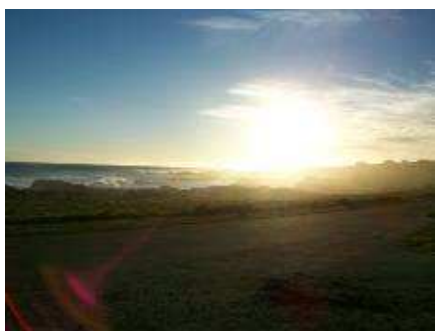


**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED
NUCLEAR POWER STATION ('NUCLEAR-1') AND ASSOCIATED
INFRASTRUCTURE**



Tourism Impact Assessment Study

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February 2010

EXECUTIVE SUMMARY

This study evaluates the tourism industry at each of the three sites defined in Eskom's Nuclear-1 programme, namely, Thyspunt, Bantamsklip and Duynefontein. The tourism market at each site is described and assessed in the following terms:

- A description of the status quo in terms of the current tourism industry and an outline of current proposed developments in each area
- A definition and value of the change in the tourism asset that would occur as a result of the construction and operation of a nuclear power station in each area
- The identification and recommendation of mitigation measures to reduce or offset the perceived negative impacts on the tourism asset

Each site was investigated with a thorough desktop study followed by a field visit. Various prominent tourism stakeholders and authorities were identified, contacted and interviewed. The complex nature of the tourism industry as a whole and the variable influence of perception and image in tourism marketing, destination branding and decision-making, makes averaging the value of tourism difficult. It was therefore decided that the best indication of tourism performance and the most comparable rand figure for each area would be the value of bed-nights spent there. This is calculated for each research area by the approximate number of beds multiplied by the average annual occupancy rate multiplied by the average cost per night.

The tourism asset at each area was then described according to specialist observation and the perceptions of the consulted stakeholders. Following a specialist review of the field data, a weighted matrix of tourism impacts was set up and annual values of the indicative impacts on tourism were calculated using the bed-night figures. A summary is depicted in the table below.

	Current Tourism Value (Rands)	Construction Phase (yrs 1-6)		Operational Phase (yrs 7-20)	
		Annual Impact (Rands)	Impact (%)	Annual Impact (Rands)	Impact (%)
Duynefontein	497,827,951	0	0.00%	7,111,828	1.43%
Bantamsklip	62,247,100	3,112,355	5.00%	5,335,466	8.57%
Thyspunt	77,745,000	-6,108,536	-7.86%	0	0.00%

The Thyspunt and Bantamsklip communities have expressed the most adamant opposition to the proposed nuclear power station. Thyspunt has expressly highlighted the premium nature of the top-end coastal vacation destination, and Bantamsklip has emphasised the new and fragile nature of the developing tourism product and the local dependence thereon. While some Duynefontein tourism stakeholders have personal objections to the construction and operation of another nuclear power station, they recognise the potential for increased business and promote a generally positive outlook for tourism.

The main mitigation measure is an aggressive community-orientated and comprehensive public relations campaign to address popular misconceptions, specifically the impacts of nuclear power generation on the marine and immediate environment. An expressed and comprehensive integration of the relevant tourism agencies and organisations into Eskom's nuclear intentions and activities at each site, will facilitate a timely adaptation of the destination marketing and tourism branding initiatives, thereby expediting the acclimatisation of each site's tourism products and

destination image toward the potential new nuclear environment; as emphasised by the commercial buy-in and stakeholder support experienced for the Koeberg NPS.

In summary, the impacts on tourism at the three sites are as follows:

- Duynefontein – most easily absorbed into the local economy; no short-term discernible impact on tourism; small-scale, long-term discernible positive impact on tourism;
- Bantamsklip – small-scale, short-term and long-term positive discernible impact on tourism;
- Thyspunt – small-scale, short-term, negative discernible impact on tourism; no overall discernible long-term impact on tourism.

In terms of the impact on tourism, there are no fatal flaws in respect of any of the three sites, and all of them would be suitable to accommodate Nuclear-1.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED NUCLEAR POWER STATION ('NUCLEAR-1') AND ASSOCIATED INFRASTRUCTURE

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ABBREVIATIONS

DEAT	Department of Environmental Affairs and Tourism
NPS	Nuclear Power Station
EIR	Environmental Impact Report
IDP	Integrated Development Plan
ECTB	Eastern Cape Tourism Board
DTI	Department of Trade and Industry
PBMR	Pebble Bed Modular Reactor

1 INTRODUCTION

1.1 Background

This study considers the broader tourism market and product that exists at each proposed site for the Nuclear-1 programme, and the potential impact thereon of the construction and operation of a nuclear power station (NPS).

The proposed sites are listed below and illustrated in Section 2:

- Duynefontein
- Bantamsklip
- Thyspunt

This report has three objectives:

- Describe the status quo in terms of the current tourism industry and outline current proposed developments in each area.
- Define and value the change in the tourism asset that would occur as a result of the construction and operation of a nuclear power station.
- Identify and recommend mitigation measures to reduce or offset perceived negative impacts on the tourism asset.

This tourism impact study forms part of the Environmental Impact Report (EIR) that will be produced by ARCUS GIBB, the principal Environmental Impact Assessment consultant.

1.2 Study Approach

1.2.1 Methodology

The tourism market in the area around each proposed Nuclear-1 site was defined and contextualised in a desktop study and site visit in November 2007. Using the contact network established during that visit, various tourism information centres and bureaux were contacted, and appointments were arranged with tourism representatives and key industry figures. Interviews followed a semi-structured conversational style designed to encourage the most comprehensive responses and to elicit the most pertinent information while maintaining control over tangential discussions and anecdotal details. Focus group meetings were held in Jeffreys Bay and Gansbaai. The initial contacts led to further appointments with relevant industry stakeholders and individuals. The markets were thereby encompassed by pursuing the tourism network to the point of perceived diminishing returns.

The tourism asset in each area was described according to specialist observation and the perceptions and input of the various stakeholders in seven key aspects:

- Hospitality systems (tourism services and facilities in area).
- General infrastructure (accessibility of area).
- Visual amenity (visual nature and image of area).
- Social amenity (community interests of area).

- Sense of place (character and appeal of area).
- Marine assets (marine-based tourism activities within area).
- Terrestrial assets (land-based tourism activities within area).

There is only one true economically comparable measure of tourism performance, that is, the number of bed-nights spent at a place, categorised by country, province, district, city, town (Myles, 2007). A monetary value utilising this figure then represents a comparable value of tourism for each area. It is calculated using the total number of available accommodation beds multiplied by an average annual occupancy rate multiplied by the average cost per night, which in turn is calculated as the average of the documented peak (high) and off-peak (low) seasonal rates where applicable. A rand value for private house lets was added to this figure, calculated by using the number of houses let, the average occupancy rate (usage) and the average cost per day of the house, again as the average of peak and off-peak seasonal rates where applicable.

Using the respective perceptions and observations from fieldwork interviews and research for each area in question, a quantification matrix was set up according to the above seven identified tourism aspects to numerically estimate the relative impacts on the respective tourism value figure for each area. The impacts were categorised into five phases for comparative and predictive purposes:

- Construction of nuclear power station (Years 1-6).
- Operation of nuclear power station (Years 7-20).
- Disaster scenario 1: Japan (90% annual tourism loss in Year 12).
- Disaster scenario 2: Brazil (40% annual tourism loss from Years 12-16).
- Disaster scenario: 3 USSR (100% annual tourism loss from Year 12 onwards).

The disaster scenarios related to incidents of varying severity at nuclear power stations in Japan (minor), Brazil (medium) and the USSR (the Chernobyl disaster) and are described in Box 1 (below). They represent three documented nuclear scenarios that have previously occurred with a range of identified statistical (percentage) impacts on the value of tourism in their respective regions. These percentage impacts are transposed onto the three South African sites to reflect conceivable levels of tourism impact in plausible and comparable statistical values.

Box 1: Past nuclear accidents

Chernobyl, USSR (Ukraine)

- Accident in 1986 caused release of very high radiation levels into the atmosphere
- All activity in the area ceased: people evacuated, industries and businesses closed down
- Estimated 300-600 years before city is fit for human habitation again
- Tourism as it was before the accident was brought to a complete end; much of the Chernobyl area is now off-limits
- Sweden lost 2.5 billion SEK income from the international tourism industry in the 10 years following the Chernobyl incident
- The disaster itself has attracted tourist attention: excursions run so that interested people can see the disaster site
- <http://www.bized.co.uk/educators/16-19/tourism/special/activity/special2.htm>
- <http://www.springerlink.com/content/k07w362247j22161/>

Goiania, Brazil

- Following a major incident in 1987 at the Goiania nuclear power plant, hotel occupancy

rate dropped by 40%

- As word of the accident spread, income from tourism dropped to almost nothing and took about 5 years to recover
- http://findarticles.com/p/articles/mi_qa3912/is_200112/ai_n9008776/
- <http://books.google.co.uk/books>

Japan

- In 2007, a leak at the nuclear plant at Kashiwazaki-Kariwa led to a 90% drop in tourism that summer season compared to previous summers
- <http://travel.iafrica.com/bulletinboard/339892.htm>

1.2.2 Assumptions

The following assumptions were made regarding the area, tourism asset and impact quantification:

- The sphere of impacted tourism asset is between 0km and approximately 20km from the proposed nuclear power station platform.
- The present marine exclusion zone at Koeberg is 2km along the shoreline and 3.2km from the shore out to sea (as per the National Key Points Act). For Bantamsklip and Thyspunt these figures are each reduced to 1km (as advised by Eskom).
- As tourism is a complex sector, the comparative figure used for each area is the number of bed-nights which is the only true measure of tourism performance. The value of bed-nights spent in each area was accepted as the most accurate feasible representation of the value of tourism.
- Resident tourism stakeholders would be the most sensitive in terms of perceived impact.
- Tourism bureaux accurately present industry data in each area.
- The impact period is up to and including the operating phase.
- For the specific optimum placement of the NPS platform within the identified possible corridor on each site, the tourism assessment identifies the Visual Impact Specialist assessment recommendations as reflective of tourism interests.
- The Japan, Brazil and USSR scenarios represent the full spectrum of possible tourism disaster impacts.

The increasingly important issue of climate change is also included as part of the considerations for tourism, although there remains a degree of uncertainty regarding the magnitude of the impacts of a changing climate. To localise climate change considerations into the South African context and for the proposed Nuclear-1 sites, the Cape Town report on Global Climate Change and Adaptation (Laquar Consultants (2008)) was used as the primary baseline for impact assessment.

Predicting tourism trends and impacts in the decommissioning phase 60 plus years into the future is not feasible. To do so would be presumptuous on the part of the specialists; and could result in misleading or inaccurate information. The number and importance of the multiple unknown variables are too great, and all input from stakeholders and consultants on this topic would only be of a hypothetical and anecdotal nature, not of any scientific relevance or contributing value to the decision-making body of knowledge.

1.2.3 Limitations

Tourism by nature is complex and diverse but, due to time and budgetary constraints and moreover for comparative purposes, the annual value of bed-nights was accepted in this study. However, the full concept of tourism product and asset is far greater than bed-nights, and includes an array of service and support industries that have not been included or quantified in this study.

Tourism is also inherently linked to the concepts of brand, image and perception. These concepts are very difficult to quantify but have a tremendous impact on the industry. The success of a tourism destination is determined by the competitive choice that exists between various destinations. This choice, in turn, is based on the perceptions of those destinations held by potential tourists, specifically in terms of the degree of attraction and the ultimate satisfaction of their visitation requirements. These requirements are as diverse as the tourists themselves, ranging from location to environment to cost. Specific tourism visitation or value statistics are neither systematically collected in, nor available for, the areas in proximity to proposed Nuclear-1 sites.

Although this report differentiates between wider tourist accommodation beds and private house lets, no distinction or quantification is made for tourists visiting friends and relatives.

The value of unexploited natural resources in tourism impact assessment was not possible to estimate in this assessment.

Specific tourism visitation or tourism monetary value statistics are neither conducted in, nor available for, the tourism industry delineated and affected by the Nuclear-1 sites.

Owing to budgetary cuts and time constraints, comprehensive surveys were excluded. Consequently, interviews with key tourism roleplayers and stakeholders were undertaken. These, supplemented by telephonic and electronic communications, form the basis of the data collection, analysis and report.

2 DESCRIPTION OF AFFECTED ENVIRONMENT

Except where information was obtained from official documents, this section is based on field interviews by the consultants with municipal officials, firms and individual operators, and the sources are not attributed for reasons of confidentiality.

2.1 Duynfontein

Duynfontein falls into the City of Cape Town. The Integrated Development Plan (Cape Town 2007) for the area clearly states that Cape Town is recognised as the gateway to the Western Cape. The environment is one of Cape Town's strongest assets driving tourism, and development initiatives for the next three years focus on the expansion of infrastructure that will improve access to, and the enhancement of, the local tourism experience. Tourism around the Duynfontein site is largely represented by the Greater Northern Cape Town tourism region. This includes Atlantis, Bellville, Blaauwbergstrand, Century City, Durbanville, Edgemead, Goodwood, Langa, Melkbosstrand, Milnerton, Parow, Pinelands, Sunset Beach and Table View. Map 2.1 illustrates the spatial context of the site. Photographs of the proposed site and a visual representation of the tourism asset are in Section 7: Annexures.

This area is characterised by a wide diversity of enterprises in the tourism industry. It is difficult to differentiate between the tourist assets of the study area itself and those of the Greater Cape Town and West Coast destinations. However, within the immediate site proximity, activities are focused on sea and eco-tourism activities such as kite-surfing, windsailing, golf, hiking and mountain biking. The area has a well-developed tourism infrastructure with a strong supply of services, facilities and amenities. The area promotes a seafront residential sense of place emphasising proximity to the coast and to the Greater Cape Town tourist hub.

The Visual Impact Assessment identifies the scenic nature of the Duynfontein site's coastal landscape, emphasising the remoteness of the location and natural bleakness and desolation caused by the wind factor, the shifting sands of the low dune field, and the extensive views up and down the coast. The site, particularly to the north, is generally undeveloped and in a natural condition. Although in terms of marine life, there is little species richness and very low endemism (Marine Environmental Specialist Report), the success of the Koeberg Nature Reserve is highlighted as a popular and safe area for recreational outdoor activities such as walking, biking and animal viewing, and is well used by visitors and the local communities.

Three large-scale hotel developments are currently underway in Blaauwbergstrand along with numerous residential developments in all of the listed areas, including plans for a further golf estate near Melkbosstrand. These developments are a response to the accommodation requirements of the area, and it may be assumed that they will follow regional occupancy trends. When completed, these projects would clearly increase the figures given in Table 2.1 below. Large-scale road and access developments are also currently in progress.

Table 2.1: Quantitative Representation of Tourism Industry in the Duynefontein Area

Accommodation beds	2,408
Average rate per night	528
Average annual occupancy (days)	231.05
Sub-sector turnover p.a.	R 293,756,158
House lets	1,463
Average cost per day	R 583
Average annual occupancy (days)	239
Sub-sector turnover p.a.	R 204,071,792
Total turnover p.a.	R 497,827,950

Source: Field interviews

Map 2.1: Duynefontein site location and sphere of impact



2.2 Bantamsklip

Bantamsklip falls under the Overberg Municipality, where the Integrated Development Plan (Prins 2007) clearly outlines the importance of tourism and more specifically environmental and conservation orientated tourism. Sustainable environmental management and bio-regional planning are identified as specific elements in future tourism development plans for the area.

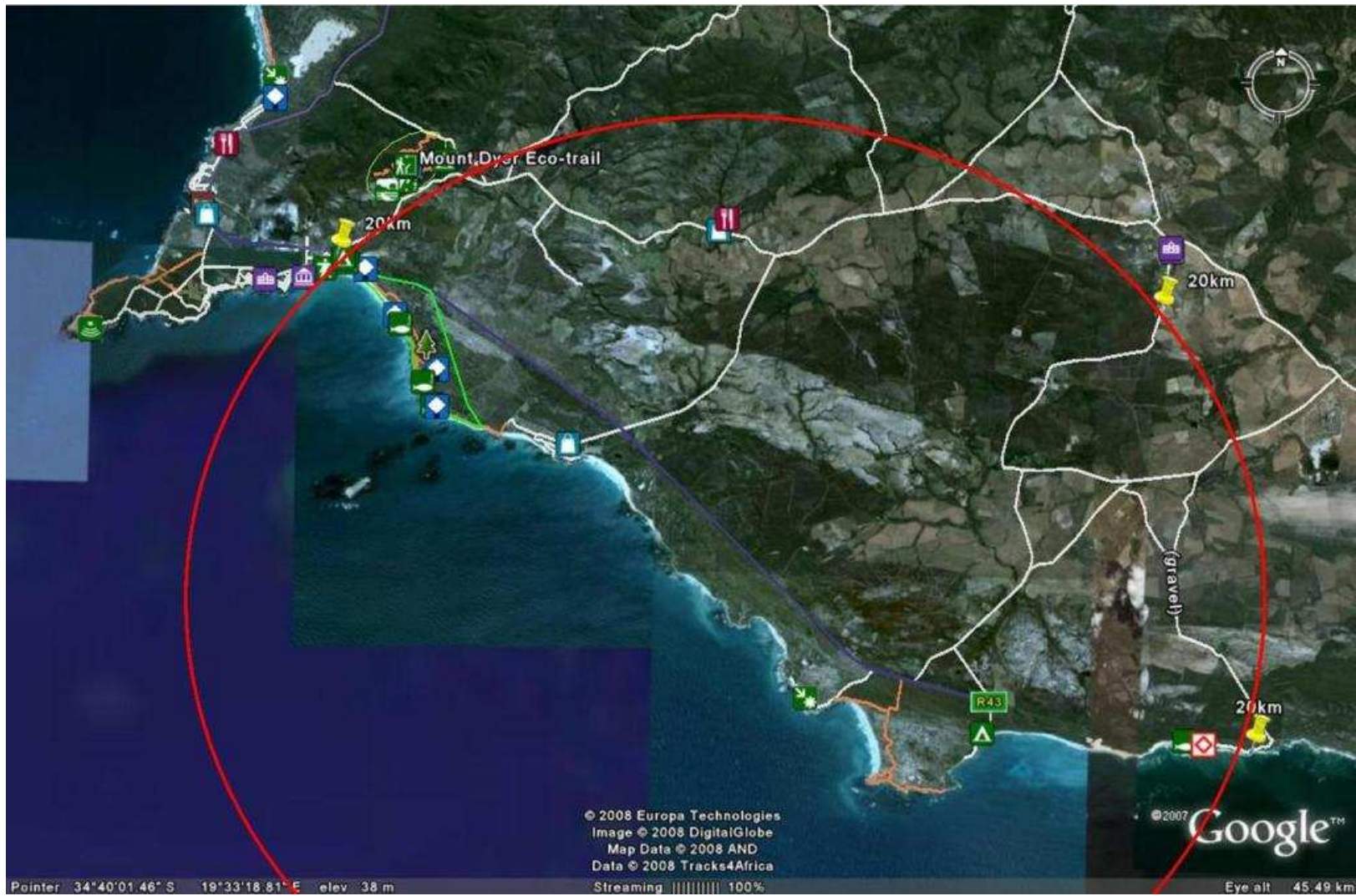
The Bantamsklip site is surrounded by the Greater Gansbaai tourism region. This includes De Kelders, Gansbaai, Kleinbaai, Franskraal, Pearly Beach, Buffeljagsbaai and Die Dam. Map 2.2 illustrates the spatial context of the site. Photographs of the proposed site and a visual representation of the tourism asset are in Section 7: Annexures.

The Greater Gansbaai area is a marine-based attraction centre with a clear focus on eco-tourism. The seasonal tourist period is over the Christmas and New Year holidays when the population grows from 22,000 permanent residents to 62,000. The general tourism product is relatively underdeveloped, and tourist support services, facilities and industries are few in number and still developing. Tourism in the area is overwhelmingly dominated by the whale-watching and shark-cage diving industries.

This marine asset draws the majority of visitors and is largely responsible for driving the local tourism economy and associated industry. However, many of these are day visitors who stay overnight in Hermanus where the accommodation sector is much larger than at Gansbaai. The Marine Environmental Specialist Report specifically identifies the area between Bantamsklip and Gansbaai as one of three shark-diving sites along the South African coast and a significant location for the birth of Southern Right Whales, further encouraging marine-based tourism. The area is also characterised by significant recreational fishing activities despite low marine species richness and very low endemism.

The Visual Impact Assessment identifies the Bantamsklip section of the coastline as particularly scenic, viewed both by road-users and persons who have access to higher-lying properties. The site's sense of place is based on the visible naturalness of the setting and visual absence of human elements, with land up to 20 km inland and (except for Gansbaai and Pearly Beach) 15 km each side of the site being predominantly undeveloped and in a mostly natural condition.

Map 2.2 Bantamsklip site location and sphere of impact



The greater Gansbaai area promotes a small seaside town atmosphere, emphasising a quiet and rustic lifestyle in a natural and undeveloped environment. However, there are large-scale tourism development plans that consist of two holiday/residential apartment blocks and hotels with a further expansion of the current 9-hole golf course to 18 holes. Accommodation is provided by the B&Bs/guest-house sector and house lets. Average annual occupancy rates for the former are estimated at 40% and for the latter at 5%.

The size of the tourism industry in the Bantamsklip area is quantified in Table 2.2 on the basis of information obtained in the field.

Table 2.2: Quantitative Representation of Tourism Industry in the Bantamsklip Area

Accommodation beds	1,111
Average rate per night	R 350
Average annual occupancy (days)	146
Sub-sector turnover p.a.	R 56,772,100
House lets	150
Average cost per day	R 2,000
Average annual occupancy (days)	18.25
Sub-sector turnover p.a.	R 5,475,000
Total turnover p.a.	R 62,247,100

Source: Field interviews

2.3 Thyspunt

Thyspunt falls under the Cacadu District Municipality. The Integrated Development Plan (IDP) (Cacadu 2007) states that tourism is becoming an increasingly important economic activity for the area and is earmarked as a key element in local economic development strategies. The municipality has identified a number of natural, historical and cultural features that could be further exploited to attract local, domestic and international tourists to the area, and is currently drafting a tourism development master plan and arranging funding to promote local tourist initiatives and construct an effective communication and marketing system (Grant Thornton Kessel Feinstein 2003). The tourism market around the Thyspunt site includes Oyster Bay, St Francis Bay, Cape St Francis, Port St Francis and Humansdorp. Map 2.1 illustrates the spatial context of the site. Photographs of the proposed site and a visual representation of the tourism asset are in Section 7: Annexures.

Although Jeffreys Bay falls outside the immediate sphere of direct influence of a proposed Nuclear-1 at Thyspunt, it is discussed briefly here because of its position in the surfing industry. Jeffreys Bay is widely recognised as South Africa's premier surfing spot with the world's longest right-hand wave break. Aside from the strong sports-tourism market it represents, the surfing community has a very pronounced environmental consciousness. It has made considerable efforts to voice its objections to the proposed nuclear power station in the form of international surfing-media publications, while a formal petition indicating boycotts and sponsorship withdrawal

has been signed by most of the local surfing market and a number of the top international merchandise brands connected with the sport and their top sponsored performers. To indicate the value of this surfing-tourism market, Table 2.3 shows the approximate income generated from the ten days of the Billabong Pro, a top event on the international surfing calendar.

Table 2.3: Approximate Visitor Expenditure during the Billabong Pro

Average number of visitors per day	5,000
Approximate average daily visitor expenditure	R 500
Duration (days)	10
Approximate value of visitor spending	R 25,000,000

Source: Field interviews

The total turnover in the Jeffreys Bay economy is estimated by local business at about R500 million per annum of which 80% is related to surfing. Despite current negative perceptions and a threatened boycott on the part of the International Association of Surfing Professionals, it appears from other specialist studies that the fears of the Jeffreys Bay and international surfing communities are groundless, and that the continuing attraction of the unique wave conditions will offset any long-term impact. Jeffreys Bay is not vital to this study, and this area, therefore, has not been factored into our quantitative analysis as the release of scientific findings should influence the surfing associations to withdraw their threats of boycotts.

The tourism asset within the radius is predominantly centred in St Francis. Indeed, the area was founded as a tourism destination. It has a strong eco-tourism brand with emphasis on water sports (including surfing, sailing and fishing) and other outdoor activities such as golf and hiking.

In discussing tourism it is necessary to make assessments of a marine and visual nature due to the inherent coastal setting of the relevant tourism product – visual aesthetics and marine resources are two of the defining characteristics. Thus, the reports of the Marine and Visual specialists were consulted in order to correlate pertinent conclusions.

The Marine Environmental Specialist Report identified no particular marine species endemic to the south coast, nor were any rare or endangered species or species of biological significance found. However, the importance of shore- and skiboat-based recreational angling was emphasised.

The Visual Impact Assessment describes the sense of place of the Thyspunt site and its surroundings as predominantly related to the remoteness of the general location. The area promotes a strong “green” community of quiet and remote exclusivity, emphasised by luxurious coastal living in a relatively unspoilt natural location. A well-developed tourism infrastructure exists with a broad range of services and facilities. Three large hotels are planned and two further sectional-title holiday residential developments are under construction.

The tourist season at St Francis is extremely short, being concentrated into a ten-day period in December-January and over the Easter week-end. The normal population of 4,000 rises to 30,000 over Christmas and New Year and perhaps to 8,000 over Easter. There is no hotel, but B&Bs and guest houses offer 1,200 beds while there

are approximately 300 houses which are let during the peak seasons. Average annual occupancy rates are estimated at 40% for B&Bs and 5% for house lets.

Humansdorp has no real tourism industry with minimal facilities and services. It acts predominately as a transition node for tourists en route to St Francis or Jeffreys Bay. The only tourist activity is extremely seasonal and revolves around an overflow from St Francis and Jeffreys Bay during the Christmas and Billabong Pro peaks.

The size of the tourism industry in the Thyspunt area is quantified in Table 2.4 on the basis of information obtained in the field.

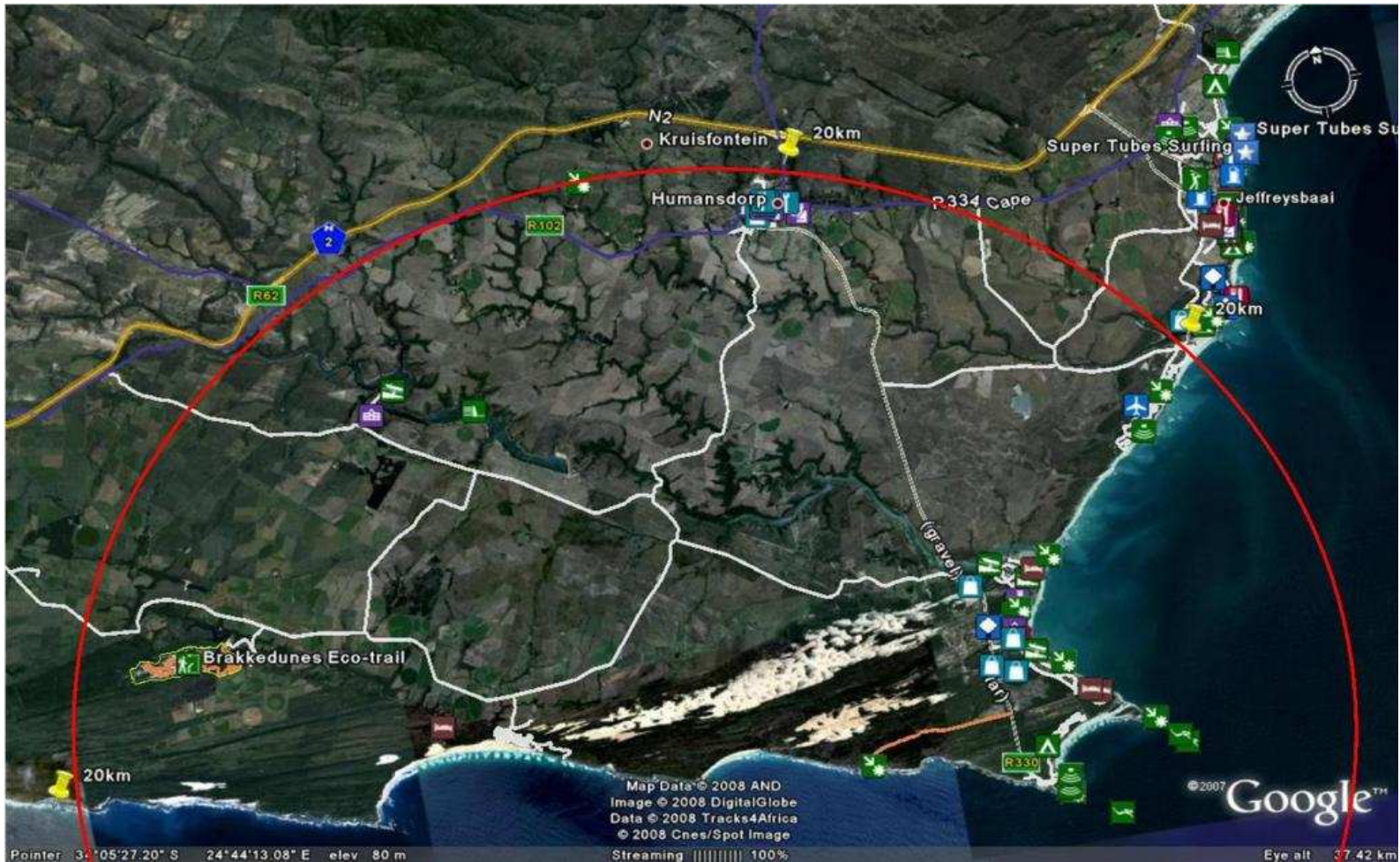
Table 2.4: Quantitative Representation of Tourism Industry in the Thyspunt Area

Accommodation beds	1,200
Average rate per night	R 350
Average annual occupancy (days)	146
Sub-sector turnover p.a.	R 61,320,000
House lets	300
Average cost per day	R 3,000
Average annual occupancy (days)	18.25
Sub-sector turnover p.a.	R 16,425,000
Total turnover p.a.	R 77,745,000

Source: Field interviews

It will be noted that the average price of house lets is highest in Thyspunt. This is explained by the up-market, prestige nature of tourism in this area compared to Bantamsklip. In the areas surrounding Duynfontein there is a large stock of various kinds of accommodation, leading to relatively low rates for house lets.

Map 2.3: Thyspunt site location and sphere of impact



3 IDENTIFICATION OF TOURISM IMPACTS

3.1 Tourism Asset and Resource Categories

The identified tourism impacts based on stakeholder perception and inputs as well as the experience and observations of the specialists are summarised and explained in the following categories that describe the assets and resources that comprise the respective tourism industries of each proposed Nuclear-1 site:

- Hospitality systems: A change in number and nature of tourism facilities and services as the area adapts to altered local community utilisation and tourist demands.
- General infrastructure: A change in each area's general infrastructure and access routes.
- Visual amenity: A change in the area's visual attractiveness and the awareness thereof in terms of the total marketable tourism product and visual brand of the destination.
- Social amenity: A community profile and demographic change through influx of power station construction and operation specialists and labour. The change holds implications for municipal priorities, political powerbases and social requirements within the community.
- Sense of place: A change in residential and holiday-visitor perception of the character and appeal of the area with specific regard to lifestyle and nature of destination, encompassing the change in discerning tourist visitation due to reduced or altered perceived attraction of destination.
- Marine assets: A change in the accessibility or development of marine-based tourism activities or resources within the area.
- Terrestrial assets: A change in the accessibility or development of land-based tourism activities or resources within the area.

3.2 Climate Change Considerations

The increasingly prevalent issue of climate change has required its inclusion in the impact assessment of Nuclear-1 on tourism. Climate change is slowly entering into decision-making of a range of tourism stakeholders, e.g., investors, insurance companies, tourism enterprises, governments, and tourists, although studies have consistently found relatively low levels of concern and little evidence of long-term strategic planning on the part of local tourism officials and operators in anticipation of changes in climate (United Nations World Tourism Organisation, 2007a). Moreover, some tourism stakeholders, professionals and scientists remain unconvinced that there is enough evidence linking climate change to impacts on the tourism sector in general. Within localised tourism sectors and stakeholders there is a degree of confusion between weather and climate phenomena attributed to climate variability (cyclical in nature) rather than to climate change (which implies more permanence). As such, damage to tourism facilities and resources inflicted by significant or

unseasonal storm activity is often associated with climate variability (Organisation of American States, 2002).

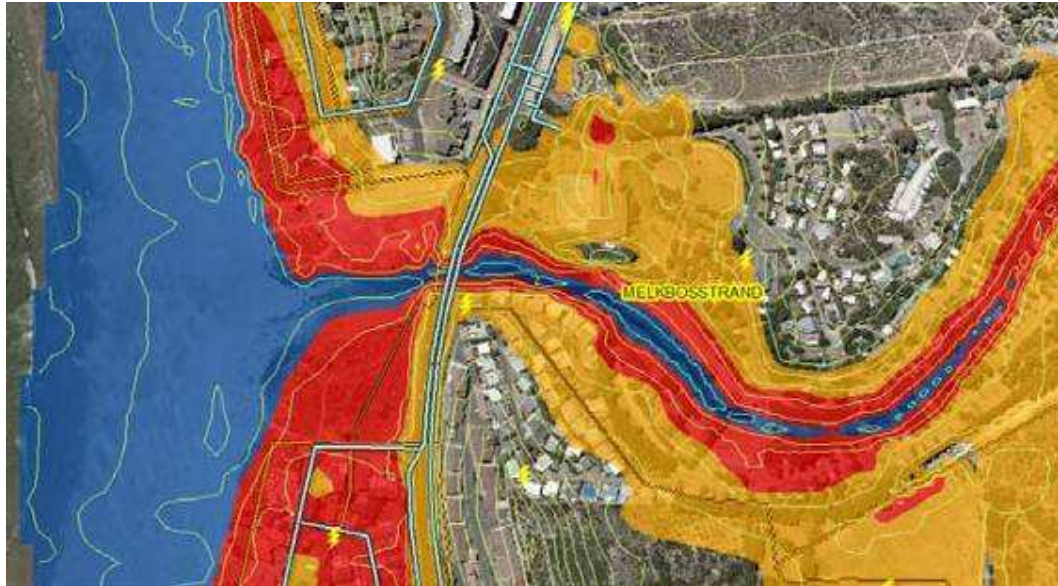
There remain considerable uncertainties about the magnitude of the impact of many effects of a changing global climate, e.g., the extent of rises in temperatures, changes in precipitation, and the extent and location of extreme events, floods and droughts. Scientific studies into climate change are still at a relatively early stage and, as such studies progress, there may well be changes in long-term predictions (United Nations World Tourism Organisation, 2003). It is not the purpose of this report to assess the scientific accuracy or merit of such studies or climate change as a phenomena, but the tourism industry (among others) should be prepared to monitor these developments and consider them within tourism planning, development and management.

At the Second International Conference on Climate Change and Tourism, the Davos Declaration acknowledged the reality of climate change and its strong interrelationship with tourism. Climate change will become an increasingly pivotal issue affecting tourism development and management (United Nations World Tourism Organisation, 2007a; 2007b). However, it was recognised that, within the current body of scientific analysis, research and prediction, there are too many variables to provide an accurate cost-impact estimate, most significantly because there are multiple climate change scenarios to consider, each with varying degrees of impact and confidence, ranging from worst-case to negligible.

It is necessary, therefore, to contextualise climate change considerations for South Africa. According to a study for the City of Cape Town (Laquar Consultants 2008), the major pertinent issues are the possibility of an increase in the number and intensity of storms followed by dramatic flooding of low-lying areas due to water-level rise. These are the two issues considered as part of the tourism impacts of climate change for this assessment as they would affect both the selection of the site for a nuclear power station and the possible correction and safeguarding measures that would need to be put in place. However, regarding the proposed construction of nuclear power stations, the risk to tourism from their construction is a reactive one, i.e., the power stations themselves would not affect climate, but the possibility of climate change could affect the risk associated with them.

Sea-level risk assessment reports (Brundrit, 2008; Cartwright, 2008; Fairhurst, 2008) identify sea-level rise as a consequence of climate change, and recommend that this must be taken into consideration in planning and future development. Three sea-level rise scenarios are identified and depicted in Map 3.1 below which illustrates the Melkbosstrand area, approximately 7km from Koeberg and the Dufnefontein site. The blue area indicates the loss of coastal amenity and infrastructure with a 2.5 m rise in sea level, the red with a 4.5m rise, and the orange with a 6.5m rise. The map shows that considerable areas of coastline could be flooded.

Map 3.1: Example of sea-level rise and associated land loss scenarios for Cape Town



Source: Fairhurst, 2008

As these studies provide contemporary South African data, the 2.5 m sea-level rise scenario will be applied in this report for each of the proposed Nuclear-1 sites. The 2.5m scenario is the most conservative and is therefore considered to be the most feasible within the lifetime of a NPS, thereby making it the most appropriate for consideration and comparison of all three sites.

In considering climate change in terms of tourism for the proposed Nuclear-1 sites, it is important to remember their inherent proximity to the sea. Due to the coastal nature of tourism within such areas, e.g., the towns, resorts, residences, beaches, etc., the storm increases and sea-level rise postulated by the Cape Town's study's scenarios will incur damages and loss on two levels: first, the immediate effects of wave, storm surge and wind-attributed impacts with their direct and indirect damages and cost, and secondly, the wider effects such as erosion, flooding and land loss which are likely to be gradual and sustained. For all three sites there are significant potential impacts to be considered:

- Loss of recreational value and carrying capacity of beaches;
- Loss of property value resulting from declining amenity value;
- Loss of land value;
- Deterioration of landscape and visual appreciation;
- Cost of beach and property protection.

4 ASSESSMENT OF IMPACTS ON TOURISM

4.1 Introduction

The following section describes the economic ramifications of the various identified impacts on the tourism industry at each site. The assessment is aggregated in a table displaying the respective impacts according to five time-based scenarios, namely, construction, normal operation and the three disaster scenarios based on actual international nuclear incidents referred to in Section 1.

In order to quantify the possible economic impacts of the proposed developments, the current value is multiplied by a factor reflecting the expected degree of change. To identify the factor of change, each of the key tourism assets is scored using expert opinion, local perceptions and documented responses from Japan, Brazil and the Ukraine. This factor can range from a positive impact such as 1.10 to a negative impact such as 0.10. The change factors for each of the five scenarios are then averaged. The average factor is then used to quantify the change in the value to the tourism industry by multiplying the current value by the factor of change to provide an indicative quantity of change in the associated economy.

For all three sites it is assumed that the waste from the desalinisation plant (brine) will be pumped back into the ocean in a controlled way. If this is the case, the Marine Biology Specialist Report indicates minimal impact on the marine asset, and thus there will be no discernible impact on tourism as a result of the desalinisation plant

For all three sites there are no “no-go” areas and no preferred siting of the facility from a tourism point of view. The alternatives for spoil disposal at all three sites, namely, on site, on surrounding beaches or out at sea, are assessed as unlikely to have an impact on the tourism sector.

The Terms of Reference require that relevant national, provincial and regional tourism policies be examined. This is in order to contextualise the formalised tourism structures and policies that have a bearing on all tourism development plans for each of the sites, and provides an understanding of the environment and conditions in which organised tourism structures have to operate. There are a number of pertinent issues. As described earlier, the South African tourism product is intrinsically diverse in its nature and extent. Furthermore, the stakeholder cluster in the greater tourism industry consists of a large number of private organisations, firms and public-sector agencies and government departments, complicating overall policy development, coordination and implementation (South African Tourism, 2008). From a national perspective the South African Department of Trade and Industry’s (DTI) national industrial strategy has been under discussion for some time. As a consequence, provincial governments that have sought to develop relevant policy have had to do so within an undefined national policy context. This has had two negative consequences that affect the relevant tourism development policies and initiatives.

The first is that the lack of a clear national policy framework has made it more difficult to devise and implement provincial policies (clarification of the national policy context is considered critical to developing effective provincial policies). The second consequence is that there has been a lack of cohesion between national and provincial policy, exacerbated by the previously limited engagement of the provinces

in the development of national sectoral plans and the various regional development strategies (Department of Economic Development and Tourism, 2006). However, over the last ten years the tourism industry has been a key focus of policy interventions of various sorts. These range from overarching macroeconomic strategies at a national level to macro-and microeconomic strategies at a provincial and local level (Standish, 2004).

4.2 Duynefontein

In Section 2.3 the description of the tourism industry around the Duynefontein site showed a dynamic and growing sector. It is important to note that most of this growth has occurred since the opening of the Koeberg NPS in 1976. In other words, the tourism sector in the Koeberg-Duynefontein area has grown and has attracted a number of up-market developments such as golf estates despite the presence of the Koeberg NPS. The fact that the presence of a NPS has not been a deterrent to investment in, and growth of, the tourism sector is consistent with the evidence in Box 2 below which shows that nuclear power stations in Egypt, France, Sweden and the Czech Republic have not halted the growth of tourism.

Box 2: Impacts of nuclear power stations on tourism

Egypt

- Dabaa nuclear reactor has not had any adverse effects on the tourism industry.
- http://goliath.ecnext.com/coms2/summary_0199-6783607_itm

France

- Almost 80% of France's power comes from nuclear plants.
- Despite a few minor incidents, tourism levels in France have not dropped.

Forsmark, Sweden

- Despite a few emergency shutdowns of the nuclear power plant at Forsmark in the last few years, including the worst nuclear incident in Sweden (in 2006), tourism has not been negatively affected.
- 15,000 (predominantly local) tourists visit the Forsmark site every year specifically to tour the nuclear power plant. Of Sweden's population of 9 million, one-third have done this tour.
- A recent survey showed that 80% of the population have no problem with continued use of nuclear power.
- <http://www.abc.net.au/news/stories/2007/10/29/2073086.htm>

Temelin, Czech Republic

- In 2007, almost 27,000 tourists visited the site (a 10% increase from 2006).
- Tourism directly related to the nuclear power plant at Temelin continues to grow steadily
- <http://www.climatesceptics.org/country/czech-republic/temelin/nuke-tourism-radiating-growth/>

The tourism industry in the area did not express any particular concerns regarding the construction of a second NPS or of the proposed Pebble Bed Modular Reactor (PBMR). This is indicative of the dynamic and adaptive nature of the tourism industry. The longer a community or tourism product is allowed to acclimatise to the proximity and function of an NPS, the more integrated the tourism industry becomes with it. The matrix of impacts on tourism as determined by extensive field research, stakeholder consultation and observation, is shown in Table 4.1. The numbers in the

matrix represent factors of change to tourism assets resulting from NPS impacts. As the greater Cape Town area is a large tourism base to start with, the positive impact of the influx of business tourists and the required extended stays of specialists, engineers and consultants during construction and operation of Nuclear-1 is relatively small as indicated in the hospitality systems row. This influx, along with significant presence of the extensive on-site labour force, will also initially change the social amenity of the area. Site works and traffic during construction, and the associated inaccessibility relating to safety and security, will result in a reduced terrestrial asset. However, as there are no viable commercial or tourism-orientated marine activities off the proposed site, there is no loss in marine asset. It is expected that, during normal operation, the social amenity of the area will return to the pre-construction equilibrium as the community adapts and acclimatises to a second NPS. This has been demonstrated before through the Koeberg experience. Moreover, with the opening of further nature reserve areas to tourists, the terrestrial asset loss from the construction phase will also be mitigated.

Table 4.1: Description of Tourism Asset Impact of Nuclear Power Station at Duynfontein

	Construction	Normal operation	Scenario		
			Japan	Brazil	Ukraine
Current Tourism Asset	Years 1 - 6	Years 7 - 20	Year 12	Years 12 - 16	Years 12 - 20
Hospitality systems	1.10	1.10	0.10	0.60	0.00
General infrastructure	1.00	1.00	0.10	0.60	0.00
Visual amenity	1.00	1.00	0.10	0.60	0.00
Sense of place	1.00	1.00	0.10	0.60	0.00
Marine assets	1.00	1.00	0.10	0.60	0.00
Social amenity	0.95	1.00	0.10	0.60	0.00
Terrestrial assets	0.95	1.00	0.10	0.60	0.00
Total	7.00	7.10	0.70	4.20	0.00
Average	1.00	1.01	0.10	0.60	0.00
Current value of tourism industry (R)	497,827,951	497,827,951	497,827,951	497,827,951	497,827,951
Potential value of tourism industry (R)	497,827,951	504,939,778	49,782,795	298,696,770	0
Representative value of impact (R)	0	7,111,828	-448,045,156	-199,131,180	-497,827,951
Percentage value of impact	0.00%	1.43%	-90.00%	-40.00%	-100.00%

Although it is difficult to disaggregate the tourism initiatives of the Cape Town Metropole and the West Coast specifically to the Duynfontein site, the Integrated Development Plan stresses that the greater Cape Town area (that includes Duynfontein) is located in a highly sensitive and vulnerable ecosystem. The environment is recognised as one of the strongest assets driving tourism in the local economy. National and provincial tourism policy issues remain a concern and, the Western Cape Department of Economic Development and Tourism, in its Annual

Performance Plan 2008/2009, specifically identifies the need for broad-based tourism development in all areas of Cape Town and the outlying regions. Specific objectives include facilitating and coordinating regional tourism growth initiatives in partnership with local, district and national government departments and the private sector, and ensuring that products and experiences based on culture, heritage and the natural environment are designed and established to match the demand for new and refined products in these areas. No specific tourism development strategies are currently dedicated to the Duynfontein area.

Further tourism development initiatives for the next three years include the expansion of 14 Visitor Information Centres throughout the Cape Town region, one at Blaauwberg being the closest to Duynfontein, as well as infrastructure developments that will improve access and the enhancement of tourism experiences. The overarching priorities are to develop tourism sites, attractions, routes and infrastructure within the Integrated Tourism Development Framework, including the equitable geographical distribution of infrastructure, products and tourists, and facilitating the development of more tourism-enhancing infrastructure. A summary of the tourism impacts at the Duynfontein site is shown in Table 4.7.

It is unfortunate that data on the impact of construction at Koeberg on the local tourism industry, and especially on the effect of the influx of white-collar workers on bed-nights, were not recorded at the time. It is logical to assume that the effect must have been substantial, and also that business visitors from out of town during the operational period must have contributed to the increased sale of bed-nights in the area. This was certainly the impression gained during field interviews. It must again be stressed that the growth of Melkbosstrand and environs (including Atlantic Beach Golf Estate and other upmarket housing and leisure developments) has occurred subsequent to the construction of the Koeberg NPS.

Seasonality is of some concern as during peak periods of tourism activity in the greater Cape Town area (Christmas and New Year) and the West Coast (school holidays and the spring flower period), there is heavy congestion on major routes across the area. This is compounded by the fact that public transport in Cape Town and the province as a whole is minimal, thus forcing commercial travellers and tourists to hire vehicles. Furthermore, as the Duynfontein area falls within the northern access and growth corridor of Cape Town, and forms part of the primary transport route to the West Coast (which is the third most popular region for domestic tourists after the Cape Peninsula and the Garden Route), congestion and road access need to be considered, particularly during NPS construction.

A Nuclear-1 facility, together with the proposed PBMR and training centre, on the Duynfontein site is likely to have a negligible impact on tourism as the sensitivity levels of residents and visitors are tempered by the presence of the existing Koeberg nuclear power station which has not deterred the growth of upmarket residential areas and leisure resorts to the south and north of the site. The Visual Impact Assessment supports this by documenting a low impact of change in the sense of place as Koeberg has already changed the desolation and remoteness of the location. The majority of impacts will be absorbed into the Greater Cape Town tourism sector. However, as alluded to earlier in this sub-section, business tourism (in the form of visits by engineers, technicians and other specialists) in Duynfontein will increase during construction and, to a lesser extent, during operation. The enlarged exclusion zone will affect the amount of available land and the accessible sea area, but only to a small degree, and the enlarged reserve area will promote the environmental preservation ideals of the Integrated Development Plan and the Integrated Tourism Development Framework.

Of all the sites, though, the conceivable impact of the sea-level rise scenario and storm frequency will be most severely experienced at Duynfontein. The postulated effects are most prevalent at this site mainly due to its topographical character. A shallow seabed gradient and low coastal contour make the proposed NPS platform site the most exposed in terms of potential sea-level rise. Consequently, not only would the proposed NPS platform require considerable protective construction measures, but the severity of associated storm damage, flooding and land, property and tourism asset loss would be likely to be exacerbated more than at the other sites. Affected areas would include Blaauwbergstrand, Melkbosstrand, Milnerton, Sunset Beach and Table View. The impact of a NPS on tourism in the sea-level rise scenario then becomes almost a moot discussion. However, it is conceivable that the impact would be even further reduced than at all the other sites as the extent of damage and loss to the local terrestrial tourism asset and the value thereof within the Greater Northern Cape Town tourism region would be of such magnitude that all reconstruction and tourism development efforts would incorporate the pre-existence of a NPS, as has occurred already, for example, in Melkbosstrand in relation to the Koeberg NPS.

Table 4.2: Summary of Tourism Impacts in the Duynefontein Area According to impact Criteria

Criteria: Duynefontein		Impacts						
		Hospitality Systems	General Infrastructure	Visual Amenity	Sense of Place	Marine Assets	Social Amenity	Terrestrial Assets
Cumulative Impacts	Unmitigated	Medium	Low	Low	Low	Medium	Medium	Medium
	Mitigated	Medium	Low	Low	Low	Low	Low	Low
Nature	Unmitigated	Positive	Neutral	Neutral	Neutral	Negative	Negative	Negative
	Mitigated	Positive	Neutral	Neutral	Neutral	Negative	Negative	Negative
Extent	Unmitigated	Local	Local	Local	Local	Local	Local	Local
	Mitigated	Local	Local	Local	Local	Local	Local	Local
Intensity	Unmitigated	Low	Low	Low	Low	Low	Low	Low
	Mitigated	Low	Low	Low	Low	Low	Low	Low
Duration	Unmitigated	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
	Mitigated	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent
Consequence	Unmitigated	Low	Low	Low	Low	Low	Low	Low
	Mitigated	Low	Low	Low	Low	Low	Low	Low
Probability	Unmitigated	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable
	Mitigated	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable	Highly Probable
Significance	Unmitigated	Low	Low	Low	Low	Low	Low	Low
	Mitigated	Low	Low	Low	Low	Low	Low	Low
Reversibility	Unmitigated	High	High	High	High	High	High	High
	Mitigated	High	High	High	High	High	High	High
Irreplaceable Resources	Unmitigated	No	No	No	No	No	No	No
	Mitigated	No	No	No	No	No	No	No
Confidence Level	Unmitigated	High	High	High	High	High	High	High
	Mitigated	Medium	Medium	High	High	High	High	High

4.3 Bantamsklip

The community in the Bantamsklip area expressed concern with regard to adverse visual impacts of the NPS and transmission lines. A NPS at Bantamsklip would be visible from Pearly Beach and Dyer Island but not from Gansbaai. Concerns with regard to a perceived negative social impact of migrant construction workers were also mentioned. An additional concern was raised relating to the impact of heavy-vehicle traffic during the construction period on local roads. These roads are not built for such traffic, and it was felt that there would be a need for strict control both over the routes to be used and over noise pollution from heavy vehicles which could be a factor in Gansbaai with negative impacts on tourism.

The matrix showing the impact on tourism assets as determined by extensive field research, stakeholder consultation and observation, is set out in Table 4.3. The numbers in the matrix represent factors of change to tourism assets resulting from NPS impacts.

Table 4.3: Description of Tourism Asset Impact of Nuclear Power Station at Bantamsklip

	Construction Years 1 - 6	Normal operation Years 7 - 20	Scenario		
			Japan Year 12	Brazil Years 12 - 16	Ukraine Years 12 - 20
Current Tourism Asset					
Hospitality systems	2.00	2.00	0.10	0.60	0.00
General infrastructure	1.05	1.05	0.10	0.60	0.00
Visual amenity	0.80	0.80	0.10	0.60	0.00
Sense of place	0.75	0.85	0.10	0.60	0.00
Marine assets	0.95	0.95	0.10	0.60	0.00
Social amenity	0.85	0.85	0.10	0.60	0.00
Terrestrial assets	0.95	1.10	0.10	0.60	0.00
Total	7.35	7.60	0.70	4.20	0.00
Average	1.05	1.09	0.10	0.60	0.00
Current value of tourism industry (R)	62,247,100	62,247,100	62,247,100	62,247,100	62,247,100
Potential value of tourism industry (R)	65,359,455	67,582,566	6,224,710	37,348,260	0
Representative value of impact (R)	3,112,355	5,335,466	-56,022,390	-24,898,840	-62,247,100
Percentage value of impact	5.00%	8.57%	-90.00%	-40.00%	-100.00%

The national, provincial and local tourism policy issues mentioned in Section 4.1 also apply here to the greater region in which Bantamsklip is situated. Of specific relevance to this site, the Integrated Development Plan for the local municipality (Prins 2007), states that the district, with its largely rural character and high dependence on agriculture and tourism, is hugely reliant on the natural environment for its existence. Tourism is further emphasised as a priority building block for economic development in the area. In terms of the study area, the smaller holiday towns in the vicinity of Gansbaai are regarded by the IDP as having little or no potential for development outside of housing and recreation.

Due to the small-scale base of the industry, the relatively undeveloped infrastructure and the basic nature of tourism services, along with the current heavy reliance on shark and whale tourism, the Bantamsklip tourism economy is expected to experience a large expansion in facilities, from increases in restaurants to increases in the number of private houses being let out, as a result of the construction and operation of a NPS. The immediate increase is expected to continue as the community services the influx of NPS staff and their associated needs and spending. This also mitigates local concerns about seasonality: the local tourism service industry is dependent on holiday peaks around Christmas and Easter for its financial survival, but a higher local permanent population and influx of personnel from a NPS could stabilise the industry. However, the influx of labour during construction and staff during operation will change the current social amenity of the area.

Road infrastructure is specifically identified by the Integrated Tourism Development Framework as an important element in realising the tourism potential of the Bantamsklip area. Most notably, to the west of Pearly Beach and Gansbaai, the traveller encounters gravel roads of varying quality. These roads are the “missing links” in tourism flows from the Cape Metropole to Cape Agulhas, and act as a barrier to the development of tourism in the region and a deterrent to the average tourist. As a result of a NPS, there will be considerable improvement of general road access in the area and an acceleration of the broader opening of the Agulhas and Bredasdorp corridors, further encouraging access and improving local tourism traffic.

However, as a result of the required exclusion zone that surrounds a NPS, there will be a loss in the marine assets along the owner-controlled boundary. Of the three proposed Nuclear-1 sites, Bantamsklip has the most locally significant marine tourism asset offshore of the site, and access to the whale-watching area will be reduced, especially during construction. Information from Eskom is that the exclusion zone will extend for 1km along the shore and 1km out to sea. The shark-cage diving and whale-watching tourism industries in the Bantamsklip area are of such dominance and importance to local tourism and the local economy that they are worthy of specific attention. Table 4.4 lists the approximate value of each industry per year and as a total.

Table 4.4: Approximate Annual Value of Shark-cage and Whale-watching Tourism Industries in the Greater Gansbaai Area

Approximate number of shark tourism visitors per annum	40,000
Average cost of shark tourism excursion	R 1,250
Approximate value of shark tourism industry per annum	R 50,000,000
Approximate number of whale tourism visitors	8,000
Average cost of whale tourism excursion	R 800
Approximate value of whale tourism industry per annum	R 6,400,000
Approximate value of shark and whale tourism industries	R 56,400,000

Source: Field interviews

The significance of 'Shark Alley', the open stretch of water between the mainland and Dyer Island off Gansbaai, is indicated by the fact that it is popularly referred to as the White Shark Diving capital of the world. There are currently two licensed whale-watching and eight licensed white shark cage-diving operators conducting tours

within the sphere of direct NPS influence. Shark-cage diving occurs mainly around Dyer Island while 80% of whale-watching trips are undertaken to the west of the trawler wreck in the Bantamsklip exclusion zone. Thus, the impact will principally be on whale-watching but, as the marine exclusion zone is expected to be only 1km in extent, this will not directly affect more than 10% of current activities which would then have to move to the larger area. An even lesser impact is possible if Eskom is successful in applying (as it has indicated to the authors that it intends doing) for permission to allow access for whale-watching trips.

A concern for local holiday and residential communities (e.g., Pearly Beach) around Bantamsklip is that of visual impact. The Visual Impact Assessment states that there will be a high level of visual intrusion and impact. The proposed Bantamsklip platform is a dominant feature on mostly flat landscape. The result is high visual intrusion in terms of visual contrast and direct line of sight for areas both east and west of the site. The high visual impact on high-quality scenic views emphasises the effect on the sense of place with the landscape setting being irrevocably changed. There is also a high level of light pollution because of the absence of other conspicuous light sources.

This could affect the immediately foreseeable demand for property and the decision to visit the area. Directly affected communities such as Pearly Beach consist predominantly of holiday-house owners, some of whom could perceive the effects of the nuclear station on their sense of place to be such that they would in all likelihood attempt to sell their properties. However, they are likely to be replaced by new owners (including staff of Nuclear-1) who would be buying into the affected sense of place and environment, thereby adjusting the sense-of-place impact over the operational phase of the NPS.

The Bantamsklip area is likely to experience an immediate and perceptible boost in tourism infrastructure and an increase in both the local resident population and business visitors. The resultant increase in bed-nights sold would have a stimulating effect on what is at present a relatively small albeit growing tourism market. In the long-term the wider effects of Nuclear-1 should also be positive. Although whale-watching might be restricted (unless permits are granted) in the zone adjoining the Nuclear-1 site, this appears to be mitigable by being moved to the larger area of the bay. Moreover, in that the natural resources and nature attractions of the site are currently inaccessible to tourists, the opening of the reserve areas that surround the proposed NPS would result in an increased terrestrial asset to leverage wider tourism for the area as a whole. This would be important in the light of eco-tourism being identified in the local municipality's IDP as one of the main economic and social development strategies for the future of the area. Tourism impacts are summarised in Table 4.5.

In terms of the sea-level rise scenario impacts on the local Bantamsklip area, induced by climate change, there are a number of considerations for tourism. First, as in the case of the Thyspunt site, the sea-level rise scenario at Bantamsklip would cause considerable loss of property and coastal land along with infrastructure damage e.g., roads, utilities, etc. However, the topographical nature of the Bantamsklip coastline, with elevated rock contour at the location of the terrestrial tourism developments such as the residential areas and holiday villages (De Kelders, Gansbaai, Kleinbaai, Franskraal, Pearly Beach, Buffeljagsbaai and Die Dam) suggests a lesser impact than that postulated for the Thyspunt tourism industry. This is also supported by the fact that the Bantamsklip area has a less developed general tourism infrastructure, mitigating the extent and cost of comparative plausible damage.

Secondly, according to the Marine Biology Specialist study, the identified sea-level change possibilities and storm frequencies will not affect local marine wildlife, specifically whales and sharks. However, marine-based tourism is weather dependent as tourist charter boats and other recreational watercraft cannot safely operate in storm conditions, and this could affect these activities. So as far as Nuclear-1 is concerned, as with Thyspunt, the identified platform at Bantamsklip is outside a 2.5m sea-level rise scenario. Thus, these two considerations outlined above are independent of whether there is a NPS or not: Nuclear-1 would not affect climate change and climate change would not influence the impact of Nuclear-1 on tourism.

Table 4.5: Summary of Tourism Impacts in the Bantamsklip Area According to Impact Criteria

Criteria: Bantamsklip		Impacts						
		Hospitality Systems	General Infrastructure	Visual Amenity	Sense of Place	Marine Assets	Social Amenity	Terrestrial Assets
Cumulative Impacts	Unmitigated	High	Low	High	High	Medium	High	Low
	Mitigated	High	Low	High	High	Medium	Medium	Low
Nature	Unmitigated	Positive	Positive	Negative	Negative	Negative	Negative	Negative
	Mitigated	Positive	Positive	Negative	Negative	Negative	Negative	Negative
Extent	Unmitigated	Local	Local	Local	Local	Local	Local	Local
	Mitigated	Local	Local	Local	Local	Local	Local	Local
Intensity	Unmitigated	High	Low	High	High	Medium	High	Low
	Mitigated	High	Low	High	Medium	Medium	Medium	Low
Duration	Unmitigated	Long	Long	Permanent	Permanent	Permanent	Long	Long
	Mitigated	Long	Long	Permanent	Long	Long	Medium	Medium
Consequence	Unmitigated	High	Low	High	High	Medium	High	Low
	Mitigated	High	Low	High	Medium	Medium	Medium	Low
Probability	Unmitigated	Highly Probable	Highly Probable	Definite	Definite	Probable	Probable	Probable
	Mitigated	Highly Probable	Highly Probable	Definite	Definite	Probable	Probable	Probable
Significance	Unmitigated	High	Low	High	High	Medium	High	Low
	Mitigated	High	Low	High	High	Medium	Medium	Low
Reversibility	Unmitigated	Low	Low	Low	Low	Medium	Low	Medium
	Mitigated	Low	Low	Low	Low	Medium	Low	Medium
Irreplaceable Resources	Unmitigated	No	No	Yes	Yes	Yes	No	No
	Mitigated	No	No	Yes	Yes	Yes	No	No
Confidence Level	Unmitigated	Medium	Medium	High	High	High	High	High
	Mitigated	Medium	Medium	High	High	High	High	High

4.4 Thyspunt

Although the Economic Impact Specialist Report (Conningarth/Imani 2009) states that the business sector (including organised agriculture) is in favour of the construction of Nuclear-1 at Thyspunt, there is an active and organised lobby of residents who are strongly opposed to the idea. This group believes that the area's sense of place will be invaded and that lifestyles and tourism will be affected by the visual impact of the NPS and the transmission lines which will need to be built. There is a wider concern within the community as a whole (including the business sector) about the possible negative social effects arising from the influx of relatively unskilled workers during the construction phase. The point was made that, in the recent past, the construction of the harbour at Port St Francis was supposed have been undertaken by local labour but it was in fact undertaken by migrants from the Ciskei and Transkei who remained in the area afterwards, leading to a growth of informal housing which has detracted from the up-market and affluent nature of the rest of the area. The matrix showing the impact on the tourist asset as determined by extensive field research, stakeholder consultation and observation, is set out in Table 4.6. The numbers in the matrix represent factors of change to tourism assets resulting from NPS impacts, and were explained in Section 1.2.1.

Table 4.6: Description of Tourism Asset Impact of Nuclear Power Station at Thyspunt

	Construction	Normal operation	Scenario		
			Japan	Brazil	Ukraine
Current Tourism Asset	Years 1 - 6	Years 7 – 20	Year 12	Years 12 - 16	Years 12 - 20
Hospitality systems	1.00	1.10	0.10	0.60	0.00
General infrastructure	1.00	1.10	0.10	0.60	0.00
Visual amenity	0.90	0.90	0.10	0.60	0.00
Sense of place	0.75	0.90	0.10	0.60	0.00
Marine assets	0.95	1.00	0.10	0.60	0.00
Social amenity	0.90	0.90	0.10	0.60	0.00
Terrestrial assets	0.95	1.10	0.10	0.60	0.00
Total	6.45	7.00	0.70	4.20	0.00
Average	0.92	1.00	0.10	0.60	0.00
Current value of tourism industry (R)	77,745,000	77,745,000	77,745,000	77,745,000	77,745,000
Potential value of tourism industry (R)	71,636,464	77,745,000	7,774,500	46,647,000	0
Representative value of impact (R)	-6,108,536	0	-69,970,500	-31,098,000	-77,745,000
Percentage value of impact	-7.86%	0.00%	-90.00%	-40.00%	-100.00%

With regard to tourism policies relevant to Thyspunt, the Eastern Cape Tourism Board (ECTB) has the stated priority of protecting and upgrading the diverse natural environment that serves as a core tourism attraction in the province. The primary identified method of achieving this priority is to expand the area with long-term conservation status. This would entail not only expanding the area under control of nature conservation bodies but also encouraging the expansion of conservation areas under private management. The ECTB further recognises that the need for land with conservation status should be balanced with the need for other land uses (Cacadu District Municipality 2007; Grant Thornton Kessel Feinstein 2003).

The associated nature reserve and marine exclusion zones of a NPS could arguably fulfill the conservation priorities and strategies of the ECTB. However, according to the Visual Impact Assessment, the remote sense of place of the Thyspunt site, the high impact on the sense of place and high visual intrusion do undermine the positive impacts on potential tourism development (although in terms of light pollution at night, a NPS would have a lower impact than the lights of the chokka boats). Nonetheless, the positive impact of environmental exclusion zones is lessened at the Thyspunt site as the area has been protected from all forms of utilisation for over a decade (Marine Environmental Specialist Report).

In terms of climate change considerations, the greater Thyspunt tourism product has already experienced storm damage in the form of beach erosion and extensive flooding, most significantly in St. Francis. However, the proposed NPS construction site is located beyond the parameters of a 2.5m sea-level rise scenario and will not be affected. But, if the wider coastal tourism asset of Thyspunt (including Oyster Bay, St Francis Bay, Cape St Francis and Port St Francis) is considered, the rise in sea-level could conceivably result in severe damage to the tourism attractions, facilities and general infrastructure, thereby resulting in extensive property, land and natural environment loss. The tourism asset and product of the area would then have to undergo massive reconstruction and rebranding which could incorporate the existence and operation of a NPS, as is exemplified by current tourism initiatives surrounding the Koeberg NPS. The existence of a NPS, though, would not affect climate change or its impact on tourism.

From a tourist perspective, the discerning visitor might choose not to visit the Thyspunt area and the eastern section of the Garden Route as a result of the construction and operation of a nuclear power station, as reflected through the loss in sense of place. However, any associated short-term reduction in the number of leisure tourists would be expected to be offset by the associated growth in the local population brought by Nuclear-1 that would increase the local demand for tourism-related services such as restaurants and accommodation. There would also be increased business tourism with specialists and consultants being brought in, especially during the construction phase, although an influx of construction labour and NPS staff would alter the current social amenity of the area. Bed-nights sold to business visitors would help to offset the loss of traditional leisure tourists. However, the desertion of the area by leisure tourists is not likely to extend into the operational period of Nuclear-1 once its benign nature is realised. Road access would improve, particularly to Oyster Bay, and although a portion of natural assets would be lost to the station, overall access would be improved to more remote areas associated with the NPS property.

The seasonal nature of tourism in the area could lead to congestion, crowding and limited access, particularly during the construction phase of a NPS as tourists would be competing with construction staff and vehicles for local services and facilities.

Eskom has advised the authors that construction would continue throughout this peak tourism period. However, these effects could be mitigated if construction is halted for the customary labour holiday period from 16 December until early January. Ultimately, the current marketed tourism brand and image of the area will change in nature, and an associated loss of sense of place will be experienced. Tourism impacts are summarised in Table 4.7.

4.5 Assessment

The rapid growth of the tourism sector in the area near Koeberg since the opening of the nuclear power station there suggests that tourism and a nuclear plant can coexist comfortably. There is no reason why a similar state of affairs should not obtain around Bantamsklip and Thyspunt, and the fears of the industry in those two areas are likely to be allayed once the proposed Nuclear-1 plants are in operation.

Table 4.7: Summary of Tourism Impacts in the Thyspunt Area According to Impact Criteria

Criteria: Thyspunt		Impacts						
		Hospitality Systems	General Infrastructure	Visual Amenity	Sense of Place	Marine Assets	Social Amenity	Terrestrial Assets
Cumulative Impacts	Unmitigated	Low	Low	Medium	High	Low	Low	Low
	Mitigated	Low	Low	Medium	High	Low	Low	Low
Nature	Unmitigated	Neutral	Neutral	Negative	Negative	Negative	Negative	Negative
	Mitigated	Neutral	Neutral	Negative	Negative	Negative	Negative	Negative
Extent	Unmitigated	Local	Local	Local	Local	Local	Local	Local
	Mitigated	Local	Local	Local	Local	Local	Local	Local
Intensity	Unmitigated	Low	Low	Medium	High	Low	Medium	Low
	Mitigated	Low	Low	Medium	Medium	Low	Low	Low
Duration	Unmitigated	Medium	Medium	Permanent	Permanent	Permanent	Long	Long
	Mitigated	Medium	Medium	Permanent	Long	Long	Medium	Medium
Consequence	Unmitigated	Low	Low	Medium	High	Low	Medium	Low
	Mitigated	Low	Low	Medium	High	Low	Low	Low
Probability	Unmitigated	Probable	Probable	Definite	Definite	Probable	Probable	Probable
	Mitigated	Probable	Probable	Definite	Definite	Probable	Probable	Probable
Significance	Unmitigated	Low	Low	High	High	Low	Medium	Low
	Mitigated	Low	Low	High	High	Low	Low	Low
Reversibility	Unmitigated	Low	Low	Low	Low	Medium	Low	Medium
	Mitigated	Low	Low	Low	Low	Medium	Medium	Medium
Irreplaceable Resources	Unmitigated	No	No	Yes	Yes	Yes	No	No
	Mitigated	No	No	Yes	Yes	Yes	No	No
Confidence Level	Unmitigated	Medium	Medium	High	High	High	High	High
	Mitigated	Medium	Medium	High	High	High	High	High

5 MITIGATION MEASURES

5.1 Introduction

An examination of international experience with regard to nuclear power stations shows that:

- In the main, people seem to have problems with nuclear power only where accidents are concerned. However, there is a diversity of entrenched perceptions with regard to nuclear power, those against usually being a minority. In a recent study undertaken by the Nuclear Energy Institute in the United States, 74% of the survey population favour nuclear energy (Bisconti Research, 2008). The minority, nevertheless are often vociferous and sometimes militant, which has serious implications for any development as they frequently engage in litigation.
 - Both minor and major accidents have adverse effects on tourism.
 - Some nuclear power stations have a positive effect on tourism, as tourists visit specifically to see the stations.
-

5.2 Specific Mitigation Measures

The mitigation measures with regard to the Nuclear-1 tourism impact are discussed in the suggested hierarchy with specific reference to targeted mitigation objectives and effectiveness. Table 5.1 summaries the effect of the mitigation measures on the identified tourism impact sectors.

5.2.1 Community Public Information Campaign

Due to the identified complexity of tourism and the highlighted impact of public perceptions and image, the first mitigation measure is an aggressive community-orientated and comprehensive public information campaign. The lack of information and the overwhelming amount of misinformation regarding nuclear power as a whole, and specifically Eskom's Nuclear-1 plans, has generated all manner of popular myth, and worst-case scenarios, scepticism and particularly doubt regarding the intentions and trustworthiness of Eskom.

The proposed public information campaign would address popular misconceptions regarding the Nuclear-1 programme, and specifically the impacts of nuclear power generation on the sea, the immediate environment and the sense of place. It is quite simply a case of the better the communications are with the local and tourism communities, the more measured and balanced their reaction to a nuclear power station will be.

A community-focused exercise in the provision of such public information in all three NPS areas would offset the majority of concerns, especially environmental and biological issues. Most important, though, it would give sufficient knowledge and time to the various tourism stakeholders and authorities to start adjusting their marketing strategies and brand focus, helping to minimise the negative tourism impacts and optimise the benefits.

5.2.2 Access Negotiation

The reduction of the local tourism asset in terms of the restriction of access to nature reserve areas and the marine asset in the exclusion zone can be mitigated by negotiating specific concessions and access with the various tourism stakeholders. This is particularly important for whale-watching tours at Bantamsklip. From a nuclear safety perspective there is no reason why whale-watching tours should not be allowed access into the 1km exclusion zone, and the security authority implementing the National Key Points Act should be approached to relax the restrictions for commercial activities. Optimising the tourism potential of the exclusion zone with the input and utilisation of the community will certainly lead to a reduced perceived negative impact, and may well provide a new tourism opportunity for each area.

5.2.3 Nature Tourism

Eskom's policy is to maintain and expand the existing nature reserves at each of the three sites. It should use these parks as catalysts to increase tourism and overcome negative public perceptions. It could do this by, for example, establishing visitor information centres with lectures and films, promoting hiking trails, funding eco-tourism and conservation education, and working in unison with the Agulhas National Park and Grootbos Private Nature Reserve in the Bantamsklip area to further develop nature tourism.

5.2.4 Transport Controls

Adequate controls on heavy-vehicle traffic during the construction phase will be required in order to mitigate negative impacts such as noise, road damage and congestion. These impacts will differ from one NPS to another, and therefore the mitigation measures will also differ.

5.2.5 Unemployment and Social Issues

Eskom's declared policy is to transfer construction workers from the first Nuclear-1 plant to the second and from there to the third as the construction phases are likely to overlap. Such transfers might not always be possible but should nevertheless be maximised wherever possible in order to mitigate the perceived adverse impacts of unemployment once the construction phase of Nuclear-1 is completed.

Table 5.1: Summary of the Effect of Mitigation Measures on Tourism Impacts

Mitigation Measures	Impacts						
	Hospitality systems	General infrastructure	Visual amenity	Sense of place	Marine assets	Social amenity	Terrestrial assets
Community information campaign	Reduction	Reduction	Reduction	Reduction	Reduction	Reduction	Reduction
Access negotiation	Rectification	No action	Rectification	Rectification	Compensation	No action	Rectification
Nature tourism	Compensation		Rectification	Compensation	Compensation	Rectification	Reduction
Transport controls	Reduction	Reduction	Reduction	Reduction	No action	Reduction	Reduction
Unemployment and social issues	No Action	No action	No Action	Rectification	No action	Rectification	No action

6 CONCLUSIONS AND RECOMMENDATIONS

The key points of each site are discussed independently followed by a brief summary of overall conclusions.

6.1 Duynefontein

The Duynefontein area is essentially desensitised to nuclear power stations. This illustrates the subjective and flexible nature of perceptions. The area has enjoyed positive growth and tourism development despite, and partly because of, the nuclear power station. The experience of the local communities regarding the current power station at Koeberg is inseparable from its very existence, thereby offsetting a reaction of any kind. This neutrality is emphasised in the various perceived impacts on the tourism industry as they are absorbed into the Greater Cape Town area, resulting in no discernible change over the short term and a small positive impact over the long run.

6.2 Bantamsklip

Bantamsklip's relatively new and underdeveloped tourism industry accentuates the potential impacts of a nuclear power station, and may skew the economic figures toward a more positive image than is actually perceived within the community. However, that does not detract from the large developments that a nuclear power station will bring. Objections are mostly limited to the main tourism agents in the area, namely, the shark-cage diving and whale-watching industries. Their influence in the area is considerable, and the economic importance of their operations is the primary reason for the development thus far experienced in the area.

However, the area of immediate impact on their operations is relatively small, and there is room for mitigation measures regarding access which reduces the localised negative impact to paint a predominantly positive picture for tourism impacts.

6.3 Thyspunt

As a result of the established premium tourism product offered in the Greater St Francis area, a nuclear power station will have a significant impact on the perceived attractiveness of the area. However, it is only from Seal Point (see Location Map) and Oyster Bay that Thyspunt is visible. The duration of the negative impact is reduced by the fact that perception is a time-based phenomenon and, with the passing of time, tourism agents and stakeholders will adjust their businesses to maximise their exploitation of the natural tourism product as experienced at each site.

The strong preservation instinct within the community promotes a negative reaction to all agents of change, not least a nuclear power station. The overall impact at worst would be a short-term reduction in the tourism market, most notably due to a drop in the premium product image that the area currently enjoys. However, this short-term negative impact could well be neutralised (as described in Section 4.4), while the long-term impact would be likely to be positive.

In summary, the impacts on tourism at the three sites are as follows:

- Duynefontein – most easily absorbed into the local economy; no short-term discernible impact on tourism; small-scale, long-term discernible positive impact on tourism;
- Bantamsklip – small-scale, short-term and long-term positive discernible impact on tourism;
- Thyspunt – small-scale, short-term, negative discernible impact on tourism; no overall discernible long-term impact on tourism.

In terms of the impact on tourism, there are no fatal flaws in respect of any of the three sites, and all of them would be suitable to accommodate Nuclear-1.

7 ANNEXURES

This section contains a selection of site specific photographs.

7.1 Duynefontein Photographs

7.1.1 Proposed Nuclear Platform Site Photographs

Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



7.1.2 Selected Tourism Asset Photographs

Koeberg Power Station (Source: <http://www.melkbos.net>)



Skydiving above Melkbosstrand (Source: <http://www.melkbos.net>).



Surfing off Blaauwbergstrand (Source: <http://www.melkbos.net>).



Fishing off Blaauwbergstrand (Source: <http://www.melkbos.net>).



Arial view of Atlantic Beach Golf Estate (Source: <http://www.melkbos.net>).



Melkbosstrand Coastline (Source: <http://www.melkbos.net>).



7.2 Bantamsklip

7.2.1 Proposed Nuclear Platform Site Photographs

Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



7.2.2 Selected Tourism Asset Photographs

Gansbaai Harbour (Source: <http://www.gansbaaiinfo.com>)



De Kelders Coastline (Source: <http://www.gansbaaiinfo.com>)



Great White Shark (Source: <http://www.gansbaaiinfo.com>)



Pearly Beach (Source: <http://www.gansbaaiinfo.com>)



Southern Wright Whale (Source: <http://www.gansbaaiinfo.com>)



Gansbaai Coastline (Source: <http://www.gansbaaiinfo.com>)



Whale watching tour boat (Source: <http://www.gansbaaiinfo.com>)



7.3 Thyspunt

7.3.1 Proposed Nuclear Platform Site Photographs

Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



Site topography and vegetation (Source: On-site Photograph).



7.3.2 Selected Tourism Asset Photographs

Cape St Francis Coastline (Source: <http://www.stfrancistourism.co.za>).



Cape St Francis Golf Course (Source: <http://www.stfrancistourism.co.za>).



Surfing along Cape St Francis Coastline (Source: <http://www.stfrancistourism.co.za>).



One of Cape St Francis Beaches (Source: <http://www.stfrancistourism.co.za>).



Cape St Francis Lighthouse (Source: <http://www.stfrancistourism.co.za>).



Cape St Francis Coastline (Source: <http://www.stfrancistourism.co.za>).



Cape St Francis Coastline (Source: <http://www.stfrancistourism.co.za>).



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Company name

IMANI DEVELOPMENT

Specialist signature

A handwritten signature in black ink, appearing to read "J. H. Masodup". The signature is written in a cursive style with some loops and flourishes.

Date

30 November 2009