



2011 South African Railways and Harbours Conference

Port Expansion Plans for Durban

Dave Stromberg – Transnet Group Planning - 8 April 2011





Introduction and Context

Transnet Container Strategy

2050 Vision for the Durban to Gauteng Freight Corridor

Containers in the Port of Durban

The new Dig-Out Port at the old Durban Airport Site



TRANSNET IN TALKS WITH ACSA FOR OLD AIRPORT SITE

Durban dugout port to cost R100bn

SUREN NAIDOO

THE PLANNED Durban dugout port at the old airport site is expected to cost R50 billion in its first phase of development and construction needs to start by 2015 for it to be ready by 2019.

That's the word from Transnet chairman Mafika Mkwana, who was speaking to *The Mercury* on the sidelines of the Durban Invest business breakfast in the city yesterday.

"We have to develop the dugout port at the old airport to meet future demand and ensure Durban remains the busiest port in Africa... This mega project is going to happen; it is just a matter of Transnet securing the land from the Airports Company South Africa (Acsa) and getting the necessary approvals," he said.

Transnet chief executive Brian Molefe said negotiations to buy the airport site were at an advanced stage.

"We have been throwing numbers back and forth with regards to a price for the site. Negotiations are ongoing and we still have to agree on a final price. The dugout port is a multibillion-rand project, but the entire capital required would not come from just Transnet or the government; we are looking at the private sector to participate in the project.

"There is an opportunity here for the private sector to both invest in the dugout port project and also port project and also possibly be involved in the new ports operations... This could be a public-private partnership. The private sector needs to play a role," he said.

Mkwana said that the current Durban port was expected to reach capacity by 2019/2020 based on growth



A Transnet graphic shows the site of the planned dugout port at the old Durban airport site in proximity to Durban's current harbour, which itself could be expanded with proposals to dig out the Bayhead area. Also shown are proposed dedicated freight routes and an upgraded rail corridor to the two ports.

GRAPHICS: TRANSNET



MOLEFE

forecasts of container traffic.

"We need to start construction on the dugout port by 2015 to complete the first phase of the project by 2019, when container capacity at the current Durban port is expected to be reached. Phase 1 of the dugout port project is expected to cost about R50bn. However, a further phase would mean that at least R100bn would be invested in its development over the long term," he said.

Mkwana said he was one

of the chief negotiators for the airport land together with Durban businessman Don Mkwana. Negotiations first started in 2006.

"We are not only talking to Acsa to buy the airport site. We are also negotiating with other adjoining landowners such as the public works and the defence departments as well as private businesses.

"We are looking at the broader area to better plan for the long term. It is part of our broader 2030 vision for Durban and South Africa in terms of port, rail and logistics master planning," he said.

Public Enterprises Minister Mafika Gigaba said the

government had big dreams for the Durban port, which was crucial to the economic growth and competitiveness of not just KwaZulu-Natal, but the country as a whole.

"Our long-term ambitions for growth are not going to be fulfilled with the current Durban port," Gigaba said.

"Both Transport Minister Shu Ndebele and I realise this and we want them (Transnet and Acsa) to reach a sale agreement by the end of the year. We are taking the matter very seriously and are facing pressure from KwaZulu-Natal Premier Zweli Mkhize to get finality on the matter."

is Business Report



The first phase of the planned Durban dugout port, inset, is expected to cost about R50 billion.

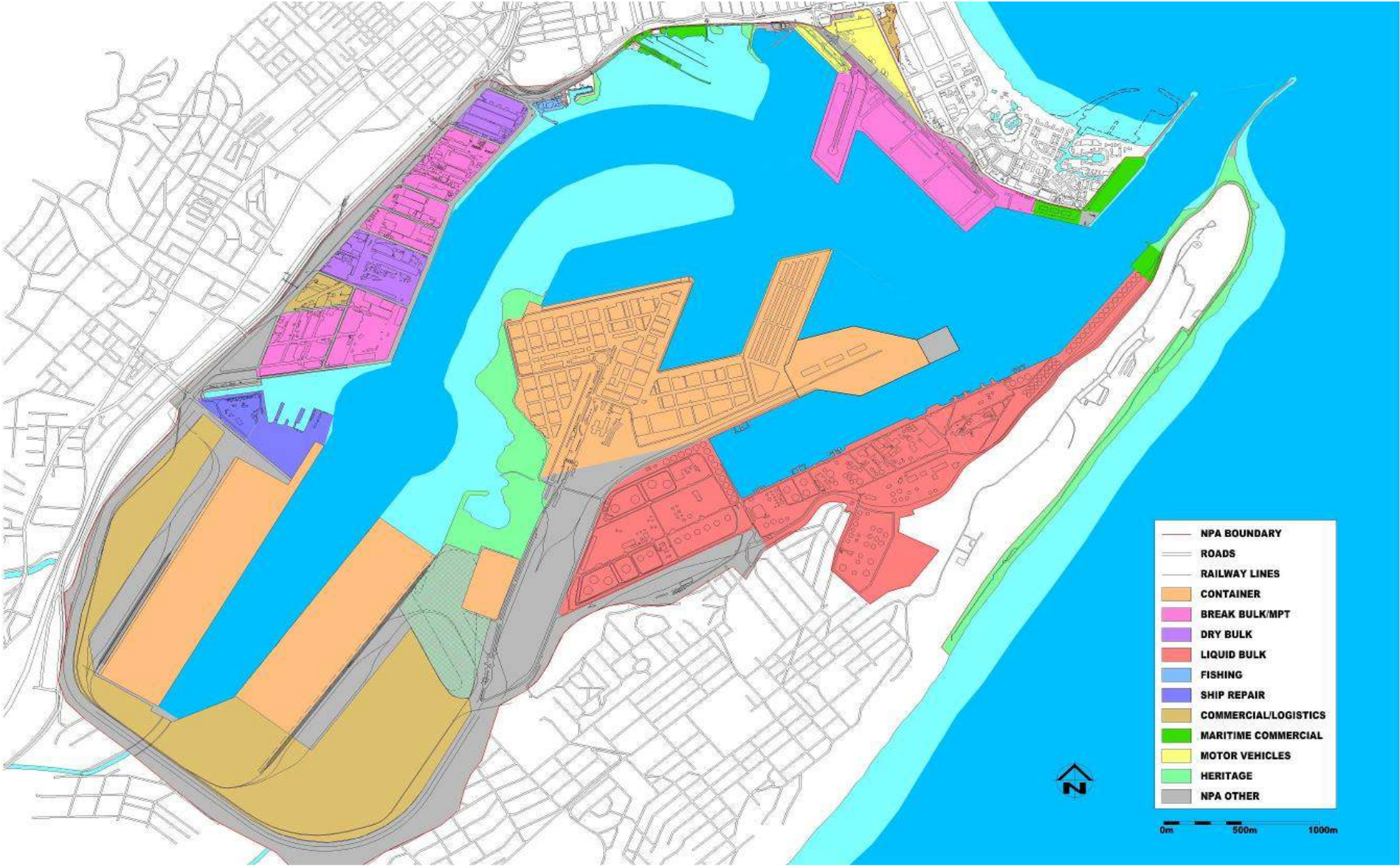
Port of Durban: Increasing congestion and limited expansion opportunities



Durban Container Terminal: Diminishing returns?



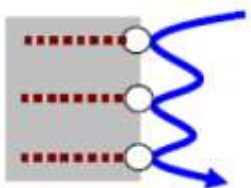
2007 Durban Port Development Plan: Unfavourable Reception!



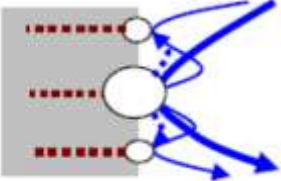
The Ngqura Hub Concept



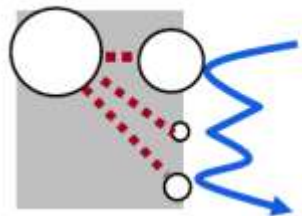
Multiple gateway system



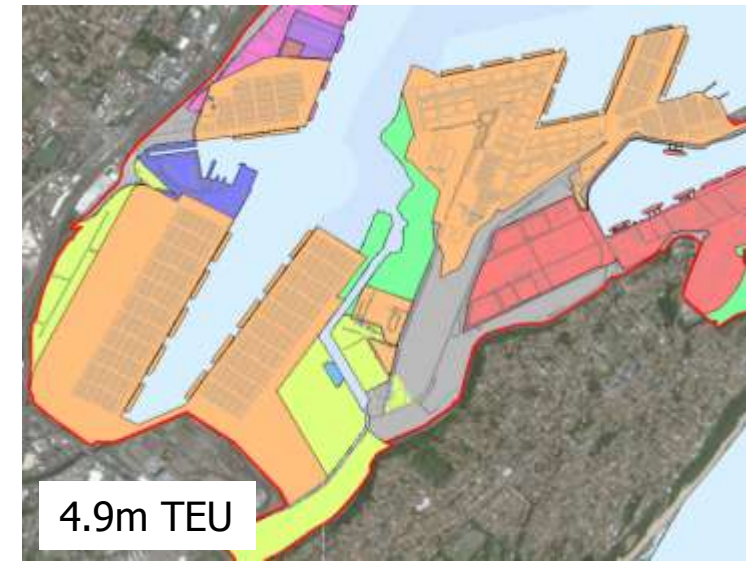
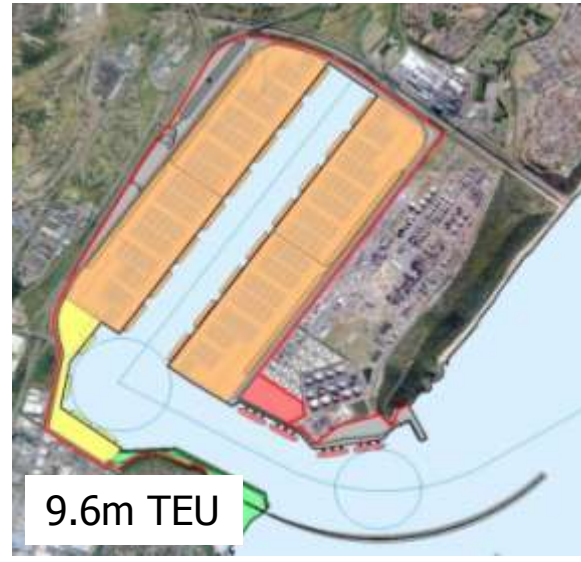
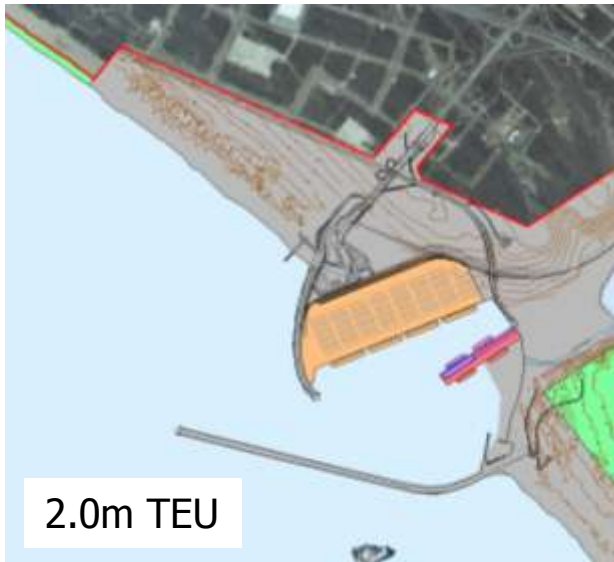
Transshipment hub and large gateway feeder ports



(More accurate version)

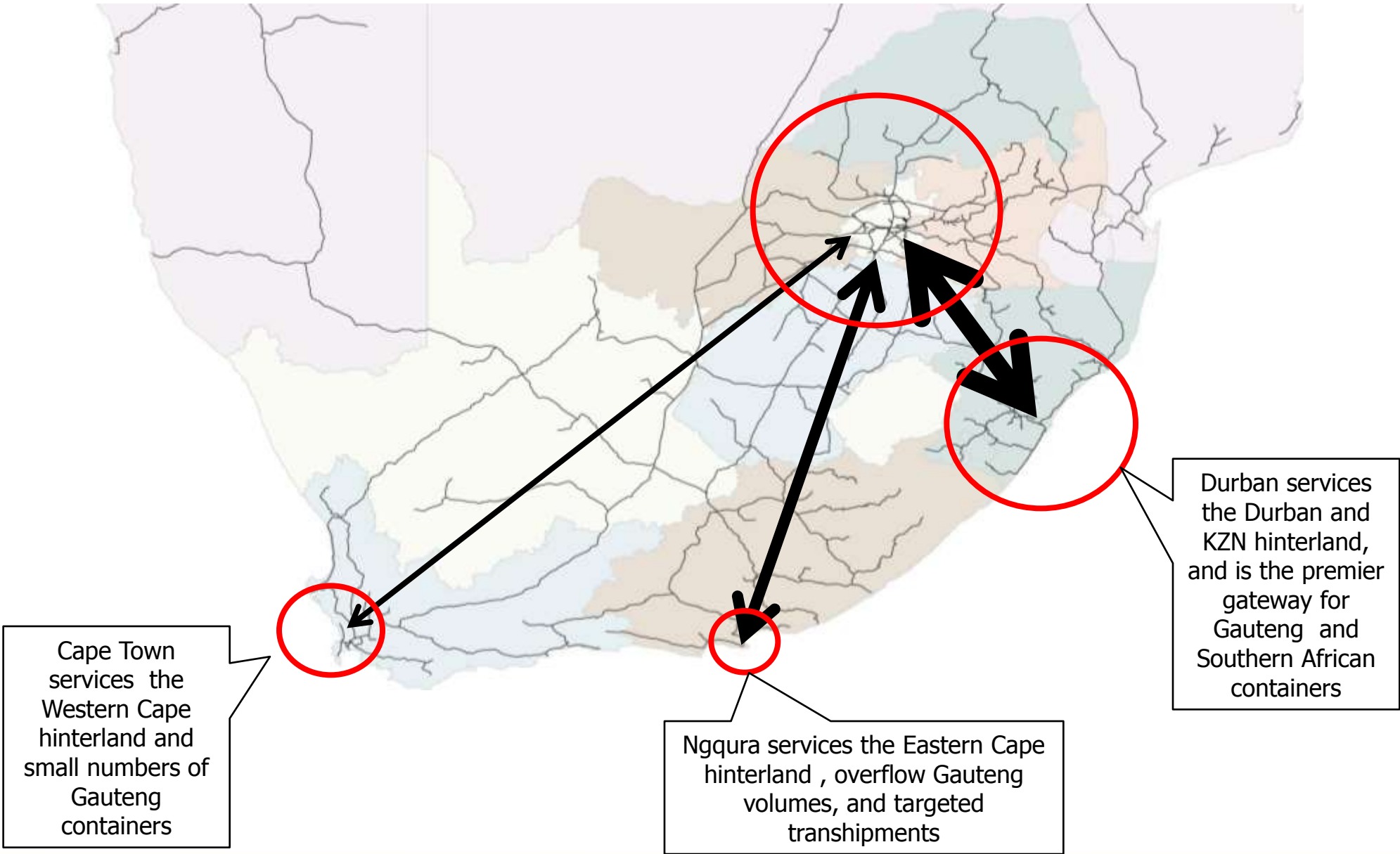


Comparative sizes of Ports of Ngqura and Durban



- A four berth terminal at Ngqura will meet the 30 year import/export needs of the central region, while still allowing for significant volumes of targeted new transhipments to fill the spare capacity
- Over the same 30 year period, Durban will need to develop DCT, Pier 1 and Salisbury Island, as well as the full Airport Site Expansion
- Ngqura is too small to replace Durban as SA's container hub port

Roles of the South African container ports



The old Durban Airport Site: Potential for Port Expansion?



CITY / PORT STRATEGIC PLANNING WORKSHOP



3 JULY 2009

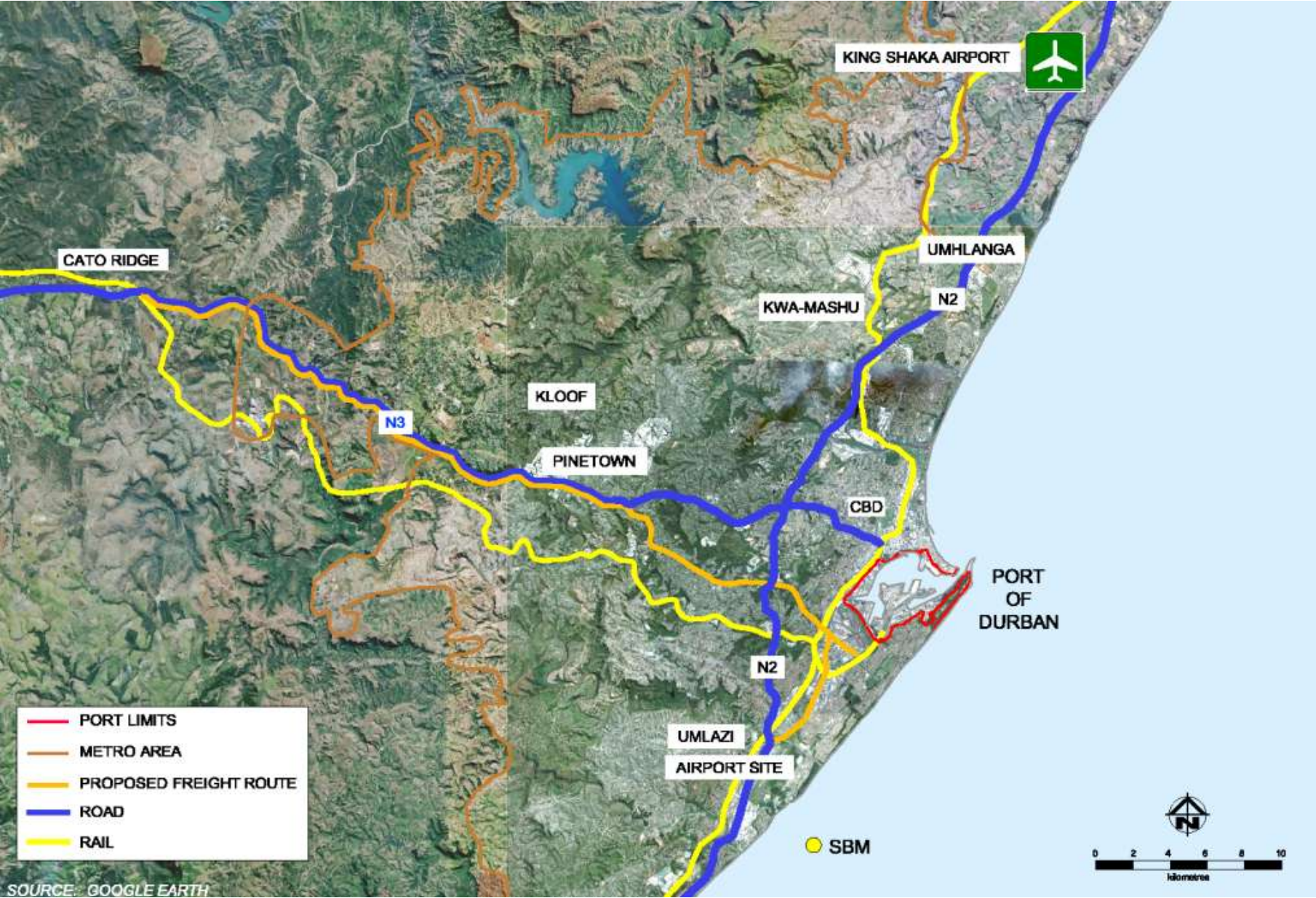


The Transnet – eThekweni Municipality Shared Vision



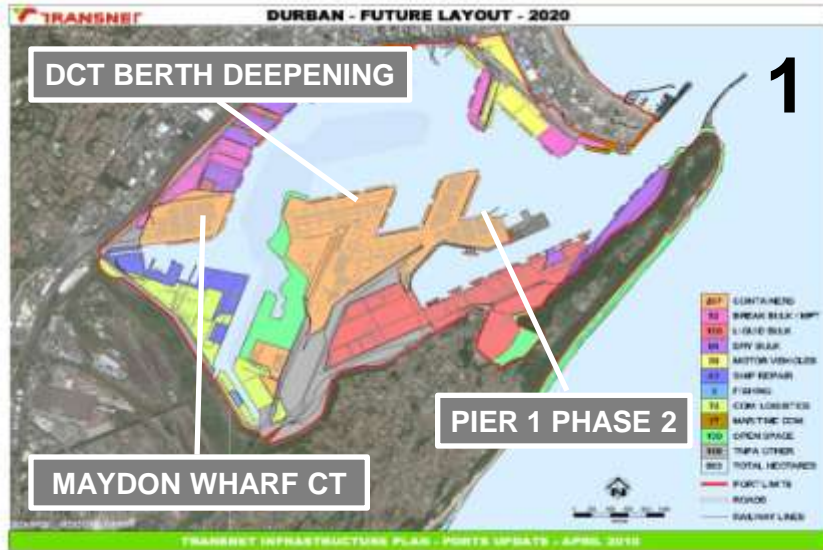
SOURCE: GOOGLE EARTH

Shared Vision - Metro Context





Durban Container Expansion Sequence



Container Expansion Sequence

DCT And Pier 1 : 3.3m TEU : 2013

Pier 1 Phase 2 : +0.8m TEU : 2017

DCT Deepening : -0.4m TEU: 2013-2017

Maydon Wharf CT : +0.15m TEU : 2016

Airport Site : +9.6m TEU : 2020

Bayhead Expansion: +6.0m TEU : Beyond 2040



2050 VISION FOR THE DURBAN-GAUTENG FREIGHT CORRIDOR



The Durban to Gauteng freight corridor forms the backbone of South Africa's freight transportation network, and is vital in facilitating economic growth for the country and the Southern African region.

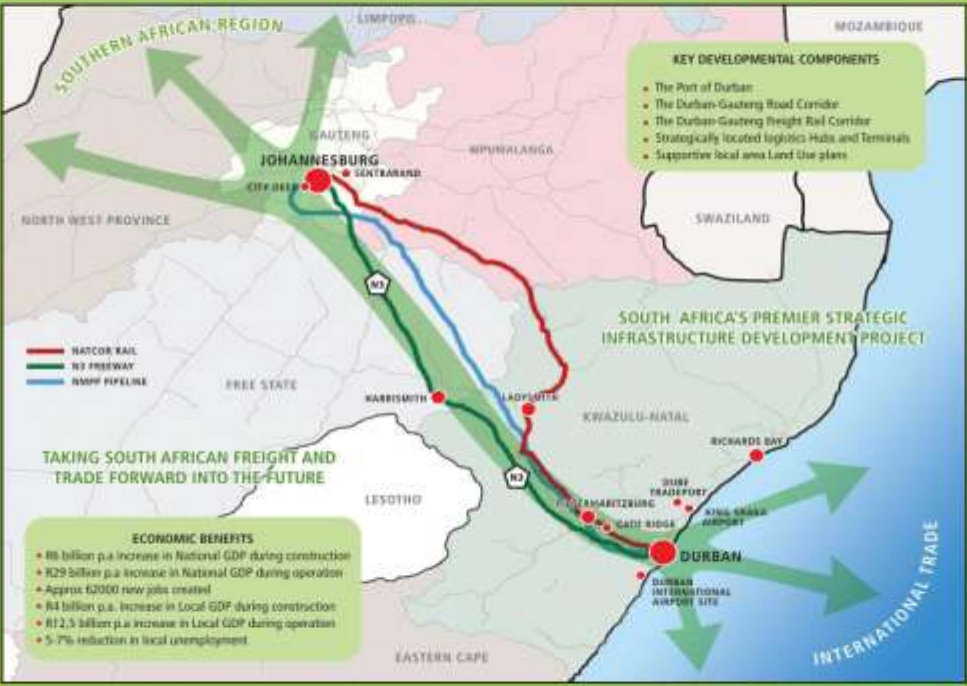
South Africa's ability to improve efficiencies and lower logistics costs on the corridor, and to provide freight handling capacity ahead of demand, will be critical to the region achieving its short, medium and long term economic objectives.

The 2050 vision provides an integrated solution to the growing expansion requirements of the Durban to Gauteng freight corridor which will form the future foundation for the establishment of a Southern African regional freight network.

- ### ROAD, RAIL AND PIPELINE PLANS
- Dedicated mandatory freight route
 - Rail capacity upgrades on Ekwuleni Natal Rail Corridor
 - New Multi Product Pipeline



- Possible new rail alignments
- New back-of-port rail infrastructure
- Future use of North Coast line and Richards Bay rail corridor
- Phased Gauteng rail freight ring linking port corridors
- Separate metro and freight rail routes
- Link to inland terminals
- Provides connectivity to cross border corridors
- High capacity road access into the port and inland terminals
- Intermodal facilities at major nodes



MAJOR PHASES OF DEVELOPMENT

The 2050 vision is driven by three major phases of port development:

- Phase 1: 2010 - 2020 (current expansion in the Port of Durban)
- Phase 2: 2020 - 2040 (Airport site development)
- Phase 3: 2040 - 2050+ (Railhead development)

The corresponding rail, road, intermodal hubs and terminal and land-use projects also follow this phasing sequence.



- ### INTERMODAL AND LAND USE PLANS
- Local Area Land Use Plans for logistics activities
 - Congestion mitigation plans
 - Rationalised land uses
 - Upgrades to City Deep, Pretoria and Vaalton terminals
 - Potential mega terminal at Sentravrand



2050 Vision for the Development of the Durban to Gauteng Freight Corridor

'A freight intervention for Southern Africa'

Implementation Plan, August 2010





Commodity	Train Length	Wagon Types
Iron Ore	50 wagons	CR-type
Manganese	50 wagons	CR-type
Coal	50, 100 & 200 wagons	CA, CFR
General Freight	Up to 40 / 50 wagons	Vacuum / Air brake
Containers	50 & 75 Wagons	S

Section	Line Type	Axle Load	Traction	Train Control	Shortest Curve	Steepest Gradient
1 Gauteng to Durban	Double	20 t	3 kV DC	CTC	250m	1:66
Section	Line Type	Axle Load	Traction	Train Control	Shortest Curve	Steepest Gradient
2 Durban to Nsese	Double and Single	20t	3kV DC	CTC	250m	1:66
Section	Line Type	Axle Load	Traction	Train Control	Shortest Curve	Steepest Gradient
3 Glencoe to Vryheid	Single	20t	3kV DC	TWS	200m	1:66
Section	Line Type	Axle Load	Traction	Train Control	Shortest Curve	Steepest Gradient
4 Ermelo to Nsese	Double	26t	25kV DC	CTC	219m	1:160
Section	Line Type	Axle Load	Traction	Train Control	Shortest Curve	Steepest Gradient
5 Welgedag to Ermelo	Double	20/26t	3kV DC	CTC	153m	1:100

Intermodal Hubs and Terminals



Road to Rail Terminals



Mega



Large



Inter-
mediate

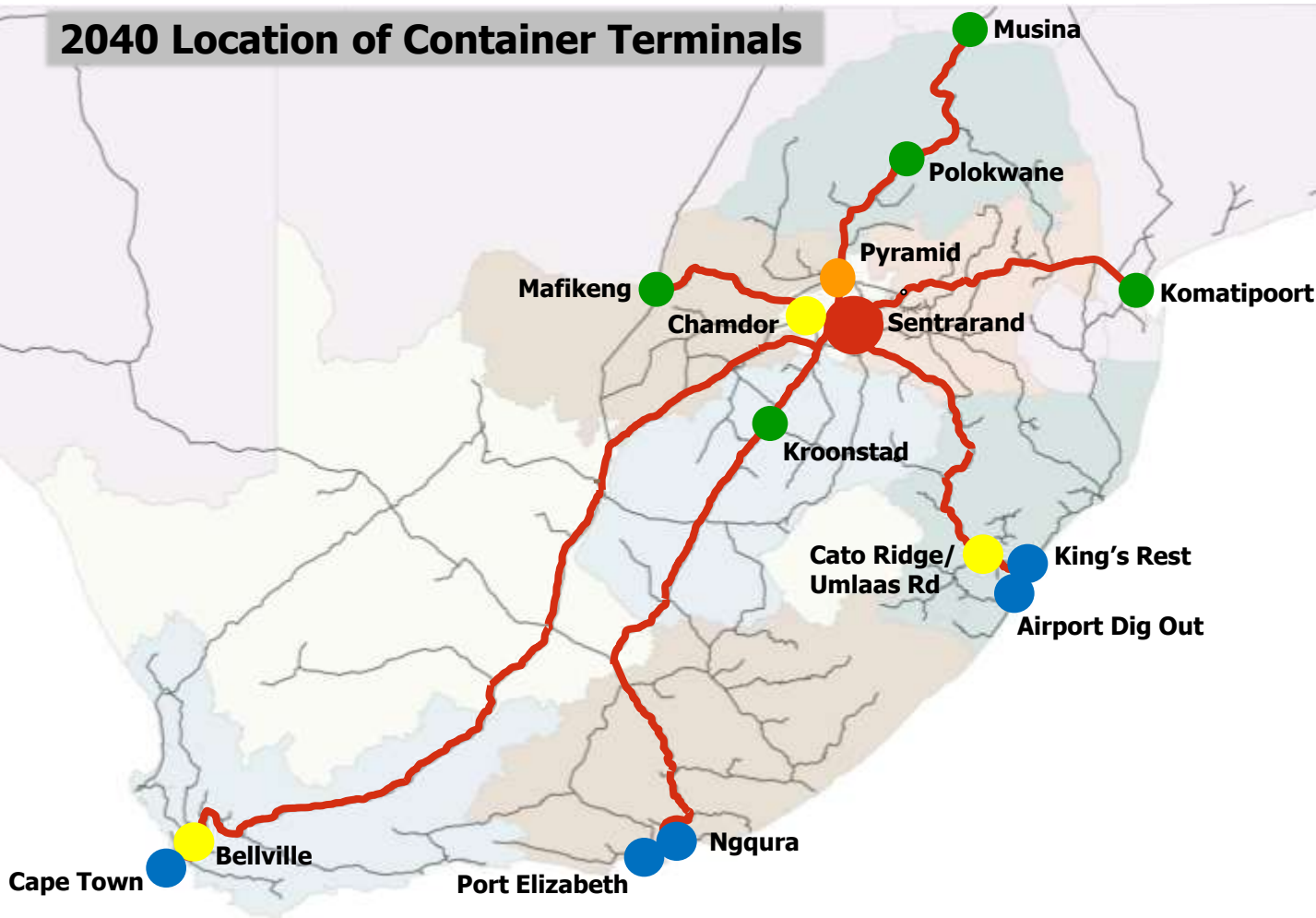


Small



Port / Rail

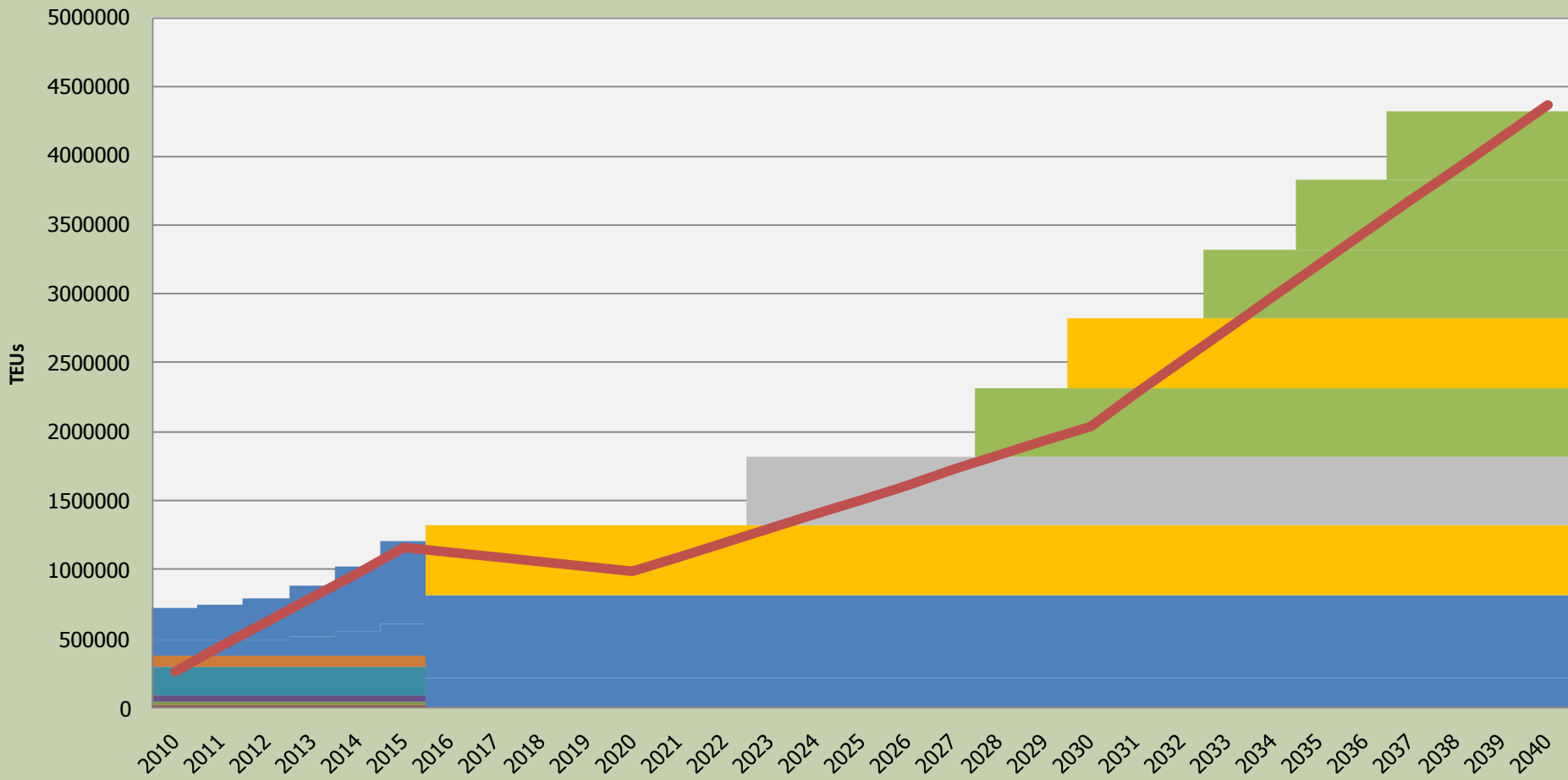
2040 Location of Container Terminals



Terminals are likely to be developed in partnership with public and private sector players or rail may only offer services to privately owned terminals. (Final positions are therefore indicative only)



Scenario 7: Container Ramp Up



Tambo Springs	Pyramid	City Deep Complex	Sentrarand	West Rand	South Terminal



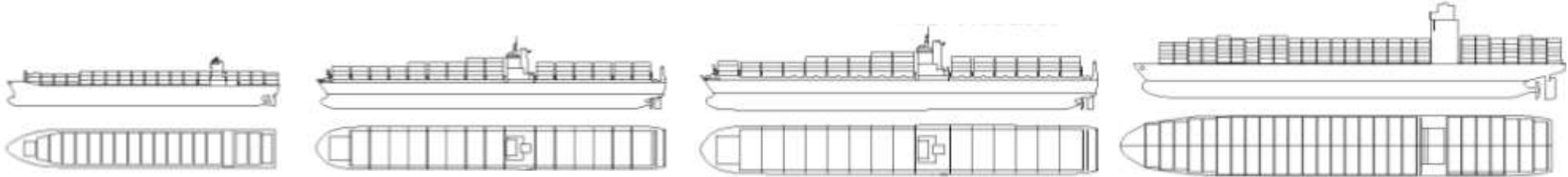
City Deep Kaserne - Phase 3 looking South



Tambo Springs - Phase 4 looking North East



Increasing Container Vessel Sizes: The Port of Durban's Challenge



Durban Container Projects: Discussion Programme



	2011/12		2012/13		2013/14		2014/15		2015/16		2016/17		2017/18		2018/19		2019/20		2020/21		2021/22	
Point Container Terminal	FEL1	FEL2	FEL3	Proc.				Com.														
+250 000 TEU			EA	EA																		
Maydon Wharf Phase 1	FEL1	FEL2	FEL3	FEL3	Proc.					Com.												
+150 000 TEU			EA	EA	EA																	
Pier 1 Phase 2	FEL2	FEL2	FEL3	FEL3	Proc.								Com.									
+800 000 TEU			EA	EA	EA																	
DCT Berth Deepening	FEL2	FEL3	FEL3	Proc.																		
-400 000 TEU / +1 000 000 TEU			EA	EA																		
Durban Airport Site	FEL1	FEL1	FEL1	FEL2	FEL2	FEL2	FEL3	FEL3	Proc.	Proc.											Com.	
+2 400 000 TEU			EA	EA	EA	EA	EA	EA	EA	EA												



Note on capacity and project timeline assumptions:

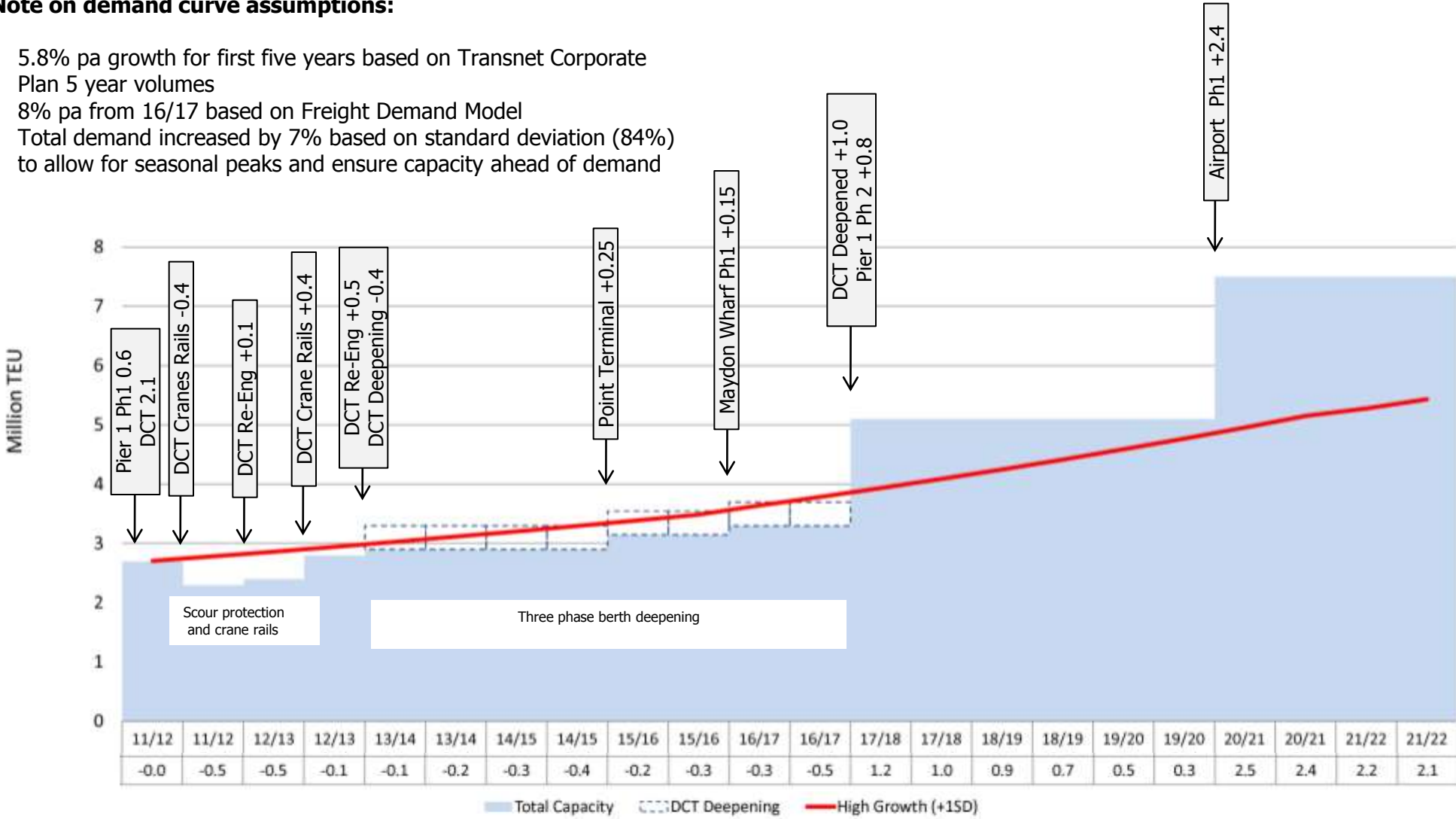
- Timelines are based on best available information
- Environmental authorisation period assumes straightforward approval process
- Six month commissioning period provided before full capacity on line
- Capacity yields are based on planning study simulations. Point CT capacity assumes a single berth terminal
- Pier 1 Phase 2 takes terminal capacity from 0.6m TEU to 1.4m TEU
- Assumed that DCT capacity will be 3.3m TEU after re-engineering, new cranes and deepening (stack capacity is 2.9m TEU)
- Airport Site capacity of 2.4m TEU is first phase of project with total capacity of 9.6m TEU

Durban Container Project Ramp Ups



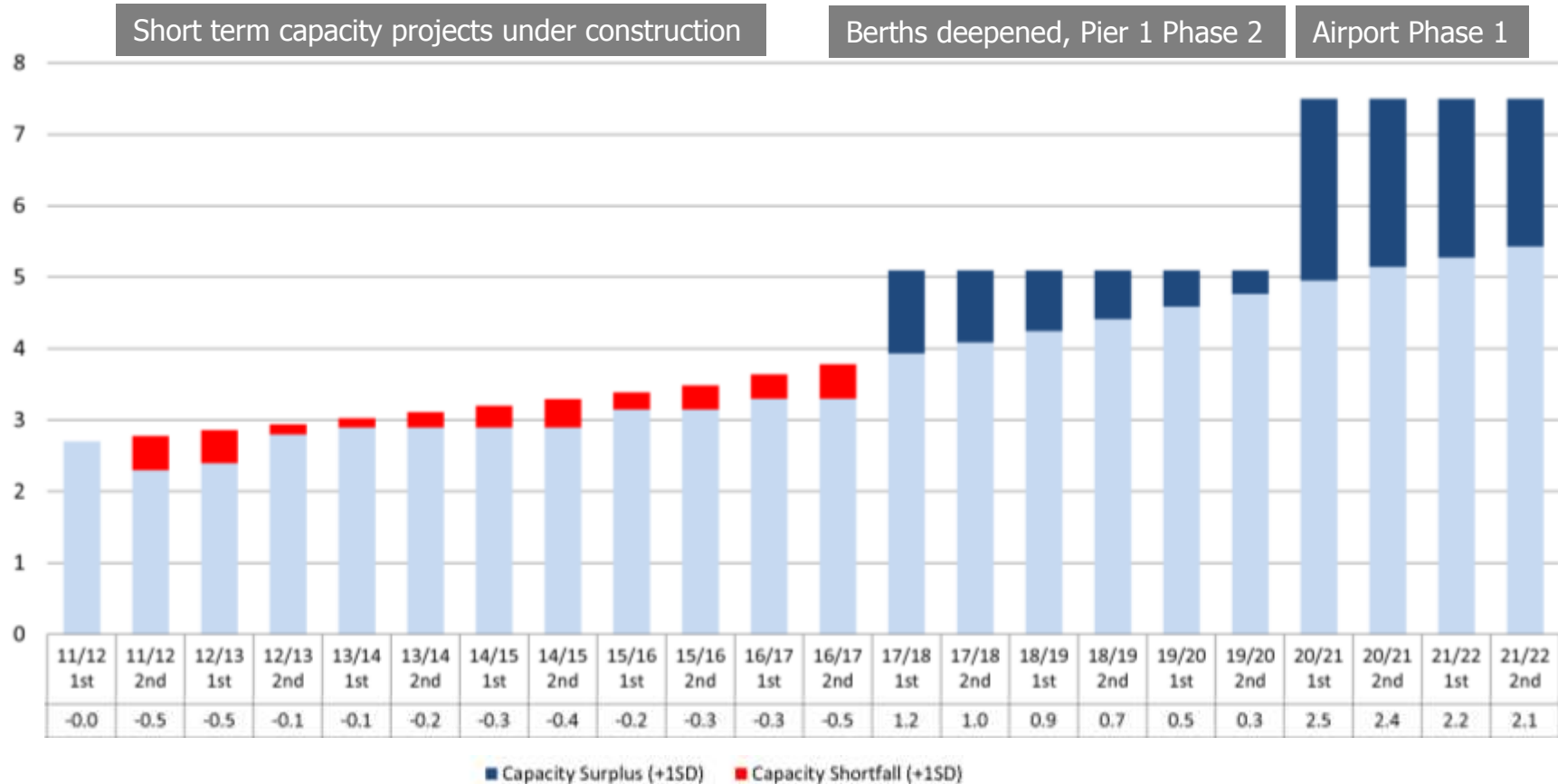
Note on demand curve assumptions:

- 5.8% pa growth for first five years based on Transnet Corporate Plan 5 year volumes
- 8% pa from 16/17 based on Freight Demand Model
- Total demand increased by 7% based on standard deviation (84%) to allow for seasonal peaks and ensure capacity ahead of demand



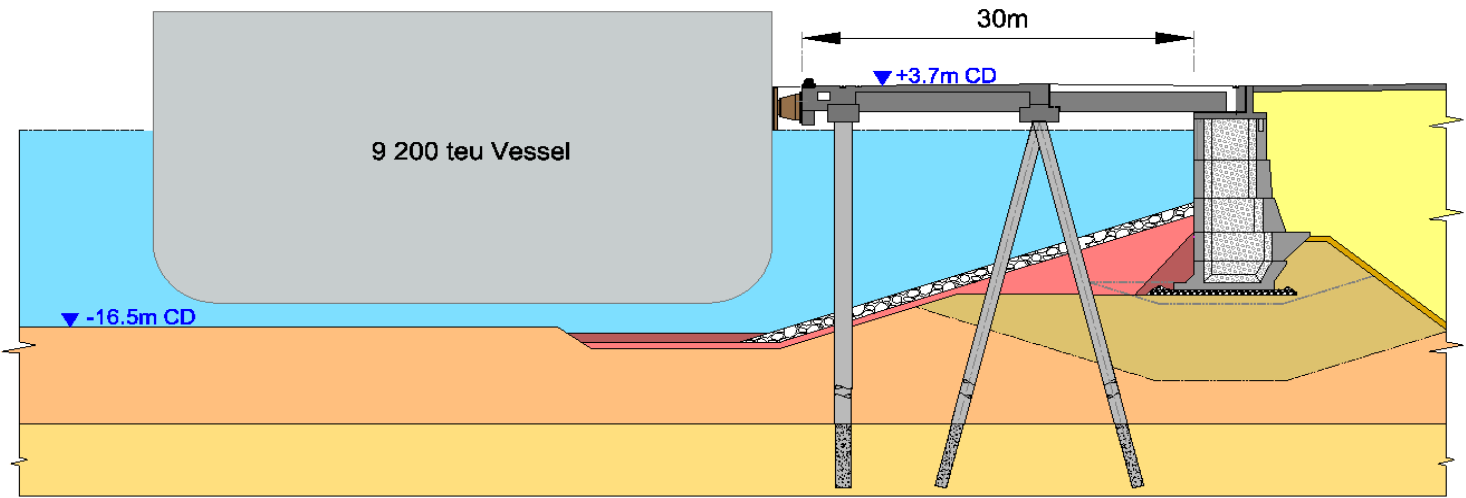
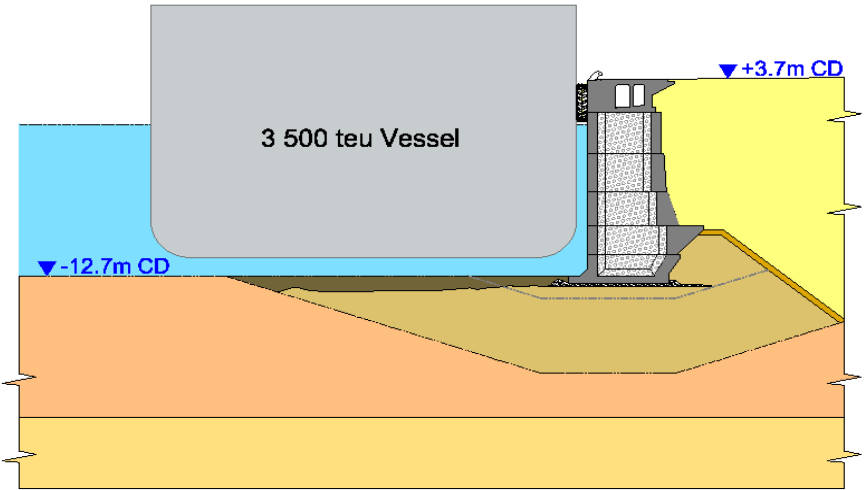


Durban Container Demand vs Capacity



Based on the demand, capacity, and project timeline assumptions used in this scenario:

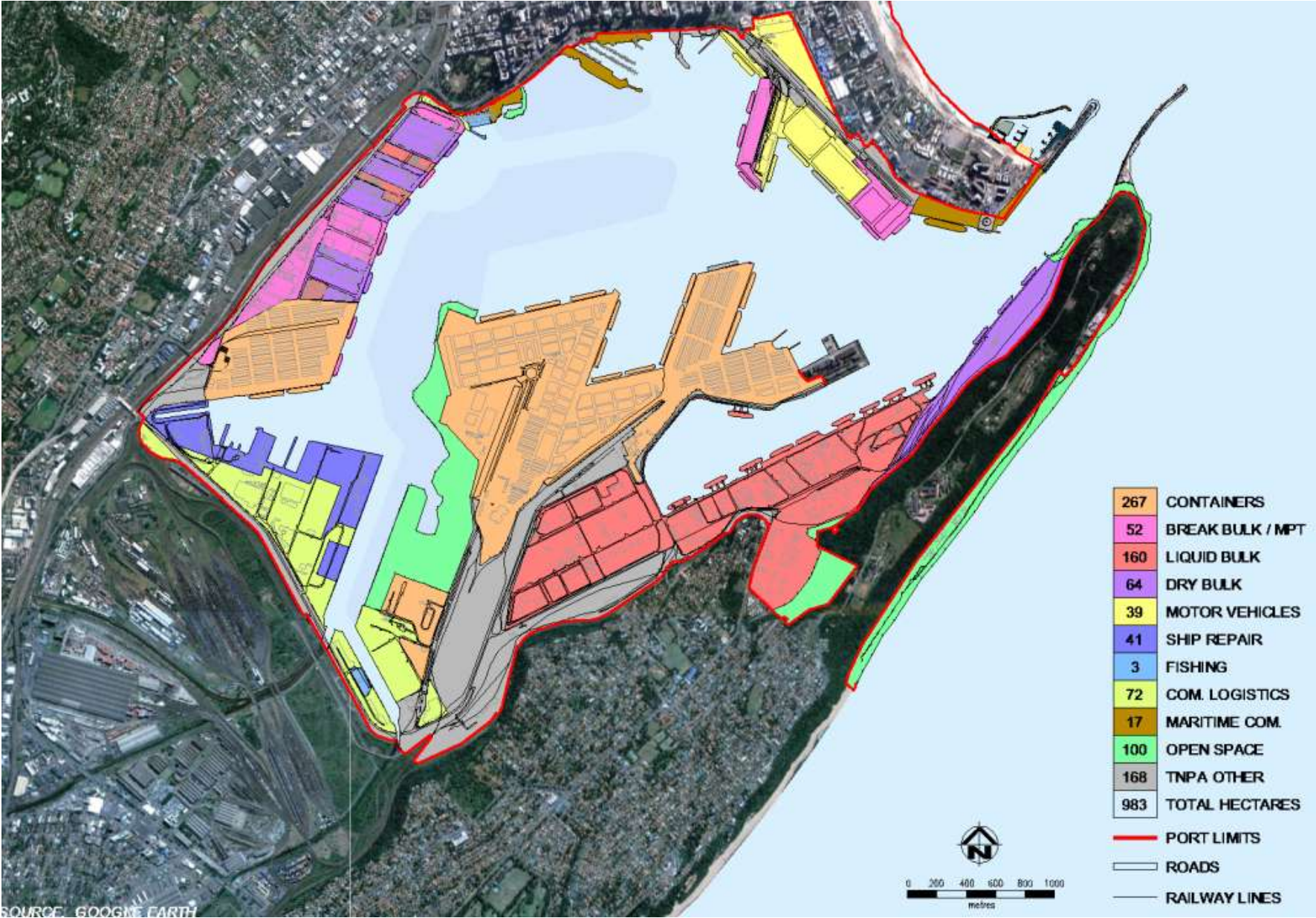
- Durban Containers will not provide sufficient capacity to meet growing demand before Pier 1 Phase 2 becomes operational in 2016/17
- Overflow volumes (transshipment and Gauteng containers) must be rerouted to Ngqura over this period
- The first phase of the Airport Site Expansion will be required to be operational in 2020
- The subsequent phases of the Airport Site Expansion will meet demand for the next 20 – 30 years, after which Bayhead will be required



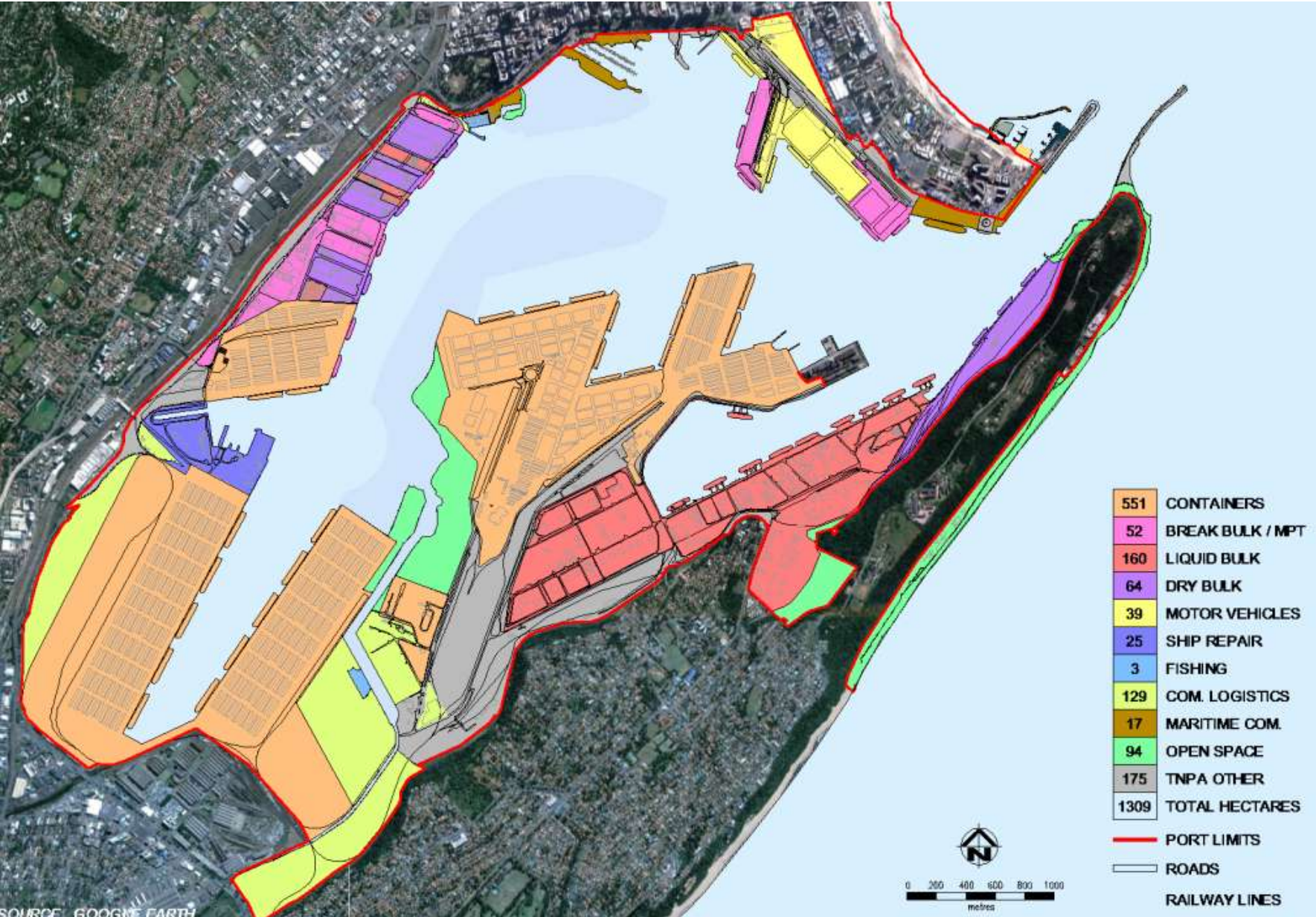
Durban – Current Layout - 2010



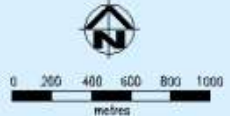
Durban – Future Layout with Short Term Expansions– 2020



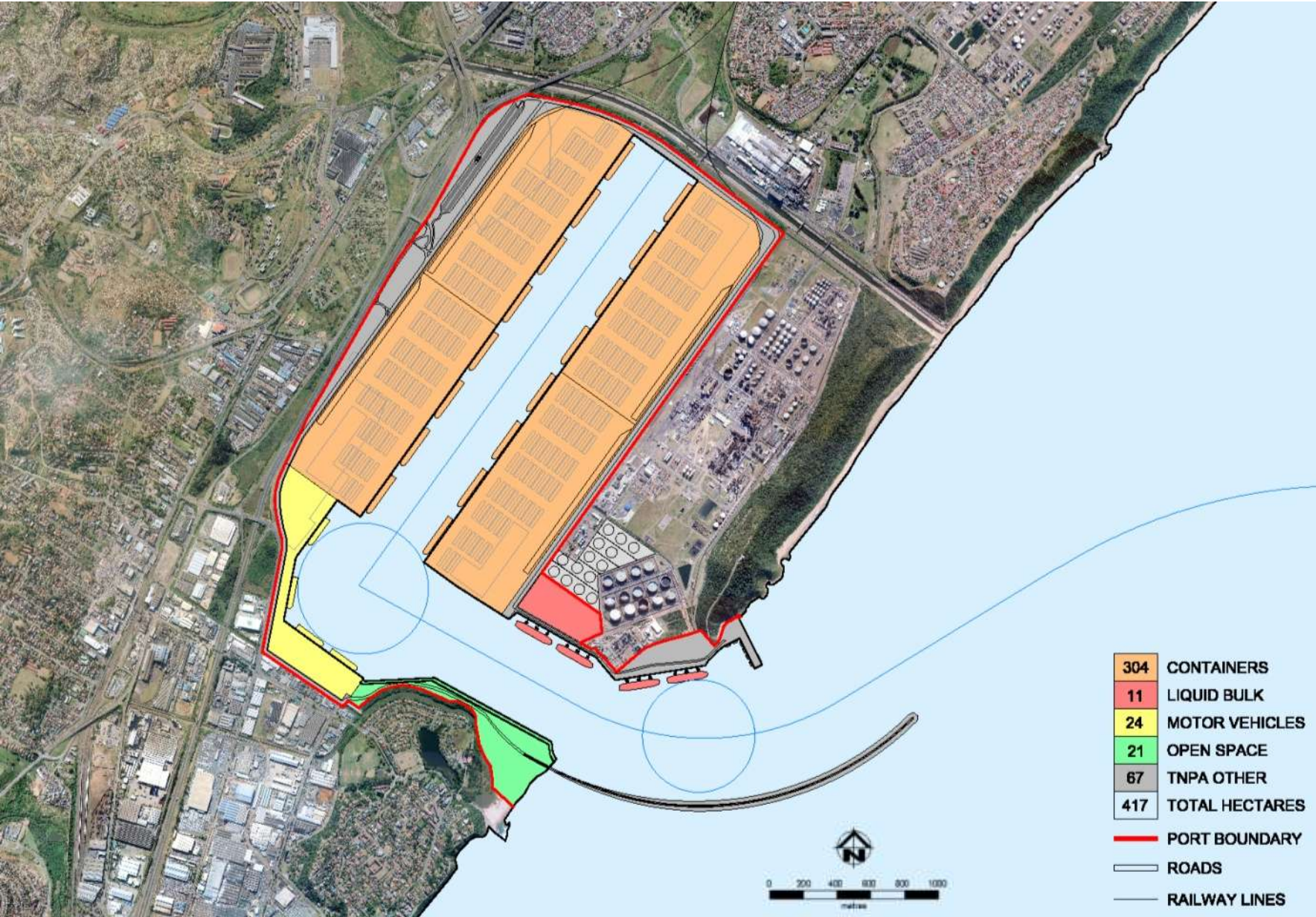
Durban – Future Layout with Bayhead Dig Out – 2050



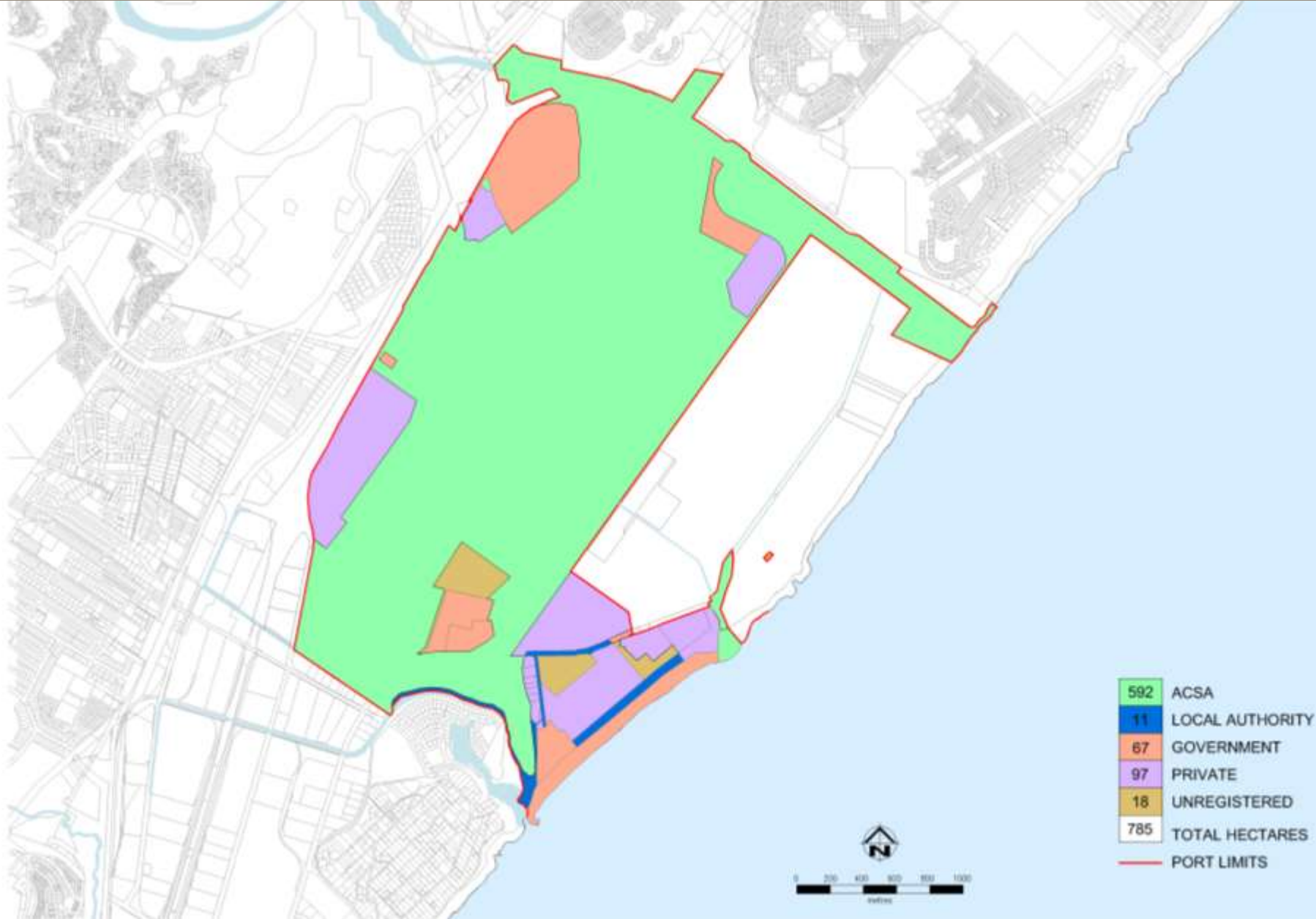
SOURCE: GOOGLE EARTH



Durban Airport Site – Future Layout – 2040



Current Land Ownership Property Plan



Airport Site Layout Options



Container Capacity Planning Assumptions

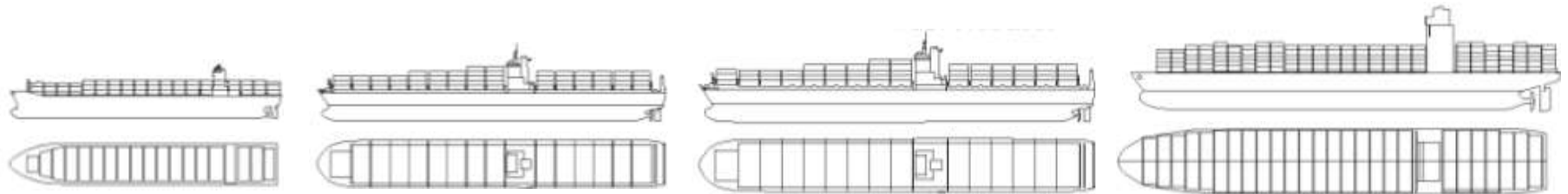


Capacity planning for all new container terminals is based on a progressive ramp-up in productivity compared with current terminal performances, and is benchmarked against global best practice.

Capacity benchmark assumptions: 600 000 TEU per 350m long berth, 1720 TEU per metre of quaywall, and an average of 33 gross crane moves per hour.

All new berths are planned for 9200 TEU vessels, and the new Durban airport site expansion will cater for 15000 TEU vessels.

Container Berth Productivity (2010/11 Transnet Latest Estimates)				
TERMINAL	TEU HANDLED	BERTHS	(TEU/BERTH)	AVERAGE CRANE MOVES
CAPE TOWN CT	681 727	4	170 432	25 GCM/H
PE CT	335 900	2	167 950	23 GCM/H
NGQURA CT	409 649	2	204 824	24 GCM/H
DURBAN CT	2 524 000	9	280 444	24 (DCT), 28 (Pier 1)
Planned Container Berth Productivity (TIP 2011)				
DURBAN AIRPORT SITE	9 600 000	16	600 000	33 GCM/H



3500TEU Panamax

5000TEU Post Panamax

9200TEU Super Post Panamax

15000TEU Ultra Large Container Ship



Berth Side

- Vessel Distribution:
 - ULCS 5%
 - Super Post-Panamax 35%
 - Post-Panamax 55%
 - Panamax 5%
- Berth Occupancy: 60-65%
- Berth Utilisation: 50-55%
- TEU factor: 1.7
- Crane moves per hour: 28-36 gmh
- Average cranes per vessel: 1.98-2.5
- *Capacity/m: 1720TEU/m*
- *Capacity/350m Berth: 600 000 TEU/berth*

Terminal Side

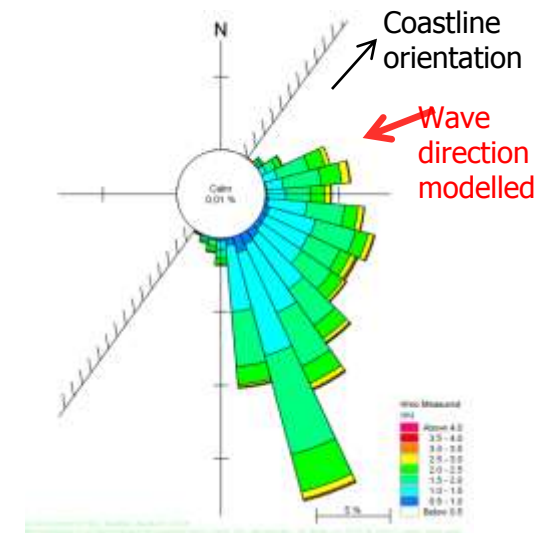
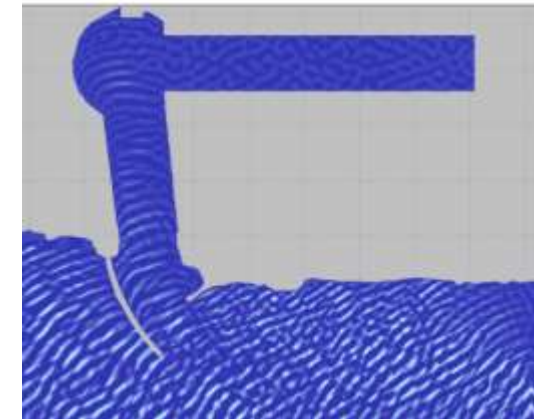
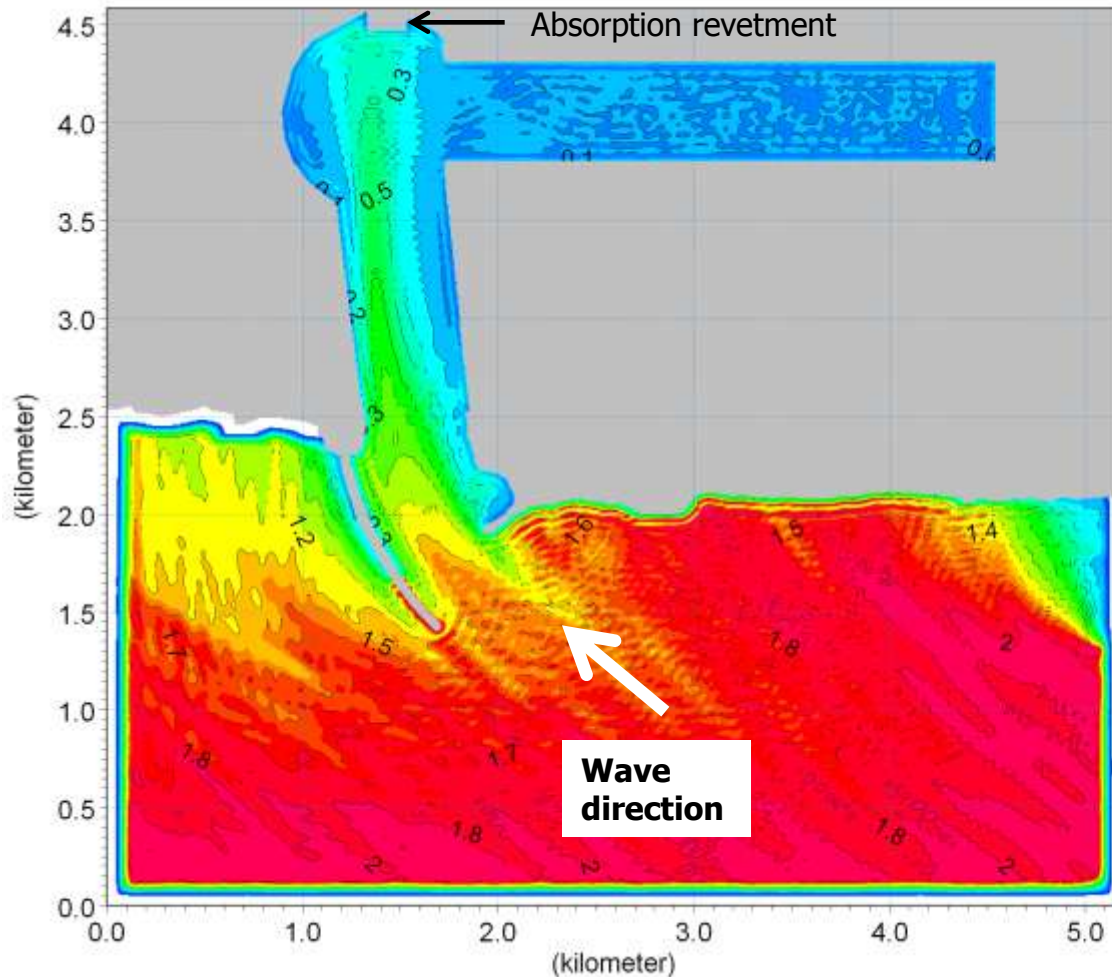
- Dwell time (average import/export): 5 days
- Maximum stack height: 5 high
- Reserve stack capacity: 25%
- Back of quay terminal depth required: 520m
- *Capacity/ha: 33 000 TEU/ha*

Total Capacity 9.6 million TEUs
(i.e. 2.4 m TEUs per terminal)

Wave Penetration for Phase 4



Easterly short period condition $H_s=2\text{m}$; $T_p=9\text{s}$; Dir: 75deg



Flooding of the Site



The uMlazi Canal can handle the 30 year flood

The 1 in 100yr flood water level reaches levels of between 4m - 6m above MSL

The port development will increase the ground level and worsen flooding of the surrounding areas (e.g. Mondi and SAPREF)





Flooding of the Site

Mitigating Measures:

1. Increase parapet wall height

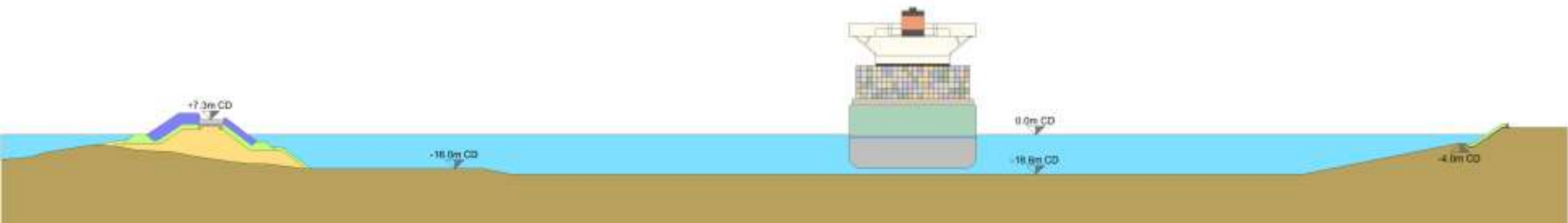
This would allow the canal to handle larger flood events but localised failure would result in catastrophic flooding.

2. Allow overtopping into the port

This would help reduce the flood risks in adjacent areas (e.g. Mondi and SAPREF).



Typical Port Cross Section



TYPICAL SECTION THROUGH ENTRANCE CHANNEL



TYPICAL SECTION THROUGH CONTAINER QUAYS



TYPICAL SECTION THROUGH CONTAINER TERMINAL

Currently the SBM operational conditions are:

- \pm 80 % of South Africa's crude oil imports
- \pm 19 mil tons of crude oil/year
- Average 220 800 tons/vessel
- \pm 85 vessels/year (2008)
- Vessels 150 000 DWT to 300 000 DWT
- Located 2.5 km offshore in 40m water depth
- **NATIONAL STRATEGIC IMPORTANCE**



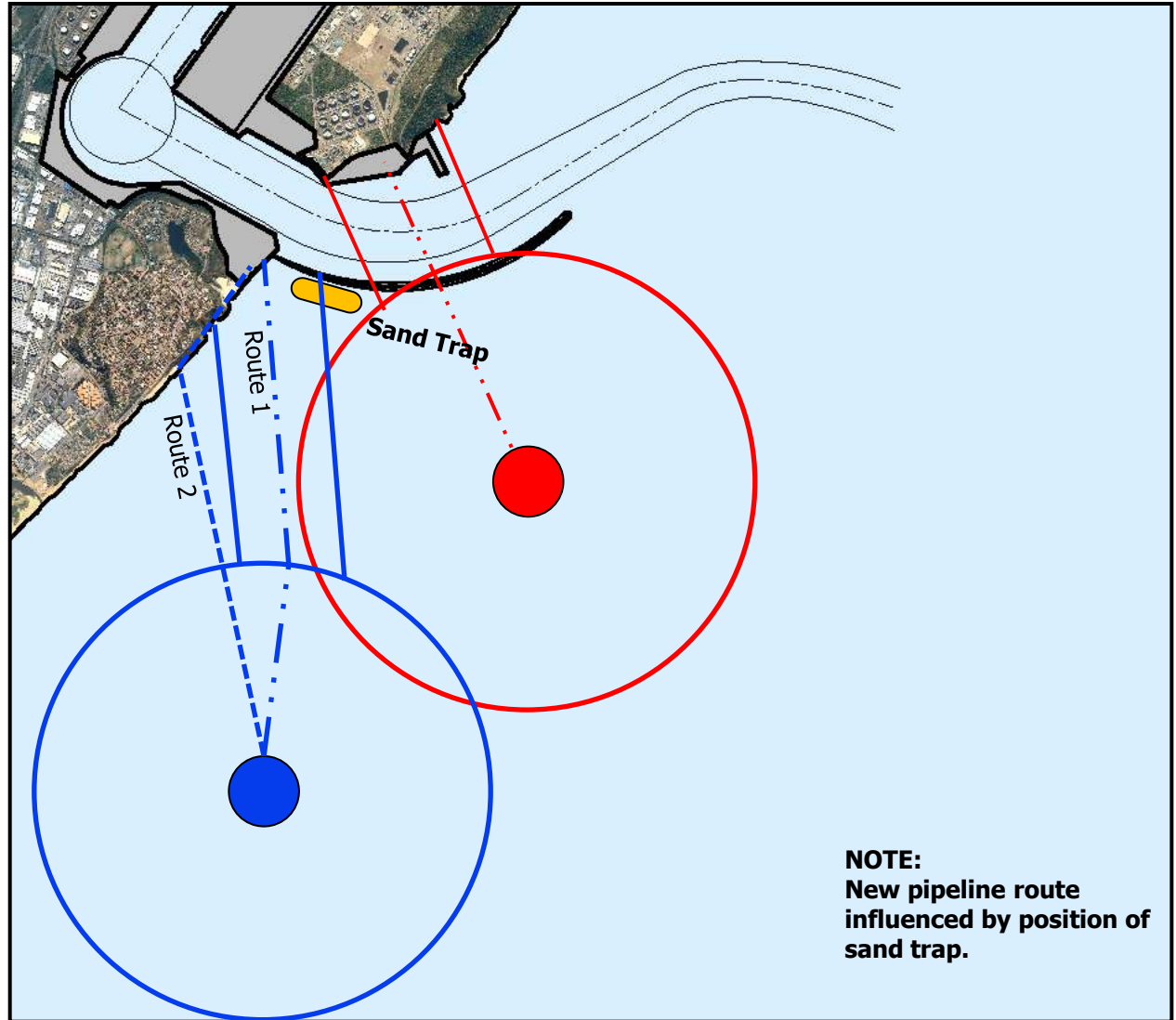


Concerns:

- 1) Security/Safety Exclusion Zone – Places a restriction on vessel movement around harbour
- 2) Aborted Entry - Increased risk of collisions due to proximity of SBM
- 3) Right of Way Conflicts – Potential for confusion as a result of dual systems in close proximity

Solution:

Shift SBM further south to try eliminate navigational issues



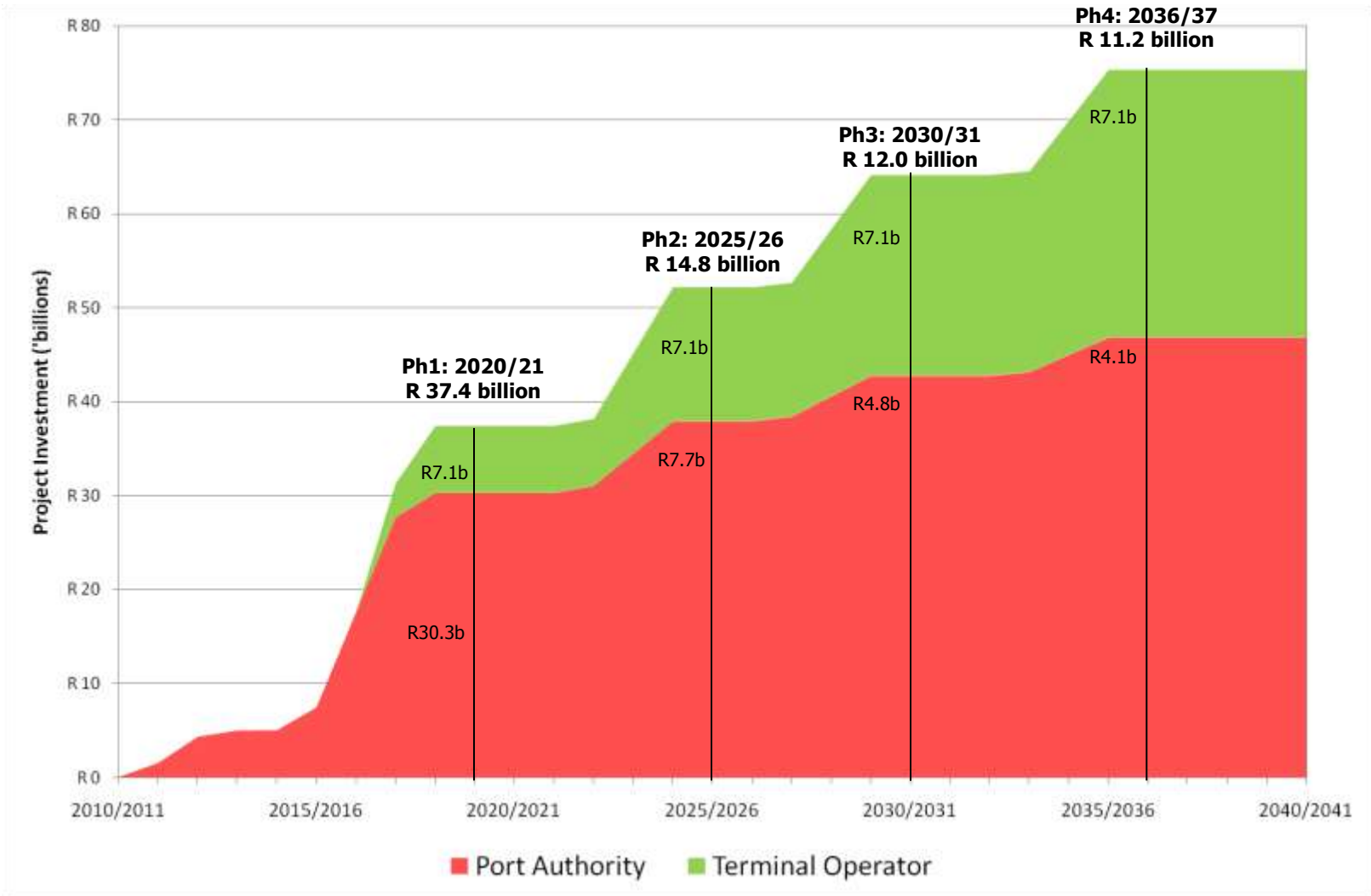
Implementation Schedule, 10 years



	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Site Investigations											
Physical Model Study											
FEL 1: Concept Design											
FEL 2: Preliminary Design											
FEL 3: Detailed Engineering											
FEL 4: Tender and Procurement											
Construction (Phase 1)											
<i>Site Establishment & Clearing</i>											
<i>Earthworks and Dewatering</i>											
<i>Quay Walls</i>											
<i>Dredging</i>											
<i>Breakwaters and Revetments</i>											
<i>Relocate SBM & Associated Pipelines</i>											
<i>Civil Infrastructure</i>											
FEL 4 Commissioning											
Environmental & Social Process											
<i>Initial Scan and Study</i>											
<i>Impact Assessments</i>											
<i>Environmental Authorisations & Appeals</i>											
Property Acquisition											
Project Approvals											
<i>Transnet Board Submission</i>											
<i>Cabinet Submission</i>											
<i>Gazetted Decision</i>											
Terminal Concessioneing											
<i>Appoint Advisor & Develop Plan</i>											
<i>Tender, Engineering & Award Construction Contract</i>											
<i>Terminal Construction</i>											
Phase 1 Commissioning											

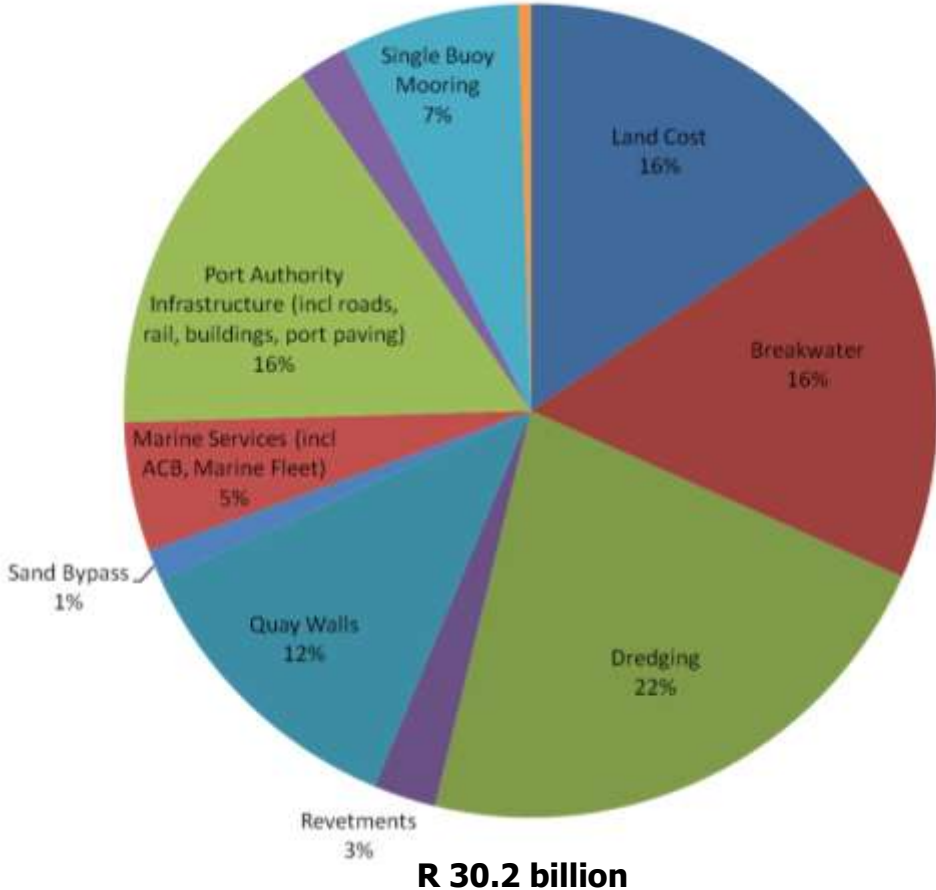


Project Investment Cash Flow, Non Escalated

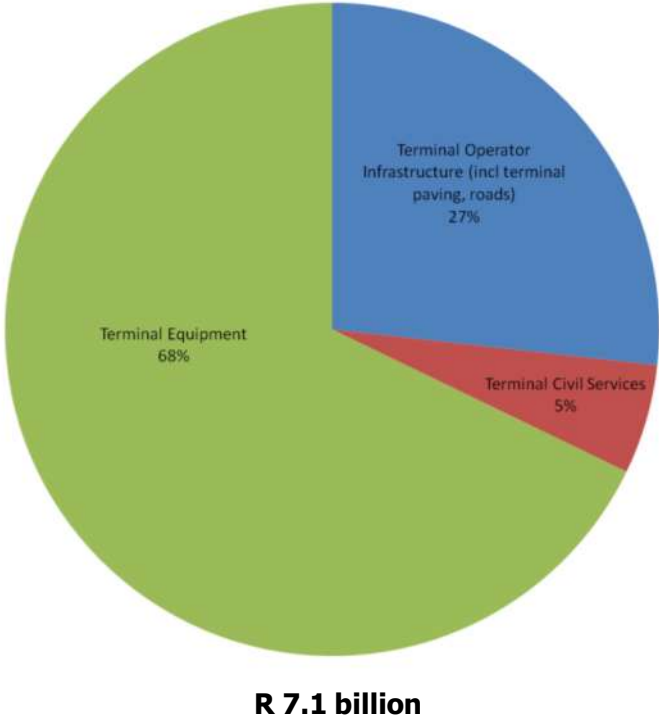




Port Authority Cost



Terminal Operator Cost



The old Durban Airport Site



Airport Site Expansion Phase 1



Airport Site Expansion: Full Development



Thank You!

