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**ENVIRONMENTAL IMPACT REPORT
FOR THE PROPOSED SIBAYA PRECINCT**

EIA/5809

JUNE 2007

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1 INTRODUCTION

1.1 GENERAL

GAEA Projects was commissioned by Moreland Developments (Pty) Ltd to undertake an Environmental Impact Assessment (EIA) for the proposed Sibaya Precinct as per the requirements of the Environmental Conservation Act (Act no. 73 of 1989). The project includes the potential development of residential, commercial, conservation and resort developments. This report represents the results of the impact assessment process of the EIA.

The EIA is being undertaken in accordance with the Relevant Authorities requirements in terms of Regulations R1182 and R1183, under Sections 21, 26, and 28 of the Environmental Conservation Act (Act no. 73 of 1989). Specifically:

- Change of land use from Agriculture to another land use (2 (c))
- Construction of Private Resorts and associated infrastructure (1(m))
- Sewage treatment plants and associated infrastructure (1(n))
- Construction of arterial roads (1(d))
- Development of virgin ground (10)
- Storage of Diesel

1.2 LOCATION & DESCRIPTION

The Sibaya Precinct includes the land surrounding the Sibaya Casino, and is located between the N2 in the west and the Indian Ocean in the east and, between the Hawaan Forest in the south and the Main Road (MR 96) into Umdloti in the north (Figures 1 & 2).

The area comprising the Sibaya Precinct includes the following properties (refer to Figure 3):

- Rem of Portion 42 of Lot 31 No. 1560
- Rem of 46 of Lot 31 No. 1560
- Portion 39 of Lot 31 No. 1560
- Portion 38 of Lot 31 No. 1560
- Rem of Portion 37 of Lot 31 No. 1560
- Rem of 36 of Lot 31 No. 1560
- Rem of 35 of Lot 31 No. 1560
- Portion 420 of Lot 31 No. 1560
- Portion 421 of Lot 31 No. 1560
- Rem of 436 (of 435) of Lot 31 No. 1560
- Rem of Lot A No. 1532

- Rem of Lot B No. 1533
- Rem of Lot 42 No. 1114
- Rem of Portion 615 Cottonlands No. 1575
- Portion 75 of the farm Cottonlands no. 1575
- Portion 76 of the farm Cottonlands no. 1575
- Portion 67 of the farm Cottonlands no. 1575
- Portion 68 of the farm Cottonlands no. 1575

It should be noted that Portion 417 of Lot 31 No. 1560 Umhlanga Rocks does not form part of the proposed area (this Portion is owned by Hawaan Investments (Pty) Ltd).

For a full description of the environment to be affected, please refer to Appendix 1.

2 DEVELOPMENT PROPOSAL

2.1 DEVELOPMENT DETAILS

The proposed development is comprised of the following (Figure 4):

- 6000 Residential Units
- 8 Hotels/Resorts
- 186 000m² commercial bulk (commercial and offices)
- Conservation/ Recreational/ Leisure activities – examples could include any or all of the following (some of which may require additional investigation and environmental approval) - luge, botanic garden types of activities, white water experience, water bodies, animal farm, monkey sanctuary, butterfly farm, wildlife environmental centre, gondolas, boardwalks, foofy slides, animal hides, forest trails and boardwalks, estuary trails and boardwalks, beach access and public facility, swimming beach, “food forests”/ market gardens

The Precinct has been divided into 5 development nodes/ precincts (Figure 5). Node 1 comprises the development area to the east of the M4 above the southern portion of Umdloti, (Figure 5). Node 2 comprises the area south and south west of the Sibaya Casino (Figure 5). Node 3 comprises the area to the east of Node 2 and bordered by Forest 31 in the east (Figure 5). Node 4 comprises the north western section of the Precinct bordered by the MR 96 in the north, the N2 in the west, the M4 in the east and the Sibaya Casino in the south (Figure 5). Node 5 comprises the hill behind Umdloti, and constitutes the north east corner of the Precinct (Figure 5).

A breakdown of the land uses across the five development Nodes is detailed in Table 1, while Table 2 details the land use areas across the entire Precinct.

Table 1. Development node land uses.

Node	Commercial/ Mixed Use / Office	Hotel Rooms	Residential (Du's)
1	65800	130	1140
2	35520	490	1100
3	9600	230	605
4	37350	0	1970
5	37900	105	1185
Total	186170	955	6000

Table 2. Land use development areas across the Sibaya Precinct.

USE	AREA(HA)	%
Commercial/ Mixed use	16.3	1.9
Low Density Residential	53.8	6.3
Medium Density Residential/Mixed Use	46.7	5.5
Mixed Use/Residential	7.38	0.9
Recreation/Entertainment	21.7	2.6
Resort/Residential	14.2	1.7
Education	3.5	0.4
Existing use	15.0	1.8
Sub Total: Built environment	178.58	21.0
Open space (all types & including urban space)	423.4	49.8
Movement corridors	248	29.2
TOTAL	850	100.0

(For further details of the development proposal refer to Appendix 2).

Moreland are proposing that Nodes 1 & 5 are the first to be developed, followed by the remaining nodes in an order to be determined by market forces. The detailed design plans for Nodes 1 & 5 have therefore been included with this report (refer to Figure 6).

An environmental recreational facility site has been identified (albeit off the Sibaya boundary) for any type of activity that fits within the overall vision and concept and objectives of Sibaya (Figure 7). This could include uses/activities such as - monkey sanctuary, bird centre, botanic gardens, wildlife environmental centre, etc. The site is directly adjacent to the Havaan Forest and the Ohlanga River and is therefore integrally linked with the conservation area and should be developed as part of the conservation development but as it is not on the site or the activities defined, a separate, additional EIA would be required for

its development. It is noted also that Moreland's Izinga Phase III EIA does include this area but it is understood that this is to be removed therefrom.

In line with the One Planet Living philosophy as discussed in 2.2 below, market gardens/ "food forests" have also been proposed (see Figure 7 and Appendix 10 for further details). These are proposed to include tropical fruit bearing trees like Avocado, Mango, Litchi, Papaw, Banana and some citrus could be planted to supplement the locally grown fruit that this area can provide. According to the Landscape Plan (Appendix 11), these fruiting trees have an added benefit in that they will also provide supplementary seasonal food for the monkey populations residing in this precinct. This is a form of habitat supplementation that has not been considered in developments before. The siting of these "food forests" has to be carefully thought out as well as using species that will not further negatively transform the landscape.

2.2 SIBAYA CONSERVATION TRUST

Moreland are proposing to form a new Conservation Trust (the Sibaya Conservation Trust) which will be directly responsible for the management of the Trust area (which in essence will include the Hawaan Forest, Forest 31, Mhlanga Forest, Ohlanga River floodplain and adjacent primary wetlands – see Figure 8).

The intention is to also include the non Tongaat-Hulett owned properties (as indicated on the plan) within the Conservation Trust to ensure an integrated and holistic approach to management.

The ultimate make-up of the Trust is still to be finalised but it is proposed that the following organisations become members (Trustees):-

- a. Moreland/Tongaath Hulett
- b. eThekweni Municipality
- c. Ezemvelo KZN Wildlife
- d. WESSA
- e. Hawaan Forest Estate/Hawaan Investments
- f. Management Association(s) of the Sibaya Precinct
- g. Sibaya Casino

It is noted that no formal discussions have as yet been held with any of the above parties and each will need to agree to become Trustees.

The Conservation Trust will employ the necessary personnel and resources required to ensure that the Trust Area is appropriately managed in accordance with a Conservation Management Plan that is required to be prepared and approved. This Conservation Management Plan will include details on the financial management of the Trust and its ongoing viability.

The ownership of the various properties within the Trust area will be retained in existing ownership but a Conservation Servitude in favour of the Sibaya Conservation Trust will be imposed over the affected properties.

The Trust has as its sole object the carrying on of any of the following activities:

- the conservation, rehabilitation and protection of the natural environment, including flora, fauna or the biosphere within the Trust area, to be achieved through the implementation of an approved Conservation Management Plan;
- the promotion of, and the provision of education and training programs relating to, environmental awareness, greening, clean-up or sustainable development projects within the Trust area;
- the leasing of any land and/or activity within the Trust area provided the use of such land and/or activity is related to the objectives of the Trust and approved by the Trust;
- Controlling access to and from the Trust area;

Funding for the Trust will be raised via the Sibaya Management Association levies and contributions by the other Trustees on an agreed Business Plan basis. Moreland will be responsible for providing the initial capital requirements for the establishment of the Trust and will, once approval has been received for the Sibaya Precinct development as proposed, formalise the establishment of the Trust.

2.3 ONE PLANET LIVING

The development proposal under consideration aims to achieve One Planet Living (OPL) status through the design and servicing of the development. The aim of OPL is to create

developments based on environmental principles that lead to sustainable community design and management which ultimately results in a community living within a single planet's constraints.

One Planet Living (OPL) is a joint initiative of BioRegional Development Group and World Wide Fund for Nature (WWF) that aims to make sustainable living easy, attractive and affordable throughout the world. The OPL vision is of a world in which people everywhere can lead happy, healthy lives within their fair share of the Earth's resources.

Specifically, this initiative aims to

- a. Build a worldwide network of OPL Communities to demonstrate One Planet Living in action.
- b. Establish One Planet Living Centres in each OPL community as a focus for education and training.
- c. Promote One Planet Living and its guiding principles to bring about change in governments, businesses and individuals.

The approach is based on:

- **Local resource availability:** using local farmland, woodlands, renewable energy and waste efficiently to meet more of our needs.
- **Closing the loop:** recycling and reclaiming materials or using waste heat from industry.
- **Appropriate scale technology:** allowing us to use regional resources which reduces transport and boosts the local economy.
- **Network production:** producing locally with centralised co-ordination and marketing.
- **Fair trade:** moving away from international trade in damaging low-value commodities to higher value, environmentally sound products.
- **Developing environmental projects** into commercial concerns that work in the real world.

In all of these ways wasteful consumption can be reduced while local production and recycling reduces transport, fossil fuel use and CO₂ emissions, and naturally encourages resource efficiency.

The principles of OPL can be described as follows:

Zero Carbon	Minimising CO ₂ emissions from heating, cooling and powering our buildings
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Zero Waste	Minimising waste and flows of waste to landfill in a resource-efficient society
Sustainable Transport	Reducing the need to travel and providing sustainable alternatives to private car use
Local and Sustainable Materials	Optimisation of use of materials, in terms of their source and their performance
Local and Sustainable Food	Maximisation of opportunities for use of local food supplies
Sustainable Water	Minimisation of water consumption and addressing flood risk issues
Natural Habitats and Wildlife	Protection of the natural environment and the habitats it offers to flora and fauna
Culture and Heritage	Protection of the cultural heritage and the sense of local and regional identity
Equity and Fair Trade	Promoting equity and fair trade within the community
Health and Happiness	Promoting well-being and healthy lifestyles

Moreland are currently finalising their Sustainability Action Plan (SAP), a draft of which has been included here as Appendix 3. This SAP details exactly what principles and objectives are to be implemented and targeted.

It is noted that a legal agreement is still required to be concluded between Moreland and BioRegional that will enable the Sibaya Precinct to be branded as an OPL development. In the event that an agreement is not able to be concluded, for whatever reason, it is still Moreland's intention to implement the principles of OPL. This will be done via inclusion into the EMP, as opposed to SAP.

3 PUBLIC PARTICIPATION PROCESS

1. An environmental scoping process was carried out which resulted in the compilation of the Final Scoping Report for EIA 5809 in November 2006.
2. The recommendations and conclusions of the scoping report included the identification for the need for the following studies to form part of the EIA phase:
 - a. Visual assessment to determine impacts of development but also including a 'viewshed analysis'.
 - b. Cost analysis for the funding and management of the conservation/ open space areas.
 - c. Detailed reports on the infrastructure required for each section of the Precinct such that all the impacts can be identified and where possible methods identified

for minimising or mitigating the issue. Alternative means of service provision to be investigated for specific sections of the Precinct.

- d. Wetland functionality.
 - e. Stormwater management plan.
 - f. Environmental management plan.
 - g. Detailed assessment of the proposed development within Mhlanga Forest
 - h. Specific investigations for the back-of-beach activities planned for the area (e.g. gondola, raised walkways, beach groyne).
 - i. Estuarine study in conjunction and related to the wetland and stormwater management studies
 - j. Rehabilitation/regeneration & landscaping plan
3. The Plan of Study for EIA was submitted to DAEA in December 2006 (Appendix 4).
 4. The Terms of Reference for the specialist studies (Appendix 5) were circulated to key stakeholders and I&APs in January 2007 (See Appendix 6 for list of registered I&APs).
 5. A public meeting was held on 8 February 2007 at the Sharks Board, Umhlanga Rocks Drive, Umhlanga at 17:30 in order to present the findings of the specialist studies (see Appendix 7 for advertisement notifying the public of the meeting as well as notes from the meeting).
 6. Correspondence with I&APs during the EIA is included as Appendix 8.
 7. The draft environmental impact report (EIR) was compiled and is being distributed to key stakeholders and I&APs for comment.

4 ISSUES IDENTIFIED

Numerous issues were identified during the scoping phase of this EIA. The issues that could be dealt with in the scoping phase have been included in Appendix 9. The focus of this section is to highlight the issues that could not be answered during scoping as they required specialist input or further study.

Table 3. Issues brought forward to the EIA phase.

Ref	Issue	Respondent	Response
1.	<p>Rehabilitation</p> <ul style="list-style-type: none"> The natural forests and wetlands must be preserved. The east-west and north-south corridors must be established. Recommended that the naval base be rehabilitated. Recommended that the naval base be rehabilitated Rehabilitation will be needed along the Ohlanga River floodplain. 	GAEA Projects	<ul style="list-style-type: none"> The Conservation Trust Area (see Figure 8) is to be managed by a new Sibaya Conservation Trust as discussed in Section 2.2 above. The wetlands outside of the Trust area are to be managed by the Sibaya Management Association(s). Marcel Henry & Geoff Nichols have compiled a landscape and rehabilitation plan (Appendix 11) which details the areas to be rehabilitated as well as how. East-west and north-south corridors are to be established and details thereof are also included in the landscaping and rehabilitation plan. The land is not owned by Moreland. In discussions with Warrant Officer Gounden from the base, he ruled out the possibility of this as an option as the base is an operational entity. The floodplain forms part of the Conservation Trust Area and as such will be rehabilitated (in accordance with the conservation management plan) and managed by the Conservation Trust.
2.	<p>Security:</p> <ul style="list-style-type: none"> How will access into the Mhlanga Forest be controlled if the area is not fenced? The development of a beach groyne means that although no major development is now proposed for the Mhlanga Forest the area will have free- 	<p>Rob Anderson & Associates cc</p> <p>GAEA Projects</p>	<ul style="list-style-type: none"> Vulnerable sections will be fenced. The physical fencing of the Forest will ensure that access to the beach via the Mhlanga Forest can be controlled, monitored, policed and maintained (Security initiative outlined in Appendix 12). The development of the beach groyne will be investigated in a separate EIA. Access potentially need not be taken through the Mhlanga Forest.

Ref	Issue	Respondent	Response
	<p>for-all access. Possibly a greater impact.</p> <ul style="list-style-type: none"> • Precinct security must be handled in a way that does not impact on the environment. In relation to the natural environment, the EMD favours using visible policing over physical barriers. 	<p>Rob Anderson & Associates cc</p>	<ul style="list-style-type: none"> • The development of the final security solutions for the Sibaya Node will consist of three clearly defined initiatives: <p>1. <u>Built Environment Phase</u></p> <p>The urban design and architectural solutions presented to the developers will be scrutinized to ensure that they comply with sound principles of Crime Prevention through Environmental Design.</p> <p>The total development will, therefore, ensure that as much of the development framework, the above ground structures and their inter relation is configured to provide as safe an environment as possible. Mixed (multi) use development will be encouraged to increase “the active fringes” and improve crime detection. The Design Review Process will address the reduction of opportunities for entrapment, concealment, the elimination of predictable routes and vandalism in the public domain and specifically at entrances to properties. Improved focused lighting solutions to deter crime and illuminated visible “way finding” signage will be provided, in terms of the Environmental Management Plan (EMP) and the Security Management Plan (SMP).</p> <p>This security initiative will continue into the management phase, with management staff ensuring that the built environment is maintained in a manner that will ensure the continued quality of life (environment) and good security is being properly controlled and achieved.</p> <p>2. <u>Physical Security</u></p> <p>As the development unfolds, and the understanding of the final layouts become clear, additional security measures will be built in, in the form of largely an electronic surveillance type initiative, as well as, where necessary, fencing and gates to restrict the flow of people through certain areas. This initiative will take all information to a central control room from which the security service provider will manage the security of Sibaya.</p> <p>Certain vulnerable boundaries of the Forest areas, managed by an independent Trust, will be fenced with appropriate controlled accesses to the various</p>

Ref	Issue	Respondent	Response
			<p>segments of the total development, which will secure, protect and provide tourist and educational awareness of the environment and its dune forest biodiversity.</p> <p>The physical fencing of the Forest will also ensure that access to a proposed beach groyne and limited access to the beach can be controlled, monitored, policed and maintained.</p> <p>3. Security Manpower Phase As Sibaya develops a security manpower group will be deployed into the area, to operate the surveillance equipment and managers to manage the total crime prevention strategy. The crime prevention strategy will be based on the use of both the environmental management plan and the security management plan for the area, which will continually monitor the success and take action where necessary.</p> <p>This phase will also include the patrolling and deployment of staff to key areas where other physical initiatives have not been able to protect the environment or reduce the potential crime hazard to an acceptable level.</p>
3.	<p>Stormwater management:</p> <ul style="list-style-type: none"> The appropriateness of a fly-fishing pond and its consistency with the ecozone. Stormwater run-off and slippage. In terms of the stormwater detention ponds, EKZNW will not support the fly- 	<p>Sagen Projects</p> <p>Sagen Projects</p> <p>Sagen Projects</p>	<ul style="list-style-type: none"> Please refer to section 5.2 of the Wetland Functionality Report (Appendix 10), 6.3 of the Hydrological Investigation (Appendix 13), correspondence from Dave Duke to John Cook (cc Debbie Donkin) dated 27th February and EKZNW response to building aesthetic dams/ponds: It is recommended that no aesthetic structure be placed and if an attenuation structure is urgently required, due to flood risk, then an appropriately designed dry attenuation structure be planned. Please refer to section 6.3 of the Hydrological Investigation (Appendix 13), correspondence from Dave Duke to John Cook (cc Debbie Donkin) dated 27th February and the 'Report to VELA VKE on a Preliminary Geotechnical Investigation of the Proposed Sibaya Residential Development, June 2006 by Drennan, Maud & Partners: Following recommendations from the above, suitable conditions (erosion protection, slope stability and attenuation design) will, and must, be implemented in the Environmental Management Plan. Refer to first Issue (Ref. 1).

Ref	Issue	Respondent	Response
	<p>fishing dam as they do not support dam creation for aesthetic purposes.</p> <ul style="list-style-type: none"> Sedimentation of the wetlands/ water courses must be prevented. 	<p>Sagen Projects</p> <p>GAEA Projects</p>	<ul style="list-style-type: none"> Please refer to section 3.2 (under “NOTE:”) of the Wetland Functionality Report (Appendix 10), section 6.2 of the Hydrological Investigation (Appendix 13) and correspondence from Dave Duke to John Cook (cc Debbie Donkin) dated 27th February: Satisfactory erosion protection structures for stormwater outfall points and potential erosion points along drainage lines should be considered and noted in the final Environmental Management Plan. These measures will be required to protect sedimentation of wetlands and water courses. <p>The EMP will include specifications for prevention of sedimentation of the wetlands/ water courses. The appointed contractor must then provide a method statement giving details of how the specifications will be met.</p>
4.	<p>Traffic implications:</p> <ul style="list-style-type: none"> The impact of the proposed new entrance into Umdloti will need to be assessed in terms of existing traffic into Umdloti Beach. In addition to the previous comments submitted, a Traffic Impact Assessment (TIA) is required. Umdloti Beach capacity is limited in terms of public facilities (toilets, parking etc). 	<p>DMA</p>	<ul style="list-style-type: none"> The proposed alternative accesses into Umdloti are pedestrian links. In terms of the existing access into Umdloti, the response recorded in the TIA produced by DMA is as follows (Appendix 14): In developing the traffic model for the area, current land uses within Umdloti Beach were estimated as below. <ul style="list-style-type: none"> Individual houses = 150 no Apartments = 1450 no Commercial = 5000 m² <p>A traffic count during a normal weekday in 2006 indicated the following traffic loadings on the Umdloti Beach access road. <ul style="list-style-type: none"> AM Peak outbound = 470 vph PM Peak inbound = 330 vph </p> <p>These surveyed traffic volumes are as would be expected for the current land uses, given the relatively low proportion of permanent residents in Umdloti Beach.</p> <p>With the restrictions of the Mdloti River to the north and the Mhlanga forest to the south, apart from increased densification of existing DU's, there is limited potential for growth.</p> <p>From surveys done in Ballito over Easter 2005, it was shown that peak holiday</p>

Ref	Issue	Respondent	Response
		Moreland	<p>traffic volumes are typically 15 to 30% higher than regular weekday traffic patterns, this occurring more in the middle of the day rather than early morning and evening. This is somewhat less than one would expect, the reason being that regular commuter peaks during non-holiday periods are greatly reduced during holiday periods.</p> <p>With the introduction of the Sibaya development, one would expect an increase in traffic on the Umdloti Beach access road due to the following types of trips:</p> <ul style="list-style-type: none"> • From Umdloti Beach to shopping opportunities in Sibaya. Due to the limited shopping opportunities within Umdloti Beach, this is most likely already happening to facilities in Umhlanga near-by (Gateway etc), so we do not see major changes here. • From Sibaya into Umdloti Beach. As there will be far more commercial developments within Sibaya than Umdloti Beach, the major attraction would be the beach. This would occur during weekends and holiday periods, outside of regular commuting peaks. It should also be borne in mind that Umdloti Beach is not the only beach opportunity in the area, and not all of Sibaya's beach trips will be to Umdloti Beach. Also, not all residents in Sibaya will visit the beach every day (an example being the massive growth in residential developments on the Umhlanga Ridge, but not the same proportional increase in visits to the Umhlanga Rocks beaches). Added to this is a proposed shuttle service from Sibaya into Umdloti Beach, which will reduce the traffic volumes and parking demand. <p>Based on the above, one would expect the maximum traffic volumes on this road to be under 700 vph. At such volumes, one cannot justify anything more than a two-lane (1+1) road as is currently in place. Only once volumes start to reach 1000 vph or more per direction can one start to justify a four-lane (2+2) road (peak hour volumes into Ballito in 2005 were 900 vph per direction as an example).</p> <p>Sibaya will provide for the parking needs of the new development and will not exacerbate the status quo problem of the seasonal influx of visitors to Umdloti and the lack of parking facilities highlighted by the Umdloti Residents and Ratepayers Association (UBRA). It will be likely to improve the current position, as visitors will be able to park in Node 5 and make their way to the beachfront,</p>

Ref	Issue	Respondent	Response
			<p>(as will be the case for residents of Sibaya) using various pedestrian access ways or the proposed vehicular access in the form of a shuttle bus service managed by the Management Association, which would use the existing M27 route into Umdloti. The number and frequency of trips would depend on the demand as Sibaya is developed. The drop off and collection points and operation of the service would be established in consultation with UBRA and the Sibaya Management Association.</p> <p>Alternative means of accessing the beach such as via the Mhlanga Forest or via a funicular will be investigated in separate EIAs.</p> <p>The fundamental principle is that there will be dedicated movement systems that will enable people to access the Umdloti beachfront in a manner that limits the impact on the current parking facilities within Umdloti.</p> <p>In terms of public facilities such as toilets, this issue needs to be resolved between Umdloti and eThekweni Municipality.</p>
5.	<p>Visual impacts:</p> <ul style="list-style-type: none"> In terms of the general approach to development, one major concern is that the proposal is to have major development on every available hill top. The proposed hilltop approach to the development will require assessment in terms of visual impact, form, design etc, particularly in terms of how it relates to the natural environmental system. A fairly 'hard' urban form/ lifestyle is proposed in these hilltop areas compared to the 'lighter' form proposed for development within/ adjacent to the forest. 	SRK	<ul style="list-style-type: none"> High density development is restricted to hilltops to retain the natural characteristics of the area. Lower density development towards low lying areas emphasises natural features such as wetlands, forests and natural green corridors. Furthermore, the assessment found that the hilltop developments are unlikely to significantly obstruct any sensitive views. In order to further enhance the quality of the area, Moreland proposes incorporating flowing green corridors by planting trees and having water bodies throughout the development. See Section 3.4 of the Visual Impact Report (Appendix 15) and the Density and Height Report (Appendix 16).

Ref	Issue	Respondent	Response
	<ul style="list-style-type: none"> The appropriateness of developing on the skyline. As an alternative, look at developing at the head of catchment areas below the skyline. (See Appendix XIII of Draft Scoping Report (August 2006) for proposed alternative layout as presented by Wade Holland). 	SRK	<ul style="list-style-type: none"> Developing the head of the catchment areas would not allow for transition zones between the development and natural features. It would also disrupt natural green corridors which may lead to the development having a more solid and dense city-like appearance. The shape of the natural environment will be lost by implementing this approach. The assessment found that due to the prominent dune system and undulating topography the hilltop developments are unlikely to significantly obstruct any sensitive views. See the Density and Height Report at Appendix 16.
	<ul style="list-style-type: none"> Maximum heights should be kept to 4 storeys. Development is already on the hilltops therefore keep buildings lower. 1-2 storey residences (i.e. low to medium densities) would be fine on hilltops but not 4-6 storeys or office blocks. Four storeys should be the maximum, six is too high. 	SRK	<ul style="list-style-type: none"> Building heights will be dependant on influences beyond the control of Visual Impact Assessment recommendations as they relate to future flight paths and the bylaws of the eThekweni Municipality. Building heights were found not to conceal any significant views. See Visual Impact Report at Appendix 15 and Height and Density report at Appendix 16.
	<ul style="list-style-type: none"> Development in the south, near the river will result in the loss of views from the Ohlanga River inland. 	SRK	<ul style="list-style-type: none"> Provision has been made in the design to ensure a buffer zone between the developed areas and the forests and to keep the building densities low in this area. This would provide some progressive mitigation although the views inland would still be altered.
	<ul style="list-style-type: none"> Overshadowing of Umdloti South residential area. 	SRK	<ul style="list-style-type: none"> There will be no overshadowing of the Umdloti residential area. See section 3.4 and Figure 6 of the Visual Impact Report (Appendix 15).
	<ul style="list-style-type: none"> What are the proposed densities and how will they impact on the viewsheds? 	SRK	<ul style="list-style-type: none"> See section 3.4 of the Visual Impact Report (Appendix 15). High density development is restricted to hilltops to retain the natural characteristics of the area. Lower density development towards low lying areas emphasises natural features such as wetlands, forests and natural green corridors. The buildings do not alter the viewsheds significantly.

Ref	Issue	Respondent	Response
	<ul style="list-style-type: none"> While in principle there is no problem with the concept of the family resort and a public area west of the M4 and north of the estuary, potential impacts on the estuary including visual impacts will need to be assessed and mitigated. 	SRK	<ul style="list-style-type: none"> This will be incorporated into the architectural design. Colour and building material must be kept natural and local to preserve the natural identity of the area. The buildings of the resort must preferably be kept below tree canopy height.
6.	The effect on the Sibaya Precinct development if both the airport and Sibaya developments go ahead (will then have 70-80db over some portions of the Precinct).	GAEA Projects	Refer to Figure 9 for the predicted 2015 LAeq, 16Hr contours and how they affect the Sibaya Precinct (information courtesy of INR and their sub-consultants). From the figure it can be seen that while the LAeq, 16Hr 45dB contour does cross the upper left and lower left corners of the site, this noise level is not of a level to prevent development in these areas; i.e. there is no significant impact on the Precinct (even the single event 747-400 does not have a major impact on Sibaya). Noise levels proposed for 2015 and 2035 also show that the Sibaya Precinct does not fall into the area of no-residential development, i.e. equal to or greater than LAQ 55 level.
7.	<p>Bathing beach:</p> <ul style="list-style-type: none"> Impact of increased number of people in the area. Link between parking facility/ family resort and beach needs careful consideration and discussion between adjacent landowners. Access points to the beach in terms of both impact and facilitating public access to the beach. (In terms of the Coastal Bill, there is a need to provide public access to the beach. It allows for municipalities to establish access servitudes over private property) The appropriateness of shark nets. Shark nets are completely indiscriminate. They catch not only the target species (those more likely to be involved in an attack), but a lot of other harmless shark species, as well as dolphins and turtles. Most authorities 	GAEA Projects	The development of a bathing beach is still under consideration for the area. However, it will undergo a separate EIA. Moreland have indicated that their rationale for a new bathing beach is the fact that, as the eThekweni Municipality has recognised in Umhlanga Rocks, there are limited existing bathing beach opportunities and with ever increasing numbers of residents and visitors to the region, there is a need to seek out and provide additional beaches.

Ref	Issue	Respondent	Response
	(marine biologists not necessarily Departments) consider this by-catch to be unacceptably high. This has obvious consequences for biodiversity, with particular regard to these predator populations and their role in the ecology of our coast. The Provincial Coastal Committee is also against any further shark nets being installed along our coastline.		
8.	<p>Open space system management:</p> <ul style="list-style-type: none"> • Is there a guarantee that in the future, the areas currently left as open space will not be developed? • Consideration should be given to zoning the forest as a conservation servitude. Could then have zones within that where some areas are protected and other areas are allowed access (e.g. for walkways etc). • Cost analysis for the funding and management of the conservation/ open space areas 	GAEA	The open space areas including the forests, corridors and wetlands will form part of a Conservation Trust as discussed in Section 2.2.
9.	<p>Dune boardwalk:</p> <ul style="list-style-type: none"> • The appropriateness of a dune boardwalk across the entire beach. • The layout is positive in terms of the dune boardwalk as this will protect the dune and vegetation can grow beneath it. 	GAEA Projects	The development of a dune boardwalk is still under consideration for the area. However, it will undergo a separate EIA.
10.	<p>Aerial boardwalks</p> <p>An aerial boardwalk is an idea that is supported provided that it does not lead to significant environmental impacts.</p>	GAEA Projects	The development of aerial boardwalks is still under consideration for the area. However, it will undergo a separate EIA.
11.	Soil erosion must be prevented.	GAEA Projects	An EMP has been produced for the development.
12.	Estuary:		

Ref	Issue	Respondent	Response
	<ul style="list-style-type: none"> An estuarine study will need to be undertaken. While in principle there is no problem with the concept of the family resort and a public area west of the M4 and north of the estuary, potential impacts on the estuary including visual impacts will need to be assessed and mitigated. 	GAEA Projects	See Appendix 19.
13.	<p>Gondola:</p> <ul style="list-style-type: none"> What type of gondola is to be established? The EMD does not support the construction of a gondola in the Umhlanga Forest. Such activities should be located in less sensitive areas. The gondola is not supported for a number of reasons including: <ol style="list-style-type: none"> The impacts that will be caused by constructing, operating and maintaining the gondola. The impact on sense of place. Impacts on birds, bats and insects that use the aerial environment immediately over the forest. Littering from the gondola. Possible shading impacts, etc. 	GAEA Projects	The development of a gondola is still under consideration for the area. However, it will undergo a separate EIA.
14.	<p>Groyne:</p> <ul style="list-style-type: none"> The proposed groyne/jetty and swimming beach will not be viable as it is unsafe for bathing. I have extensive knowledge of the littoral drift and sediment transport along the KwaZulu-Natal coast as a marine and coastal engineer with the National Ports Authority and a man made interruption to this natural process will be 	GAEA Projects	The development of a groyne is still under consideration for the area. However, it will undergo a separate EIA. Moreland's rationale for the groyne is to attempt to create a safe swimming beach.

Ref	Issue	Respondent	Response
	<p>disastrous.</p> <ul style="list-style-type: none"> The appropriateness of a groyne given the proposed ecological theme of the area. Although beach driving by club members has always been banned at Peace Cottage, the club has maintained at their own expense, a ramp for vehicular access onto the beach for search & rescue teams, enforcement agencies and beach cleaning crews, as there is no road access to the beach from the Umhloti side and when the Mhlanga River mouth is open, access from the Umhlanga side of the beach is cut off. That said, this ramp and vehicular access would be greatly compromised by the building of the proposed groyne, apart from it being built where it would possibly aid the silting up of the rocky outcrop which is such a hallmark of the beach, as it would alter the strong currents which scour out the build up of sand during times of heavy seas. The beach is already functional, therefore no need for groyne. The groyne will have negative spin-offs in terms of sand transfer. 		
15.	<p>Layout:</p> <ul style="list-style-type: none"> The archaeological sites have not been taken into account. If every hilltop has development, the 	<p>GAEA Projects</p> <p>Iyer Rothaug</p>	<p>There are 3 sites that have high value and will be excavated and reported upon prior to construction commencing in those specific areas. The other sites will require investigation once the cane has been cleared for construction. See Appendix XX of the Scoping Report, 2006. Where permits are required, these will be applied for from Amafa. (Refer to the Density and Height Report at Appendix 16.) A fundamental design</p>

Ref	Issue	Respondent	Response										
	<p>theme would possibly lose out on such a big scale. Alternatively, look at the heads of the catchments/ head of the valleys and put development within the valley heads.</p>		<p>driver for Sibaya is the “hilltop town” approach to reduce the overall physical footprint to enable a more urbane hilltop development, which is played against a more generous open space system. The designers suggest that there are several benefits to this, including inter alia:</p> <ul style="list-style-type: none"> • Compact development creates an urban intensity that delivers an environment that offers diverse opportunities by creating threshold to support a wider range of activities; • Clustering of development on hilltops together with landmarks, would create a more legible and visually diverse environment, as opposed to the perpetual sameness of suburbia, • Greater density encourages greater efficiencies in terms of infrastructure and provides an important basis to sustain a diverse offering in terms of services, facilities and economic activity. • Compact and clustered development reduces the spatial footprint and therefore reduces the impact on the environment. It is argued that ironically the converse applies in low density environments that perpetuate suburban sprawl whilst perceived to have a lower impact. <p>From a sustainability perspective, the Sibaya development project is on a One Planet Living (OPL) trajectory, where it is proposed that future development subscribes to OPL principles. It is argued that compact development offers far greater possibilities to achieve the core principles of OPL, and in turn sustainability, as found in the Case Study of the City of Vancouver in Canada, where the following was found:</p> <p>TABLE 1: OPL AND DENSITY</p> <table border="1"> <thead> <tr> <th>OPL Principles</th> <th>Benefits of Density / Compact Development</th> </tr> </thead> <tbody> <tr> <td>Zero Carbon</td> <td>Greater energy efficiencies resulting in lowered carbon emissions</td> </tr> <tr> <td>Zero Waste</td> <td>More innovative waster management strategies result form dense developments</td> </tr> <tr> <td>Sustainable Transport</td> <td>Better public transport use in dense developments</td> </tr> <tr> <td>Local and Sustainable Food</td> <td>Allows for prime agricultural production closer to urban consumers</td> </tr> </tbody> </table>	OPL Principles	Benefits of Density / Compact Development	Zero Carbon	Greater energy efficiencies resulting in lowered carbon emissions	Zero Waste	More innovative waster management strategies result form dense developments	Sustainable Transport	Better public transport use in dense developments	Local and Sustainable Food	Allows for prime agricultural production closer to urban consumers
OPL Principles	Benefits of Density / Compact Development												
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Ref	Issue	Respondent	Response								
	<ul style="list-style-type: none"> The role of Umdloti Beach and linkages to and integration with the proposed New Town area as well as the rest of the precinct are also important considerations. In the forest portions, the appropriateness of conceptual trails across the entire forest needs to be considered. It will need careful design. 	<p>GAEA Projects</p> <p>GAEA Projects</p>	<table border="1"> <tr> <td>Natural Habitats and Wildlife</td> <td>Concentrates settlement preserving habitats</td> </tr> <tr> <td>Culture & Heritage</td> <td>Creates vibrant neighbourhoods in which arts, culture heritage thrive</td> </tr> <tr> <td>Equity and Fair Trade</td> <td>Greatly enhances opportunities for local economic development</td> </tr> <tr> <td>Health & Happiness</td> <td>Walkable, greener, job-environments offer higher quality of life</td> </tr> </table> <ul style="list-style-type: none"> Due to the topography of the land between the New Town node (nodes 1 & 5) and Umdloti, the presence of a wetland in the north-east corner of the node and the proposed green corridor, physical integration with Umdloti (i.e. extending development from Sibaya directly into Umdloti) is not viable. However, the development of this node for residential, resort and commercial uses will in essence, act as an extension to Umdloti at the same time providing necessary 'back of beach' activities for Umdloti and the beachfront for, for example, parking, commercial and recreational activities. Proposed linkages between the New Town area and Umdloti are via pedestrian linkages and a proposed shuttle service which will provide access for Sibaya residents to Umdloti and for Umdloti residents to Sibaya. The development of trails would require a separate study/ assessment. 	Natural Habitats and Wildlife	Concentrates settlement preserving habitats	Culture & Heritage	Creates vibrant neighbourhoods in which arts, culture heritage thrive	Equity and Fair Trade	Greatly enhances opportunities for local economic development	Health & Happiness	Walkable, greener, job-environments offer higher quality of life
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Health & Happiness	Walkable, greener, job-environments offer higher quality of life										
16.	<p>Niche resort/ spa:</p> <ul style="list-style-type: none"> The Natal Estates Angling Club site relies on two water tanks, with no water borne sewerage apart from one toilet (septic tank). The Angling Club thus sees the development of the proposed niche resort as being detrimental to the already pressurised coastal dunes and threat to further encroachment into the forest vegetation as the new resort will certainly need a greater total footprint area than the Club's present site. 	GAEA Projects	While a footprint has been identified within the Mhlanga Forest on the already disturbed site where the existing angling club is situated, the actual development of the niche resort and spa will undergo a separate EIA due to the sensitivity of the site.								

Ref	Issue	Respondent	Response
	<ul style="list-style-type: none"> • The proposed development of the niche resort/ spa in the coastal forest is not supported. Likewise the link between this proposed resort and the proposed family resort west of the M4 is also of concern. There is likely to be some kind of relationship between these facilities and hence additional numbers of visitors would be anticipated in the forest area. • The appropriateness of the niche resort and spa within the Mhlanga Forest and of the riverside resort is questioned. • The development of a boutique hotel in the forest could lead to further development in this node. The proposed walkways will also have impacts (e.g. littering). How will it be guaranteed that no further development would take place in this node? • The EMD does not support the location of the Boutique Hotel and Spa in the Umhlanga Forest, as this will lead to significant environmental impacts. The developers of the concept have generally adopted a principle which locates all development outside of currently forested areas. The EMD supports this principle because coastal forest in central KZN has been drastically reduced in recent history. According to Moll (1976), in The Vegetation of the Three Rivers Region, 99% of Coast Forest in the Three Rivers Region (between the Tugela River and Mkomanzi River catchments) 		

Ref	Issue	Respondent	Response
	has been cleared. Every effort should be made to avoid further impacts on coastal forest and the processes that support its persistence.		
17.	Wetland functionality assessment should be done as there will be increased run-off which will affect both the estuary and wetlands on the site.	GAEA Projects	A wetland functionality assessment was completed by LRI and is included as Appendix 10.

Further to the issues raised during the scoping phase, some issues were raised during the EIA phase and are included in the table below.

Table 4. Issues raised during PPP for EIA

Ref	Issue	Identified by	Respondent	Response
18.	Referred to the last presentation (OPL) of the public meeting (08/02/2007) which presupposes control and a management system. Asked if developers would be punished if these systems were not adhered to?	Graham Cairns WESSA	Moreland	Sibaya Development will be managed through a Section 21 Company (Sibaya Management Association). Moreland will control the process initially and hand over to the owners and residents in phases when functional, viable and sustainable Associations have been established. The building review processes will be controlled through a Design Review Panel of the Sibaya Management Association's Boards. The land sale agreements, the Design Codes and Association rules are planned to encourage compliance with One Planet Living (OPL) principles and the creation of a sustainable communities and life styles. The Sustainability Action Plan (SAP) is the guiding document that indicates how OPL is to be applied to Sibaya. The formal adoption of OPL within Sibaya is subject to a legal agreement with BioRegional and is still being concluded. However, in the event of such a legal agreement not being concluded, the intention remains to utilise and implement, as part of the EMP, the principles of OPL.

Ref	Issue	Identified by	Respondent	Response
			GAEA Projects	An EMP will be produced for the development which will be audited by an ECO and DAEA. If developers do not comply with the requirements of the EMP, development can be stopped and possibly fines imposed.
19.	<p>Botanic Garden</p> <ul style="list-style-type: none"> Said that a current publication at Moreland states that the largest botanical garden is going to be included in the Sibaya Precinct. Asked if Moreland can give an idea of the approximate area of the botanical gardens and where they will be situated. Said that they need clarity as to whether a botanical garden is to be developed or whether the whole development is a botanical garden and then whether it is to be indigenous. 	<p>Heather Cairns WESSA</p> <p>Graham Cairns WESSA</p>	Moreland	<p>Although no specific site has been identified (but could be established within the open space system or an adjacent site if appropriate), the proposal for a Botanic Garden is compatible with the vision for Sibaya. Detailed planning would need to be addressed through a separate EIA process and would be subject to a viability and sustainability analysis by the proponent. .</p> <p>A site for an environmental recreational facility has been identified (albeit off the Sibaya boundary) adjacent to the existing sewer treatment works for any type of activity that fits within the overall vision and concept and objectives of Sibaya (Figure 7). This could include uses/activities such as - monkey sanctuary, bird centre, botanic gardens, wildlife environmental centre, etc. The site is directly adjacent to the Hawaan Forest and the Ohlanga River and is therefore integrally linked with the conservation area and should be developed as part of the conservation development but as it is not on the site or the activities defined, a separate, additional EIA would be required for its development. It is noted also that Moreland's Izinga Phase III EIA does include this area but it is understood that this is to be removed therefrom.</p>
20.	Said that the management of the precinct had not been touched on. Asked what the envisaged plan for the management/ operation/ sustainability of the Precinct was.	Neil Slatter	Moreland	Sibaya Development will be managed through a Section 21 Company (Sibaya Management Association). Moreland will control the process initially and hand over to the owners and residents in phases when functional, viable and sustainable Associations have been established.

Ref	Issue	Identified by	Respondent	Response
				The building review processes will be controlled through a Design Review Panel of the Sibaya Management Association(s) Boards. The land sale agreements, the Design Codes and Association rules are planned to encourage compliance with One Planet Living (OPL) principles and the creation of a sustainable communities and life styles.
21.	Noise from the aircraft using the proposed King Shaka airport.	Wade Holland	GAEA Projects	Refer to Figure 9 for the predicted 2015 LAeq, 16Hr contours and how they affect the Sibaya Precinct (information courtesy of INR and their sub-consultants). From the figure it can be seen that while the LAeq, 16Hr 45dB contour does cross the upper left and lower left corners of the site, this noise level is not of a level to prevent development in these areas; i.e. there is no significant impact on the Precinct (even the single event 747-400 does not have a major impact on Sibaya). Noise levels proposed for 2015 and 2035 also show that the Sibaya Precinct does not fall into the area of no-residential development, i.e. equal to or greater than LAQ 55 level.
22.	It was not stated what effect it would have on hydro levels if the development nodes were built from the bottom of the slopes upwards, leaving the hilltops relatively free of buildings.	Heather Cairns WESSA	Sagen Projects	<p>If the development takes place closer to the end/exit of the catchment then the run-off <u>peak</u> will be higher as the hardened surfaces of the development are discharging immediately towards the catchment exit. But because the development occurs on the highest points (start/head of the catchment) then the run-off peak is 'attenuated'/reduced by the stream channels and any reservoirs in place before the catchment exit.</p> <p>It is the same for the run-off volume, but to less extent or magnitude. If the development was closer to the catchment exit the total run-off <u>volume</u> immediately flows from the developed area towards the exit point. With development taking place at the catchment head, and if run-off from the development is dispersed over a larger area rather than being directed into channels that</p>

Ref	Issue	Identified by	Respondent	Response
				<p>carry run-off directly to the exit point, the run-off volume is reduced as it reinfilters the soil and has a chance to be taken up and used by plants and evaporated from the soil (evapotranspiration).</p> <p>So the closer to the catchment exit the easier it is for the run-off volume and run-off peak, created by the development, to immediately exit the catchment. The closer to the head/start of the catchment the more the run-off peak will be attenuated and the more chance the run-off volume will be reduced. Hydrologically, Moreland have put the development nodes in the right place, as far from the exit of the catchments as possible.</p>
23.	What space has been allocated to places of worship, community centres, schools etc?	Heather Cairns WESSA	Moreland	Provision has been made for an education/ school site to the west of the M4. In terms of places of worship, the legislation no longer requires a certain number of worship sites per number of residential units. However, any religious body may purchase a site and apply for rezoning to a worship site. The same logic applies to a crèche.
24.	<p>Planning/Urban design</p> <p>We need your urgent clarification of the actual land use framework. Nathan Iyer stated that of the Sibaya Precinct area of 850ha, some 41 % would be retained as natural forest. We queried whether or not the Hawaan Forest, which lies outside of the study area, was incorporated in determining the division of land uses. If this is correct then it will grossly distort the percentage used in the report for 'built environment' of 21 % and other designated areas.</p> <p>We regard this as a very serious issue as it brings into question the validity of other information provided in this report.</p>	UBRA & Mike Norris	GAEA Projects	<p>Clarification on area described as the Sibaya Precinct: The area comprising the Sibaya Precinct includes the Hawaan Forest (apart from the portion owned by Hawaan Investments) and covers the following properties (see Figure 3):</p> <p>Cadastral Description</p> <ul style="list-style-type: none"> • Rem of Portion 42 of Lot 31 No. 1560 • Rem of 46 of Lot 31 No. 1560 • Portion 39 of Lot 31 No. 1560 • Portion 38 of Lot 31 No. 1560 • Rem of Portion 37 of Lot 31 No. 1560 • Rem of 36 of Lot 31 No. 1560 • Rem of 35 of Lot 31 No. 1560 • Portion 420 of Lot 31 No. 1560 • Portion 421 of Lot 31 No. 1560

Ref	Issue	Identified by	Respondent	Response
	<p>Page 88 of the Draft Scoping Report Aug 2006 Ref 44 stated, “the exact densities of the development will be based on the outcomes of the specialist studies”.</p> <p>From what we understand so far, the built environment densities may be unacceptably high.</p>			<ul style="list-style-type: none"> • Rem of 436 (of 435) of Lot 31 No. 1560 • Rem of Lot A No. 1532 • Rem of Lot B No. 1533 • Rem of Lot 42 No. 1114 • Rem of Portion 615 Cottonlands No. 1575 • Portion 75 of the farm Cottonlands no. 1575 • Portion 76 of the farm Cottonlands no. 1575 • Portion 67 of the farm Cottonlands no. 1575 • Portion 68 of the farm Cottonlands no. 1575 <p>It should be noted that Portion 417 of Lot 31 No. 1560 Umhlanga Rocks does not form part of the proposed area (this Portion is owned by Hawaan Investments (Pty) Ltd).</p>
25.	<p>Traffic Study</p> <p>David McFarlane made a very strong case in his Sibaya TIA revised Aug. 2006 para.6.2 as to why the M4 should not be widened. These included impact on environmentally sensitive Hawaan Forest, scenic route for tourism and knock on effects. We had already passed this on to Institute of Natural Resources with the request that the Sibaya TIA be incorporated into the La Mercy Airport TIA.</p> <p>We were shocked therefore to hear him tell us that the M4 needs to be widened from 2 lanes to 4 or more lanes. Given the constraints posed above is this a realistic suggestion?</p> <p>It is important that TIA for La Mercy Airport be included in this Report to get a true picture of traffic densities.</p>	UBRA	GAEA Projects	<p>The TIA for the airport does take existing and proposed developments for the entire region into account including Sibaya. According to the TIA produced for the airport, several road-based infrastructure upgrades have been proposed (at various times within the following 15 years) to accommodate the increase in traffic which includes upgrading of the M4. In terms of the 2020 situation, on the N2 the critical consideration is whether or not the M4 will be widened to the south of Umdloti. If the M4 is not widened, an 8 lane (4+4) freeway will be required.</p> <p>If the M4 is widened it is predicted that the N2 will require (and be operating near the capacity of) a 6 lane (3+3) freeway.</p> <p>According to the airport TIA, the demand on the M4 appears to justify a four lane facility (2+2). However, it does state that if the upgrade is not possible (say due to environmental considerations) the traffic demand will shift to the N2 as discussed above (DTP TIA).</p> <p>In terms of the TIA produced for the Sibaya Precinct, it does take the airport into account (see Appendix 14).</p>

Ref	Issue	Identified by	Respondent	Response
	McFarlane also made reference to the fact that the existing M4 reached 80 percent capacity during peak hours. There is already a strong case to reduce traffic flows by restricting heavy vehicles from using the M4. Assuming that the M4 cannot be widened it is clear that alternative routes will be necessary to cater for the envisaged increase in traffic.			In McFarlane's presentation he indicated that at full development, it will be necessary to upgrade the M27 in the vicinity of the M4 and the Sibaya interchange will require upgrading, through re-striping (i.e. no upgrading of the M4). In terms of heavy vehicles using the M4, this is regulated by the eThekweni Transport Authority and the Roads Department. While the access routes used by construction vehicles during the construction phase of the development can be controlled through the implementation and monitoring of the EMP, it cannot control the use of the M4 by other heavy vehicles.
26.	<p>Niche Resorts and Spa. Urban design charts include provision of a niche resort and spa in the Mhlanga Forest area. We request details of this proposal.</p> <p>What is the area to be used and what is the total forest area?</p> <p>It was previously indicated that 20 or more "exclusive" sites were to be developed in this area. Is this no longer the case?</p>	<p>UBRA & Mike Norris</p> <p>Mike Norris</p> <p>Mike Norris</p>	<p>GAEA Projects</p> <p>GAEA Projects</p> <p>GAEA Projects</p>	<ul style="list-style-type: none"> There are no exact details available for the niche resort and spa as this will have to undergo its own EIA to determine the suitability and sustainability of developing in the open area within the forest. UBRA will be notified once the EIA for this proposed development is commenced. In terms of the area to be used, it includes the open/ cleared portion within the Mhlanga Forest (at the end of the current access route) where there is currently the Angling clubhouse and ablution facilities. The previous EIA for the Mhlanga Forest was for the development of the Mhlanga Forest Estate which was proposed to consist of 69 residential units and one community facility site where a swimming pool and small Clubhouse and related facilities would have been developed. However, as a result of the scoping exercise carried out for this proposal, the concern of developing numerous sites within the forest itself was highlighted. The need to look at the greater area was also raised, hence the termination of the EIA for the MFE and the commencement of the EIA for Sibaya Precinct.

Ref	Issue	Identified by	Respondent	Response
				During the charrette facilitated by Iyer Rothaug for the Precinct, the idea of developing a niche resort and spa within the open area of the forest was identified and hence the development of separate units was abandoned.
27.	<p>Waste Water Disposal</p> <p>Brendan Magill indicated that sewerage would be linked to the Phoenix system. Can you confirm that the proposal of using the Umdlotti system has been abandoned? With regard to storm water management we have requested Umdlotti Coastal Conservancy to respond on our joint behalf.</p>	UBRA & Mike Norris	Goba & VelaVKE	The Umdlotti system will not be used. See Appendix 20.
28.	<p>Crime & Security</p> <p>It is well known that there is an escalation of crime during construction and building phases of new developments. The Sibaya Precinct development will be no exception given the large workforce required.</p> <p>Safety measures, including a fenced buffer between Nodes 1 and 5 and the forest area on Umdlotti's Western boundary needs to be implemented before construction commences. Thereafter, there needs to be adequate security management planning for the entire area.</p>	UBRA	Rob Anderson & Associates	<p>As Sibaya develops a security manpower group will be deployed into the area, to operate the surveillance equipment and managers to manage the total crime prevention strategy. The crime prevention strategy will be based on the use of both the environmental management plan and the security management plan for the area, which will continually monitor the success and take action where necessary (Appendix 12).</p> <p>This phase will also include the patrolling and deployment of staff to key areas where other physical initiatives have not been able to protect the environment or reduce the potential crime hazard to an acceptable level. The forest areas above Umdlotti will be fenced off during construction to ensure no poaching and squatting.</p> <p>See Appendix 12 for further details.</p>
29.	<p>Umdlotti Issues</p> <p>These have not so far been addressed. We have made the point on several occasions that the parking capacity of Umdlotti is</p>	UBRA	Moreland & Vela VKE	Parking will be provided in Nodes 1 & 5 with a shuttle service proposed to transport people between the Sibaya Precinct and Umdlotti. There would thus be a

Ref	Issue	Identified by	Respondent	Response
	<p>limited and there is a need to redesign the entrance to Umdlotti. Page 88 of the Draft Scoping Report Ref 45 states that, "DMA's understanding is that parking areas are to be provided within the Sibaya Precinct with shuttles to the beaches."</p> <p>Page 89 of the Scoping Report Ref 52 promised an investigation/specialist study to address the concern that there is no connection between Umdlotti and the new town centre. Page 100 Ref 96 suggests the eThekweni Municipality would need to be involved.</p> <p>In the 8 Feb Report Back two references were made that back-of-beach parking was planned in Nodes 1 & 5 but no indications as to how beachgoers would access the beach other than via a pedestrian link via Fourth Avenue and another from the Sports Precinct area via Margaret Bacon Avenue. Neither of these avenues has pavements and would have to be upgraded.</p>	UBRA & Mike Norris		<p>reduced impact on the parking facilities.</p> <p>It is intended that the shuttle bus service will be managed by the Management Association, which would use the existing M27 route into Umdlotti. The number and frequency would depend on the demand as Sibaya is developed. The drop off and collection points and operation of the service would be established in consultation with the Umdlotti Beach Residents and Ratepayers Association (UBRA) and Sibaya Management Association.</p> <p>Proposed pedestrian access to the beach will be via Margaret Bacon Avenue and Fifth Avenue. Initially the framework plan indicated using Margaret Bacon and Fourth Avenue, however, after more detailed on site analysis, assessing gradients, impact on the existing forest and the degree of private building encroachment within the road reserves, it was decided that Fifth Avenue would be the better option. Where appropriate and encroachments permit, new pedestrian sidewalks will be provided on these routes. Such access points will need to be controlled and managed for both existing Umdlotti residents as well as future Sibaya residents.</p> <p>In addition it is suggested that either a funicular link or some other appropriate, economically viable people mover system from Node 5 could provide a two-way service for Sibaya and Umdlotti residents.</p> <p>In the longer term and subject to the EIA process an additional link to the beach is planned south of Umdlotti in the area of Peace Cottage / Meadowbanks / estuary edge as indicated on the framework plan.</p> <p>The proposed dune boardwalk and sea groyne are intended to increase access to the beach and to enable</p>

Ref	Issue	Identified by	Respondent	Response
				an underutilized resource to be more fully and sensitively used, something that will become increasingly important into the future when Sibaya becomes a significant tourist attraction to the north of the city.
30.	<p>La Mercy Airport Noise pollution from aircraft landing and taking off from the proposed new La Mercy Airport needs to be taken into account in this Study. Noise implications for the proposed La Mercy Airport specialist study are currently being redone by INR and should be factored in to the Sibaya Study when available.</p>	UBRA	GAEA Projects	Refer to Figure 9 for the predicted 2015 LAeq, 16Hr contours and how they affect the Sibaya Precinct (information courtesy of INR and their sub-consultants). From the figure it can be seen that while the LAeq, 16Hr 45dB contour does cross the upper left and lower left corners of the site, this noise level is not of a level to prevent development in these areas; i.e. there is no significant impact on the Precinct (even the single event 747-400 does not have a major impact on Sibaya). Noise levels proposed for 2015 and 2035 also show that the Sibaya Precinct does not fall into the area of no-residential development, i.e. equal to or greater than LAQ 55 level.
31.	<p>General In what sequence is it proposed to develop the various nodes? What is the 'time frame' for development? Will development of the nodes comply with the proposed waste water, road and storm water layouts from inception?</p>	Mike Norris	GAEA Projects	Nodes 1 & 5 will be developed first followed by 2, 3 & 4, the order of which will depend on numerous factors. They will have to comply with the proposed waste water, road and storm water layouts as approved by the appropriate authorities.
32.	<p>Roads and traffic The various handouts indicate that the M27 will continue to the only road access into Umdloti Beach. Can you confirm that this is the intent? What provision if any is intended for 'back of beach' parking and transport from there to the beach?</p>	Mike Norris	<p>GAEA Projects</p> <p>GAEA Projects</p>	<ul style="list-style-type: none"> As indicated in point 12 above, pedestrian links have been proposed via Margaret Bacon and Fifth Avenue with the M27 remaining as the only vehicular access to Umdloti. Back of beach parking will be provided in Nodes 1 & 5, with a shuttle service proposed to transport people between Umdloti & the Sibaya Precinct. Apart from the proposed pedestrian links,

Ref	Issue	Identified by	Respondent	Response
	<p>An additional traffic circle is proposed on the M4 to service Node 3 and the 'Peace Cottage' area. It is submitted that this will further impact on the efficiency of the M4 which is inevitably going to be heavily congested. This traffic circle should be avoided if at all possible.</p> <p>Are there any steps to control or constrain heavy vehicle traffic on the M4 e.g. Limit vehicle size to 15 tonnes Impose time constraints – e.g. close from 06:00-09:00.</p>		<p>DMA</p> <p>GAEA Projects</p>	<p>investigations into a funicular linking the 2 areas will be investigated in a separate EIA.</p> <ul style="list-style-type: none"> The TIA identifies that a new traffic circle is proposed to service Node 3. Before the ETA got involved in the north, the Province (KZN-DOT) gave approval of an access off the M4 at that location. As the M4 in this vicinity is a Provincial road, KZN DOT will need to approve the circle. The ETA has not opposed this proposed circle. In terms of heavy vehicles using the M4, this is regulated by the eThekweni Transport Authority and the provincial Roads Department. While the access routes used by construction vehicles during the construction phase of the Sibaya Precinct can be controlled through the implementation and monitoring of the EMP, it cannot control the use of the M4 by other heavy vehicles.
33.	<p>Security</p> <p>Are there any plans to impose access control for the various nodes?</p>	Mike Norris	Rob Anderson & Associates	Sibaya consists largely of open space, unfenced developments and will not be a gated community, although it is acknowledged that "top structures" may be individually secured. It will require a range of security initiatives to ensure a secure environment.
34.	Question raised about moving the M4.	Pierre Jevon	GAEA Projects	There is no proposal to move the M4.
35.	Iconic structures & wind - I have a client who paid top \$ for a penthouse in The Oysters & is selling because their sliding door has blown out!	Pierre Jevon		The iconic structures will be developed as landmarks identifying the different hilltops and might not necessarily be residential blocks. According to the architectural guidelines for development within the Precinct, the architects responsible for designing the structures will need to take the environment (i.e. sun, prevailing wind direction etc) into account when designing the buildings (Appendix 18).
36.	Who polices the development once ROD received?	Pierre Jevon	GAEA Projects	An environmental control officer must be appointed to monitor the development and compliance with the Environmental Management Plan (EMP) drawn up for the development. Audit reports must be submitted to

Ref	Issue	Identified by	Respondent	Response
				DAEA and the eThekweni Municipality recording compliance/ non-compliance with the conditions of the EMP. DAEA and the eThekweni Municipality may also audit development of the Precinct. Depending on the severity of non-compliance, development can be halted.
37.	I see no drainage\stormwater plan directly above 4 th & 5 th & 6 th Avenue Umdloti - that is below the proposed 2 hotels.	Pierre Jevon	GAEA Projects	Stormwater management plan (Appendix 17).
38.	A concern about the boardwalk to the beach: The beach in front of 4 th , 5 th & 6 th Avenue is NOT a safe bathing area Knowing holiday makers they will see the sea & jump in & good bye The beach at Margaret Bacon is far more suitable	Pierre Jevon	GAEA Projects	Moreland have proposed the development of a beach groyne in the vicinity of the Mhlanga Forest (north of the Ohlanga river mouth). However, this will be the subject of a separate EIA as will the development of the dune boardwalk.

5 IMPACT DESCRIPTION AND EVALUATION

5.1 METHODOLOGY

Based on visits to the site and consultation with the various role-players this section of the report examines key issues and the resulting impacts associated with the proposed development.

The impacts have been identified, described and their significance assessed with and without mitigation under the categories of planning phase, construction phase and operational phase impacts. A brief discussion of the impact and the rationale behind the assessment of the significance and whether the impact can be reduced or negated through mitigation has been included.

An impact of low significance has only limited effect on the environment, whereas an impact of high significance has a major effect on the environment. A positive impact is one that enhances the existing environment whereas a negative impact is one that degrades it.

Temporal and spatial influence is also addressed in the analysis of impacts.

5.2 IMPACTS

Impacts and issues identified by the scoping process and outlined in Tables 3 & 4 are carried forward into Table 5, which classifies them using the methodology described in 5.1. In order to highlight the linkage the reference (ref.) indicates the issue or group of issues from Tables 3 & 4 is being addressed.

Table 5. Assessment of Impacts and Issues

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
PLANNING PHASE IMPACTS					
Socio-economic Environment – Positive Impacts					
15	Linkages between the New Town Centre (Node 5) and Umdloti	Low, positive impact. Long term duration	Umdloti	In terms of linking physical development from Node 5 to Umdloti, this is not possible due to the green corridor and the location of a wetland in the north east corner of the site. However, movement between the two areas will be encouraged and facilitated through a shuttle service and pedestrian links. Therefore, while the areas will not be directly linked, integration between the two areas will occur.	Moderate, positive impact, long term duration
Socio-economic Environment – Negative Impacts					
15	Location of archaeological sites relative to development	Low to high, negative impact, long term duration	Regional	Three sites of high significance have been identified which will require excavation and reporting. The other areas will be re-investigated just prior to construction and 'cleared' by a suitable consultant. Where permits are required, these will be applied for from Amafa.	Low, negative impact, long term duration
24	Densities	Moderate to high, negative impact, short to long term duration	Local	The engineering consultants (VelaVKE and GOBA) have shown that in terms of infrastructural requirements, the densities proposed can be accommodated. The planning and urban design consultants have motivated and explained the rationale and need for the densities as proposed and it has been shown that such densities provide more support for the OPL principles than lower density developments spread over a larger area (See Appendix 16).	Low to moderate, negative impact, short to long term duration
29	Limited parking capacity in Umdloti	Moderate, negative impact, long term duration	Umdloti	Parking will be provided in Nodes 1 & 5 with a shuttle service to transport people between the Sibaya Precinct and Umdloti. There would thus be a reduced impact on the parking facilities. Proposed pedestrian access to the beach will be via Margaret Bacon Avenue and Fifth Avenue. Initially the framework plan indicated using Margaret Bacon and Fourth Avenue, however, after more detailed on site analysis, assessing gradients, impact on the existing forest and the degree of private building encroachment within the road reserves, it was decided that Fifth Avenue would be the better option. Where appropriate and encroachments permit, new pedestrian sidewalks will be provided on these routes.	Low, negative impact, long term duration
32	Traffic circle proposed to facilitate access off	Moderate, negative	Local	As the M4 in this vicinity is a Provincial road, KZN DOT will need to approve the circle. A preliminary meeting with the Roy Ryan of the	Low, negative impact, long term

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
	the M4 to Node 3 may result in traffic congestion on the M4.	impact, long term duration		DoT reflected no major reservations about the proposed southern circle (See Appendix 14, pp2, sentence 2 of paragraph 2 of the Minutes of meeting to discuss Sibaya developments and access M4 traffic circles). The traffic circle has been proposed to facilitate access to Node 3 off the M4 and therefore reduce impact on traffic flow on the M4.	duration
Bio-Physical Environment – Negative Impacts					
3	Stormwater management	High, negative impact. Long-term duration.	Site and surroundings	A storm water management plan (SWMP) has been drawn up for the proposed development which outlines the principles to be applied to ensure that post-construction storm water run-off should be less than or equal to pre-construction values. Stormwater management is a vital part of the planning phase as the impacts of incorrect planning in this phase will carry through to the long term operational phase of the development. In terms of retention pond locations, these have been placed outside the wetlands. The implementation of the SWMP will reduce the potential impact to low significance.	Low, negative impact, short term duration.
15	Location of development in the valley heads as opposed to development on hilltops.	Moderate, negative impact. Long-term duration	Site	The Sibaya Precinct is aiming to achieve One Planet Living status (or at least to implement OPL principles) which promotes sustainable development. Hence the planners have proposed hilltop developments so as to provide for a larger, more connected open space system, to reduce the spatial footprint of the development, to prevent urban sprawl and to provide greater efficiency in terms of infrastructure and servicing. The location of the development therefore reduces the impact of the development on the area.	Low, negative impact, long term duration
35	Effect of wind on iconic structures	No impact	Local	According to the architectural guidelines for development within the Precinct, the architects responsible for designing the structures will need to take the environment (i.e. sun, prevailing wind direction etc) into account when designing the buildings so as to prevent such events from occurring.	No impact
Bio-Physical Environment – Positive Impacts					
1	Rehabilitation: Rehabilitation of natural forests, wetlands and the	Moderate, positive impact. Long-term duration.	Regional	The forests, wetlands and the Ohlanga River floodplain form part of the open space system which will be rehabilitated and managed through the Sibaya Conservation Trust as discussed in Section 2.2. Internal roads, secondary wetlands and access network reserve	High, positive impact, long term duration

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
	Ohlanga River floodplain.			areas will be managed by the Sibaya Management Association.	
Visual Environment – Negative Impacts					
5	Impact of density and developing on hilltops	Moderate, negative impact. Long-term duration.	Site	While high density development is restricted to hilltops to retain the natural characteristics of the area, inappropriate architecture/ design could result in a negative visual impact. It is therefore essential that the Design Review Panel that manages the architectural design of developments within the Precinct manage this process correctly in order to ensure that only environmentally-sensitive/ cognisant developments take place. The visual assessment found that the hilltop developments are unlikely to significantly obstruct any sensitive views or to overshadow any existing development. Therefore with appropriate architecture and design, the visual impact will be reduced to a low to moderate significance.	Low to moderate, negative impact, long term duration
5	Building heights	Moderate, negative impact. Long-term duration.	Site and from surrounding higher lying areas	The heights proposed are based upon the hilltop town and compact city type approach that supports the OPL principles and the creation of sustainable cities. Other than the iconic structures, the heights are designed to follow the topography and to create sensitive build up to higher buildings. Tall buildings have been limited within each node and placed within a specific context. Together with architecture and landscaping design considerations and mitigative measures, the visual impact of the buildings can be reduced.	Low to moderate, negative impact, long term duration
5	Development in the south, near the river will result in the loss of views from the Ohlanga River inland.	Moderate, negative impact, long term duration.	Areas visible from the Ohlanga River inland.	Provision has been made in the design to ensure a buffer zone between the developed areas and the forests and to keep the building densities low in this area. This would provide some progressive mitigation although the views inland would still be altered. The impact will be reduced through the architectural design, i.e. colour and building material must be kept natural and local to preserve the natural identity of the area.	Low, negative impact, long term duration
CONSTRUCTION PHASE IMPACTS					
Bio-physical Environment – Negative Impacts					
3, 11	Stormwater management during construction phase	High, negative impact. Short - to long - term duration.	Site & surroundings.	Erosion control measures and on-site stormwater management must form part of the design phase of the development, with allowance made for retention ponds and other erosion protection measures. The EMP will include specifications for soil conservation. The	Low, negative impact. Short term duration.

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
				<p>appointed contractor must then provide a method statement giving details of how the specifications will be met. Vegetation clearance must be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. Erosion protection measures in the form of brush packing should be undertaken as recommended by the ECO. In addition and if required, re-vegetation of disturbed surfaces should be undertaken almost immediately after construction activities are completed in each area and should be closely monitored by the ECO. Where it is unnecessary to remove existing vegetation for construction, this vegetation should be maintained to prevent soil erosion and assist in dust control until the rehabilitation programme is implemented.</p> <p>Stockpiles must be stored close to areas of final utilisation in order to avoid unnecessary topsoil loss and erosion. Stockpiles must be well protected from wind and placed away from stormwater routes. Stockpiles not utilised within three months of the initial stripping process (or prior to the onset of seasonal rains) must be seeded with appropriate grass seed mixes to avoid possible erosion. Species of grasses and application rates should be recommended/ approved by the ECO and the developer.</p> <p>The implementation of the EMP will reduce the significance of the impact to low.</p>	
12	Effect of construction phase on Ohlanga River estuary.	High, negative impact, medium term duration	Ohlanga River estuary	The EMP and stormwater management plan must include specifications for the protection of the estuary and the prevention of excess run-off entering the estuary. The appointed contractor must then provide a method statement giving details of how the specifications will be met.	Medium, negative impact, medium term duration
17	Wetland functionality (increased run-off)	High, negative impact, medium term duration	Wetlands	A wetland functionality assessment has been completed for the Precinct (Appendix 10). At present, the overall ecological services supplied by the wetlands were rated moderately low to intermediate. However, if run-off is not controlled during the construction phase, this will decrease. Therefore the EMP will include specifications for controlling run-off. The appointed contractor must then provide a method statement giving details of how the specifications will be met.	Low, negative impact, medium term duration
18, 20, 36	Non-compliance with ROD/ operational EMP	High, negative impact, medium- long term duration	Local	Sibaya Development will be managed through a Section 21 Company (Sibaya Management Association). Moreland will control the process initially and hand over to the owners and residents in phases when functional, viable and sustainable Associations have been	Low, negative impact, medium-long term duration

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
				<p>established.</p> <p>The building review processes will be controlled through a Design Review Panel of the Sibaya Management Association's Boards. The land sale agreements, the Design Codes and Association rules are planned to encourage compliance with One Planet Living (OPL) principles and the creation of sustainable communities and life styles. An EMP will be produced for the development which will be audited by an ECO and DAEA. If developers do not comply with the requirements of the EMP, development can be stopped and fines imposed.</p>	
Socio-economic Environment – Negative Impacts					
28	Crime and security management during the construction phase	Moderate, negative impact, short term duration	Regional	<p>As Sibaya develops a security manpower group will be deployed into the area, to operate the surveillance equipment and managers to manage the total crime prevention strategy. The crime prevention strategy will be based on the use of both the environmental management plan and the security management plan for the area, which will continually monitor the success and take action where necessary (Appendix 12).</p> <p>This phase will also include the patrolling and deployment of staff to key areas where other physical initiatives have not been able to protect the environment or reduce the potential crime hazard to an acceptable level.</p> <p>See Appendix 12 for further details.</p>	Low, negative impact, short term duration
33	Control of heavy vehicle use of the M4	Moderate, negative impact, short term duration	Local	The access routes used by construction vehicles as well as time constraints during the construction phase of the Sibaya Precinct will be controlled through the implementation and monitoring of an EMP.	Low, negative impact, short term duration
OPERATIONAL PHASE IMPACTS					
Socio-economic Environment – Positive Impacts					
23	Allocation of land to places of worship, community centres, school etc.	Moderate, positive impact, long term duration	Precinct and surrounding areas	<p>While provision has been made for education/ school sites to the west of the M4, in terms of places of worship, the legislation no longer requires a certain number of worship sites per number of residential units. However, any religious body may purchase a site and apply for rezoning to a worship site. The same applies to crèche facilities.</p> <p>It must be noted that while land is designated for school sites, in terms of government schools, the Education Department determines</p>	Moderate, positive impact, long term duration

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
				when these are to be developed.	
Socio-economic Environment – Negative Impacts					
4, 32	Traffic implications – the impact of a new entrance into Umdloti and impact on limited parking facilities in Umdloti.	Moderate, negative impact, long term duration.	Umdloti	Development of the Sibaya Precinct does not require the development of a new road access into Umdloti. While the traffic into Umdloti will increase, the TIA done for the development has shown that the current road into Umdloti will cope with the increased traffic. The provision of a shuttle service (with parking in Nodes 1 & 5) and the development of pedestrian accesses between Sibaya and Umdloti will serve to reduce the impact on the M27 access road into Umdloti as well as on the limited parking facilities in Umdloti.	Low, negative impact, long term duration.
6, 21, 30	Implication of noise if both the King Shaka airport and Sibaya Precinct development go ahead.	Moderate, negative impact, long term duration	Sibaya Precinct	Refer to Figure 9 for the predicted 2015 LAeq, 16Hr contours and how they affect the Sibaya Precinct (information courtesy of INR and their sub-consultants). From the figure it can be seen that while the LAeq, 16Hr 45dB contour does cross the upper left and lower left corners of the site, this noise level is not of a level to prevent development in these areas; i.e. there is no significant impact on the Precinct (even the single event 747-400 does not have a major impact on Sibaya). Noise levels proposed for 2015 and 2035 also show that the Sibaya Precinct does not fall into the area of non-residential development, i.e. equal to or greater than LAQ 55 level.	Low, negative impact, long term duration
Bio-Physical Environment – Positive Impacts					
1	Rehabilitation: Rehabilitation of natural forests, wetlands and the Ohlanga River floodplain.	Moderate, positive impact, long term duration.	Regional	The natural forests, wetlands and the Ohlanga River floodplain form part of the open space system (conservation areas) which will be rehabilitated and managed through the Sibaya Conservation Trust as per Section 2.2. The Trust will ensure the long term maintenance and protection of the conservation areas while the Sibaya Management Association will manage the internal roads, secondary wetlands and access network reserve areas.	High, positive impact, long term duration
2	Controlling access to the Mhlanga Forest	Moderate, positive impact, long term duration.	Mhlanga Forest	The physical fencing of certain sections of the Forest will ensure that access to a proposed beach groyne and limited access to the beach can be controlled, monitored, policed and maintained (Security initiative outlined in Appendix 12). Controlling access to the Forest not only contributes towards security management for the area but also ensures the protection of the Forest itself. The positive impact will therefore be optimised.	High, positive impact, long term duration
8	Open space system management:	Moderate, positive impact,	Open space system	The open space areas including the forests, corridors and wetlands will form part of a Conservation Trust as per Section 2.2.	High, positive impact, long term

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
	protection of open space system and prevention of development within open space system	long term duration.			duration
Bio-Physical Environment – Negative Impacts					
2	Precinct security must be handled in a way that does not impact on the environment. In relation to the natural environment, the EMD favours using visible policing over physical barriers.	Moderate, negative impact, long term duration.	Site	As mentioned in Table 3, the Precinct security will be managed through three clearly defined initiatives, namely Built Environment Phase, Physical Security and Security Manpower Phase. While visible policing will form part of the security initiative for the area, in terms of the natural environment, in some areas, certain boundaries of the Forest areas, managed by an independent Trust, will be fenced with appropriate controlled accesses, which will secure, protect and provide tourist and educational awareness of the environment and its biodiversity. The security initiatives proposed aim to manage security risks while also protecting the environment, thereby reducing the impact to low significance and in some areas, will have a positive impact on the environment protected.	Low, negative impact, long term duration
12	Effect of operational phase on Ohlanga River estuary.	High, negative impact, short to long term duration	Ohlanga River estuary	The operational phase EMP and stormwater management plan must include specifications for the protection of the estuary and the prevention of excess run-off entering the estuary. Post-development run-off must be managed such that it is equal to or less than pre-development levels.	Low, negative impact, long term duration
17	Wetland functionality (increased run-off)	High, negative impact, short to medium term duration	Wetlands	A wetland functionality assessment has been completed for the Precinct (Appendix 10). At present, the overall ecological services supplied by the wetlands were rated moderately low to intermediate. Moreland have proposed rehabilitating the wetlands to increase their functionality. However, if run-off is not appropriately managed during the operational phase, functionality will decrease. Therefore an EMP and Stormwater management plan will be drawn up to ensure that run-off is controlled and appropriate measures put in place to protect the wetlands from run-off and erosion.	Low, negative impact, short term duration
Visual Environment – Impacts					
5	Overshadowing of Umdloti South residential area.	Low, no impact, long term duration.	Umdloti South	No over-shadowing will occur. In terms of the proposed iconic structures, these are proposed to be located away from residential areas. This point together with the steep topography/ dune between	Low, no impact, long term duration

REF	IMPACT / ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
				Sibaya and Umdloti South will prevent over-shadowing of Umdloti South.	

5.2.1 Planning Phase Impacts

Significant impacts relevant to the planning phase of the project, which should be taken into account during the detailed design phase, include:

- Storm water retention on site through the inclusion of retention basins/ ponds etc in the planned layout
- Densities
- Heights
- Archaeological sites
- Umdloti
- Visual impacts

It must be noted that the above impacts will be minimised through the building review process, which will be controlled through a Design Review Panel(s) of the Sibaya Management Association(s). The land sale agreements, the Design Codes and Association rules are planned to encourage compliance with One Planet Living (OPL) principles and the creation of sustainable communities and life styles.

5.2.2 Construction Phase Impacts

The negative construction phase impacts identified include potential impacts on the open space areas, wetlands and the Ohlanga River, the potential for pollution to watercourses/ drainage lines, poaching in forests, stream bed erosion and uncontrolled run-off during construction leading to erosion.

The need for security management to reduce crime risk during this phase was also raised.

The implementation of an EMP and Stormwater Management Plan will mitigate/ reduce the potential impacts identified.

5.2.3 Operational Phase Impacts

Operational phase impacts related to traffic, in particular in relation to access to Umdloti, the impact of additional people and cars on the limited facilities in Umdloti, visual impacts and security management.

The operational phase will have significant positive ecological benefits as 49.8% of the Precinct will remain as open space to be managed through the Sibaya Management Association and the Sibaya Conservation Trust. The open space system includes the portion of the Havaan Forest owned by Moreland, Forest 31, Mhlanga Forest, the Ohlanga River floodplain, the primary wetlands, the internal roads and access network reserve areas and Recreational Areas.

The report produced by SEF found that the natural vegetation of the Precinct site functions as an essential dispersal/movement corridor for faunal species between regionally important habitat types such as the Ohlanga and Mdloti estuaries, adjacent secondary grasslands, coastal shrub and dune forest (see Appendix XIX of the Scoping Report). The open space system proposed thus aims to link ecologically important environments and prevent their fragmentation.

Apart from protecting these areas from future development, alien vegetation will be removed and these areas rehabilitated to improve their functioning.

6 ENVIRONMENTAL ISSUES RELATING TO DEVELOPMENT NODES

Unlike Table 5 above, the following tables provide for a more detailed assessment of each development node proposed. Initially, the focus was on broader cross cutting issues with respect to the entire area as a whole. In terms of these broader overarching issues (e.g. environmental corridors connecting throughout the development site), the negative issues identified can be mitigated. Thus such overarching factors have been considered in terms of the site as a whole, but in this section these issues have been taken to another level of detail in terms of the 5 individual nodes.

The issues identified have been analysed in terms of each node. Similar to the methodology used in Section 5 above, Sections 6.1 to 6.5 analyse and offer possible optimisation/ mitigation for the issues which affect each node.

6.1 NODE 1

The following table (Table 6) identifies issues specific to this node in relation to environmental sensitivities as well as archaeological considerations.

Table 6. Node 1 issues

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
GENERAL ISSUES				
Visual				
A visual assessment is required to determine the impact of the proposed layout in terms of building	Moderate to high, negative impact, long term duration.	Local	The visual impact assessment has revealed that the area has a relatively low visual quality and a strongly defined sense of place, characterised by sugar cane cultivation and recreational activities associated with holiday towns. Given the undulating	Low to moderate, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
heights and densities.			topography and the height and size of the proposed development, the proposed Precinct will be moderately visible to visible. However, the architectural design and urban development layout incorporates measures that aim to enhance the visual character, quality and sense of place of the area.	
Archaeological				
Archaeological site 21 falls within Node 1 (as identified in Archaeological survey undertaken by the Natal Museum).	Moderate, negative impact, long term duration	Local	Site 21 falls within Node 1, is of low-medium significance and requires test pits/ sampling. This will be done prior to construction commencing around the specific site.	Low, negative impact, long term duration
ENVIRONMENTAL STATUS				
Corridors				
The section along the eastern portion of the node is to be rehabilitated in order to provide for a functional corridor/ link from the Mhlanga Forest north to the Mdloti lagoon.	Moderate, positive impact, long term duration	Regional	The rehabilitation and landscape plan re-affirm the rehabilitation of this corridor. The area will fall within the open space system which will be managed and maintained by the Trust and Sibaya Management Association.	High, positive impact, long term duration
Buffers				
Buffer on Mhlanga Forest.	Moderate, negative impact, long term duration	Local	A 40m buffer has been established from the edge of the forest (See Figure 4, Framework plan). No development is proposed for this zone.	Moderate, positive impact, long term duration
INFRASTRUCTURE				
Stormwater				
Stormwater generation and management.	High, negative impact, short -to long - term duration.	Local and regional	A Stormwater management plan (Appendix 17) and EMP must be implemented to ensure the management/ control of storm water.	Low, negative impact, short term duration
Sewage				
Location of sewerage infrastructure leading from	Moderate, negative impact,	Local	While sewage infrastructure is being kept out of ecologically sensitive areas, it is important that the construction phase is	Low, negative impact, short term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
bulk sewers.	short -to long - term duration		controlled and monitored through the implementation of an EMP. The Umdloti sewer reticulation network is not to be utilised for Node 1 and 5 as these nodes will be sewerred, in the short term at least, to the Phoenix Treatment Works.	
Water				
Location of water infrastructure leading from bulk water lines.	Moderate, negative impact, short -to long - term duration	Local	While water infrastructure is being kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP.	Low, negative impact, short term duration
Electricity				
Location of electricity infrastructure leading from bulk supply line.	Moderate, negative impact, short -to long - term duration	Local	While electricity infrastructure is being kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP.	Low, negative impact, short term duration
Traffic & Transportation				
Creation of traffic circle on the M4 to facilitate access to node.	Moderate, negative impact on traffic on the M4 but positive impact in facilitating access to Node 1.	M4	The creation of the traffic circle will require approval from DoT. The eTA has not objected to this circle.	Low, negative impact, long term duration

6.2 NODE 2

The following table (Table 7) identifies issues specific to this node in relation to environmental sensitivities as well as archaeological considerations. It must be noted that Node 2 has not been subject to the same level of detailed design as Nodes 1 and 5.

Table 7. Node 2 issues

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
GENERAL ISSUES				
Visual				
A visual assessment is required to determine the impact of the proposed layout in terms of building heights and densities.	Moderate to high, negative impact, long term duration.	Local	The visual impact assessment has revealed that the area has a relatively low visual quality and a strongly defined sense of place, characterised by sugar cane cultivation and recreational activities associated with holiday towns. Given the undulating topography and the height and size of the proposed development, the proposed Precinct will be moderately visible to visible. However, the architectural design and urban development layout incorporates measures that aim to enhance the visual character, quality and sense of place of the area.	Low to moderate, negative impact, long term duration
Archaeological				
Archaeological sites 1- 5, 8, 9, 12 and 13 fall within Node 2 (as identified in Archaeological survey undertaken by the Natal Museum).	Moderate, negative impact, short to long term duration	Local	Site 1 is of medium significance and requires a deeds survey, test pits and sampling. Site 2 is of medium significance and requires test pits and sampling. Site 3 is of high significance and requires excavation. Site 4 is of medium significance and requires test pits/ sampling. Site 5 is of low-medium significance and requires a deeds survey, test pits and sampling. Site 8 is of low significance and requires test pits/ sampling. Site 9 is of low significance and requires sampling. Site 12 is of low significance and requires no mitigation. Site 13 is of low significance and requires no mitigation. All of the above will be dealt with prior to construction	Low, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
			commencing around each specific site.	
Layout				
The appropriateness and positioning of the riverside resort (42). (Proximity to floodplain and 1:100 year flood line.)	Moderate, negative impact, long term duration	Local	All infrastructure and buildings must be outside of the 1:100 year flood line. The exact position of this resort will need to be determined during the detailed design phase for this node. Detailed design will need to be approved by DAEA as well as the local authority.	Low, negative impact, long term duration
In terms of the stormwater detention ponds, EKZNW will not support the fly-fishing dam as they do not support dam creation for aesthetic purposes.	Moderate, negative impact, long term duration	Local	The need for a retention pond to manage storm water in this vicinity has been identified (see Figure 1 of the Stormwater management plan). The pond will serve to control stormwater run-off thereby reducing risk of damage to the wetland.	Moderate, positive impact, long term duration
ENVIRONMENTAL STATUS				
Wetlands				
A substantial area of the node consists of wetland, the majority of which fall into the open space on the layout.	Moderate, positive impact, long term duration	Local	Wetland delineation & functionality assessment have been done for the site with a recommendation of a minimum buffer of 20m on the wetlands. While the current layout has taken this into account, the detailed design plans must be approved by DAEA and the eThekweni Municipality. The wetlands will be protected through the implementation of a construction and operational EMP as well as through the implementation of a stormwater management plan that takes the wetlands into account. They will also be rehabilitated as required as per the landscaping plan.	Moderate, positive impact, long term duration
The position and function (in terms of stormwater management) of the proposed ponds must be finalised.	Moderate, positive impact, long term duration	Local	The location of the retention ponds has been included in the storm water management plan drawn up for the development (see Figure 1 of Appendix 17).	Moderate/ high, positive impact, long term duration
Corridors				
Although provision for corridors along the N2,	Moderate, positive impact,	Local	The transecting corridor identified by SEF has been taken into consideration in the revision of the framework plan (Figure 4),	Moderate/ high, positive impact, long

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
MR96 and M4 had been made in the initial alternative framework drawn up, a corridor transecting the site was identified by SEF.	long term duration		with no development occurring within the corridor.	term duration
INFRASTRUCTURE				
Stormwater				
Stormwater generation and management.	High, negative impact, long term duration.	Local and regional	A Stormwater management plan (Appendix 17) and EMP must be implemented to ensure the management/ control of storm water.	Low, negative impact, short term duration
Sewage				
Location of sewerage infrastructure leading from bulk sewers.	Moderate, negative impact, long term duration	Local	While sewage infrastructure must be kept out of ecologically sensitive areas, unless where absolutely necessary and to DAEA approval, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Water				
Location of water infrastructure leading from bulk water lines.	Moderate, negative impact, long term duration	Local	While water infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Electricity				
Location of electricity infrastructure leading from bulk supply line.	Moderate, negative impact, long term duration	Local	While electricity infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration

6.3 NODE 3

The following table (Table 8) identifies issues specific to this node in relation to environmental sensitivities as well as archaeological considerations. It must be noted that Node 3 has not been subject to the same level of detailed design as Nodes 1 and 5.

Table 8. Node 3 issues

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
GENERAL ISSUES				
Visual				
A visual assessment is required to determine the impact of the proposed layout in terms of building heights and densities.	Moderate to high, negative impact, long term duration.	Local	The visual impact assessment has revealed that the area has a relatively low visual quality and a strongly defined sense of place, characterised by sugar cane cultivation and recreational activities associated with holiday towns. Given the undulating topography and the height and size of the proposed development, the proposed Precinct will be moderately visible to visible. However, the architectural design and urban development layout incorporates measures that aim to enhance the visual character, quality and sense of place of the area.	Low to moderate, negative impact, long term duration
Archaeological				
Archaeological site 7 falls within Node 3 (as identified in Archaeological survey undertaken by the Natal Museum).	Low, negative impact, short to long term duration	Local	Site 7 is of low significance and requires sampling. To be done prior to construction commencing on or around the site.	Low, negative impact, long term duration
Layout				
Linkages between the proposed family resort on the Ohlanga estuary and its linkages to the beach will need to be carefully	Moderate to high, negative impact, short to long term duration.	Ohlanga river bank and estuary.	Development of this node is still to undergo a detailed design phase. Once completed, these plans will need to be approved by DAEA and the eThekweni Municipality.	Low to moderate, negative impact, short term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
considered.				
ENVIRONMENTAL STATUS				
Wetlands				
The southern area of this node consists of the Ohlanga River floodplain with wetlands extending down the valleys.	Moderate, positive impact, long term duration	Local	Wetland delineation & functionality assessment have been done for the site with a recommendation of a minimum buffer of 20m on the wetlands. While the current layout has taken this into account, the detailed design plans must be approved by DAEA and the eThekweni Municipality. The wetlands will be protected through the implementation of a construction and operational EMP as well as through the implementation of a stormwater management plan that takes the wetlands into account. They will also be rehabilitated as required in terms of the landscaping plan.	High, positive impact, long term duration
The position and function (in terms of stormwater management) of the proposed ponds must be finalised.	Moderate, positive impact, long term duration	Local	The location of the retention ponds has been included in the storm water management plan drawn up for the development (see Figure 1 of Appendix 17).	Moderate/ high, positive impact, long term duration
Corridors				
As with the other nodes there are areas defined as open space within the area which are to serve as ecological corridors within the Precinct.	Moderate, positive impact, long term duration	Local	The rehabilitation and landscape plan re-affirm the rehabilitation of the open space system. These areas will be managed and maintained by the Sibaya Management Association.	Moderate/ high, positive impact, long term duration
Buffers				
Buffer on Forest 31 in terms of development of the New forest matrix.	Moderate, negative impact, long term duration	Local	A buffer of 40m will be applied to Forest 31. It should be noted that the intention, adjacent to a portion of the forest is to develop an estate within a future forest extension of Forest 31, i.e. part of the area adjacent to Forest 31 will be rehabilitated to coastal forest within which the estate will then be designed to the approval of DAEA, the eThekweni Municipality and KZN Wildlife.	Moderate, positive impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
INFRASTRUCTURE				
Stormwater				
Stormwater generation and management.	High, negative impact, long term duration.	Local and regional	A Stormwater management plan (Appendix 17) and EMP must be implemented to ensure the management/ control of storm water.	Low, negative impact, short term duration
Sewage				
Location of sewerage infrastructure leading from bulk sewers.	Moderate, negative impact, long term duration	Local	Sewage infrastructure must be kept out of ecologically sensitive areas, unless where absolutely necessary (with the exception of Forest 31 and the Mhlanga Forest through which no infrastructure may be constructed) and to DAEA approval. It is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Water				
Location of water infrastructure leading from bulk water lines.	Moderate, negative impact, long term duration	Local	While water infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Electricity				
Location of electricity infrastructure leading from bulk supply line.	Moderate, negative impact, long term duration	Local	While electricity infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Traffic & Transportation				
Creation of traffic circle on the M4 to facilitate access to	Moderate, negative impact	M4	The creation of the traffic circle will require approval from DoT. The eTA has not objected to this circle.	Low, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
node.	on traffic on the M4 but positive impact in facilitating access to Node 3.			

The niche resort and spa which fall within Node 3 have been excluded from the above table as it has been acknowledged that any development within the Mhlanga Forest will require a separate EIA process.

6.4 NODE 4

The following table (Table 9) identifies issues specific to this node in relation to environmental sensitivities as well as archaeological considerations. It must be noted that Node 4 has not been subject to the same level of detailed design as Nodes 1 and 5.

Table 9. Node 4 issues

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
GENERAL ISSUES				
Visual				
A visual assessment is required to determine the impact of the proposed layout in terms of building heights and densities.	Moderate to high, negative impact, long term duration.	Local	The visual impact assessment has revealed that the area has a relatively low visual quality and a strongly defined sense of place, characterised by sugar cane cultivation and recreational activities associated with holiday towns. Given the undulating topography and the height and size of the proposed development, the proposed Precinct will be moderately visible to	Low to moderate, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
			visible. However, the architectural design and urban development layout incorporates measures that aim to enhance the visual character, quality and sense of place of the area.	
Archaeological				
Archaeological sites 10, 11, 14, 15, 16 and 17 fall within node 4 (as identified in Archaeological survey undertaken by the Natal Museum).	Low to medium, negative impact, short to long term duration	Local	Site 10 is of low significance and requires no mitigation. Site 11 is of low significance and requires no mitigation. Site 14 is of low significance and requires test pits/ sampling. Site 15 is of high significance and requires excavation. Site 16 is of low significance and requires sampling. Site 17 is of medium significance and requires test pits/ sampling. To be done prior to construction commencing on or around the sites.	Low, negative impact, long term duration
ENVIRONMENTAL STATUS				
Wetlands				
The node has three wetlands, one in the north eastern corner, a second on the western boundary in the northern half of the node and a third in the southern area of the node, adjacent to the N2.	Moderate, negative impact, long term duration	Local	Wetland delineation & functionality assessment have been done for the site with a recommendation of a minimum buffer of 20m on the wetlands. While the current layout has taken this into account, the detailed design plans must be approved by DAEA and the eThekweni Municipality. The wetlands will be protected through the implementation of a construction and operational EMP as well as through the implementation of a stormwater management plan that takes the wetlands into account. They will also be rehabilitated as required.	Moderate, positive impact, long term duration
The position and function (in terms of stormwater management) of the proposed ponds must be finalised.	Moderate, positive impact, long term duration	Local	The location of the retention ponds has been included in the storm water management plan drawn up for the development (see Figure 1 of Appendix 17).	Moderate/ high, positive impact, long term duration
Corridors				
Although provision for corridors has been made	Moderate, positive impact,	Local	While part of the proposed transecting corridor identified by SEF has been taken into consideration, there is the need for a road in	Moderate, positive impact, long term

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
along the N2, MR96 and M4, a corridor transecting the site was identified by SEF.	long term duration		this vicinity. The road reserve will however, be landscaped and managed by the Sibaya Management Association as part of the open space system and as per the landscaping plan.	duration
INFRASTRUCTURE				
Stormwater				
Stormwater generation and management.	High, negative impact, long term duration	Local and regional	A Stormwater management plan (Appendix 17) and EMP must be implemented to ensure the management/ control of storm water.	Low, negative impact, short term duration
Sewage				
Location of sewerage infrastructure leading from bulk sewers.	Moderate, negative impact, long term duration	Local	While sewage infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Water				
Location of water infrastructure leading from bulk water lines.	Moderate, negative impact, long term duration	Local	While water infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Electricity				
Location of electricity infrastructure leading from bulk supply line.	Moderate, negative impact, long term duration	Local	While electricity infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Traffic & Transportation				
Creation of traffic circle on the M4 to facilitate access to node.	Moderate, negative impact on traffic on the	M4	The creation of the traffic circle will require approval from DoT and eTA but is not fundamental to the development.	Low, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
	M4 but positive impact in facilitating access to Node 4.			

6.5 NODE 5

The following table (Table 10) identifies issues specific to this node in relation to environmental sensitivities as well as archaeological considerations.

Table 10. Node 5 issues

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
GENERAL ISSUES				
Visual				
A visual assessment is required to determine the impact of the proposed layout in terms of building heights and densities.	Moderate to high, negative impact, long term duration.	Local	The visual impact assessment has revealed that the area has a relatively low visual quality and a strongly defined sense of place, characterised by sugar cane cultivation and recreational activities associated with holiday towns. Given the undulating topography and the height and size of the proposed development, the proposed Precinct will be moderately visible to visible. However, the architectural design and urban development layout incorporates measures that aim to enhance the visual character, quality and sense of place of the area.	Low to moderate, negative impact, long term duration
Archaeological				
Archaeological sites 18, 19 & 20 fall within Node 5 (as	Low, negative impact, short to	Local	Site 18 is of low significance and requires sampling. Sites 19 and 20 are possibly of low significance but both require	Low, negative impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
identified in Archaeological survey undertaken by the Natal Museum).	long term duration		revisiting to establish if this is correct. To be done prior to construction commencing on or around the sites.	
ENVIRONMENTAL STATUS				
Wetlands				
There is a wetland along the north eastern boundary, in the north west corner and the south eastern corner of the node.	Moderate, negative impact, long term duration	Local	Wetland delineation & functionality assessment have been done for the site with a recommendation of a minimum buffer of 20m on the wetlands. The current detailed design has taken this into account. The wetlands will be protected through the implementation of a construction and operational EMP as well as through the implementation of a stormwater management plan that takes the wetlands into account. They will also be rehabilitated as required.	Moderate, positive impact, long term duration
The position and function (in terms of stormwater management) of the proposed ponds must be finalised.	Moderate, positive impact, long term duration	Local	The location of the retention ponds has been included in the storm water management plan drawn up for the development (see Figure 1 of Appendix 17).	Moderate/ high, positive impact, long term duration
Corridors				
A large section along the eastern portion of the node is to be rehabilitated in order to provide for a functional corridor/ link from the Mhlanga Forest north to the Mdloti lagoon.	Moderate, positive impact, long term duration	Local	The rehabilitation and landscape plan re-affirm the rehabilitation of this corridor. The area will fall within the open space system which will be managed and maintained by the Trust and Sibaya Management Association.	Moderate/ high, positive impact, long term duration
Buffers				
Buffer on Mhlanga Forest.	Moderate, negative impact, long term duration	Local	A 40m buffer has been established from the edge of the forest (See Figure 4, Framework plan). No development is proposed for this zone with the exception of passive recreational activities including walking and cycling along appropriate type pathways.	Moderate, positive impact, long term duration
INFRASTRUCTURE				
Stormwater				

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
Stormwater generation and management.	High, negative impact, long term duration.	Local and regional	A Stormwater management plan (Appendix 17) and EMP must be implemented to ensure the management/ control of storm water.	Low, negative impact, short term duration
Sewage				
Location of sewerage infrastructure leading from bulk sewers.	Moderate, negative impact, long term duration	Local	While sewage infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality. The Umdloti sewer reticulation network is not to be utilised for Node 1 and 5 as these nodes will be sewerred, in the short term at least, to the Phoenix Treatment Works.	Low, negative impact, short term duration
Water				
Location of water infrastructure leading from bulk water lines.	Moderate, negative impact, long term duration	Local	While water infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Electricity				
Location of electricity infrastructure leading from bulk supply line.	Moderate, negative impact, long term duration	Local	While electricity infrastructure must be kept out of ecologically sensitive areas, it is important that the construction phase is controlled and monitored through the implementation of an EMP. The exact location of the sewage infrastructure will be determined during the detailed design phase. These plans must be approved by DAEA and the eThekweni Municipality.	Low, negative impact, short term duration
Traffic & Transportation				
Creation of second access into Umdloti.	Moderate, positive impact, long term duration	Umdloti	The development of a second vehicular access was determined to be unnecessary in the TIA. However, proposed parking facilities in Node 5 with a shuttle service operating between Sibaya Precinct and Umdloti should reduce traffic entering Umdloti. Pedestrian links via Margaret Bacon and Fifth Avenue have also been investigated and are options pending approval of	Moderate, positive impact, long term duration

ISSUE	UNMITIGATED SIGNIFICANCE / DURATION	SPATIAL INFLUENCE	POST MITIGATION ASSESSMENT/ OPTIMISATION	POST MITIGATION SIGNIFICANCE / DURATION
Creation of traffic circle on the M4 to facilitate access to node.	Moderate, negative impact on traffic on the M4 but positive impact in facilitating access to Node 5.	M4, Node 5	sidewalk upgrades to both roads. The creation of the traffic circle will require approval from DoT and ETA but is not fundamental to the development.	Low, negative impact, long term duration

7 ALTERNATIVE OPTIONS

7.1 ORIGINAL VS ALTERNATIVE DEVELOPMENT CONCEPT & FRAMEWORK

The initial/ original development framework (dated 2004, Figure 10)) proposed raised many concerns relating to the layout, the land uses and the need for more connected “green” corridors leading to a less fragmented ecological environment. Following the Scoping Process which was initiated in February 2005, and as a result of the concerns and issues raised, Moreland took a decision to review, through a ‘charrette’ process, the initial concept plan and to produce a new vision and development framework which was more appropriate and sympathetic to the site and the concerns raised (December 2005).

As with the original concept and framework, the alternative development concept and framework was also subject to a public participation process. The process followed has thus looked at two development frameworks and shown that the alternative framework has better taken the issues and concerns raised into account. It is thus this framework that is being put forward as the development proposal for authorisation by DAEA.

7.1.1 Need for the development

Moreland Developments (Pty) Ltd have motivated that there are a number of factors relating to the “need” for development to occur in the Sibaya Precinct, namely:

1. The development of the Sibaya Casino
2. The development of major infrastructure (services and roads)
3. The need for the formal, sustainable management of the conservation areas
4. The fact that there are existing zoning rights
5. The relatively poor agricultural soils (on particularly the area to the east of the M4)
6. The King Shaka International Airport and Dube Tradeport
7. The need for new investment, economic growth and the significant need for new employment opportunities
8. The significant potential of the precinct given its physical and natural attributes and characteristics
9. The site’s strategic location, visibility and accessibility
10. The lack of back of beach activities and facilities in the sub-region
11. The development’s strategic location and situation along a provincially identified primary, multi-sectoral development corridor.

12. The need for new and different tourism facilities, activities and accommodation, especially given the 2010 Soccer World Cup
13. The fact that the majority of the precinct is situated within the existing Urban Edge and the fact that given the new airport, it is likely that the urban edge will be expanded in time to come

According to Moreland, the first two, related to the Sibaya Casino and construction of major new infrastructure are particularly relevant and important. Sun International's decision to develop the Casino in this location was based on a variety of issues but a key factor was the significant development potential of the wider node, of the potential for resort hotel developments, commercial developments, recreational developments as well as residential developments. The Casino developers (Sun International) saw the Casino as the main catalyst that would kick-start the development of the node and ultimately have it as just one of the attractions into a large tourist, recreational node (Moreland, 1998).

7.2 NO DEVELOPMENT OPTION

According to Tongaat Hulett Sugar, an increasing amount of land on the east of the M4 is being removed from sugar cane production as a result of its poor productive capacity. This area is therefore becoming invested with alien weeds and a haven for dumping and illegal occupation, hence the "no development option" is not economically or agriculturally viable.

7.3 NATURAL AREA

In terms of the option identified of rehabilitating the area into a natural habitat with no residential component, this neither fits in with the need identified for the development of the area or the Northern Spatial Development Plan drawn up by the eThekweni Municipality which identifies development north of the Ohlanga River. The local and provincial imperative and priorities further dictate the need for economic generation and employment creation which some would argue the development as proposed by Moreland would go toward assisting in addressing.

7.4 OPEN SPACE AREA

The alternative of proclaiming the open space areas as protected areas under either Section 3 of the KwaZulu-Natal Nature Conservation Act 9 of 1997 or Chapter 2 & 3 National Environmental Management: Protected Areas Act 57 of 2003 was identified by I&APs during the scoping process and is are options that are being more fully investigated by Moreland. Moreland is however committed to, and which it is recommended that it become a condition of the record of decision, ensuring that the open space areas are afforded formal and sustainable conservation management protection. This is to be achieved through the creation of a Conservation Trust which will be directly responsible for the management, by way of a Conservation Management Plan, of the Conservation Trust area.

7.5 DEVELOPING IN THE HEADS OF THE CATCHMENTS IN STEAD OF ON THE HILL TOPS

According to Iyer Rothaug (town planners), in order to achieve broader development goals of compactness reduced spatial footprint and sustainability, the Sibaya Precinct aims at clustering development on hilltops (although not exclusively) and having a more generous open space system (Appendix 16). At an overall level, Iyer Rothaug state that it must be understood that the Sibaya Project aims at creating a new urban form and identity as a reaction to the problems (social, environmental and economic) related to placeless low density suburban sprawl.

It has also been identified by Sagen Projects, that from a hydrological perspective, a hilltop development approach, as opposed to development closer to the exit of the catchment, is preferable as the lower down the slope the development is, the higher the storm water run-off peak, the higher the volume (although volume to a lesser degree) and the easier for the run-off to exit the catchment. However, the higher up the development is, there is greater chance for attenuation therefore reducing the peak and volume.

8 CONCLUSIONS

8.1 DEVELOPMENT CONCEPT AND FRAMEWORK

It must be noted that this report is written as a result of a two and half year process in which the proposal for this area has undergone two significant changes and complete revisions, together with numerous other significant changes to aspects of the proposal. Since its inception, this EIA has been successful in assisting the applicant in its consideration of alternatives and to make significant changes in response to comments and concerns raised during the Scoping of this EIA. This process has been managed in such a way as to try and resolve, and get the applicant to revise certain proposals, before compiling final reports. Thus the recommendations made for this EIA, are as a result of much debate and interrogation prior to the drafting of this EIR. Thus, the overall development concept and framework has taken the issues raised during the scoping and EIA phases into account. The establishment of ecological corridors ensuring linkages between key habitats has been provided for; with rehabilitation of these areas (including the wetlands) forming part of the development proposal.

A significant addition to the applicant's development proposal has been the incorporation and buy-in to the principles of One Planet Living (OPL) which aim to establish an environmentally sustainable development. Stemming from an effort to apply these principles is that the proposed development be based on a hilltop town approach, to facilitate better efficiencies in terms of infrastructure. It also serves to reduce the spatial footprint, thereby reducing the impact on the environment.

8.1.1 Development Nodes

Detailed design has been done for Nodes 1 and 5 as these are the nodes that Moreland is planning to develop first. Nodes 2-4 are still to undergo detailed design. However, the principles applied to Nodes 1 and 5 will also apply to Nodes 2-4. These principles are outlined in the recommendations section below.

The Niche Resort and Spa proposed for the Mhlanga Forest has not undergone specialist review in this process as it is recommended that it undergo a separate EIA.

8.1.2 Related activities

Moreland have proposed a number of “back-of-beach” activities that aim to complement and enhance the purpose of the Sibaya Precinct. These proposed activities have not been taken any further in this EIA process and will undergo separate EIAs.

8.2 RECOMMENDATIONS

It is recommended that the development of the Sibaya Precinct be allowed to proceed based on the revised alternative development concept and framework plan. The following recommendations must be in place to ensure the sustainability of the development and the protection of the sensitive ecosystems forming part of the Precinct. The general recommendations apply to all nodes of the Sibaya Precinct, with specific conditions outlined for Nodes 1 & 5; Nodes 2-4 and for the “back-of-beach” activities as discussed in 2.1 above.

General:

1. The alternative development concept and framework (Figure 4) is the proposed layout forming the basis of this approval.
2. Moreland Developments (Pty) Ltd as the applicant are responsible for adherence to the conditions laid out in the Record of Decision (RoD) issued by the Department of Agriculture and Environmental Affairs (DAEA). However, upon the sale of land to developers and/or private purchasers, the RoD must become binding on the new landowner whom shall assume direct and full responsibility for adherence to the conditions of the RoD and monitoring thereof according to the RoD and EMP.
3. In addition to the recommendations listed here, attention must also be drawn to the mitigations mentioned in Tables 5-10, which also form part of these recommendations.
4. Where development abuts a forest (Hawaan, Mhlanga, Forest 31), buffer zones of 40m must be established from the edge of the forest, which is defined as the drip-line of the trees. These buffer zones are to be maintained and are strictly areas of no development with the exception of passive recreational activities such as cycling and walking.
5. All wetlands on site are to be protected. Wetland buffers are to be a minimum of 30m. The buffer zones are to be maintained and are areas of no development (see Condition 20 below for more detail).

6. The wetlands within the Sibaya Precinct must be rehabilitated according to the wetland specialist report and the landscape plan in order to improve their functionality (see Condition 20 below for more detail).
7. Ecological corridors are to be established, vegetated and maintained according to the approved development concept framework and the landscaping and rehabilitation plans with the involvement of KZN Wildlife and the eThekweni Municipality.
8. A Conservation Trust must be established for the Conservation Trust areas provided the development as proposed is approved. The Conservation Trust is to have a Conservation Management Plan prepared and approved by the eThekweni Municipality, Ezemvelo Wildlife and DAEA and must include the financial sustainability of the operation of the Trust.
9. A Conservation Servitude in favour of the Conservation Trust must be registered over all the properties that form the Trust area.
10. The relevant departments of the eThekweni Municipality must approve all finalised infrastructural service layouts and plans for sewer, water and electricity.
11. All proposed road upgrades and new road works must be approved in writing by the relevant transport authority (i.e. the Department of Transport, eThekweni Transport Authority and SANRAL) prior to commencement of the proposed works.
12. As proposed by Moreland Developments (Pty) Ltd, the Sibaya Management Association (a Section 21 Company) must be formed to manage development of the Sibaya Precinct.
13. All development must adhere to the Architectural guidelines (refer to Appendix 18 for some of these guidelines re materials, forms, lighting, clip ons etc) drawn up for the Sibaya Precinct. All architectural designs must be approved by the Design Review Committee (formed by the Boards of the Sibaya Management Association) prior to commencement of construction.
14. The Environmental Management Plan (EMP) (Construction phase):
 - a. Must be in place for the construction period of the development.
 - b. While a generic EMP has been drawn up for the development, node-specific specifications must be drawn up by the appointed environmental consultant for the individual nodes to be developed as part of the Precinct and these must be included with the generic EMP. These specifications must be submitted to the DAEA and/ or eThekweni Municipality Environmental Management Department and any other relevant authorities for approval prior to the commencement of construction.
 - c. Developers of hotels, resorts and/or multiple residential developments must appoint their own Environmental Control Officers (ECO) who together with DAEA

- and eThekweni Municipality will be responsible for monitoring and auditing construction in accordance with the EMP for the specific Precinct.
- d. It is the responsibility of the Department of Agriculture and Environmental Affairs to ensure compliance with the EMP and ROD.
15. The Stormwater Management Plan (SMP):
 - a. Must be implemented during both the construction and operational phases of the development of the Sibaya Precinct.
 - b. The SMP must be seen as an active document to be updated as detail is confirmed during the development stage of each site.
 - c. Where necessary, site-specific specifications must be included with the SMP. These specifications must be approved by the relevant authorities.
 - d. Stormwater management must take cognisance of the wetlands on site and must not lead to a decrease in the functionality thereof.
 - e. Stormwater management must take cognisance of the Ohlanga River and estuary, with post-development run-off into the estuary maintained at pre-development levels.
 16. The Sibaya Management Association must have an Operational Management Plan (OEMP) which details how potential impacts will be mitigated should they arise.
 17. The landscape and rehabilitation plan included with this report must be included with the EMP as a legally binding document with which all developers, their contractors and the Management Associations must comply. Site-specific modifications to the landscape plan must be approved by DAEA and/ or the eThekweni Municipality and any other relevant authority prior to implementation.
 18. Alien vegetation removal must form part of the construction and operational phase EMPs. This program not only relates to the removal of alien species but also to the rehabilitation of the area thereafter.
 19. A security management plan based on the principles noted in this EIR (see Appendix 12) must be implemented during both the construction and operational phases of the development.
 20. All archaeological sites identified within the Sibaya Precinct must be treated according to the recommendations in the archaeological study produced by the Natal Museum (4 June 1997).
 21. Developers/ contractors must be sensitive to the occurrence of Heritage Resources in the area. If such a site is located during construction, Amafa must be contacted immediately and construction discontinued until further notice.
 22. Iconic buildings be limited to single buildings on the hilltops within each node, subject to approval via the rezoning and Precinct plan processes.

23. A Design Review Panel of the Management Association be established and be responsible for the approval of all site development plans and building plans prior to submission of such plans to the Local Authority.

24. Recommendations from Visual Impact Assessment report (Appendix 15):

- a. As much of the natural vegetation as possible should be retained and all berms and soil stockpiles should be immediately vegetated to both reduce visual impact and wind and water erosion;
- b. A canopy cover should be continued along the M4 to reduce the immediate visual impact of the Precinct and to keep the vista consistent with that when travelling next to the Mhlanga Forest and Forest 31;
- c. Visual screening should be erected at strategic points around the development site during construction to minimise the visual impact and potential accidents on the motorists whilst travelling past the Precinct;
- d. The building colours should be kept earthy and natural and be consistent with the architectural recommendations;
- e. Anti-glare materials should be used for buildings adjacent to the M27, M4 and N2;
- f. Litter and dust management measures should be in place at all times;
- g. Fires should not be allowed on-site and burning of waste should be avoided at all times;
- h. The entire site should be kept neat and tidy at all times;
- i. Except for the required aviation lighting, outdoor lighting should be focussing towards the landscaping to detract the focus from the building structures;
- j. Where unavoidable, outdoor lighting should be as unobtrusive as possible. Reflectors can be used to avoid light spillage and low level lighting should be used for footpaths and parking areas;
- k. External signage should be kept to a minimum and where possible attached to structures to avoid free-standing signs in the landscape; and

25. Wetland delineation report recommendations (Appendix XIV of Scoping Report, November 2006):

In order to mitigate the impacts on the wetland system the following recommendations should be taken into account during the planning of the proposed development.

a. Buffer Zones

Adequate buffer zones would need to be determined for the wetland habitats within the development site. This should take into account:

- The current state of the wetland systems,
- The slopes adjacent to the wetland habitat, and

- The marginal wetland characteristics of some areas suggests that buffering of these areas would be of little value in terms of protecting wetland functioning

b. Development Layout

It is recommended that the developer recognise the value of the wetland system and a buffer zone and plan the proposed development to occur outside of these areas. The developer should also take into consideration the Regional Draft Norms and Standards Relating to Wetlands and Urban/Infrastructure Development (KZN DAEA, 2003) during the planning of the proposed development.

c. Wetland Rehabilitation and Management

The following rehabilitation should be considered within the wetland system, thereby potentially improving the status and functioning of the system:

- Removal of alien vegetation
- Restoration of hydrological conditions within the wetland by plugging the drainage channels utilising rehabilitation techniques.
- The wetland habitat and surrounding buffer zone would require management to maintain the system. This would involve:
 - The well-timed and frequent removal of vegetative matter within the herbaceous wetland areas.
 - The eradication of emerging alien invasive vegetation within the wetland and buffer zones.

d. Management guidelines for wetland areas within South Africa are outlined by Kotze and Breen (2000).

26. Recommendations from the Hydrological Plan for stormwater planning (Appendix 13):

a. *Wetlands*

- It is strongly recommended that wetland habitats be rehabilitated wherever possible to both increase the ecological status as well as the hydrological functioning of the lower lying hydrogeomorphic units. Wetlands that are functionally restored will further assist in aspects of stormwater management such as flood peak attenuation. Essentially the wetlands act as natural attenuation structures or reservoirs due to their geographical position and their geomorphological shape. The larger the wetland area, and the more dense the vegetation in the wetland's natural watercourse, the better the flood peak attenuation characteristics the wetland will possess.
- Restoring the natural vegetation in the wetland as well as the natural watercourse will improve the hydrological capabilities of these low lying areas and will assist in

maintaining the required flood patterns. It is therefore also important to ensure that the watercourses leading to these wetland systems are protected and maintained to assure the condition of the rehabilitated wetlands from negative impacts such as soil erosion and channel degradation. As a result it is recommended that any stormwater outfalls and outlet points (eg. Culverts) from the primary development nodes are protected and stabilised to prevent erosion and stream 'cutback'.

- The current drainage channels should be in-filled, as mentioned in the wetland functionality report (Appendix 10), to additionally decrease the risk of incised channels which increases stream velocities and therefore flood risk and erosion potential.
- In areas where flood risk is high and attenuation structures are essential then a 'no-nett loss' approach should be incorporated, whereby the area of wetland that is affected be restored elsewhere within the development area.

b. Flood Risk

- It is a common legislative principle and good engineering practice that post-development flood peaks be maintained or controlled to pre-development levels within the proposed development area. The most effective method is through the use of attenuation structures, dry or wet, placed at low points within the relevant catchments. The problem that occurs is that wet attenuation structures reduce the prevailing wetland areas due to the standing water body. As mentioned in the wetland report, it is thus recommended that wet attenuation structures be kept from sensitive wetland areas or areas where wetland potential is high. Wet structures should be placed in those areas that are geomorphically conducive and where wetland functionality is low or nil. In some catchments it is possible that the application of a wet attenuation structure may improve the total wetland habitat/functionality, specifically where deep incised channels occur in flatter valley areas. Therefore it is important to take note of wetland functionality and the possible negative or positive effects thereon within attenuation structure planning and design.

c. Streamflow

There will be an increase in streamflow throughout all the study units. The following indirect measures may be utilised to reduce the increase in streamflow:

- Induced runoff infiltration or soil permeability:

The majority of the development area lends itself to deep sandy soils that are conducive to good surface water infiltration rates. Therefore, where possible,

hardened surfaces should be made more permeable to promote excess surface water infiltrating into the soil. If possible, localised subsurface drains or larger communal subsurface drainage pits/tanks should be promoted at specific outfall points.

- Domestic Systems:

Wherever possible, rain-water from hardened surfaces should be utilised for irrigation purposes or domestic systems that require water. Water could be stored in tanks, elevated or subsurface, for later use. Any domestic water storage facilities would decrease the volume of streamflow reaching the downstream catchment. The stored water could be released slowly back into the system if necessary or, preferably, utilized on-site. These systems should be pre-planned within the architectural and civil design framework. These storage systems will also reduce the magnitude of flood peaks from areas where they are applied.

- Promote water features and irrigation systems:

Design water features to utilise excess stormwater runoff from localised urban areas. Any open water surfaces or features and systems that induce water spray will promote evaporation and water loss. This option will be more successful when applied at a larger scale or where smaller systems are numerous. Ponds, trickle stream features and garden irrigation systems are examples.

d. It should be noted that all of the above mentioned measures will be successful according to the scale at which they are applied. It is therefore recommended that these approaches be incorporated in initial architectural and civil design where possible and strongly promoted.

27. The following recommendations concerning stormwater implementation procedures have been extracted from the Stormwater Management Plan (Appendix 17):

The following procedures are to be followed by owners, developers, appointed agents, professional teams and contractors:

a. *Application for Permission to Build*

A copy of the Stormwater Management Plan shall be obtained from Moreland.

b. *Site Survey and Investigations*

Anyone involved in site survey and investigation work shall be familiar with the contents of the Stormwater Management Plan.

c. *Design Stage*

The professional team shall take into account the stormwater management requirements contained in this document and shall clearly indicate on all plans and in any contract document where and how measures have been provided in the design to ensure the stormwater management requirements are

implemented. Approval from the eThekweni Municipality must be obtained before commencing construction.

d. Construction

The contractor shall prepare a Stormwater Control Plan to ensure that all construction methods adopted on site and within the Sibaya Precinct precincts do not cause, or precipitate, soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on site, as indicated in the stormwater control plan (usually the contractor) shall ensure that no construction work takes place before the stormwater control measures are in place.

e. Certificate of Occupation

On completion of the works, the eThekweni Municipality, or their appointed professional person will inspect the site for compliance with the stormwater management requirements, prior to the issuing of a certificate of occupation by the eThekweni Municipality.

f. Occupation Period

During occupation of any property, Moreland or the eThekweni Municipality may undertake periodic inspections, to ensure the stormwater management policy is being correctly implemented, and may serve notice on occupants to undertake remedial work, which is deemed necessary in the opinion of Moreland and/ or the eThekweni Municipality.

28. The following recommendations concerning compliance with the stormwater management policy have been extracted from the Stormwater Management Plan (Appendix 17):

- a. Within the jurisdiction of a site specifically and the Sibaya Precinct precincts in general, the owner and his professional team, including the contractor, shall be responsible for ensuring that the requirements of this Stormwater Management Plan are met.
- b. The owner and his professional team shall be responsible for the performance of all stormwater control measures implemented on a site under their jurisdiction and the impact such works may have on downstream property within the Sibaya Precinct nodes.
- c. Approval of any plan or document, whether verbally or in writing, by the eThekweni Municipality shall not be construed as absolving the owner or the professional team of this responsibility.

Nodes 1 & 5

29. The development of Node 1 should be allowed to proceed based on the detailed design plans included with this report.
30. The development of Node 5 should be allowed to proceed based on the detailed design plans included with this report.
31. Any changes to the detailed design plans of Nodes 1 & 5 must be submitted to DAEA and/ or the eThekweni Municipality and any other relevant authorities for approval prior to implementation of the amendments.
32. The general recommendations mentioned above must be adhered to by the developers/ contractors during the planning and development of the individual sites comprising Nodes 1 & 5.
33. Moreland have proposed the establishment of a shuttle service between Sibaya Precinct and Umdloti in order to reduce the impacts on the roads and limited facilities within Umdloti. The number and frequency of trips of this shuttle service will depend on the demand as Sibaya is developed. The drop off and collection points and operation of the service must be established in consultation with the Umdloti Beach Ratepayers Association and the Sibaya Management Association.
34. The establishment of pedestrian routes from the Sibaya Precinct into Umdloti via Margaret Bacon Avenue and Fifth Avenue will need to be approved by the eThekweni Municipality. The establishment of these routes must include the provision of sidewalks.
35. Nodes 1 and 5 shall, in the short term at least, be sewered to the Ohlanga catchment and specifically to the Phoenix Treatment Works as recommended in the Sewer report Appendix 20). When a new wastewater treatment works is provided in the Umdloti catchment, and provided construction is due to commence in Nodes 2 and 3 and such nodes are required to be sewered to the Ohlanga catchment, the sewer system will need to be amended to provide for Nodes 1 and 5 being sewered to the new treatment works.

Nodes 2, 3 & 4

36. While the concept and framework plan for the Precinct does include broad detail for Nodes 2, 3 and 4, no detailed designs have yet been finalised. Once the detailed design has been produced for these nodes, the design layouts must be approved by DAEA, the eThekweni Municipality and any other relevant authority.
37. The detailed design of Nodes 2-4 must adhere to the general recommendations mentioned above.

38. The individual site plans produced for the sites comprising Nodes 2-4 must adhere to the above-mentioned general recommendations.
39. No development is to commence in these nodes prior to the details design plans obtaining approval from the relevant authorities.
40. Once the detailed design plans have been approved, any changes to the detailed design plans of Nodes 2-4 subsequent to this approval must be submitted to DAEA and/ or the eThekweni Municipality and any other relevant authorities for approval prior to implementation of the amendments.
41. The niche resort and spa (within the Mhlanga Forest) that forms part of Node 3 must undergo a separate EIA.

Related Activities

42. All “non building” activities (see examples on page 2 of this report) to be developed as part of the Sibaya Precinct must undergo separate basic assessments or EIAs as the relevant legislation dictates.