ESKOM HOLDINGS LIMITED

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR A PROPOSED NUCLEAR POWER STATION AND ASSOCIATED INFRASTRUCTURE

DEA REF. No.:12/12/20/944

Authority Meeting:
Draft Environmental Impact Report

3 August 2010




PROPOSED AGENDA

1. Welcome and introductions
2. Aim and expected outcomes of meeting
3. Presentation of EIA and EMP findings
4. Timelines and project schedule
5. General discussion
6. Close

KEY ISSUES

- Some people are opposed to and others are in favour of a nuclear power station at Bantamsklip, Thyspunt and Duynefontein
- Concerns about the potential impacts on human health and safety
- Local residents share a deep-felt connection to the area and have a strong “sense of place”
- A power station could potentially be unsightly
- Tourism is linked to conservation and preservation of the coastline

KEY ISSUES

- Marine life could potentially be adversely affected by altered sea temperature and turbulence caused by inflow and output of sea water to the plant
- Concern that commercial and recreational fishing may be negatively impacted
- Light pollution
- Concerns about potential drop in property values
- Concern about cost of constructing a power station
- Some people expressed a lack of trust in the EIA
- Storage of hazardous waste
- Renewable (‘green’) energy (e.g. wind, solar) vs. nuclear

PROJECT MOTIVATION

- Increasing demand for electricity (> 4% growth per annum)
- Projected requirement for more than 40 000 MW of new electricity generating capacity over the next 20 years
- In SA only coal and nuclear power are solutions for base load generation, while gas turbines, hydroelectric power stations and pumped storage schemes are used for peaking and emergency electricity generation

PROPOSED ACTIVITY

- Eskom proposes the construction, operation and decommissioning of a conventional nuclear power station and associated infrastructure either in the Eastern or Western Cape

- A nuclear power station of the Pressurised Water Reactor (PWR) type technology e.g. Koeberg Power Station

- The transmission lines and employee villages are subject to separate environmental authorisation processes




TRANSMISSION (TX) LINE EIAs

- Bantamsklip – Scoping phase has been extended to include Multi-stakeholder Workshops and additional public consultation. Revised Draft Scoping Report will be made available for public comment

- Thyspunt and Duynefontein – Scoping Report accepted by Authorities and EIA phase has commenced

PROJECT BACKGROUND

- The power station and directly associated infrastructure
- The footprint assessed makes provision for the potential future expansion of a power station to 10 000 MW or the maximum carrying capacity. Separate EIA required for any further expansion beyond 4 000 MW
- The proposed nuclear power station will include nuclear reactor, turbine complex, spent fuel, nuclear fuel storage facilities, waste handling facilities, intake and outfall pipelines, desalinisation plant and auxiliary service infrastructure (e.g. access roads, OCGT plant, HV yard, visitor centre)

PROJECT BACKGROUND

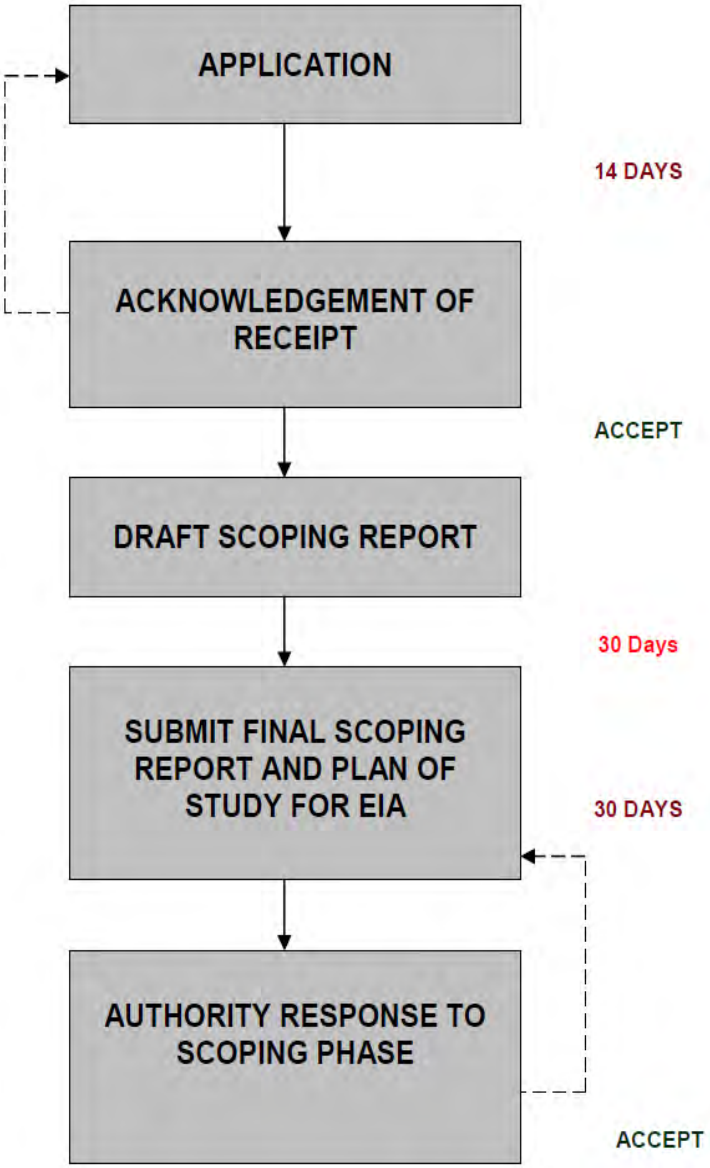
- Should the proposed project be authorised, it is anticipated that construction of the station could commence in 2011 with the first unit being commissioned in 2018 (optimistic)
- Construction period – 7 to 9 years
- Labour requirements:
  - Construction – 7 700 persons
  - Operation – 1 400 persons
- Construction and operational access routes to sites (22 m wide, tarred)
- Normal (sedans), heavy (buses, trucks) and exceptionally heavy vehicles (42 m x 8.23 m max.)
- Peak construction vehicle trips: 828 morning and 945 evening

OTHER AUTHORISATIONS

- >30 other permits and authorisations required (e.g. Waste Permits, Water Use Licenses, Air Quality Licenses, Heritage Permits, etc.) before construction can commence
- SAHRA authorisation:
  - Meetings held with SAHRA in Oct 2009 and July 2010
  - Detailed mitigation plan to be developed
- NNR licensing:
  - Once vendor has been appointed reports will be submitted;
  - As per the NNR / DEA co-operative agreement, a number of specialist studies related to human health risk and safety were commissioned and included in this EIR for information
  - NNR licensing process is subject to public hearings

ENVELOPE OF CRITERIA

- Detailed description of proposed nuclear plant is not available, as preferred supplier has not been selected
- Approach used has been to specify enveloping environmental and other relevant requirements, to which the power station design and placement on site must comply
- Enveloping criteria represent the most conservative parameters associated with the various plant alternatives within the available Generation III PWR technology



Application submitted to DEA (May 2007) and amended in July 2008

Mid 2009, Eskom considers amending application to include more than one power station. Eskom subsequently decided not to pursue the amendment

DEA approved the Scoping Report - November 2008

Plan of Study (PoS) for EIA was made available for two rounds of comment

DEA approved Final PoS for EIA - January 2010

Scoping phase of the EIA process complete

EIA PROCESS

60 Days

SUBMIT EIA REPORT AND DRAFT EMP

60 DAYS

AUTHORITY RESPONSE TO EIA REPORT

45 DAYS

DECISION

10 DAYS

GRANT/REFUSE AUTHORISATION

30 DAYS

APPEALS

Current position in the EIA process

In line with Eskom's intention to investigate the potential development of up to 20 000 MW of nuclear power generating capacity - application for the second nuclear power station may be submitted soon after the submission of the Final EIR for Nuclear-1

SITE SELECTION

DUYNEFONTEIN

- Adjacent to Koeberg NPS
- Approx 34 km N of Cape Town city centre

THYSPUNT

- Within the Cacadu District Municipality
- Approx 80 km W of Port Elizabeth with Humansdorp located 15 km to the N
- Approx 7km E of Oyster Bay

BANTAMSKLIP

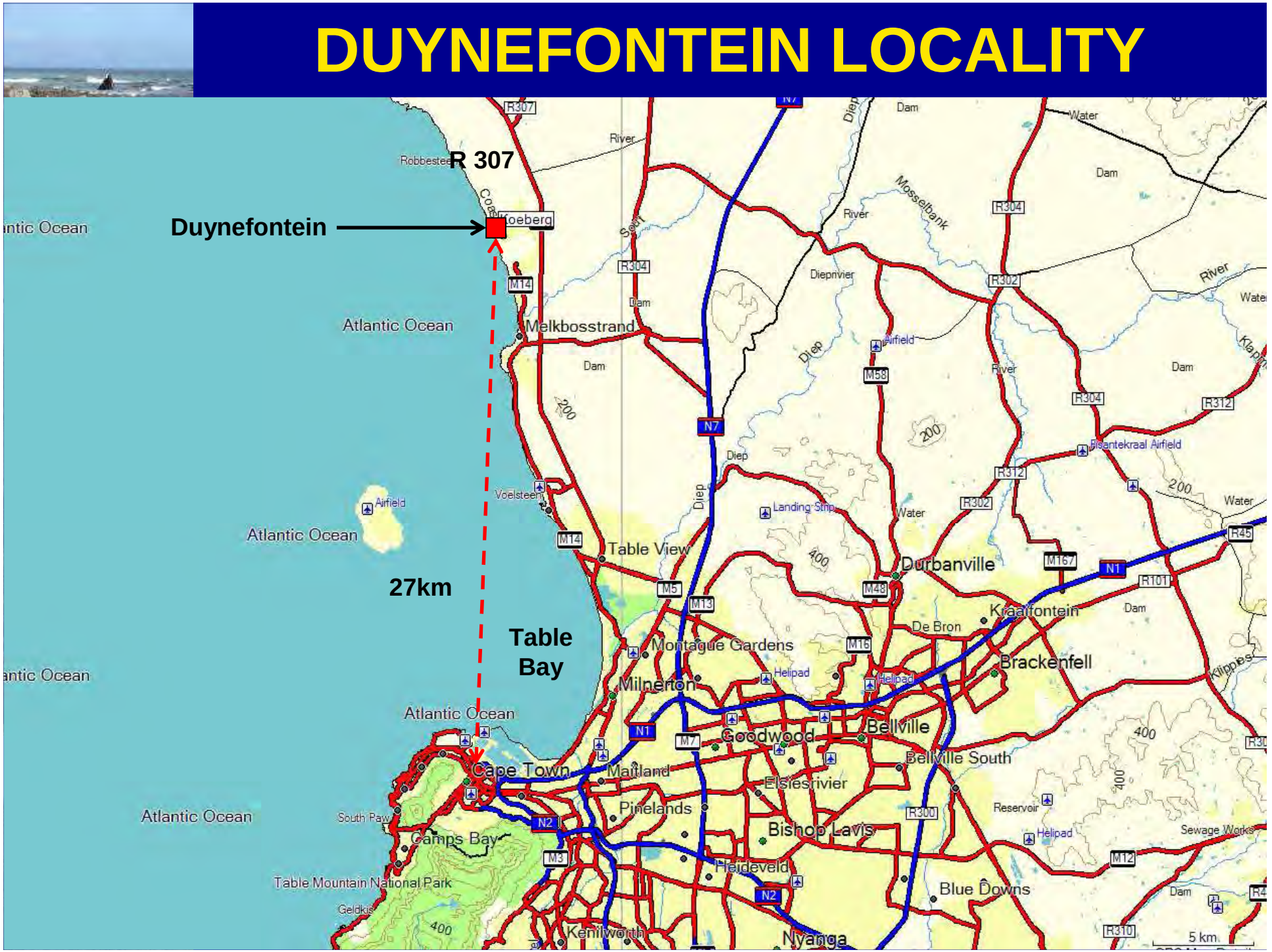
- Within the Overberg District Municipality
- Approx 10 km E of Pearly Beach
- Approx 50 km NW of Cape Agulhas

LEGEND

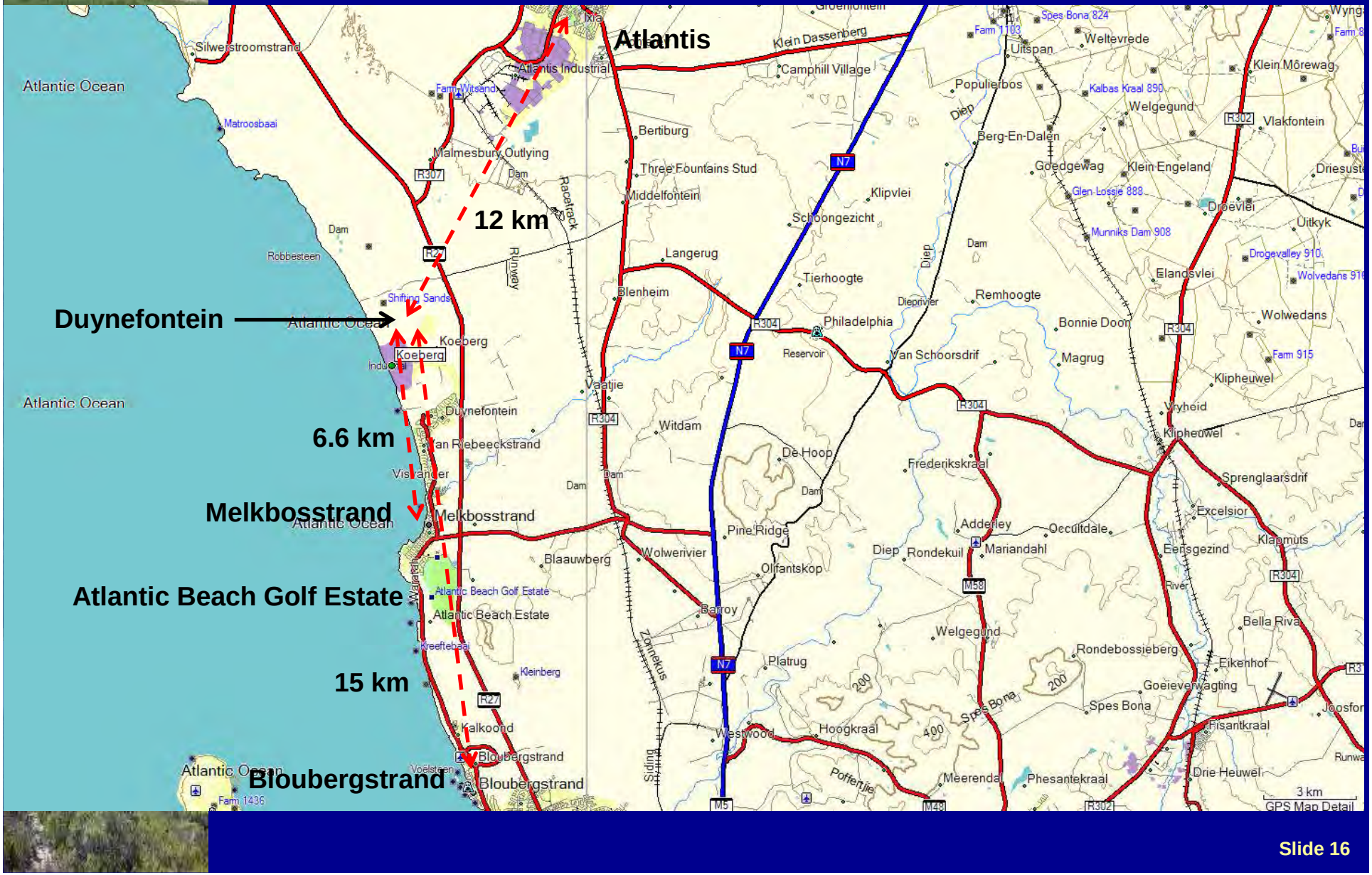
- TOWNS
- Nuclear Power Station
- Potential Nuclear Sites

KLEINSEE
Brazil
Schulpfontein
Duynefontein
Koeberg N.P.S.
Palmiet PS
Cape Town
PEARLY BEACH
Bantamsklip
MANDELA METROPOLE
OYSTER BAY
Port Elizabeth
Thyspunt

DUYNEFONTEIN LOCALITY



DUYNEFONTEIN LOCALITY



BANTAMSKLIP LOCALITY

THYSPUNT LOCALITY

ASSESSMENT OF IMPACTS

- **The potential impacts assessed were based on:**
  - Issues identified by I&APs during the public participation process (PPP)
  - Issues identified by specialists through research
  - Experience of relevant specialists with projects of a similar nature or in a similar environment
  - Consultation with local specialists
  - Environmental resources and conditions identified during site surveys

METHODOLOGY

- Independent specialists assessed potential positive and negative impacts with and without mitigation, including cumulative impacts

- According to the specialists:
  - all potential negative impacts can be mitigated
  - there are no fatal flaws at any of the alternative sites

SPECIALIST STUDIES

- **Physical Impacts**
  - Geology and geological risk
  - **Seismological risk**
  - Geo-hydrology
  - Geotechnical characteristics

- **Biophysical Impacts**
  - **Dune geomorphology**
  - **Flora**
  - **Fauna (Invertebrate and Vertebrate)**
  - Hydrology
  - **Freshwater ecosystems**
  - Oceanographic conditions
  - **Marine biology**
  - Air quality
  - Assessment of the 1:100 year floodline

SPECIALIST STUDIES

- **Socio-economic Impacts**
  - **Social**
  - **Economic**
  - Noise
  - Visual
  - **Heritage and cultural resources**
  - Waste
  - **Tourism**
  - **Agriculture**
  - Transport

SPECIALIST STUDY RESULTS

- **Seismic Risk**

Seismic studies indicate that the design basis for the respective sites in terms of peak ground acceleration values (PGA) are as follows:

  – Duynefontein – PGA ~0.30 g

  – Bantamsklip - PGA ~0.23 g

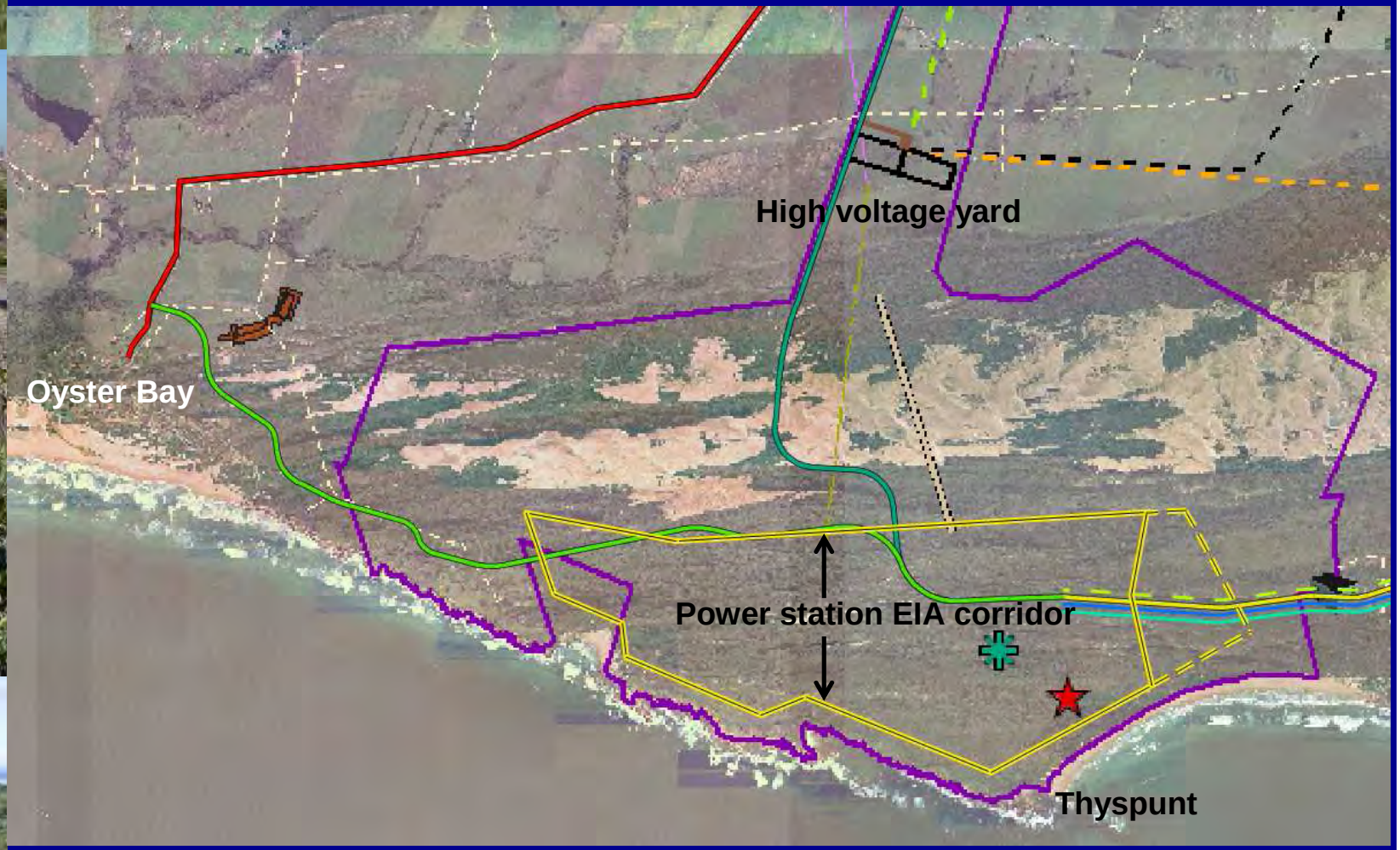
  – Thyspunt - PGA ~0.16 g




SPECIALIST STUDY RESULTS

- **Impacts on Dune Geomorphology and associated geo-hydrology (landforms, sand and water movement)**
  - Groundwater does not ‘daylight’ at **Duynefontein** and **Bantamsklip** sites: access roads and transmission lines can be built across the mobile dunes
  - The interaction between dune systems and wetlands is complex at **Thyspunt**, since groundwater ‘daylights’ in many inter-dune areas
  - Haul roads and conveyor belts through Oyster Bay dunefield at **Thyspunt** between the nuclear power station and the HV yard, may cause more significant dune geomorphology impacts than at the other two sites

Impacts on Dune Geomorphology



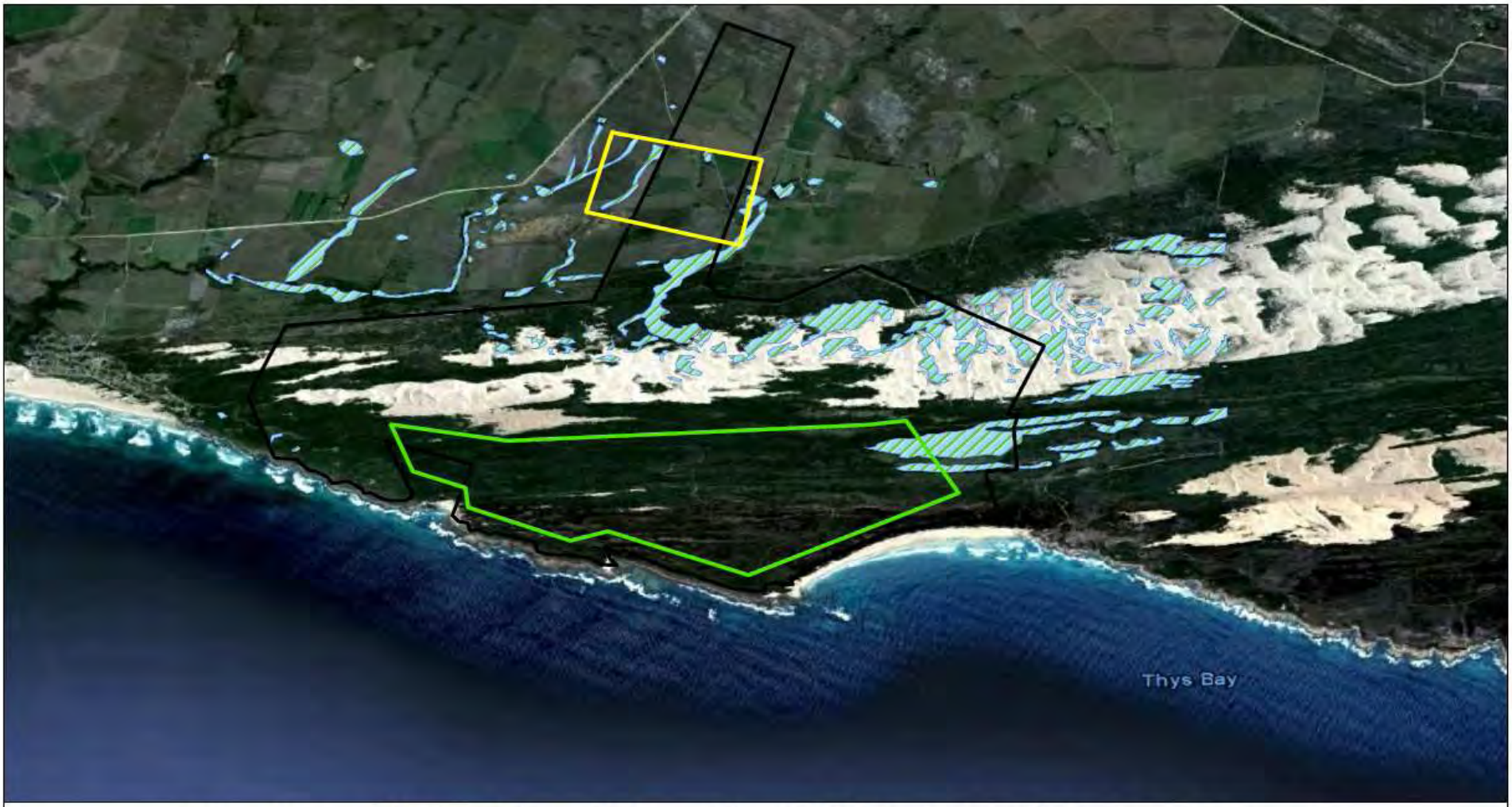
SPECIALIST STUDY RESULTS

- **Impacts on Flora (plants)**
  - **Bantamsklip** will experience the least potential negative impact on plant communities and species - the ecosystems on this site are fairly common along this section of coastline
  - **Thyspunt** has the greatest diversity of vegetation communities (nine), including extensive and highly sensitive wetlands (6 of the 9 communities)
    - 383 plant species and low rare species count
    - Low endemism
    - Habitat resilience low for dunes, limestones and wetlands
    - Important headland bypass dune system

SPECIALIST STUDY RESULTS

- **Impacts on Wetlands**
  - Development of a nuclear power station at **Duynefontein** is unlikely to result in any unmitigable, highly significant negative impacts on wetlands
  - Development of the proposed nuclear power station at **Bantamsklip** would not be associated with any unmitigable impacts to wetland systems
  - **Thyspunt** wetland systems are complex and potential negative impacts could occur without appropriate mitigation
  - Additional monitoring in process to confirm assumptions about groundwater impacts on wetlands

THYSPUNT WETLANDS



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: Wetlands on site Thyspunt

Legend

HVY Corridor | EIA corridor | Wetlands

0 0.5 1 2 Kilometers

1:50,000

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SPECIALIST STUDY RESULTS

- **Impacts on Terrestrial Vertebrates (mammals and birds)**
  - Amount of land that is not of high faunal sensitivity at **Duynefontein** is more than sufficient for the nuclear power station
  - At **Bantamsklip** the nuclear power station could have significant negative potential impacts, without mitigation, because of the impacts on faunal habitats within the footprint
  - At **Thyspunt** a nuclear power station would have significant potential negative impacts, without mitigation, because of the potential impacts on faunal habitats within the footprint, the development of two access roads and proposed infrastructure across the dunefield

SPECIALIST STUDY RESULTS

- **Impacts on Terrestrial Invertebrates (insects)**
  - Potential impacts on terrestrial invertebrate communities are similar for all alternative sites, with site-specific differences
  - **Duynefontein:**
    - None of the butterflies are endangered or endemic
    - Low to very low overall insect sensitivity
    - New species of ant found is regarded as a generalist (likely to be found on other areas of the site)




SPECIALIST STUDY RESULTS

• Impacts on Terrestrial Invertebrates

- **Thyspunt** has the highest butterfly diversity and conservation value of the alternative sites
- From the viewpoint of potential positive impacts of the nuclear power station, **Duynefontein** already positively benefits under the management of Eskom, which means that it would experience the least improvement in conservation status
- **Bantamsklip and Thyspunt** would benefit substantially from formal protection status, resulting in a net positive impact on insect communities
- Additional site visits carried out in summer season

SPECIALIST STUDY RESULTS

- **Economic Impacts**
  - Positive macro-economic impacts will be greatest at **Bantamsklip** and **Duynefontein** as the sites are situated in a province with a larger, more diversified economy. Nuclear-1 would result in less dislocation of economic activities if located at Duynefontein than at either of the other two sites
  - Macroeconomic indicators favour **Duynefontein** and **Bantamsklip**
  - Cost-effectiveness analysis indicates that **Thyspunt** is slightly favoured relative to **Duynefontein** and more favoured relative to **Bantamsklip**.
  - The differences between the alternative sites are slight, and all the sites would have positive economic impacts both on the local area and the province in which they are situated
  - The economic impact assessment gives greater weight to the cost-effectiveness analysis, which favours **Thyspunt**

SPECIALIST STUDY RESULTS

- **Heritage Impacts (archaeological sites, cultural history and fossils)**
  - All alternative sites contain significant heritage resources
  - **Duynefontein** is palaeontologically highly sensitive, but has less Stone Age heritage than **Bantamsklip** or **Thyspunt**
  - **Thyspunt** more sensitive than **Bantamsklip** in terms of its heritage richness – sites mostly along coast at all sites. 200 m setback line recommended to protect heritage sites
  - Cultural history issues – Gamtkwa Community




SPECIALIST STUDY RESULTS

Marine Biology Impacts

- Potential impacts similar at all sites and the impacts can be mitigated if the proposed designs are implemented as planned

- Potentially the most significant impacts are:
  - Disruption of the marine environment through the offshore disposal of sediment
  - Release of warmed cooling water

- Spoil disposal will have a potentially highly significant long-term negative impact on the marine environment within a localised area (3 km^2 initially to 6 km^2 [2 x 3 km] after 5 years) – acceptable impact according to marine specialist




SPECIALIST STUDY RESULTS

Marine Biology Impacts

- Impacts on Chokka fishing industry:
  - Chokka spawn at depths less than 50 m
  - Recommended that spoil must be released in depths more than 50 m (1.4 - 1.8 km offshore) and medium pumping rate
  - Warm water release recommendations to aid heat dissipation:
    - tunnelled design
    - multiple release points
    - high flow rate
    - above sea floor




SPECIALIST STUDY RESULTS

Marine Biology Impacts

- Radionuclides such as Cesium (Cs-137) and Strontium (Sr-90) present in oceans alongside other elements since 1940s
- Background Cesium has been recorded at Koeberg before the power station was established - detected in mussels, sand mussels and fish below levels at which further investigation would be required
- Strontium not recorded in marine organisms at Koeberg
- Due to few organisms in which Cesium has been recorded, low concentrations and lack of Strontium, these nuclides have no detectable potential impact on marine organisms




SPECIALIST STUDY RESULTS

Social Impacts

- Potential negative impacts relate to accommodation for temporary workers during construction
- Potential positive impact is the provision of electricity and related benefits to the broader national and regional economies
- Perceived risks associated with nuclear incidents could potentially lead to a change in attitude and behaviour – reliable information is important
- Need for Eskom to agree with authorities on responsibility for infrastructure provision

SPECIALIST STUDY RESULTS

Tourism Impacts

- Communities at **Thyspunt** and **Bantamsklip** have expressed opposition to the proposed power station
- **Thyspunt** community highlighted the premium nature of the top-end coastal vacation destination
- **Bantamsklip** community emphasised the new and fragile nature of the developing tourism product and the local dependence thereon
- Some **Duynefontein** tourism stakeholders have personal objections to another power station, however they recognise the potential for increased business and promote a generally positive outlook for tourism




SPECIALIST STUDY RESULTS

Tourism Impacts

- Assessment takes account decline in nature-based tourism as well as an increase in business-related tourism associated with the proposed nuclear power station
- **Duynefontein** – limited potential impact during construction; potential 1.4% improvement during operation
- **Bantamsklip** - potential 5% positive impact during construction; a potential 8.6% improvement during operation
- **Thyspunt** – potential 7.9% negative impact during construction; 0% impact during operation




SPECIALIST STUDY RESULTS

Agricultural Impacts

- Agriculture around **Thyspunt** is based mainly on milk production (2008: R150 m per annum)
- Fynbos farming prevails at the **Bantamsklip** although there is some dairy as well as grape, beef, sheep and game farming (2008: R29 m per annum)
- **Duynefontein** is based on mixed farming (2008: R75 m per annum)




SPECIALIST STUDY RESULTS

Agricultural Impacts

- **Duynefontein** – no impact on agriculture during construction and operation
- **Bantamsklip** – negative potential impact of dust (construction). Potential of less than 5% increase in local market due to water limitations that restrict expansion
- Thyspunt – negative potential impact of dust (construction). Potential for 15% positive impact on production due to increased local market




PROJECT ALTERNATIVES

- **Location of the power station (i.e. site selection)**
- Forms of power generation
- Nuclear plant types
- **Layout of the nuclear plant**
- **Fresh water supply and utilisation of abstracted groundwater**
- Management of brine
- Intake of sea water
- **Outlet of water**
- Management of spoil material
- Access to Thyspunt
- **Waste**
- **No-development (i.e. ‘No-Go’)**

SITE SELECTION

- Site selection was based on:
  - Results of independent specialist studies: the significance of potential impacts, with mitigation, at each of the alternative sites
  - An integration workshop, involving all specialists, where ranking of the sites and key decision factors were agreed on
  - Quantified ranking taking into account the key decision factors




SITE SELECTION

- Impacts of low significance at all alternative sites filtered out e.g. noise, visual impacts, hydrology
- Impacts of medium and high significance that have the same significance at all sites were filtered out e.g. social
- The key factors for decision-making:
  - Integration into the national grid
  - Seismic suitability
  - Impacts on dune geomorphology
  - Impacts on wetlands
  - Impacts on vertebrate fauna
  - Impacts on invertebrate fauna
  - Economic impacts

INTEGRATION INTO THE NATIONAL GRID

- Where do we require power stations for future load growth?
- Electricity needs to be transmitted from the high voltage yard at the power station through a network of transmission and distribution lines to end users
- To improve efficiency, Eskom tries connect new base load generation to the closest load, where possible

CAPE LOAD GROWTH AREAS

Growth requires network strengthening

Estimated load growth points

Polokwane

Pretoria

Johannesburg

Upington

Bloemfontein

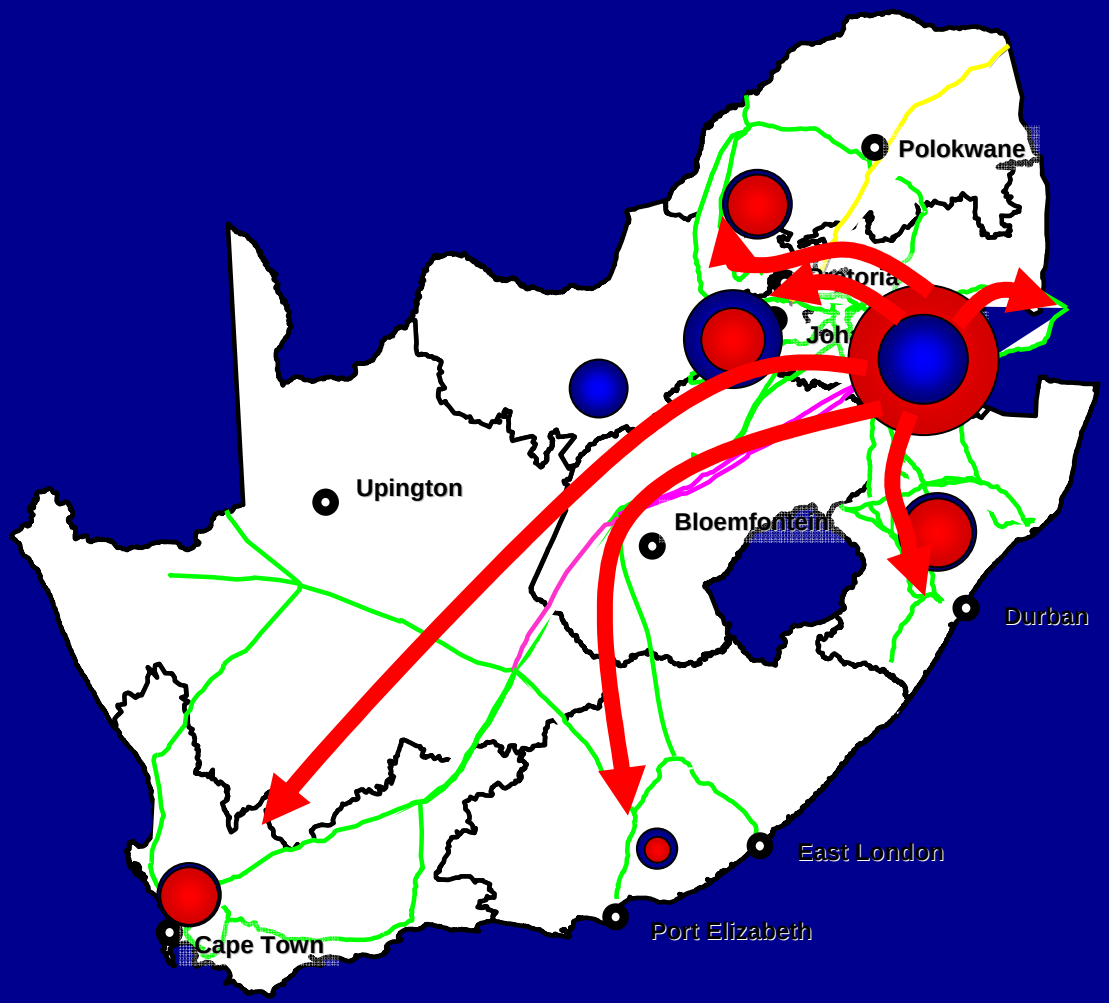
Durban

East London

Port Elizabeth

Cape Town

CURRENT NATIONAL GRID



SITE SELECTION

A number of factors indicate that **Bantamsklip** cannot be regarded as a **preferred alternative** for Nuclear-1 when compared to the other two alternative sites:

- Substantially higher construction costs due to its remote location (requirements for upgrading of roads and bridges and lengthy transmission lines)
- Cumulative environmental impacts of the transmission corridors
- Potential impacts on invertebrate fauna

Bantamsklip is regarded as the least preferred site alternative for Nuclear-1

SITE SELECTION: RECOMMENDATIONS

A quantitative assessment of key criteria indicates that **Thyspunt** is preferred (with a score of 76 as opposed to **Duynefontein**'s score of 57) due to:

- Lower seismic risk
- Relative ease of integration into the transmission grid
- Site's locality relative to the Port Elizabeth load centre
- Potential benefits of the conserving the majority of the site (2 400ha), as well as additional land being managed for conservation purposes
- Conservation benefits would not be realised at Duynefontein

NUCLEAR PLANT LAYOUT

- Sensitivity maps of all specialist studies were integrated and composite maps were produced to indicate areas of high environmental suitability for each alternative site

- Finalisation of the site layout plans (including corridor for outfall pipe, access roads, buildings, HV yard) will require detailed investigations, in conjunction with relevant qualified and experienced specialists

Site Sensitivity: Duynefontein – Invertebrate Fauna

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity invertebrate fauna on site Duynefontein

Legend

HVY Corridor | EIA corridor | Invertebrate Fauna

0 0.5 1 2 Kilometers

1:70,000

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Site Sensitivity: Duynefontein – Vertebrate Fauna

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vertebrate fauna on site Duynefontein

Legend

HVY Corridor | EIA corridor | Vertebrate Fauna

0 0.5 1 2 Kilometers

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GIBB ENGINEERING & SCIENCE

Site Sensitivity: Duynefontein – Flora

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vegetation on site Duynefontein

Legend

HVY Corridor | EIA corridor | Vegetation

0 0.5 1 2 Kilometers

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Site Sensitivity: Duynefontein – Wetlands

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: Wetlands on site Duynefontein

Legend

HVY Corridor | EIA corridor | Wetlands (not significant)

0 0.5 1 2 Kilometers

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Site Sensitivity: Duynefontein – Heritage

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity heritage features on site Duynefontein

Legend

HVY Corridor | EIA corridor | Heritage

0 0.5 1 2 Kilometers

1:70,000

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Site Sensitivity: Duynefontein – Combined Sensitivity

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity features on Duynefontein site

Legend

- Affected portion of road
- 800m road buffer
- Least sensitive area
- HVY corridor
- EIA corridor
- Heritage
- Vegetation
- Vertebrate fauna
- Invertebrate fauna
- Wetlands (not significant)

Geotechnical and seismology not significant

0 0.5 1 2 Kilometers

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1:65000

GIBB ENGINEERING & SCIENCE

Site Sensitivity: Bantamsklip – Invertebrate Fauna

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity invertebrate fauna on site Bantamsklip

Legend

HVY Corridor | EIA corridor | Invertebrate Fauna

0 0.5 1 2 Kilometers

1:50,000

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Site Sensitivity: Bantamsklip – Vertebrate Fauna

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vertebrate fauna on site Bantamsklip

Legend

HVY Corridor | EIA corridor | Vertebrate fauna

0 0.5 1 2 Kilometers

1:50,000

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Site Sensitivity: Bantamsklip – Flora

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vegetation on site Bantamsklip

Legend

HVY Corridor | EIA corridor | Vegetation

0 0.5 1 2 Kilometers

1:50,000

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GIBB

Site Sensitivity: Bantamsklip – Wetlands

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: Wetlands on site Bantamsklip

Legend

HVY Corridor | EIA corridor | Wetlands

0 0.5 1 2 Kilometers

1:50,000

N

GIBB ENGINEERING & SCIENCE

Site Sensitivity: Bantamsklip – Heritage

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity heritage features on site Bantamsklip

Legend

HVY Corridor | EIA corridor | Heritage

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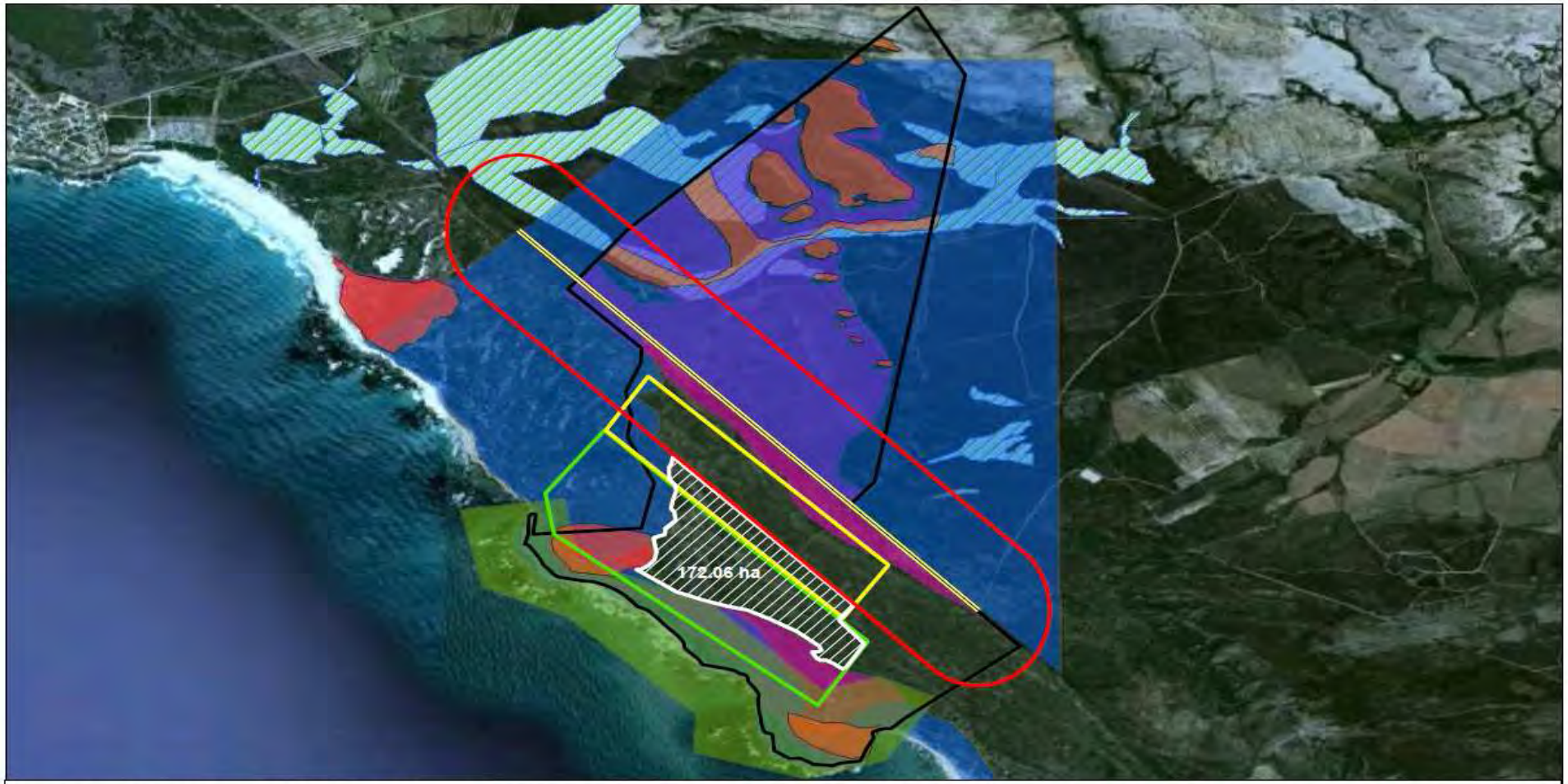
Site Sensitivity: Bantamsklip – Combined Sensitivity



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity features on Bantamsklip site

Affected portion of the road
800m road buffer
Least sensitive area
HVY corridor
EIA corridor
Vegetation
Heritage
Vertebrate fauna
Invertebrate Fauna
Wetlands
Geotechnical and seismology not significant

0 0.5 1 2 Kilometers

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Site Sensitivity: Thyspunt – Wetlands

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: Wetlands on site Thyspunt

Legend

HVY Corridor | EIA corridor | Wetlands

0 0.5 1 2 Kilometers

1:50,000

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Site Sensitivity: Thyspunt – Flora

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vegetation fauna on site Thyspunt

Legend

HVY Corridor | EIA corridor | Vegetation

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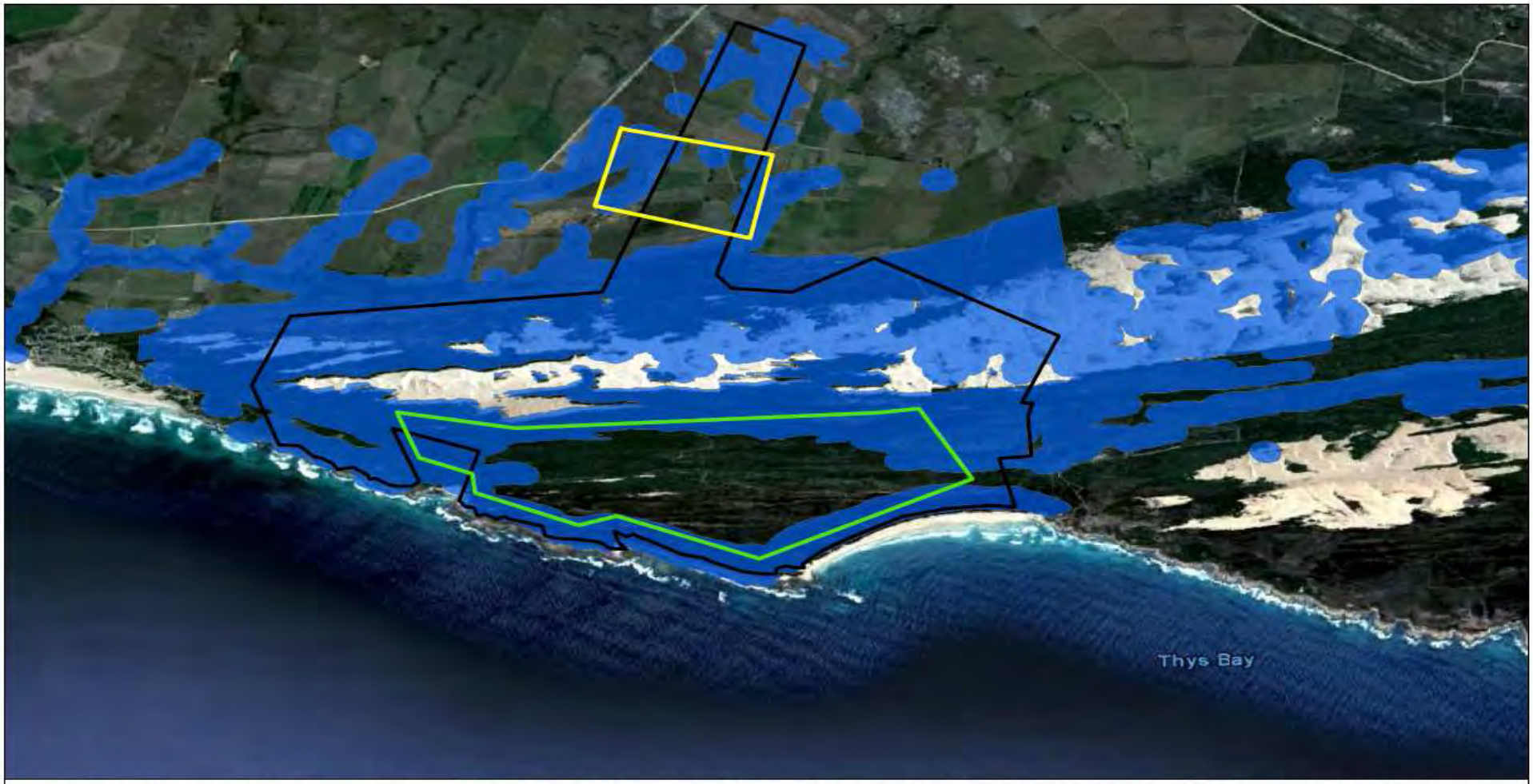
ARCUS GIBB ENGINEERING & SCIENCE

Site Sensitivity: Thyspunt – Vertebrate Fauna



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity vertebrate fauna on site Thyspunt

Legend

HVY Corridor | EIA corridor | Vertebrate Fauna

0 0.5 1 2 Kilometers

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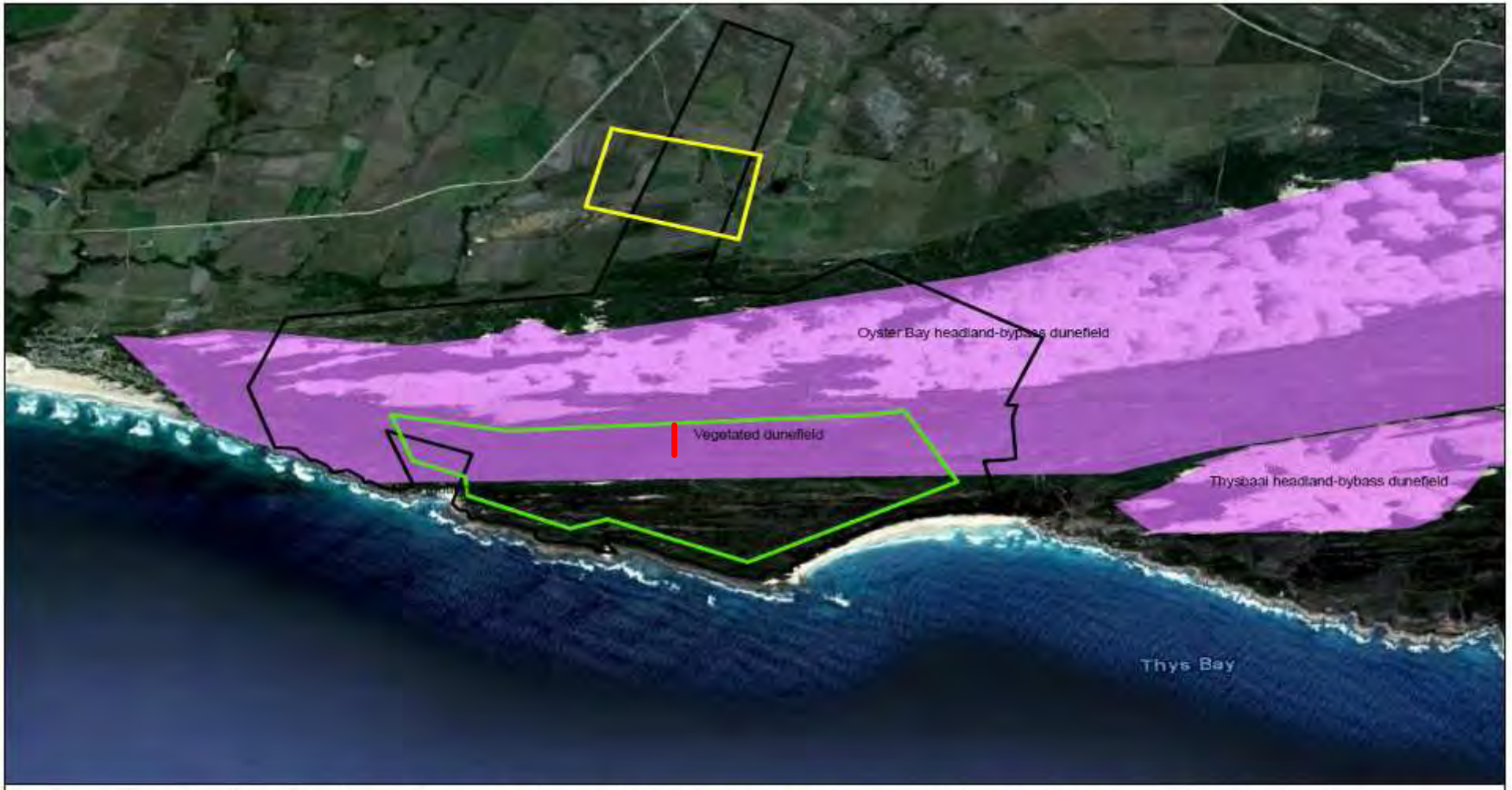
Site Sensitivity: Thyspunt – Heritage

Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity heritage features on site Thyspunt

Site Sensitivity: Thyspunt – Dunefields



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity dunefields on site Thyspunt

Legend

HVY Corridor | EIA corridor | Dune Geomorphology

0 0.5 1 2 Kilometers

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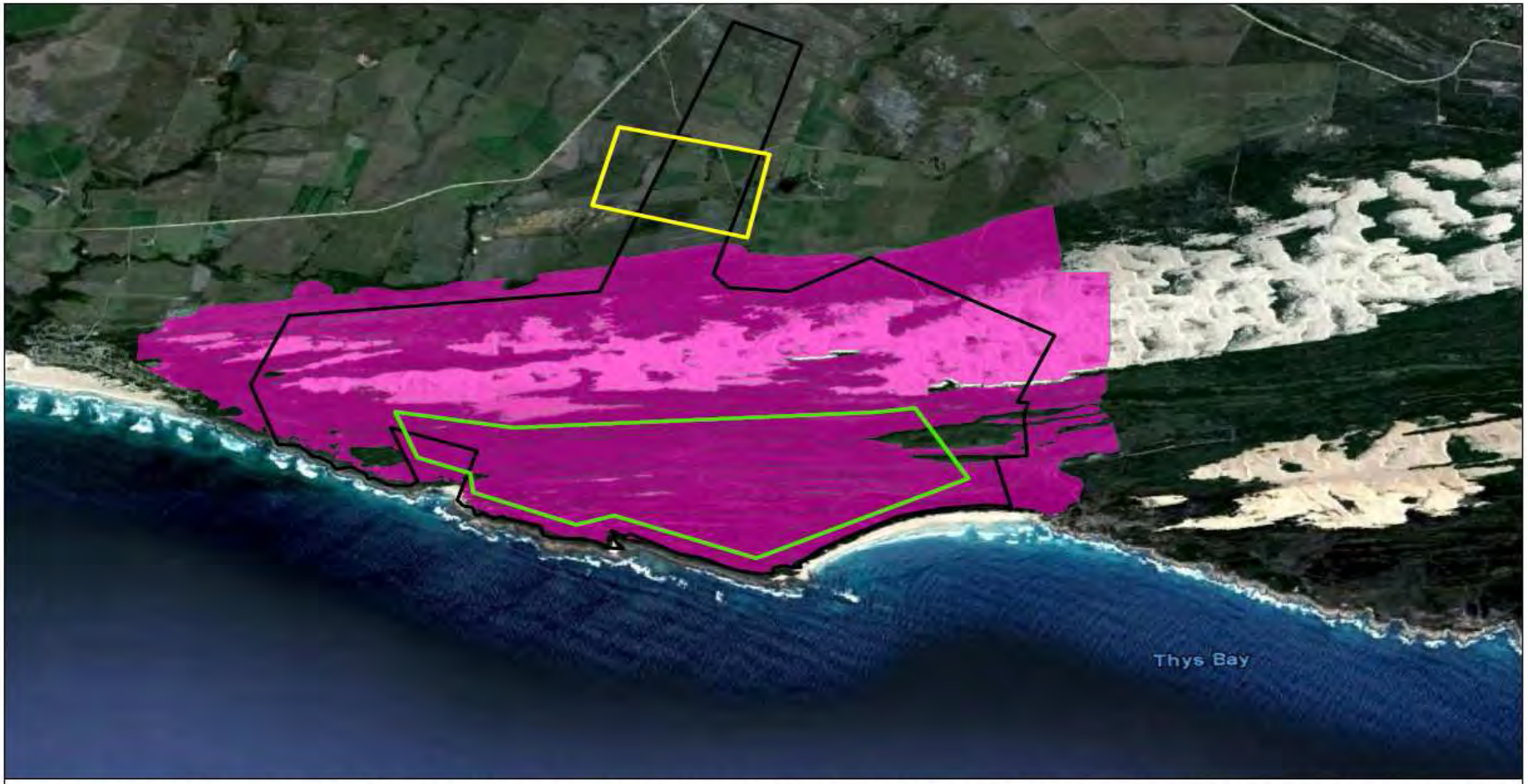
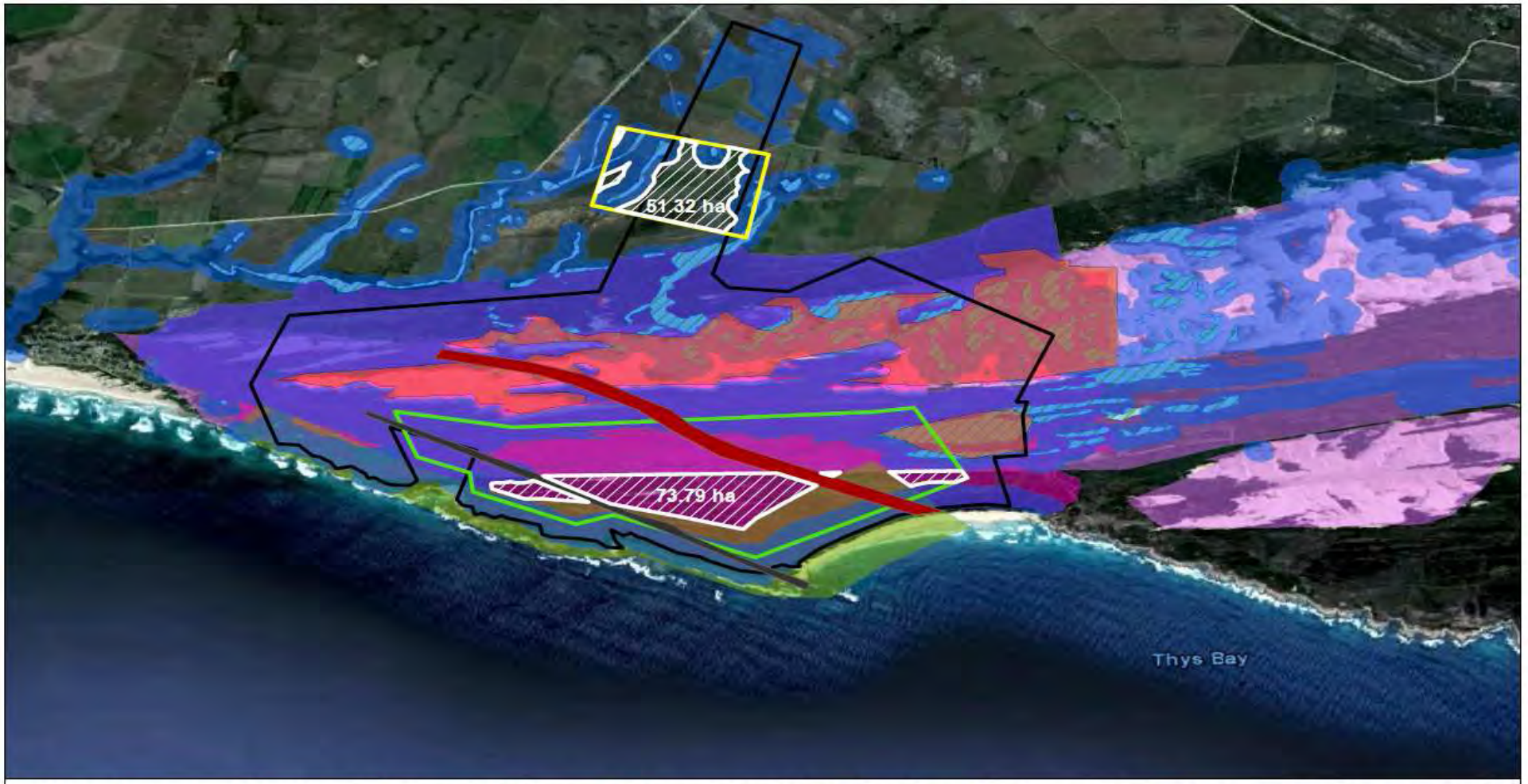
Site Sensitivity: Thyspunt – Invertebrate Fauna



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity invertebrate fauna on site Thyspunt

Site Sensitivity: Thyspunt – Combined Sensitivity



Eskom Proposed Nuclear-1 Power Station and Associated Infrastructure: High sensitivity features on Thyspunt site

Legend

- Least sensitive area
- HVY corridor
- EIA corridor
- Vegetation
- Vertebrate fauna
- Heritage
- Wetlands
- Invertebrate fauna
- Dune geomorphology

Geology, Seismology and Geotechnics

- 'No-go' Zone of Seismic Hazard (Goudini/ Cederberg Transition)
- 'No-go' Zone of Seismic Hazard (Skurweberg/Goudini Transition)

0 0.5 1 2 Kilometers

N

1:50000

GIBB ENGINEERING & SCIENCE




CONSERVATION BENEFITS

- In spite of potentially significant negative impacts, all biophysical specialists in agreement:
  - no fatal flaws at any of the sites
  - positive impacts for conservation of the area outside the footprint of the power station at **Thyspunt** and **Bantamsklip** are significant
- Acquisition of properties for conservation outside the current **Thyspunt** property for wetland conservation
- To guarantee conservation benefits, property's conservation status must be secured, i.e. declared as an official nature reserve

FORMS OF POWER GENERATION

- Nuclear generation and coal-fired power generation are the only proven base-load technologies
- Coal-fired generation is not viable in the coastal regions of the Western and Eastern Cape
- The life cycle contributions of nuclear electricity generation to greenhouse gas emissions is small compared to coal-fired electricity generation
- Renewable energy sources such as solar and wind energy do not provide the guaranteed base-load generation capacity that is required.

NUCLEAR PLANT TYPES

- Pressurised Water Reactors (PWRs) are internationally the most commonly used nuclear reactors

- The existing Koeberg nuclear power station uses PWR technology, making it a tested form of power generation that has been operating safely for the past 24 years

- Eskom is familiar with the technology from a health, safety and an operational perspective

FRESH WATER SUPPLY AND UTILISATION OF ABSTRACTED GROUNDWATER

- At all sites desalination provides a guaranteed source of fresh water supply for the lifespan of the proposed nuclear power station without jeopardising the availability of fresh water to other users

- Desalinisation plant is therefore the preferred alternative for the provision of fresh water at all sites, from the construction phase

MANAGEMENT OF BRINE

- The disposal of brine into the sea and the co-disposal of brine and cooling water into the sea is environmentally acceptable
- Disposal of brine directly into the sea should be utilised only during construction
- Brine should be mixed with cooling water that is discharged into the sea during the operational phase

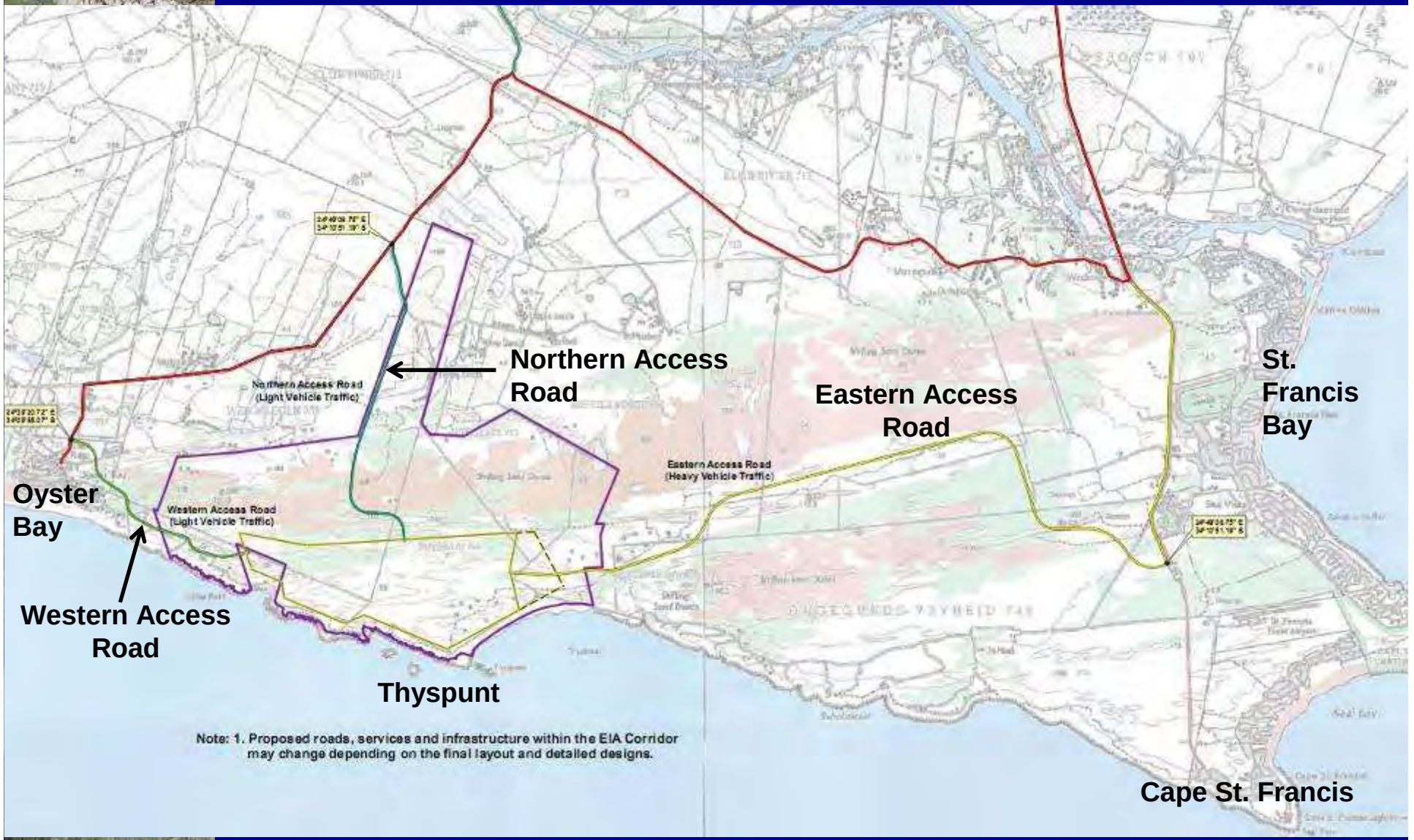
INTAKE AND OUTLET OF WATER

- Installation of intake and outlet tunnels that obtain water from the ocean and feed cooling water into a storage area located adjacent to the cooling water pump houses is the only feasible alternative for all sites
- Outlet structures for cooling water and chemical effluent must be offshore
- All releases need to occur at the distances and depths prescribed by the relevant specialists
- Provided that the specific mitigation measures identified in the marine biology report are adhered to, offshore effluent release above the sea floor is the recommended alternative

MANAGEMENT OF SPOIL MATERIAL

- Fine spoil must be disposed of in the marine environment at all sites
- Spoil material that cannot be pumped to sea, must be disposed of on land and used for activities like levelling of the HV yard and to minimise the footprint on the terrestrial environment
- Visual impact of spoil dumps must be minimised
- Transport of spoil to the panhandle at Thyspunt via conveyor belt is not recommended due to the Oyster Bay mobile dune system

ACCESS ROAD ALTERNATIVES



ACCESS TO THE THYSPUNT SITE

- Eastern Access Road is required by Eskom for heavy loads and there is no alternative to this route
- Western Access Road is favoured over the Northern Access Road, with respect to the potential impacts on agriculture, flora, wetlands, dune geomorphology and heritage resources
- Northern Access Road is favoured only in terms of visual impacts
- Western Access Road is preferred for **Thyspunt**

WASTE TYPES

- Low-level waste: ± 940 drums (50 – 100 kg per drum) per year
- Intermediate level waste: ± 160 x 6.3 ton concrete drums per year
- High level waste: ± 1 880 tons of spent fuel over life of power station (60 years)

WASTE DISPOSAL

- Only feasible alternative for the disposal of Low-Level and Intermediate-Level radioactive waste is Vaalputs nuclear waste disposal site in Northern Cape
- This is the only authorised facility for this form of waste in SA. Vaalputs has sufficient capacity for the waste that will be generated by Nuclear-1
- With regards to High-Level Waste, only alternative currently available in SA is long-term storage of the spent fuel in the power station – common practice internationally
- Vaalputs may be considered as a disposal site for High-Level Waste in future

WASTE DISPOSAL

- National Radioactive Waste Management Institute established by the National Radioactive Waste Management Institute Act No. 53 of 2008)
- Act came into effect in Dec 2009
- Subject to NNR Regulations
- Institute will transfer responsibility from NECSA

NO-DEVELOPMENT ALTERNATIVE

- Given the urgent power demand in South Africa, the No-Go alternative is not considered to be an alternative, as Eskom's mandate is to provide power for the country
- Eskom would likely apply to develop coal-fired power stations if the current application is declined as coal-fired generation is the only feasible base load alternative
- Life-cycle environmental impacts of coal-fired power generation are greater than nuclear-fuelled power generation

NO-DEVELOPMENT ALTERNATIVE

- If Eskom does not utilise Bantamsklip and Thyspunt for Nuclear-1, there are two options:
  - Keep as a future nuclear site; or
  - Sell to a willing buyer - this may result in an any alternative form of land use - may not involve management of the majority of the properties as a nature reserve
  - Eskom has informal agreement with SanParks not to sell Bantamsklip to another buyer

KEY MITIGATION MEASURES

- Independent specialists have proposed mitigation measures to reduce potential negative impacts
- Draft EMP has been compiled as part of draft EIR and if authorised, it will be a legally binding document
- Compliance to EMP must be independently audited throughout construction and operation
- Mitigation measures for botanical impacts, vertebrate and invertebrate fauna, wetlands and heritage resources are particularly important
- Mitigation of heritage impacts will require the work of a site-specific team dedicated to excavations over a period of several years prior to construction

KEY MITIGATION MEASURES

- Qualified and experienced botanical, wetland, vertebrate and invertebrate fauna, dune geomorphology and heritage specialists will need to find acceptable detailed final access route alignments
- Additional groundwater studies are necessary to improve accuracy to of the groundwater model to understand interaction between groundwater and coastal seep wetlands
- Cut-off wall to prevent drawdown of groundwater affecting wetlands during construction
- Acquisition of properties on eastern side of site outside of current Eskom property up to the western boundary of The Links for dedicated wetland conservation

PROGRAMME AND WAY FORWARD

- Comment Period – initially 6 March to 10 May (66 days)
- Extended to 31 May and further extended to 30 June (116 days)
- Revised draft EIR to be made available for comment for further 45 calendar days
- Websites: www.gibb.co.za and www.eskom.co.za/eia
- Submission of Final EIR to authorities – Dec 2010

THANK YOU