly mitigate the disturbance of habitat as it will be in the transformed/lawned areas. Rehabilitation of these areas may offset loss of habitat in secondary vegetation.			
Cumulative impacts	The potential impact affects a negligible proportion of the overall habitat available for these species and will not directly affect any individuals.			

Project Phase	**Construction**	
Activity	**Waste Pollution**	
Description of impact	Pollution of buffer zones and natural areas caused by waste generated by the construction process.	
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts
Potential mitigation	• All construction waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.	

	• All construction waste materials must be collected and disposed of at a suitable waste facility. • No dumping of construction material within natural areas or buffer zones may take place. • The buffer and "no-go" areas must be monitored on a weekly basis to clean-up any waste that may have been blown from the construction site. • Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	Construction activities are likely to generate significant quantities of solid waste that could pollute buffer zones and natural areas. In addition, the high numbers of construction workers present on site will generate a significant amount of human waste, which could pollute the environment.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**	
Activity	**Construction Vehicles**	
Description of impact	Pollution caused by the operation of vehicles and heavy machinery.	
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts
Potential mitigation	• Construction activities must be confined to clearly demarcated areas so as to prevent unnecessary disturbance the surrounding environment. • No vehicles are to park or operate within "no-go" areas. • Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work on site. • No fuel storage, refuelling, vehicle maintenance or vehicle depots to be allowed near natural spring and dam. • Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, must be located on impervious bases and should have bunds around them (sized to contain 110 % of the tank capacity) to contain any	

	possible spills. These areas must not be located within any natural drainage areas or preferential flow paths and must be located outside of buffer zones. • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Very limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Likely	The impact may occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	Operation of vehicles could result in spillages or leaks of hydrocarbons (fuel and oil) and could lead to unnecessary disturbance of natural areas.			
Cumulative impacts	The impact would result in insignificant cumulative effects.			

Project Phase	**Construction**	
Activity	**Disturbance / removal of topsoil**	
Description of impact	Disturbance of topsoil, potential soil erosion and the loss of topsoil	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• Areas that are disturbed through building activities (such as the excavations for pipelines) should be suitably rehabilitated without delay. Failure to do so will have a knock-on effect on biodiversity in the form of an increase in wind erosion, soil exposure and a loss of the soil micro-organisms that are essential for plant growth. • Organic matter, such as roots and humus/topsoil should be removed from the footprint of structures and stockpiled separately for landscaping purposes. • The stockpiling of topsoil for use in rehabilitation is required. • Stockpiles must not exceed 1.5m in height, must be covered with shade cloth or similar, to prevent erosion and any invasive alien species that begin to grow within it must be removed. • Soil disturbance during the removal of alien invasive plants must be minimised as much as possible. • The site must be stabilised where necessary using available materials, where possible. It is recommended that exposed soils are covered with wood chips, and tree branches used to create berms. Any cut alien vegetation on site can be utilised for this purpose if it is without seed.	
Assessment	**Without mitigation**	**With mitigation**
Nature	Negative	Low Negative

Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	Clearing areas of the site in preparation for construction will expose bare soil which may lead to the potential loss of topsoil through runoff and incorrect storage. This is not envisaged to be a significant impact with mitigation measures in place. Topsoil can be reused on site for rehabilitation purposes.			
Cumulative impacts	Without mitigation this impact could result in potential erosion downhill of the site caused by stormwater flow.			

Project Phase	**Construction**			
Activity	**Pollution of groundwater**			
Description of impact	Spillages of diesel, petrol, oil, paints, clears and other harmful chemicals. These substances may potentially percolate into the groundwater and enter the surrounding environment			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Install the sewage and and wastewater infrastructure according to applicable national SANS standards (SANS1200 Part K:Civil Engineering Standard Specifications, SANS10400:The National Building Regulations and Building Standards Act, SANS 1913:Planning, Design, and Construction of Sanitation Systems), DWS Guidelines and adhere to municipal regulations & by-laws. • Site to be monitored regularly for contaminant spillages and if detected, contact spillage remediation companies. • Separate, tightly cover and monitor toxic substances to prevent spills and possible site contamination. • Cover stockpiles of building materials like cement, sand and other powders. • Regularly inspect stockpiles for spillages and store away from waterways or drainage areas. • Collect any wastewater generated from site activities during construction insettlement tanks then screen, discharge the clean water,and dispose of remaining sludge according to environmental regulations. • Install at least three monitoring piezometers into the water table, one upstream and two downstream of site.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year

Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the significance becomes negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Construction**			
Activity	**Noise pollution**			
Description of impact	Noise caused by machinery and staff			
Mitigable	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	• Construction activities must only take place during normal working times between 07:00-17:00 on weekdays. • Machinery may be fitted with silences to dampen noise. • Staff must be reminded that they are working within a residential area and noise levels must be kept low.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Not relevant		Not relevant	

Significance	Minor - negative	Negligible - negative
Comment on significance	Some extent of noise pollution during construction is expected; however, with mitigation the impact will be reduced.	
Cumulative impacts	No cumulative impacts exist.	

Project Phase	Construction			
Activity	Visual impact			
Description of impact	Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource. During construction, earthworks would some visual scarring of the landscape.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	• The Architectural Design Guidelines proposed for the development must be adopted to mitigate the colours, heights, disturbance areas, maximum footprint, vegetation, etc, which will all contribute to a smaller visual impact on the landscape. • The necessary measures be implemented during the construction phase to protect the natural vegetation, to control the noise, dust and visual intrusion. • Appoint a Landscape consultant to recommend and implement the introduction of an indigenous landscape plan to protect the existing indigenous vegetation and to prepare a landscape plan for implementation in the private and common areas. • Implement external lighting restrictions and guidelines. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of this development layout options before mitigation are medium and low after mitigation.			

Project Phase	Construction			
Activity	Employment			
Description of impact	Empowerment of the local community members living in the area relating to temporary employment opportunities			
Mitigable	Medium	Mitigation only exists to ensure that the positive impact is followed through.		
Potential mitigation	• Use existing social structures and communication channels to ensure social representation. • Use local labour and source local materials as far as possible.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Not relevant		Not relevant	
Resource irreplaceability	Not relevant		Not relevant	
Significance	Negligible - negative		Negligible - positive	
Comment on significance	Due to the proposed development being on a small-scale, there is a low difference in impacts between without mitigation and with mitigation. However, as the impact would be positive for the local community to be employed during construction, mitigation is recommended to ensure this occurs.			
Cumulative impacts	Minor upliftment for the local community.			

Impacts foreseen during the Operational Phase for Alternative 2 (19 Residential Stands):

Project Phase	Operational	
Activity	Visual / Sense of place	
Description of impact	The development would result in a small change in visual character from a landscape covered in vegetation and without buildings to a low-density well landscaped built landscape.	
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts
Potential mitigation	• Municipal by-laws need to be adhered to.	

	• Re-vegetation and Landscaping of open space areas with suitable indigenous vegetation. • Systematic removal and follow-up operations of invasive alien plants. • Adhere to Architectural Design Guidelines and Landscape Plan. • Create a 10m wide buffer between the development and the Keurboom Road. This strip of land will be densely vegetated to obscure the development. • Implement mitigations as per the Visual Impact Assessment (November 2023).			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Partly reversible	the impact is reversible but more intense mitigation measures are required
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	Marginal loss, the resource is not damaged irreparably or is not scarce
Significance	**Moderate - negative**		**Minor - negative**	
Comment on significance	The significance of impacts is determined through a synthesis of the assessment criteria. The significance of the impacts for the development layout options is low. The well-positioned and designed development infrastructure allows for it to blend in very well with its surroundings and create minimal contrast in the landscape. The alternative 2 development layout option provides a slight advantage over the preferred and altenative 1 development layout options due to its lower density and more open space for landscaping to screen views from the road. But with the implementation of appropriate mitigation measures the preferred and alternative 1 development layouts can also be screened effectively from the road.			
Cumulative impacts	An effect that in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative impacts of the development layout option before mitigation are medium and low after mitigation.			

Project Phase	**Operation**	
Activity	**Stormwater Management**	
Description of impact	Accelerated erosion / pollution into sub-surface water.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• The storm water drainage system must be adhered to, and the system should lead runoff water away from sensitive areas to prevent soil erosion. • Use rainwater collection tanks to serve as a retention vessel in downpours. • Driveways can be constructed from grass blocks to allow for effective retarding of surface flow and facilitate percolation.	

Assessment	Without mitigation		With mitigation	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The development portion of the site is flat with no gradient along its southern boundary and has no defined drainage discharge points. The existing flat and permeable conditions allow for natural infiltration.			
Cumulative impacts	Without mitigation this impact could result in potential erosion on the site caused by stormwater flow.			

Project Phase	Operation	
Activity	**Stormwater Runoff**	
Description of impact	Alteration of surface flows caused by increased stormwater runoff.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• Stormwater from erven must be attenuated on site as far as possible. • Stormwater from access roads must be attenuated onsite (prior to any discharge into retention ponds). • The runoff velocity of stormwater must be reduced with energy dissipaters prior to discharge into retention ponds. • Stormwater management should encourage infiltration of water into the soil profile and other on site attenuation (i.e. using grass pavers etc.). • The natural spring and small dam must be protected by a 10 m buffer throughout the operational phase. • No stormwater should be put into this dam as the water is of high quality	

Assessment	Without mitigation		With mitigation	
Nature	Negative		Low Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years

Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Almost certain	It is most likely that the impact will occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The development will result in an increase in the area of paved/hardened surfaces. This will generate increased volumes of stormwater runoff. Hardened surface and establishment of foundations for houses may increase sub-surface flows towards the natural spring and small dam. The dam water is of high quality, and pollutants from stormwater runoff entering the dam should be minimised. A lower density development may result in less runoff with fewer hardened surfaces. Adequate management of stormwater should therefore effectively minimise the intensity of this impact.			
Cumulative impacts	Without mitigation this impact could result in the water quality of the dam being compromised.			

Project Phase	**Operational**
Activity	**Groundwater Contamination**
Description of impact	• Leakage from underground sewage holding tank and associated pipework. • Leaks and leachate from the wastewater treatment plant. • Improperly treated effluent used for irrigation. • WWTP failure. • All of the aforementioned impacts could percolate into the groundwater.
Mitigable	High | Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	• Ensure the WWTP comply with SANS1200 Part K: Civil Engineering Standard Specifications, NWA, Water Quality Guidelines (DWAF), SANS1913: Planning, Design, and Construction of Sanitation Systems, Wastewater Treatment Plant Design and Operational Guidelines (DWAF, 2008). • All areas where potential leachate may occur are to be paved and cemented. • Regularly service the WWTP and inspect the integrity and efficacy of the WWTP. • Ensure emergency procedures are in place to rapidly repair WWTP should failure occur. • Set up a comprehensive monitoring system to monitor the effluent quality. • Incorporate monitoring network as implemented during the construction phase into operational phase monitoring

	• Install shallow aquifer piezometers in close proximity to the WWTP to be monitored regularly for any leakages. • Should a leak be detected or the monitoring piezometers be contaminated, a baseline Phase 1 Contamination Assessment should be undertaken and the site remediated in consultation with a contamination remediation consultant and the Authorities.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible and the significance, negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operational**			
Activity	**Groundwater Recharge and Flooding**			
Description of impact	Infrastructure limiting groundwater recharge and/or flooding risk.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	• Permeable pavement and green infrastructure (limit coverage of surface area by infrastructure as far as possible. • Rainwater Harvesting • Sustainable Urban Drainage Systems (SUDS) • Retention and Detention Basins • Design stormwater drainage systems to handle increased rainfall events by incorporating overflow pathways, sump pumps, and flow control structures. • Installation of piezometers to track groundwater level. • Inspect and maintain drainage systems, stormwater infrastructure, and mitigation features. • The site levels must be designed such that the floor levels will all be set higher than the level of the Road 394, the existing southern flood containment level.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very Limited	Extending only as far as the development site area

Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Probable	It is most likely that the impact will occur	Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Partly reversible	the impact is reversible but more intense mitigation measures are required	Completely reversible	the impact can be reversed with the implementation of minor mitigation measures.
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Negligible - negative**		**Negligible - negative**	
Comment on significance	After the implementation of mitigation measures, the consequence becomes negligible, and the significance remains as negligible - negative.			
Cumulative impacts	Since the impact is negligible negative with mitigation, cumulative impacts to groundwater with other projects are not anticipated.			

Project Phase	**Operation**			
Activity	**Impacts on ecological drivers**			
Description of impact	Effects of the development and activity on the underlying systems and processes that support ecosystems.			
Mitigable	Medium	Mitigation will reduce the significance of impacts		
Potential mitigation	❖ Access to forested areas during construction must not be permitted by any construction personnel. These areas must be fenced off and no access allowed. ❖ Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control. ❖ Undertake regular monitoring to detect alien invasions early so that they can be controlled, as per the Alien Management Plan. ❖ Restrict access to forested areas once the development is complete. An ecological management plan must be compiled and committed to by the future HOA. This should contain measures for protecting the forest from undue traffic and impacts.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Long Term	Impact will last more than 15 years	Long Term	Impact will last more than 15 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Very low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Possible	Has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Irreversible	the impact is irreversible, and no mitigation measures exist	Irreversible	the impact is irreversible, and no mitigation measures exist
Resource irreplaceability	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Significance	**Minor - negative**		**Negligible - negative**	

Comment on significance	The most important ecological drivers on site that may be affected by the proposed development are related to maintenance of the forest ecosystem. The forest margins are important for maintaining forest integrity, and the forest canopy needs to be maintained for the health of the forest ecosystem. No development is proposed within the forest, and the secondary forest on the southern margin is also excluded from development.
Cumulative impacts	The impact would result in insignificant cumulative effects

Project Phase	**Operation**			
Activity	**Impacts on ecological corridors**			
Description of impact	Cut-off of natural dispersal and foraging movement by animals, impacts on suitable link or important corridor, fragmentation of ecological infrastructure			
Mitigable	Low	Mitigation will slightly reduce the significance of impacts		
Potential mitigation	❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Use clearVu fencing to separate the corridor from the development area. The spring must be incorporated into the corridor. The fence is to keep domestic animals (cats and dogs, etc) out of the wildlife corridor. ❖ Fencing should not extend into the corridor on the neighbouring boundaries as the aim is to have an inter-connected corridor that extends across properties, should development occur in adjacent areas. ❖ Provide open-space corridors through the development.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/or social functions and/or processes are somewhat altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Definite	There are sound scientific reasons to expect that the impact will occur	Definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	Irreparable damage and is not represented elsewhere	High	Irreparable damage and is not represented elsewhere
Resource irreplaceability	Low	Marginal loss, the resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The vegetation type (Garden Route Shale Fynbos) is listed as Endangered. All upland areas of the site on the steep slopes are covered with forest that matches the description for Goukamma /Mesic Dune Thicket (Cowling et al. 2023), which is not threatened, but is separately listed as protected under the National Forests Act. These forested areas are completely excluded from the proposed development (all options) and are not directly affected. The proposed development layout makes provision for a 20m buffer along the forest margin and also incorporated portions of the secondary vegetation area to form part of the open space system within the development, which will link up with the forest area.			
Cumulative impacts	The impact may result in cumulative effects through the landscape.			

Project Phase	Operation			
Activity	**Eradication of Alien Vegetation**			
Description of impact	Impacts on biodiversity / natural habitats / increased fire risk			
Mitigable	High	Mitigation exists and will considerably reduce significance of impacts		
Potential mitigation	• All invasive alien plants should be completely cleared from the property, and where a tree or bush cover is desired, replaced with suitable indigenous species. • Rehabilitation of disturbed areas, as well as previously invaded areas, should promote establishment of site-appropriate indigenous species. • A suitable planting list of trees and shrubs must be compiled and incorporated into the Landscape Plan. • An Alien Control Plan should be compiled to systematically remove and control alien plant species. • Follow-up operations must be done. • Minimise disturbance to the natural vegetation using low impact manual labour techniques. • Reduce fire hazard on site			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Medium	Natural and/or social functions and/or processes are notably altered
Probability	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Not relevant		Not relevant	
Significance	**Moderate - negative**		**Moderate - positive**	
Comment on significance	An ongoing alien invasive management programme should take place on site. This will protect riparian habitats downslope from degradation and could potentially be the biggest contribution to maintaining and protecting biodiversity on site and in surrounding areas.			
Cumulative impacts	Without mitigation the development would not be meeting design guidelines enforced by the municipality. Specifically design guidelines for the local area.			

Project Phase	Operation
Activity	**Formal gardens**

Description of impact	Habitat loss for terrestrial wildlife, fragmentation of ecological corridor			
Mitigable	Low	Mitigation will slightly reduce the significance of impacts		
Potential mitigation	• Areas that are not required for development purposes should remain natural with indigenous vegetation. • All alien invasive plants must be removed from the site on an on-going basis. • Investing landowners within the proposed development should be encouraged to avoid planting exotic plants in favour of locally indigenous plants. • Landscaping must be done with locally occurring indigenous vegetation.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Positive	
Duration	Brief	Impact will not last longer than 1 year	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Negligible	Natural and/ or social functions and/ or processes are negligibly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Highly unlikely / None	Expected never to happen	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Not relevant	
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Not relevant	
Significance	**Negligible - negative**		**Minor - positive**	
Comment on significance	With mitigation the impact is likely to have more beneficial impact to retaining natural biodiversity, than without mitigation.			
Cumulative impacts	Without mitigation this impact could result in the spread of alien invasive plants and the loss of indigenous vegetation.			

Project Phase	**Operational**	
Activity	**Package Plant Maintenance**	
Description of impact	Impacts associated with the maintenance of the sewage package plant and potential downtime or failures.	
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	❖ Assign an Estate maintenance manager responsible for daily inspections of the plant. ❖ Ensure the maintenance manager is trained specifically in plant operations and maintenance procedures. ❖ Install screening systems to remove non-biodegradable materials and prevent clogging or system damage. ❖ Dispose of screened non-biodegradable waste via incineration at a recognized waste disposal site. ❖ Install an emergency alarm system that activates if effluent levels rise in the emergency storage component.	

	❖ Design the plant with a 48-hour emergency effluent storage period to accommodate unexpected downtime or failures. ❖ Have a contract or arrangement with effluent removal tanker services for extended maintenance events. ❖ Conduct monthly testing of effluent to ensure compliance with quality standards. ❖ Power the plant using a Solar/Eskom battery system with a backup generator to mitigate Eskom power outages.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Brief	Impact will not last longer than 1 year	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to specific isolated parts of the site
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are slightly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	**Moderate - negative**		**Negligible - negative**	
Comment on significance	The implementation of the proposed mitigation measures will significantly reduce the likelihood and severity of operational failures, environmental contamination, and service disruptions associated with the sewage package plant.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			

Impacts foreseen during the Decommissioning Phase (19 Residential Stands):

Project Phase	Decommissioning			
Activity	**Package Plant**			
Description of impact	Decommissioning of the package plant resulting in potential pollution of surface and groundwater sources, soil contamination, and health and safety risks.			
Mitigable	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	❖ Empty and clean tanks before dismantling. ❖ Remove all sludge and residue with certified disposal contractors. ❖ Conduct soil testing before and after decommissioning. ❖ Provide PPE and training for workers. ❖ Follow safe dismantling procedures. ❖ Prepare and follow a Health and Safety Plan. ❖ Ensure seamless transfer of services to municipal sewer connections to prevent public health issues.			
Assessment	**Without mitigation**		**With mitigation**	
Nature	Negative		Low Negative	
Duration	Short term	Impact will last between 1 and 2 years	Brief	Impact will not last longer than 1 year
Extent	Local	Extending across the site and to nearby settlements	Very limited	Limited to specific isolated parts of the site
Intensity	Low	Natural and/or social functions and/or processes are slightly altered	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
Probability	Possible	Has occurred here or elsewhere and could therefore occur	Improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Negligible	No loss of resources	Negligible	No loss of resources
Significance	**Minor - negative**		**Negligible - negative**	
Comment on significance	The decommissioning requirements will only comprise the emptying and removal of the above ground containerized bio reactor plant. Sludge is recycled within the plant system and there will be no sludge accumulation requiring removal on decommissioning.			
Cumulative impacts	Without mitigation this impact could result in the groundwater quality being compromised.			