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WESTERSCHELDE CONTAINER

TERMINAL VLISSINGEN:

AN UPDATE STUDY

May 2004

Prepared for **Zeeland Seaports** by:
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SECTION 1 – INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Introduction

Container port demand is expanding very rapidly in the North European market as a whole and in the immediate France / Belgium / Netherlands region. It is also apparent that the structure of container trades is changing. The fastest demand is being noted on trade to/from the Asian markets and these containers are being shipped in larger container vessels that require very deepwater and high volume container handling facilities.

The planned container terminal investment at Vlissingen (WCT) represents a competitive and effective solution to the requirement to provide correctly formatted container handling in the region. The hinterland of the terminal will be the entire European markets served by means of road, rail, barge and sea-sea transshipment operations. The project represents a major commitment to the container sector and will become a valuable contribution to European port infrastructure.

Extensive analysis has been developed concerning the development of this project since 1999 and this paper should be reviewed in the context of earlier studies developed by Ocean Shipping Consultants Ltd¹. This paper provides a complete update of the development of demand for container handling in the region and also assesses the provision of capacity and the resulting supply/demand balance. It is concluded that the WCT investment will provide a competitive contribution to forecast container port demand in the period to 2020 and beyond.

In developing this analysis the following important questions are answered with regard to the WCT project and its role in the European container sector:

- How is regional container trade developing?
- Why should the terminal be developed?
- Will the terminal be competitive in the market?
- What are the alternatives to the WCT project?
- How has the market developed since 2001?
- How do these developments affect the WCT project?

The study develops an analysis of the comparative position of WCT versus other ports (and combinations of ports) and also provides a summary 'SWOT analysis' (strengths, weaknesses, opportunities and threats) for the project.

¹ 'Market Study – Vlissingen Container Terminals', March 1999, 'The Westerschelde Container Terminal – commercial feasibility study', May 2000, and 'WCT Vlissingen – a review of major issues', December 2001.

1.2 Conclusions

The paper draws the following major conclusions:

- *Container port demand has continued to develop very rapidly in the Immediate Market (the range of ports between Dunkirk and Amsterdam). Within this market, demand has continued to be concentrated on the Antwerp-Rotterdam zone. These trends are forecast to continue over the study period. The addition of a new terminal at Vlissingen (with its deepwater capabilities) would offer considerable complementary opportunities for linking strong levels of Antwerp traffic with Asian cargo flows. The terminal would also constitute a major deepwater alternative to Rotterdam that would be very well suited to the current and anticipated balance of demand in the region. Analysis confirms that there will be sufficient room in the market for the proposed terminals at both Rotterdam (Maasvlakte II and Euromax) and Vlissingen.*
- *Strong and robust growth has been identified for the North Continent² market as a whole. Within the region, the Immediate Market will maintain market share and demonstrate sustained expansion across a range of economic conditions. Within the demand that will be so generated, the greatest growth will be noted in the deepsea and transshipment sectors – with specific reference to the Asian trades. These sectors will be dominated by larger classes of vessels where terminal and access water depth will be critical. The WCT project is correctly configured to meet this changing demand base.*
- *Since our earlier analysis the pace of demand growth has accelerated and the trend towards the introduction of larger vessels has also proceeded even more rapidly than had been anticipated.*
- *Considerable capacity additions are scheduled for the North Continent range in general and the Immediate Market in particular. If these proceed on the schedules estimated there will be a decline in capacity-utilisation rates in the period over 2007-2008, although it is anticipated that current utilisation rates will be re-approximated by 2012.*
- *The relative advantages of WCT – principally its deepwater and low transit costs – indicate that a significant requirement for the project will be noted against this background. This suggests that the balance at WCT will be significantly more favourable than in the total market.*
- *Without these investments only Rotterdam will have a major role for the Immediate Market and there are questions over the ability of the port to deliver capacity within the required timeframe following the completion of current projects. Of course, Antwerp will also play a major role but with a somewhat different emphasis – particularly with regard to the transshipment sector.*

² In this study the following regions are defined for the container port market:

- 'North Continent' – includes all containers moved through ports in the range between Le Havre and Hamburg.
- 'North European Region' – includes all containers moved through ports in the North Continent, together with the UK/Ireland and Scandinavia/Baltic regions.
- 'The Immediate Market' – is defined as containers moved through ports between Dunkirk-Amsterdam. This includes Dunkirk, Zeebrugge, Antwerp, Rotterdam, Amsterdam and (potentially) Vlissingen.

- *This paper provides an updated analysis of the competitive position of WCT as a location for container handling from a variety of perspectives and the position is clearly one of a very positive market position. This is reviewed from the viewpoints of:*
 - *Marine access and capacity considerations;*
 - *The location of the terminal in relation to its hinterlands;*
 - *The costs of transiting the facility;*
 - *The productivity of the terminal;*

- *WCT is seen to score very positively in each sector. The terminal is seen to be highly competitive with regard to marine access considerations (especially with regard to the next generation of vessels), and will offer effective and competitive through-costs and intermodal linkages. In addition, the transfer of established productive stevedoring by Hesse-Noord from Antwerp should result in a highly competitive productivity level.*

- *The facility will enjoy a broad sea and landside hinterland and will also be able to compete for the Antwerp and Rotterdam markets, given its relative proximity to both regions. The only slight difficulty relates to the lack of an immediate (or local) hinterland. This, by itself, need not be a problem given the highly competitive specification offered by the terminal as a whole.*

- *Vlissingen will be at least as competitive as Rotterdam and from some viewpoints will be the superior development. The Maasvlakte II project has now passed the most important stages of political decision-making, and is seen to be on schedule for commercial opening somewhere between 2010 and 2012. In the meantime, the Euromax terminal is also being developed, and set for a commercial start by (the end of) 2007, providing substantial additional capacity until Maasvlakte II is ready. This means WCT will enter the market right in the middle of the Rotterdam developments, and not well ahead of them, as was anticipated before. Despite these developments the clear market role of WCT is established.*

- *Given the delays with Maasvlakte II, it is apparent that there will be a lack of capacity for the largest vessel sizes by the end of the decade. This requirement will not be met within this timeframe by the proposed Maasvlakte II expansion. The WCT project will answer these problems. Indeed, WCT represents the only alternative to Maasvlakte II (over and above the Euromax project) that can be developed in time for anticipated demand growth. The Deurganckdok will also play a role but it will be less well suited to the transshipment market.*

There is a clear and pressing requirement for the development of new deepwater container handling capacity in the identified Immediate Market. The other suggested locations for development all involve considerable constraints with regard to marine access, costs and hinterland links. The proposed WCT facilities are seen to be highly competitive from each criteria of appraisal and will provide the required solution to deepsea regional container handling needs within an acceptable timeframe.

The development of market conditions since the earlier analyses have not significantly altered these conclusions. Indeed, faster demand growth, and a further acceleration in the introduction of larger vessels make the case for WCT even more pressing.

SECTION 2 – REGIONAL CONTAINER PORT DEMAND

2.1 Introduction

OSC have been evaluating the potential market role of a new deepwater container terminal at Vlissingen since 1999 and have developed a series of market analyses that evaluate the overall balance of the market and the potential future role of the terminal. This paper provides an update of the demand side of the equation and also assesses how the market has developed in contrast with our earlier projections. The issues that are here addressed are as follows:

- How has demand developed since 2001?
- How does this actual development compare to projections developed earlier?
- What major structural changes have been noted?
- How has the European economy developed and what are the implications for future demand growth?

The following analysis represents an update and revision of earlier projections of regional demand.

2.2 The Structure of Regional Demand

In this Section the review of the development of demand is considered from the following perspectives:

- The total development of demand in the entire Le Havre-Hamburg port range (the 'North Continent' market), and
- The narrower focus of competition between the Dunkirk-Amsterdam port range (the potential Vlissingen 'immediate Market').

How Fast is Container Port Demand Growing?

The total development of container port demand in the entire North European region (including the UK) reached a level of some 31.7m TEU in 2000. Between 1995/2003 total container volumes handled doubled, with this equating to an annual average growth rate of some 7.5 per cent. This has been achieved despite the limited economic expansion noted in much of the regional economy over 2000-2002. The globalisation of trade – i.e. the transfer of manufacturing to low cost suppliers – has been at the centre of this trend and containerisation has benefited from these developments.

Table 2.1 summarises the development of North European container port demand by national market within the region. Given the comparative economic maturity of the regional market, the proportional development of demand has recorded only limited alterations over the period, although the following points are of some significance:

Table 2.1
The UK/North Continent Lo-Lo¹ Container Port Handling Market 1990/2003

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
'000TEUs										
UK	3344.8	4629.6	4985.7	5357.8	5775.2	6224.5	6647.8	6610.5	6907.3	7011.1
France - N	1021.5	1161.4	1197.1	1349.3	1499.2	1622.7	1759.0	1822.4	2025.5	2265.3
Belgium	1794.0	2664.7	2983.3	3322.3	3701.6	4085.0	4600.8	4539.6	5143.8	5841.3
Netherlands	3734.9	4878.1	5107.6	5561.9	6054.6	6396.2	6337.1	6157.9	6575.2	7162.6
Germany - W	3166.8	4408.4	4607.0	5057.4	5392.9	6015.3	7054.7	7721.3	8475.3	9374.6
Total	13061.9	17742.1	18880.7	20648.6	22423.4	24343.6	26399.4	26851.7	29127.0	31655.0
Percentage										
UK	25.6	26.1	26.4	25.9	25.8	25.6	25.2	24.6	23.7	22.1
France - N	7.8	6.5	6.3	6.5	6.7	6.7	6.7	6.8	7.0	7.2
Belgium	13.7	15.0	15.8	16.1	16.5	16.8	17.4	16.9	17.7	18.5
Netherlands	28.6	27.5	27.1	26.9	27.0	26.3	24.0	22.9	22.6	22.6
Germany - W	24.2	24.8	24.4	24.5	24.1	24.7	26.7	28.8	29.1	29.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

- Following a period of sustained market share at between 25-26 per cent of regional demand, the role of the UK has recorded some contraction and is estimated at around 22 per cent in 2003. This has resulted from a lack of container port capacity that has resulted in the relocation of significant transshipment volumes to continental ports
- After years of under-achievement the market share of French ports has recorded some improvement since 2000 – largely as a result of the addition of new capacity at Le Havre. The future role of these terminals remains a significant uncertainty in the market. The degree to which this port will be competitive in the transshipment market will be dependent upon the pace of operational reform and not on the pace of physical capacity addition. It seems likely that competition from this source will become more significant in the medium term.
- The increase in market share of Belgian container terminals has continued, with demand (principally at Antwerp) seeing market share increase to 18.5 per cent in 2003. In 1995 the corresponding proportion was just 15 per cent. This represents a highly dynamic and important trend in the regional market that will have considerable implications for Vlissingen.
- The market share of Dutch container handling ports has declined over the period, but this was arrested in 2003. These ports now account for some 22.6 per cent of regional container handling demand.
- The re-establishment of the eastern European hinterland has been directly reflected in very strong demand growth in German container ports. The combined market share of Bremerhaven and Hamburg has increased steadily from 24.8 per cent in 1995 to some 29.6 per cent in 2003.

The overall position has been characterised by strong demand for the eastern ports and within the immediate Market Antwerp has recorded by far the most dynamic expansion.

¹ 'Lo-lo' refers to containers handled by gantry cranes and excludes (where possible) roll-on, roll-off container movements.

What is the Structure of this Demand?

Table 2.2 provides an overview analysis of the development of North Continent container volumes in terms of type. Three categories are here identified, which have each recorded distinct development over the period:

- Deepsea container movements include all direct container shipments between the European markets and other world trading regions.
- Transshipment and relay handlings constitute container movements between vessels – either as part of regional 'hub and spoke' distribution or as a relay operation between deepsea services.
- Intra-Europe container handling is generated by direct shipments between European markets and is sometimes undertaken at dedicated 'shortsea' container terminals.

Each of these market sectors (although related) is distinct and are driven by different factors. With regard to deepsea and transshipment volumes, the level of trade between Europe and distant economies is central in driving demand growth. This applies directly to deepsea operations and also funds transshipment demand. In the case of the latter, demand is a function not simply of underlying economic trends but also of shipping economics, the introduction of larger vessels and the comparative costs of direct versus transshipped delivery².

Table 2.2
North Continent Container Port Market by Type 1990/2003

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
000TEUs										
Deepsea	5502.7	7290.6	7772.6	8314.6	8974.1	9601.0	10383.0	10572.4	11206.0	12439.0
Transship./Relay	1973.2	3192.2	3342.9	3795.8	4201.2	4702.5	5184.1	5389.1	6140.1	6963.7
Inter-Europe	2241.2	2629.8	2779.5	3180.4	3473.0	3815.6	4184.5	4279.7	4873.6	5241.1
Total	9717.1	13112.6	13895.0	15290.8	16648.3	18119.1	19751.6	20241.2	22219.7	24643.8
Percentage										
Deepsea	56.6	55.6	55.9	54.4	53.9	53.0	52.6	52.2	50.4	50.5
Transship./Relay	20.3	24.3	24.1	24.8	25.2	26.0	26.2	26.6	27.6	28.3
Inter-Europe	23.1	20.1	20.0	20.8	20.9	21.1	21.2	21.1	21.9	21.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

In contrast, inter-European operations are a function of trade within the region, and this sector competes with other modes such as ro-ro shipping and longhaul intermodal and fixed link alternatives. As congestion worsens on European roads, this sector is increasingly being favoured at the policy level. From a port development viewpoint this does, however, constitute a distinct market.

Port demand generated by trade to/from distant markets (both directly and including transshipments) is the most significant demand sector. With regard to the North Continent market, the most important trend has been the progressive increase in the proportional importance of transshipment movements – increasing from under 24 per cent in 1995 to around 28.3 per cent in 2003. The total North Continent transshipment market now equates to nearly 7m TEU per annum – an annual average growth rate of 10.3 per cent. There is no indication that demand from this sector is slowing.

² The transshipment market is considered in detail in Task 2.

What is the Position in the Immediate WCT Market?

Against these background trends, attention is now focused on the development of the 'Immediate Market'. For this study, the core market for WCT terminals will be accounted for by shipments in the range of ports between Dunkirk and Amsterdam. The development of demand is summarised on a port-specific basis in Table 2.3.

This is – to some extent – an over-simplification, with WCT's hinterland also overlapping with that of Le Havre for the northern French markets and for the German ports in the Ruhr and eastern European zones. In addition, transshipment will be a major target area of the proposed WCT facilities and this is best understood from the regional (i.e. entire North European) perspective. This study addresses these issues by focusing on the Immediate Market and also developing a background analysis of the development of demand in the North Continent and transshipment markets as a whole.

Table 2.3
The immediate Market: Lo-Lo Container Handling Volumes 1990/2003

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
000TEUs										
Amsterdam	69.0	91.1	136.6	64.2	35.2	46.2	52.8	47.8	45.0	44.5
Rotterdam	3665.9	4787.0	4971.0	5495.0	6011.5	6341.8	6274.6	6096.1	6515.5	7106.8
Vlissingen				2.7	7.9	8.2	9.7	13.9	14.7	11.3
Antwerp	1549.1	2329.1	2653.4	2969.2	3265.8	3614.2	4082.3	4218.2	4777.2	5445.4
Zeebrugge	244.8	335.6	329.4	353.1	435.9	470.7	518.5	321.4	366.6	395.9
Dunkirk	70.4	70.9	54.2	65.7	81.2	107.3	148.5	150.6	160.8	161.9
Total	5599.2	7613.7	8144.6	8949.9	9837.5	10588.4	11086.4	10848.0	11879.8	13165.7
Percentage										
Amsterdam	1.2	1.2	1.7	0.7	0.4	0.4	0.5	0.4	0.4	0.3
Rotterdam	65.5	62.9	61.0	61.4	61.1	59.9	56.6	56.2	54.8	54.0
Vlissingen	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Antwerp	27.7	30.6	32.6	33.2	33.2	34.1	36.8	38.9	40.2	41.4
Zeebrugge	4.4	4.4	4.0	3.9	4.4	4.4	4.7	3.0	3.1	3.0
Dunkirk	1.3	0.9	0.7	0.7	0.8	1.0	1.3	1.4	1.4	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

Some very important trends emerge from a review of the port-specific data here detailed:

- The most significant trend has been the decline in the market share of Rotterdam's terminals. In 1990 these facilities accounted for nearly 66 per cent of all containers shipped in the Immediate Market. By 1995 this had fallen to 63 per cent but in 2003 the port accounted for just 54 per cent of regional demand.
- This decline in market share has been reciprocated by stronger demand growth in Antwerp. The port's market share has developed from 27.7 per cent to 41.1 per cent over the period.
- The other important point to note is that all other terminals – despite significant investment at each location – remain of marginal importance within the market. Clearly, the establishment of capacity is no guarantee of significant market share.

It is apparent that the development of WCT's market role will be dependent upon its competitive position in the regional market. It will be necessary to carefully define the role of

the terminal and to assess its competitive position directly against the major Rotterdam and Antwerp terminals – see Section 4.

The growth in the Immediate Market – and the balance of the North Continent zone – is further summarised in Figure 2.1. Here the dynamic nature of the market is well illustrated, with a very strong and broadly based development noted in both sectors. The proportional share of the Immediate Market within the broader port context remained remarkably stable over the period to 1999 at between 57/59 per cent. More recently, problems at Rotterdam – specifically the relocation of significant transshipment volumes by Maersk Sealand to Bremerhaven have complicated the position, with market share falling to around 53.5 per cent. This decline has now been arrested and it is forecast that current market share will be sustained over the forecast period.

For the entire period since 1995 growth in the Immediate Market has averaged some 7.2 per cent per annum. This includes the problematic year of 2001 when volumes actually declined. Since 2001 growth has averaged around 10.2 per cent. There was clearly a period of structural adjustment noted, but growth in the Immediate Market is now back on track.

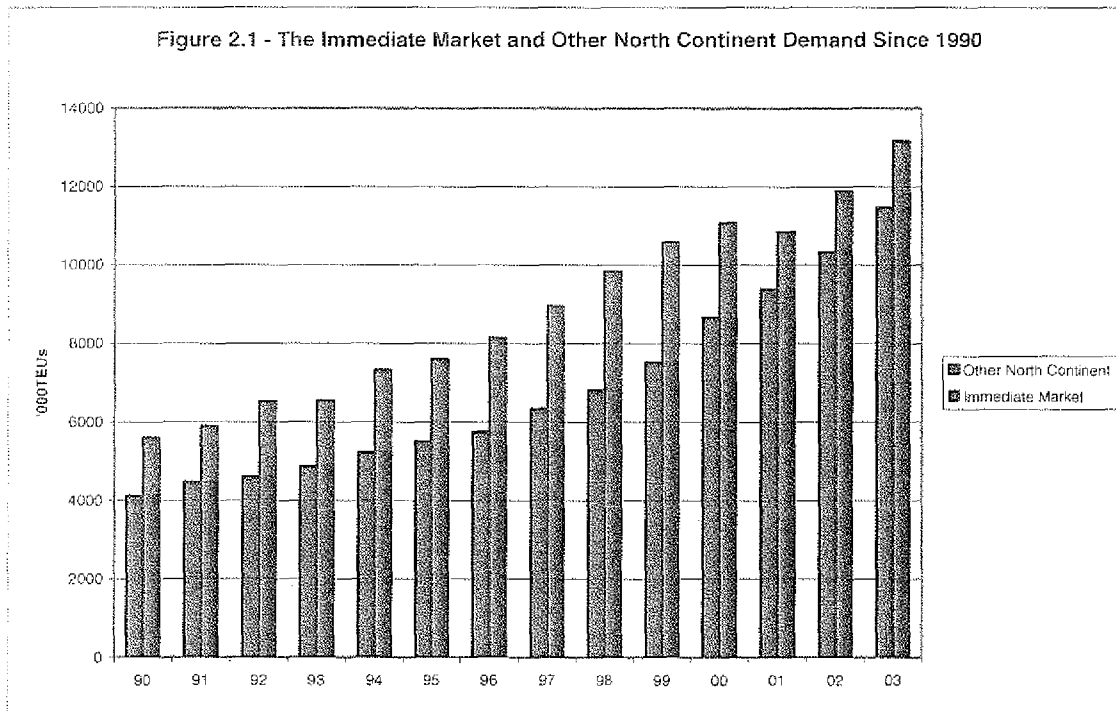


Table 2.4 summarises the development of demand by category in the Immediate Market. The development of demand in the Immediate market closely reflects the broader trends identified with regard to the entire North Continent market, although transshipment accounts for a smaller market share in this region and has grown less rapidly than for the market as a whole.

With regard to demand growth by type:

- Direct deepsea transshipment demand has expanded by 79 per cent since 1995 to reach a total of 7.82m TEU in 2003 – an annual average growth rate of 7.7 per cent. Following the uncertainty of 2001 demand has expanded very rapidly with an annual average rate of 11.7 per cent noted since then.

- Transshipment and relay demand has also increased rapidly – by 68 per cent – over the period and, an annual average growth rate of 6.9 per cent is noted. This sector is seen to be more volatile, with the switching of transshipment between UK and German ports being noted. Despite this, a very dynamic trend is recorded.
- Intra-European demand has been generally more limited in expansion. Since 1999 an average annual growth rate of around 5 per cent has been noted. In this sector, competition is between the major ports and also smaller capacity terminals and alternative modes (ferry, Channel Tunnel, etc.). As such this constitutes a distinct part of the market.

Table 2.4
Immediate Container Port Market by Type 1990/2003

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
000TEUs										
Deepsea	3510.7	4370.2	4675.0	5369.9	5577.9	6024.8	6341.4	6270.2	6914.0	7820.4
Transship./Relay	911.4	1369.2	1513.9	1730.7	1876.9	2020.0	2073.1	1844.2	2067.4	2292.6
Inter-Europe	1177.2	1874.2	1955.7	1849.3	2382.8	2543.6	2671.8	2733.7	2898.3	3052.7
Total	5599.2	7613.7	8144.6	8949.9	9837.5	10588.4	11086.4	10848.0	11879.8	13165.7
Percentage										
Deepsea	62.7	57.4	57.4	60.0	56.7	56.9	57.2	57.8	58.2	59.4
Transship./Relay	16.3	18.0	18.6	19.3	19.1	19.1	18.7	17.0	17.4	17.4
Inter-Europe	21.0	24.6	24.0	20.7	24.2	24.0	24.1	25.2	24.4	23.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

Table 2.5 provides a review of the development of deepsea container movements in the core market by region in the 1990/2003 period. In order to simplify the analysis at this stage the following definitions of deepsea cargo flows have been utilised:

- Far East – all (direct) shipments to/from markets ASEAN and other East Asian markets;
- North America – all (direct) shipments to/from the USA and Canada;
- Other Deepsea – all (direct) shipments to/from other non-European markets.

This provides a general indication of the levels of demand growth in the market as a whole.

By far the most significant trend has been the increased importance of the Asian trades within the overall port market. Since 1995, demand on these trades has increased by 118 per cent to reach a total of 3.7m TEU. This equates to an annual average growth rate of 10.4 per cent (even given the market contraction noted in 2001). The Far East markets accounted for some 47.5 per cent of all deepsea containers handled in the region in 2003. This is a continuing trend of major importance and it is on these trades that the largest ships are deployed.

It should also be noted that deepsea demand with other regions has also been dynamic, with an annual average growth rate of 5.7 per cent and 5.6 per cent noted on North American and 'Other Deepsea' trades, respectively.

Table 2.5**Immediate Market - Deepsea Container Throughput by Trading Zone 1990/2003**

	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
000TEUs										
Far East	1193.6	1704.4	1907.4	2319.8	2510.0	2699.1	2866.3	2840.4	3180.5	3714.7
North America	1235.8	1315.4	1365.1	1503.6	1478.1	1626.7	1699.5	1692.9	1853.0	2033.3
Others	1081.3	1350.4	1402.5	1546.5	1589.7	1699.0	1775.6	1736.8	1880.6	2072.4
Deepsea	3510.7	4370.2	4675.0	5369.9	5577.9	6024.8	6341.4	6270.2	6914.0	7820.4
Percentage										
Far East	34.0	39.0	40.8	43.2	45.0	44.8	45.2	45.3	46.0	47.5
North America	35.2	30.1	29.2	28.0	26.5	27.0	26.8	27.0	26.8	26.0
Others	30.8	30.9	30.0	28.8	28.5	28.2	28.0	27.7	27.2	26.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

This overview of the structure of regional demand reveals several major points about the position of regional ports:

- Demand has continued to be concentrated at the major terminals in the Antwerp-Rotterdam zone. Secondary facilities have failed to develop a significant market role.
- The relatively low costs and high productivity have been very successful in boosting the market role of Antwerp in regional deepsea flows, despite the time penalties of Scheldt transit.
- Antwerp is fairly limited in the Asian trades, with this being partly a function of less than optimum water depth for the largest vessels on these trades.
- The addition of a new Scheldt terminal (at Vlissingen) would offer considerable complementary opportunities for linking strong levels of Antwerp traffic with Asian cargo flows.
- This would constitute a major deepwater alternative to Rotterdam and the terminal would be well suited to the current and anticipated balance of demand in the region.

2.3 Actual Demand v. Projected Demand Growth

A period of 2.5 years has elapsed since the last detailed forecasts of demand for the proposed terminal were prepared. During that period the economy of the EU in general has recorded disappointing growth and there has been some considerable uncertainty at the world level. It is now possible to review how the market has actually developed since then with the forecasts developed at that time. The results are summarised in graphic terms in Figure 2.2.

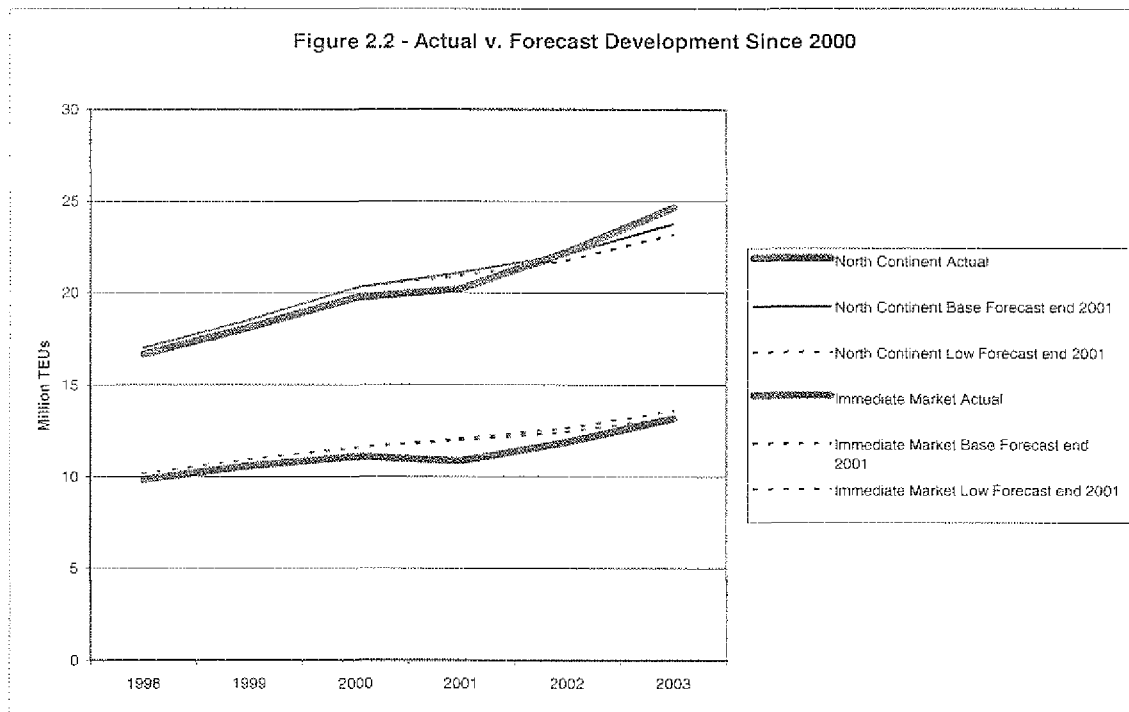
Several points emerge from this analysis:

- More data has become available in the past two years with regard to the role of ro-ro demand within the regional market. In this analysis ro-ro container handling has

been excluded, where possible, from the analysis. This means that the base data is somewhat lower than had previously been assessed³.

- Despite this adjustment, with regard to the development of demand in the entire North Continent market total demand exceeded that forecast in 2001. In 2003 total volumes reached 24.6m TEUs – some 3.7 per cent higher than originally forecast in the Base Case.
- With regard to the Immediate Market, total volumes are somewhat less than projected – but this is partially due to the re-basing of the data to exclude ro-ro operations. In terms of proportional increase the actual development of demand in 2003 was seen to be 18.7 per cent higher than in 2000. This contrasts to our earlier projection of an increase of 17.2 per cent.
- The earlier forecasts were designed to represent average growth rates. As such, the earlier understated the impact of the economic slowdown of 2001 but are now back on track.

It can be concluded that our earlier methodology represented a valid approach to forecasting demand, and attention is now directed towards providing an updated view of potential developments on the basis of macro-economic and shipping-specific factors.



2.4 Forecast Demand Growth

In considering the future development of container port demand – and thus the potential market for WCT – the most important question to answer must be 'what are the fundamental forces that are driving demand growth?'. Furthermore, has the recent period of dramatic

³ This is specifically relevant to the role of Zeebrugge in the Immediate Market. Data for this port now excluded ro-ro containers.

demand increases been the result of a specific special market situation or will recent demand growth trends continue into the forecast period?

The primary characteristic of regional container port demand is its relation to trade volume to/from and within the EU markets. Global trade in manufactured goods represents the natural constituency of containerisation. These inter-regional flows have driven the development of deepsea and transshipment demand in the European ports – these sectors are central to demand in the Immediate Market. There are additional demands for intra-European movements of containers but these are of far more restricted importance. In looking to the future it is apparent that as long as inter-regional trade grows – the continuing 'globalisation' of the world economy – then container volumes and port demand will continue to expand rapidly.

Throughout the period since the mid-1980s the expansion of the OECD economies has been directly linked to inter-regional trade growth. This relation between economic growth and trade volumes is fundamental to an understanding of the development of the container market in northern Europe.

This Section proceeds to:

- Summarise the relation between economic growth and trade volumes in the EU market.
- Detail the longer term linkages between economic growth and container port demand – both in the broader North Continent market and in the Immediate Market.
- Summarise the macro-economic outlook for the region under review.
- Apply the established relations to container flows in order to define potential demand growth.
- Assess how the current projection of regional demand compares with the earlier forecasts.

Table 2.6 utilises OECD and IMF-produced data to contrast the development of total GDP and regional port demand over the period since 1986. The quantification of trade volumes utilises gross year-on-year import volumes. Although this includes transfers of services as well as goods (and is thus only indirectly comparable with container trade volumes) the general relation between the two variables is of some relevance.

The general position may be characterised as follows:

EU economic development over the period has been partly funded by the increased integration of the economy into world trade patterns. There is seen to be a direct quantifiable link between year-on-year economic growth and overall trade volumes. Total trade volumes are, in turn, linked to containerised goods flows. There is, therefore, a methodological link between the two key variables – GDP development and container port demand.

The overall period has been characterised by sustained economic expansion, but during periods of economic contraction or slowdown – as was noted in Europe over 1993 and has been noted over 2002 and 2003 – there was seen to be a considerable contraction (or slowdown in the pace of expansion of) total import volumes. The subsequent economic upturns have been reflected in very strong renewed growth in trade. However, the dynamism of the container trade sector saw limited growth maintained for these cargoes during this period.

A further trend has been the rapid increase in trade to/from the Asian markets – especially China. This process of 'globalisation' has been the most significant economic trend impacting on long-haul container trades in the past five years and has resulted in trade volumes continuing to expand rapidly despite the slower economic growth. This is likely to continue in the coming period and will generate even greater demand growth. The implications of this are complex and are considered in the following forecast analyses. This represents a significantly increased medium term demand potential.

Table 2.6

North Europe: Economic Development and Container Port Demand 1986/2003

- annual percentage change

	EU GDP Growth	Import Volumes - Total	Total Container Port Demand	Deepsea & Trans shipment Demand	Import/Export Demand
1986	2.8	6.1	5.4	3.2	3.8
1987	2.2	7.6	7.4	5.2	2.7
1988	4.2	7.9	10.5	10.3	10.1
1989	3.5	8.5	5.0	8.0	7.6
1990	3.0	6.3	3.2	6.5	3.0
1991	1.7	4.0	6.2	8.6	5.6
1992	1.1	3.6	6.7	7.6	6.8
1993	-0.4	-3.3	4.6	4.8	0.6
1994	2.8	7.8	10.7	9.2	8.4
1995	2.4	7.2	5.3	5.3	4.0
1996	1.7	3.9	6.4	6.0	6.4
1997	2.6	8.9	9.4	9.0	8.9
1998	3.0	9.3	8.6	8.8	8.3
1999	2.7	7.5	8.6	8.6	7.8
2000	3.4	9.5	8.4	8.8	8.6
2001	1.7	2.1	1.7	2.5	2.0
2002	1.1	0.7	8.5	8.7	8.3
2003	0.7	0.9	8.7	11.9	10.0

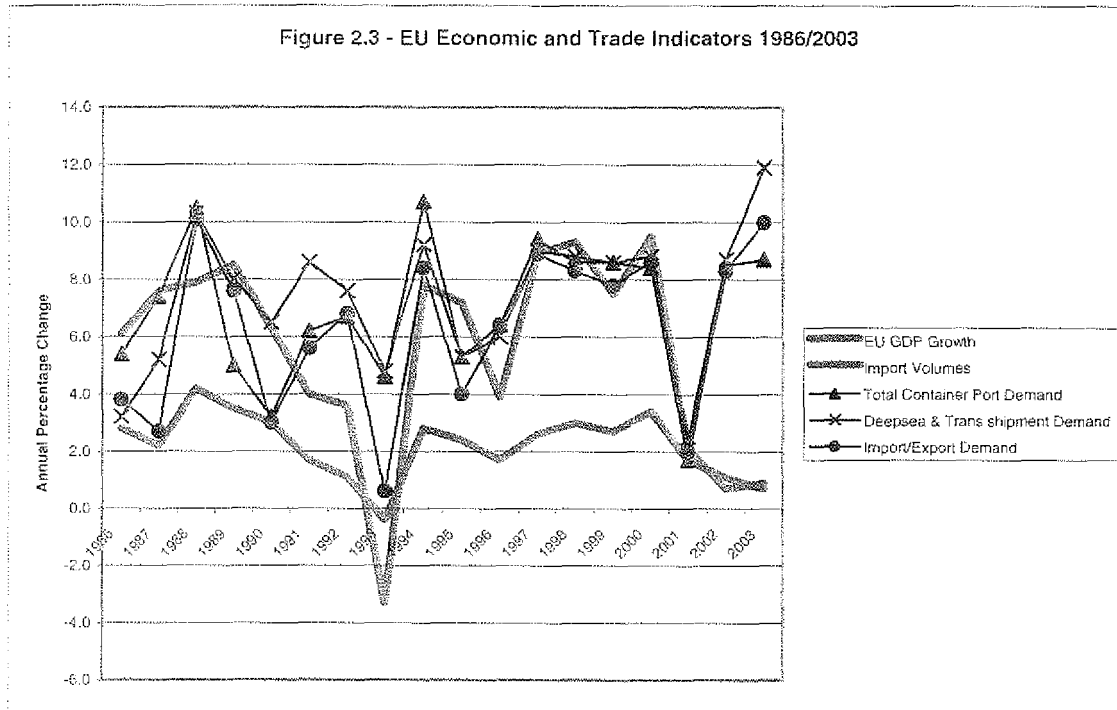
Source: IMF/OECD/Ocean Shipping Consultants Ltd.

Of course, OECD data is collated at the national level and therefore fails to distinguish between trade within the EU and with external trading partners. As has already been stated, container flows are *primarily* determined by the flows of goods to/from the EU from other global regions.

Figure 2.3 provides some further illustration of the development of the following important annual variables over the longer-term period:

- EU GDP growth – real percent per annum;
- Total EU import volumes (real annual development – percent per annum);
- Total container port demand – all containers handled (TEUs) percent per annum;
- External trade – deepsea and half of container transshipment (TEUs) percent per annum;
- Total import/export demand – deepsea and intra-Europe volumes (TEUs) percent per annum.

It is apparent from this analysis that there is a relationship between the development of the regional economy, total trade flows and also – most importantly – the development of extra-regional trade volumes in the containerisation sector. As long as trade grows broadly in both the intra- and extra-EU sectors, then this relationship will be central to projection of future container flows. It must be noted at this stage that there has been no slowdown in the relative pace of demand growth in the extra-EU sector – despite the rapid integration of the EU national economies since 1992. Indeed, external EU trade has expanded more rapidly.



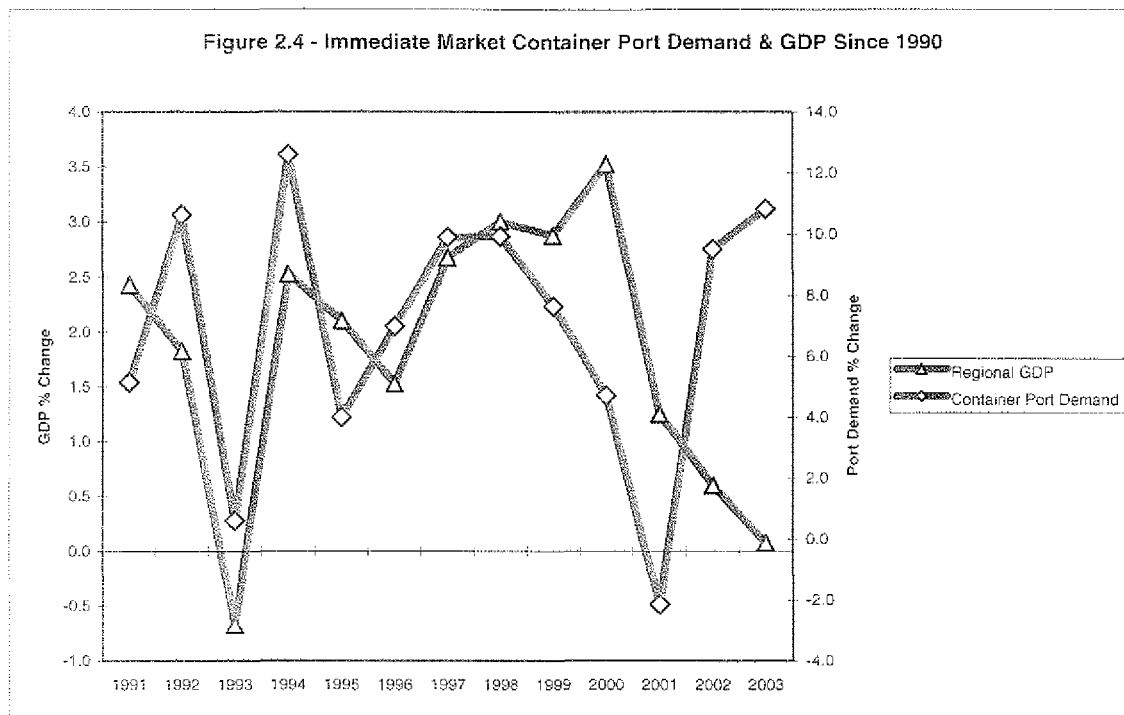
For the time horizon of the current study – to 2020 – the future growth in the EU will be intimately linked with trade volumes between member states and also with external goods flows. It is regarded as extremely unlikely that extra-EU flows will suffer unless a highly protectionist policy is applied. Under such circumstances the overall level of growth would also be adversely affected.

This relation between GDP and trade is thus very useful in forecasting the development of the container sector. Over the period as a whole it is apparent that trade has increased at a rate in excess of the volume of year-on-year GDP development. The fundamental trade-driven nature of the EU economy will continue to emphasise this relationship.

Given the importance of the GDP/container trade relationship to analysing aggregate potential for Antwerp, it is worth looking at this in some more detail. Figure 2.4 focuses attention on the relation between GDP in the immediate Market and the year-on-year growth in container port demand for this market. Such an analysis is, of course, an oversimplification – especially insofar as the hinterland of these ports extends considerably beyond the local region. However, some important points emerge from this exercise:

- There has been a close directional and proportional relation between these two variables;
- This relation has been sustained throughout the period since 1990 and was noted even during periods of economic contraction;
- There has been a gradual decrease in the intensity of the relation between GDP and port demand in the region over most of the period.

The development of container port demand has been somewhat anomalous over 2002 and 2003, with this resulting from a strong recovery in demand following a highly uncertain and problematic 2001. This was due to specific difficulties in Rotterdam and underlines the general and medium term nature of this relation. Further, very strong demand growth has been noted despite sluggish economic expansion. This is also a manifestation of the globalisation effect and seems certain to result in a significant medium term further boost to demand growth.



The development of the relation is further detailed in Table 2.7 which summarises the trend in the relation between GDP and port demand for the North Continent market in the period since 1986 and forecast over the period to 2020. The general trend has been one of a decline in intensity, although some significant annual fluctuations are noted in this trend. Clearly, there has been a decline in the intensity of the relation, although this has begun to level off since the late 1990s.

Table 2.7

The Ratios Between Annual EU GDP Growth and N. Continent Container Port Demand Growth

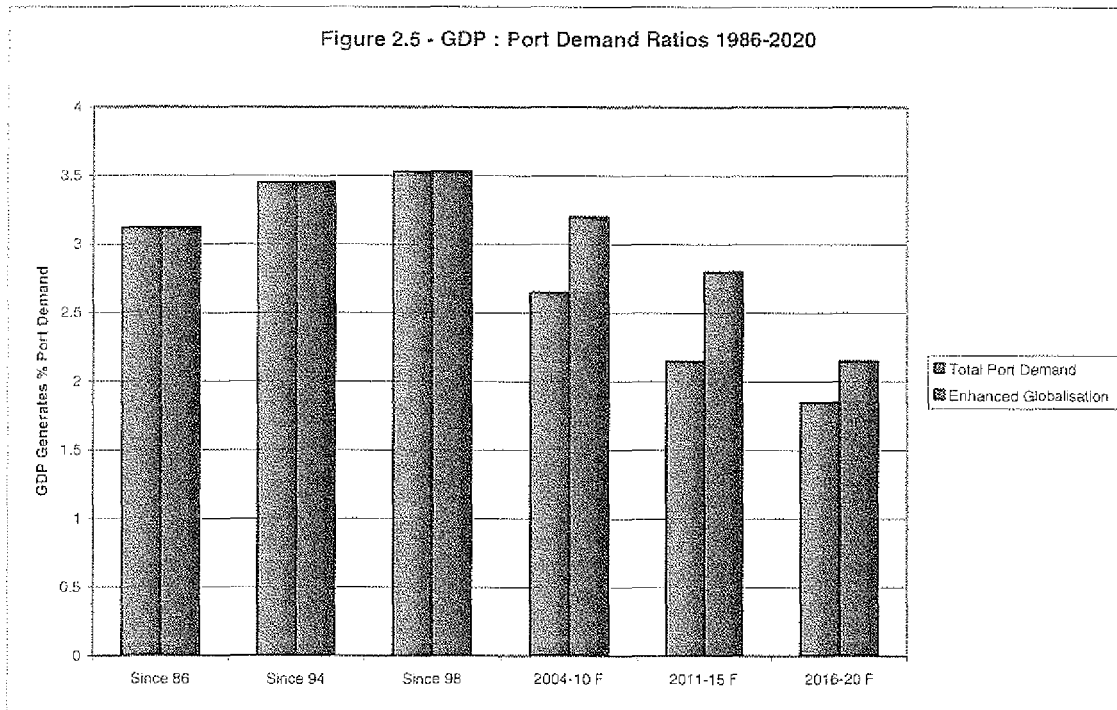
	GDP : Total Port Demand	GDP : Deepsea/ Feeder Port Demand	GDP : Import/Export Port Demand	GDP : Total Port Demand - Enhanced Globalisation
Since 1986	1 : 3.12	1 : 3.31	1 : 2.81	1 : 3.12
Since 1994	1 : 3.45	1 : 3.57	1 : 3.29	1 : 3.45
Since 1998	1 : 3.53	1 : 3.91	1 : 3.57	1 : 3.53
Forecast 2004/2010	1 : 2.65	1 : 2.75	1 : 2.45	1 : 3.20
Forecast 2011/2015	1 : 2.15	1 : 2.30	1 : 2.20	1 : 2.80
Forecast 2012/2020	1 : 1.85	1 : 3.15	1 : 2.05	1 : 2.15

Source: Ocean Shipping Consultants Ltd.

The pace of this decline in intensity is an extremely difficult subject. On the one hand there is clear scope for continued transfer of European manufacturing to the East Asian markets (specifically China), and this will follow automatically from the lower production costs of the region and the extremely low transport costs offered by containerisation. From the other perspective, the ability of the OECD nations to continue funding massive import surpluses will become problematic at some stage. A review of the situation in North America where wealth – interpreted in terms of Purchasing Power Parity – is considerably greater than in the EU and would indicate that the hinterland of the North European ports still has much further to expand.

In order to capture this uncertainty, an additional case has been generated that stresses the central position of globalisation for regional demand growth. The main cases of this study assume a decline in the intensity of the relation progressively over the forecast period. However, if globalisation continues at current levels for a further five-year period a significantly higher demand profile is generated. This is labelled the 'Enhanced Globalisation' case.

The historic and forecast nature of this relation is further summarised in Figure 2.5.



The current analysis proceeds by presenting a summary of the development of the major economies of OECD Europe that will continue to generate the Immediate Market hinterland in the forecast period. The resulting run of underlying average growth rates is thus utilised in analysing the relationship between trade and GDP on a sub-regional basis.

Regional Economic Development

Table 2.8 summarises the development of the GDP of the major continental economies (and the UK) for the period since 1990.

Table 2.8
North Continent/UK GDP Development 1990/2003
 - annual percentage change

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Germany	5.7	5.0	2.2	-1.1	2.3	1.7	0.8	1.4	2.0	1.8	3.0	1.0	0.2	0.0
Netherlands	4.1	2.3	2.0	0.8	3.2	2.3	3.0	3.8	4.3	3.7	3.5	1.2	0.2	-0.5
Belgium	3.0	1.6	1.6	-1.5	2.7	2.6	1.2	3.6	2.2	3.0	4.0	0.7	0.7	0.7
France	2.5	0.8	1.5	-0.9	1.9	1.8	1.1	1.9	3.5	3.0	3.6	2.1	1.3	0.1
UK	0.4	-1.5	0.1	2.5	4.7	2.9	2.6	3.4	3.0	2.1	3.0	2.1	1.7	1.9
EU	3.0	1.6	1.2	-0.4	2.8	2.4	1.7	2.6	3.0	2.7	3.4	1.7	1.1	0.7
EU Index	100.0	101.6	102.8	102.4	105.3	107.8	109.6	112.5	115.9	119.0	123.0	125.1	126.5	127.4

Source: OECD/IMF

The major development that has been noted since our earlier analysis has been the severe slowdown noted over 2002 and 2003. This followed on from a period of very strong and robust economic expansion in the northern EU, which was initiated following the recovery in 1994. The average EU growth was placed at some 3.4 per cent in 2000 but has since fallen back to around 1.1 per cent in 2002 and just 0.7 per cent in 2003. This represents a severe downturn in economic fortunes but projections indicate a period of renewed growth.

Table 2.9
North Continent Trade Indicators 1993/2003
 - annual percentage change

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Germany											
Imports	-5.4	7.3	5.9	3.1	8.4	8.6	8.5	10.0	1.2	-1.6	2.9
Exports	-5.5	7.6	5.7	5.1	11.3	7.0	5.6	13.2	6.1	3.4	0.3
Netherlands											
Imports	-4.4	8.0	6.3	3.5	5.7	6.0	6.3	9.4	2.4	-0.2	-0.5
Exports	6.0	6.8	5.8	3.4	6.2	7.0	5.4	9.5	1.7	0.1	-0.5
Belgium											
Imports	0.6	3.1	7.3	5.0	6.4	6.8	4.1	9.7	1.1	1.1	-0.2
Exports	6.7	10.1	8.5	4.7	6.6	6.9	5.0	9.7	1.3	0.8	-1.3
France											
Imports	-3.7	8.2	7.7	1.6	6.2	12.1	4.2	15.4	1.4	0.8	1.2
Exports	0.0	7.7	7.4	3.5	10.7	8.8	3.9	13.3	1.8	1.3	-2.2
UK											
Imports	3.2	5.4	5.5	9.1	9.2	8.8	8.9	10.9	4.5	3.6	1.1
Exports	3.9	9.2	9.5	7.5	8.6	2.6	5.4	10.3	2.5	-0.9	-0.9
EU											
Imports	-3.3	7.8	7.2	3.9	8.9	9.3	7.5	9.5	2.1	0.7	0.9
Exports	1.2	8.8	8.0	4.7	9.9	6.2	5.2	12.8	2.7	0.9	-0.9

Source: IMF/OECD/OSC Ltd.

Difficulties in the German economy have been at the centre of these developments, with the failure to address structural problems and lack of flexibility in the economy severely curtailing overall EU economic expansion. The pace of GDP increase has been marginally more positive in France and – to a lesser extent – in Belgium. In general terms overall economic expansion has been maintained but only at a below trend level over 2002 and 2003.

Table 2.9 focuses on data sourced primarily from the OECD with regard to trade volume growth (including intra-EU flows). Once again, the pace of recovery noted since 1993 has been the most significant factor for the period as a whole but – as is to be expected – a slowdown in trade expansion has been noted in the period since 2000. Imports have maintained a faster growth rate than exports over the period, with this reflecting the continuing importance of Asian sourced imports for the EU economy. The overwhelming beneficiary of this expansion has been the container trade sector.

Forecast Economic Development to 2020

The rationale for core forecasts of regional container port demand have been analysed at length in earlier studies and it is not necessary to recapitulate these arguments. In the current paper the primary aim is to update the macro-economic forecast in the short-medium term and to work through the effects of these developments on forecast port demand. Also, the horizon of these forecasts has been extended to 2020.

Table 2.10

Forecast GDP Developments to 2020

- annual percentage change

	2004	2005	2006-10	2011-15	2016-20
Base Case					
Germany	1.4	2.3	2.0	2.1	2.0
Netherlands	1.0	2.0	2.2	2.1	2.0
Belgium	1.9	2.8	2.4	2.1	2.0
France	1.7	2.4	2.2	2.1	2.0
<i>Immediate Market</i>	1.5	2.4	2.2	2.1	2.0
UK	2.7	2.9	2.3	2.3	2.2
EU	1.9	2.5	2.2	2.1	2.0
Low Case					
Germany	1.4	2.3	1.8	1.9	1.9
Netherlands	1.0	2.0	2.0	2.0	1.9
Belgium	1.9	2.8	2.2	2.0	1.9
France	1.7	2.4	2.0	2.0	1.9
<i>Immediate Market</i>	1.5	2.4	2.0	2.0	1.9
UK	2.7	2.9	2.1	2.1	2.0
EU	1.9	2.5	2.0	2.0	1.9

Source: OECD/OSC Ltd.

Table 2.10 presents a summary of the most recent forecasts for OECD economic development for the near term period to end-2005. The tabulated data also includes a framework of potential economic development for the balance of the period to 2020. This has been identified as a Base Case (the most likely outcome when viewed from the current perspective) and also a Low Case,

The pace of recovery from the current slowdown in the EU is the major uncertainty. Core forecasts indicate an EU expansion of 1.9 per cent in 2004 and 2.5 per cent in 2005. The range of subsequent development places average growth rates at around 2.2 per cent through to 2010 and then some decline to around 2 per cent per annum over the balance of the study period. This represents a stabilisation at growth rates somewhat slower than those noted in the 1990s.

Regional Container Port Demand Develop to 2020

The effect of these revised developments on core demand forecasts has been defined. The approach is to initially forecast the range of demand in the total North Continent port market and then to assess the level of demand that will be handled in the immediate zone. This has been calculated on the basis of maintenance of market share for these terminals within the North Continent. The recent declines in the role of the Immediate Market within the North Continent range have resulted primarily from uncertainties at Rotterdam and some capacity constraints in Antwerp. This period is now passed and it is reasonable to assume that current market shares will be sustained. This should be seen as a cautious assumption as there is some potential for a further increase in market share for these ports.

The broad macro-economic framework detailed in this study underlines the generally very positive outlook for regional port demand. Table 2.11 provides a summary of the forecast development of total North Continent port demand on an annual basis to 2020.

Three cases are identified:

- The Base Case – currently regarded as the 'most likely' outlook.
- The Low Case – which introduces more restricted GDP expansion into the forecasts.
- The Enhanced Globalisation Case – which takes the Base Case economic projections together with a more intense development of container port demand for the deepsea and transshipment sectors.

Under the Base Case economic conditions it is estimated that between 2003/2010 total regional port demand will increase by some 47 per cent to reach a total of 36.2m TEU. This expansion will continue, and a further demand increase of 50 per cent will be noted to 2020. Even under the Low Case economic conditions, strong demand growth over these periods of some 43 per cent and 47 per cent, respectively, is forecast.

It is apparent that there are very strong and sustained increases anticipated even if the overall pattern of demand growth identified since the 1990s is extrapolated in line with the assumptions here identified. There is seen to be significant additional 'upside' to these projections, however. If globalisation continues to accelerate and have the same impact on total trade volumes, then there is clear scope for greater demand generation within the same overall level of economic expansion. Under the Enhanced Globalisation case demand will increase by around 59 per cent in the period to 2010 and then demonstrate a further expansion of 68 per cent over the balance of the forecast period.

It is not clear exactly how this situation will develop, but it is apparent that further demand growth could potentially be realised. The need to include such a scenario represents a significant modification over our earlier analyses.

Demand under each of these scenarios is further analysed in terms of type, and from this perspective some significant modifications are apparent. Firstly, direct deepsea demand will largely increase its market share over the period to 2005, despite the increasing volumes of transhipped containers. Under the Base Case, deepsea traffic is set to increase from 12.4m TEU in 2003 to around 19.1m TEU in 2010 and then has the potential to reach nearly 30m TEU at the end of the study period.

These increases will also be mirrored in the closely linked feeder sector. It is anticipated that North Continent transshipment demand will reach nearly 10m TEU in 2010 and then 14.6m TEU in 2020. This development will be funded by increased vessel sizes, further moves towards port concentration and rationalisation and the far greater use of relay operations between deepsea vessels linking major arterial trades.

Table 2.11
Forecast North Continent Container Port Demand to 2020
 - million TEUs

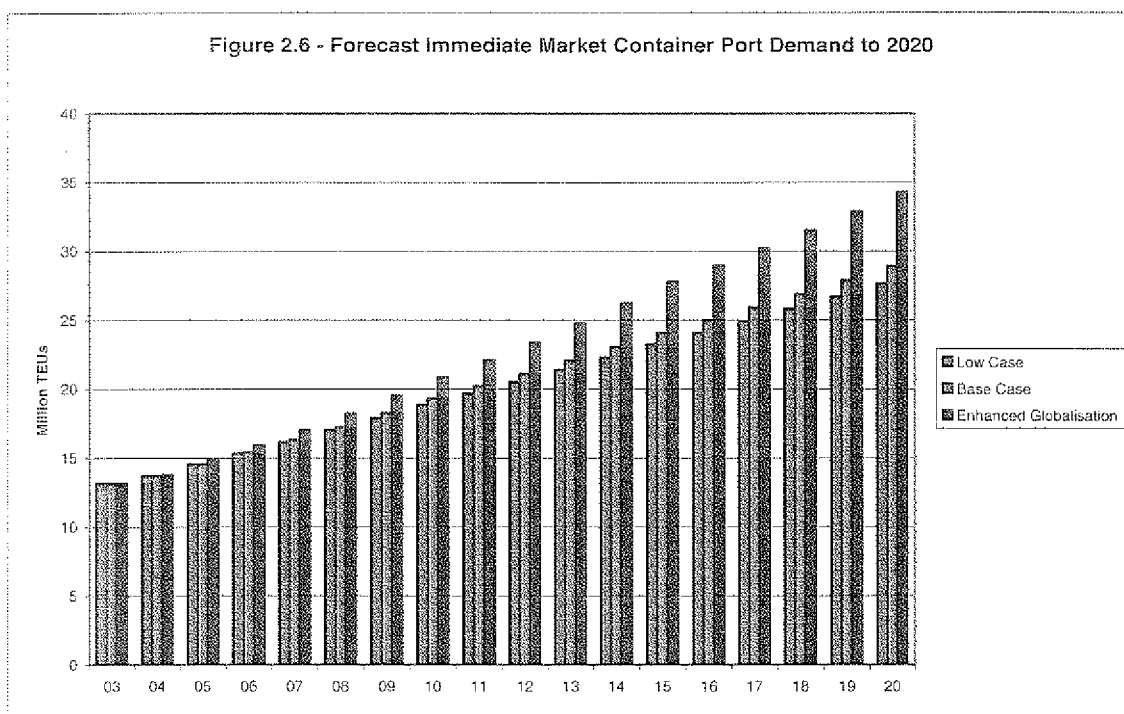
	Deepsea	Inter Europe	Transshipment	Total
Base Case				
03	12.44	5.24	6.96	24.64
04	13.02	5.39	7.21	25.62
05	13.94	5.67	7.64	27.25
06	14.85	5.94	8.06	28.84
07	15.81	6.22	8.49	30.52
08	16.84	6.51	8.95	32.30
09	17.94	6.81	9.44	34.19
10	19.10	7.13	9.95	36.18
11	20.12	7.34	10.36	37.81
12	21.18	7.55	10.79	39.52
13	22.30	7.77	11.23	41.30
14	23.48	7.99	11.70	43.17
15	24.72	8.21	12.18	45.12
16	25.66	8.50	12.63	46.79
17	26.63	8.79	13.10	48.52
18	27.63	9.10	13.58	50.31
19	28.68	9.41	14.09	52.18
20	29.76	9.74	14.61	54.11
Low Case				
03	12.44	5.24	6.96	24.64
04	13.02	5.39	7.21	25.62
05	13.94	5.67	7.64	27.25
06	14.77	5.91	8.02	28.70
07	15.65	6.16	8.41	30.22
08	16.59	6.41	8.82	31.82
09	17.58	6.68	9.25	33.51
10	18.63	6.95	9.70	35.28
11	19.58	7.14	10.08	36.80
12	20.57	7.33	10.48	38.38
13	21.62	7.53	10.89	40.03
14	22.71	7.72	11.32	41.75
15	23.87	7.93	11.76	43.55
16	24.72	8.19	12.17	45.08
17	25.61	8.46	12.60	46.66
18	26.53	8.73	13.04	48.30
19	27.48	9.02	13.50	50.00
20	28.47	9.32	13.98	51.76
Enhanced Globalisation				
03	12.44	5.25	6.96	24.64
04	13.17	5.33	7.33	25.83
05	14.32	5.56	7.93	27.81
06	15.48	5.76	8.53	29.77
07	16.73	5.96	9.18	31.86
08	18.07	6.17	9.87	34.11
09	19.53	6.37	10.61	36.51
10	21.10	6.57	11.41	39.08
11	22.53	6.78	12.07	41.38
12	24.05	7.00	12.76	43.81
13	25.67	7.22	13.49	46.39
14	27.40	7.45	14.26	49.11
15	29.25	7.67	15.08	52.00
16	30.75	7.76	15.73	54.24
17	32.33	7.83	16.40	56.57
18	33.98	7.91	17.11	59.00
19	35.72	7.97	17.85	61.54
20	37.55	8.02	18.61	64.18

Source: Ocean Shipping Consultants Ltd.

The Low Case applies these same proportional market shares to the lower demand growth generated under these conditions and the results are also detailed in Table 2.11.

With Enhanced Globalisation it is clear that considerably more rapid demand is anticipated for both the deepsea and transshipment market sectors. It is also important to note that, under this scenario, the pace of inter-European container trade growth is much slower, with globally sourced manufactured goods partially displacing regional production. This case represents a sharp acceleration in deepsea and transshipment traffic, with this having considerable implications for a project such as WCT.

Although these general trends are important, it is also necessary to identify the specific outlook for the Immediate Market. The position for these ports is detailed under each case in Figure 2.6.



It is anticipated that the Immediate Market will maintain market share within the overall North Continent market as a whole, although the relative importance of deepsea, transshipment and local cargoes will differ significantly.

Once again, it is clear that the Base Case and Low Case generate a significant demand increase, and the difference between these alternatives is limited. The Enhanced Globalisation scenario provides considerable addition potential for the regional ports.

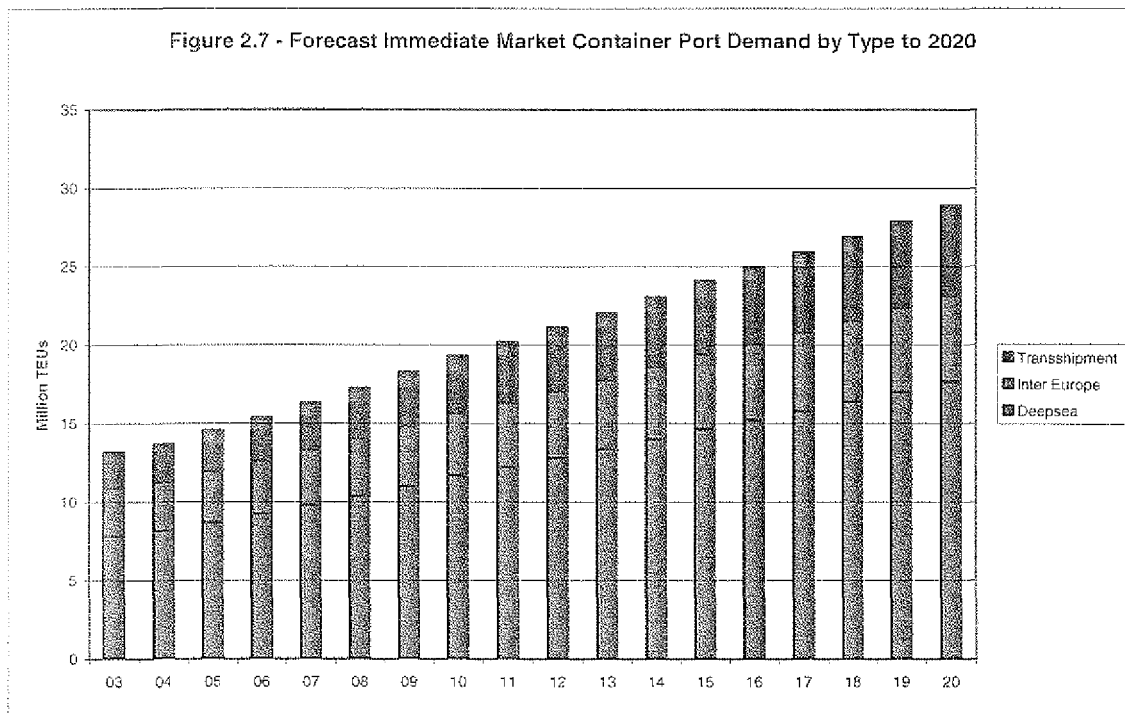
Table 2.12 provides the most important assessment of the market for WCT as it focuses on the development of the immediate regional demand. Under Base Case conditions total demand is forecast to reach 19.3m TEU in 2015 and then grow steadily to 28.9m TEU in 2020. There will be some shift in favour of transshipment and deepsea volumes within this total but the general balance of demand by sector is forecast to remain fairly stable. Somewhat slower demand growth is identified under the Low Case scenario. The Enhanced Globalisation case sees demand increase more rapidly to 20.9m TEU in 2010 and 34.3m TEU at the end of the period.

Table 2.12
Forecast Immediate Market Container Port Demand to 2020
 - million TEUs

	Deepsea	Inter Europe	Transshipment	Total
Base Case				
03	7.82	3.05	2.29	13.17
04	8.15	3.12	2.42	13.69
05	8.69	3.26	2.61	14.56
06	9.23	3.39	2.79	15.41
07	9.79	3.52	3.00	16.31
08	10.39	3.66	3.21	17.26
09	11.02	3.80	3.44	18.26
10	11.69	3.94	3.69	19.33
11	12.23	4.09	3.88	20.20
12	12.80	4.24	4.07	21.11
13	13.39	4.40	4.27	22.07
14	14.01	4.57	4.49	23.06
15	14.66	4.74	4.71	24.10
16	15.21	4.87	4.91	25.00
17	15.79	5.02	5.11	25.92
18	16.39	5.16	5.33	26.88
19	17.01	5.31	5.55	27.87
20	17.66	5.46	5.78	28.91
Low Case				
03	7.82	3.05	2.29	13.17
04	8.15	3.12	2.42	13.69
05	8.69	3.26	2.61	14.56
06	9.18	3.37	2.78	15.33
07	9.69	3.49	2.97	16.14
08	10.23	3.60	3.17	17.00
09	10.80	3.72	3.38	17.90
10	11.40	3.85	3.60	18.85
11	11.91	3.98	3.77	19.66
12	12.43	4.12	3.95	20.51
13	12.98	4.27	4.14	21.39
14	13.55	4.42	4.34	22.31
15	14.15	4.57	4.55	23.27
16	14.66	4.70	4.73	24.08
17	15.19	4.82	4.92	24.93
18	15.74	4.95	5.11	25.81
19	16.31	5.09	5.32	26.71
20	16.90	5.23	5.53	27.65
Enhanced Globalisation				
03	7.82	3.05	2.29	13.17
04	8.28	3.06	2.46	13.80
05	9.00	3.15	2.71	14.86
06	9.73	3.22	2.96	15.90
07	10.51	3.28	3.24	17.02
08	11.36	3.33	3.54	18.22
09	12.27	3.37	3.86	19.50
10	13.26	3.40	4.22	20.88
11	14.11	3.51	4.49	22.11
12	15.01	3.61	4.79	23.40
13	15.97	3.71	5.10	24.78
14	16.99	3.82	5.44	26.24
15	18.07	3.92	5.79	27.78
16	18.94	3.96	6.08	28.98
17	19.85	4.00	6.38	30.22
18	20.80	4.03	6.70	31.52
19	21.79	4.06	7.03	32.88
20	22.84	4.08	7.37	34.29

Source: Ocean Shipping Consultants Ltd.

The future development of Immediate Market demand under the Base Case is detailed in Figure 2.7, where it is apparent that the trend will continue to favour the deepsea and transshipment markets and that the inter-regional flows will record a decline in market share. Having said this, however, the overall market is forecast to be highly dynamic and each sector will record significant absolute growth.



The major beneficiaries of greater globalisation of regional trade flows will be the deepsea and transshipment markets, which will be significantly stimulated under these conditions. Once again, some of the acceleration in globalised demand that will follow under these conditions will be reciprocated by reduced growth in the European trades. The actual scope of this effect remains problematic to assess from the current perspective, however.

Within these totals, the relative shares of the various major deepsea market sectors have also been projected. In the short-term, it is that there will be a steady increase in the importance of Asian trades within total deepsea demand (with this specifically further stimulating transshipment demand). This pattern is forecast to continue over the balance of the period, with each region recording the following shares of deepsea demand under the Base and Low Cases to 2020:

	<i>Asia</i>	<i>N.America</i>	<i>Others</i>
2003	47.5	26.0	26.5
2010	49.5	24.0	26.5
2015	51.5	21.5	27.0
2020	53.5	19.0	27.5

The effect of the increased globalisation trend will focus on the Asian trades and it is anticipated that regional market shares (of an already more significant deepsea sector) will develop as follows in this case:

Table 2.13**Forecast Immediate Market Deepsea Container Port Demand to 2020 by Region**

- million TEUs

	Asia	North America	Other Deepsea	Total
Base Case				
03	3.71	2.03	2.07	7.82
04	3.90	2.10	2.16	8.15
05	4.18	2.21	2.30	8.69
06	4.46	2.32	2.44	9.23
07	4.76	2.43	2.59	9.79
08	5.08	2.55	2.75	10.39
09	5.42	2.68	2.92	11.02
10	5.79	2.81	3.10	11.69
11	6.10	2.87	3.25	12.23
12	6.44	2.94	3.42	12.80
13	6.79	3.01	3.59	13.39
14	7.16	3.08	3.77	14.01
15	7.55	3.15	3.96	14.66
16	7.90	3.19	4.12	15.21
17	8.26	3.24	4.30	15.79
18	8.64	3.28	4.47	16.39
19	9.03	3.32	4.66	17.01
20	9.45	3.36	4.86	17.66
Low Case				
03	3.71	2.03	2.07	7.82
04	3.90	2.10	2.16	8.15
05	4.18	2.21	2.30	8.69
06	4.44	2.31	2.43	9.18
07	4.71	2.41	2.57	9.69
08	5.01	2.51	2.71	10.23
09	5.32	2.62	2.86	10.80
10	5.64	2.74	3.02	11.40
11	5.94	2.80	3.17	11.91
12	6.25	2.86	3.32	12.43
13	6.58	2.92	3.48	12.98
14	6.92	2.98	3.64	13.55
15	7.29	3.04	3.82	14.15
16	7.61	3.08	3.97	14.66
17	7.94	3.11	4.13	15.19
18	8.29	3.15	4.30	15.74
19	8.66	3.18	4.47	16.31
20	9.04	3.21	4.65	16.90
Enhanced Globalisation				
03	3.71	2.03	2.07	7.82
04	3.98	2.10	2.19	8.28
05	4.38	2.24	2.38	9.00
06	4.79	2.36	2.58	9.73
07	5.23	2.49	2.79	10.51
08	5.72	2.63	3.01	11.36
09	6.25	2.77	3.25	12.27
10	6.83	2.92	3.51	13.26
11	7.31	3.04	3.75	14.11
12	7.83	3.17	4.01	15.01
13	8.39	3.30	4.28	15.97
14	8.99	3.43	4.57	16.99
15	9.62	3.57	4.88	18.07
16	10.15	3.66	5.13	18.94
17	10.71	3.74	5.40	19.85
18	11.29	3.83	5.68	20.80
19	11.91	3.91	5.97	21.79
20	12.56	4.00	6.28	22.84

Source: Ocean Shipping Consultants Ltd.

	<i>Asia</i>	<i>N.America</i>	<i>Others</i>
2003	47.5	26.0	26.5
2010	51.5	22.0	26.5
2015	53.3	19.8	27.0
2020	55.0	17.5	27.5

Once again, these projections highlight the necessity for positioning the planned port expansions to be primarily orientated to the major Asian and other deepsea trades and their associated feeder links. These sectors will be by far the most dynamic throughout the period.

The Shift to Larger Vessel Sizes

It has been demonstrated in earlier studies⁴ that there is a rapid shift in favour of much larger vessels in container shipping. This will be a critical factor in determining the competitive position of a particular terminal – specifically in the Asia-Europe trades.

For the port sector, the focus is primarily on vessel draft and the depth of access channels and berths. Since the early 1990s, major river ports such as Antwerp and Hamburg have responded to these developments by deepening access channels. This has provided a temporary solution to these trends. However, there is now little scope to further improve the position – except at very high and prohibitive cost – and the net effect has been increasing restrictions on the tidal access window at major container terminals.

The locational advantages of WCT are thus of increasing importance in the North Continent market. This will significantly improve the competitive position of the terminal in the forecast period. These issues have become even more pronounced in the past few years.

Table 2.14

The WCT Market - Key Draught Considerations

- dimensions in metres

	Access Channels		Berth Depth
	At Low Tide	With Tidal Window	
Antwerp – Scheldt Terminals			
Water Depth	13.3	14.5	15.0
Maximum Draught*	11.8	13.5	14.2
Rotterdam - Delta			
Water Depth	19.6	20.5	17.0/18.5
Maximum Draught**	17.7	18.6	16.2/17.7
Vlissingen - WCT			
Water Depth	14.7	16.6	17.5
Maximum Draught**	13.4	15.0	16.7

* - on current requirement of 12.5 per cent keel clearance at Antwerp

** - on a 10 per cent keel clearance requirement typical for coastal terminals

Source: Antwerp PA/OSC Ltd.

For the major Asian trades, the current position is characterised by the deployment of vessels of up to 7000TEU, with typical vessels for major owners dominated by 4500/5500TEU units. Already vessels in the 8500TEU size range are being delivered and vessels of up to 10,000TEU are on order. Between 2010/2015, it can reasonably be assumed that 12500TEU vessels will be a feature of these long-haul trades, with a resulting

⁴ 'The Westerschelde Container Terminal' – Section III.2

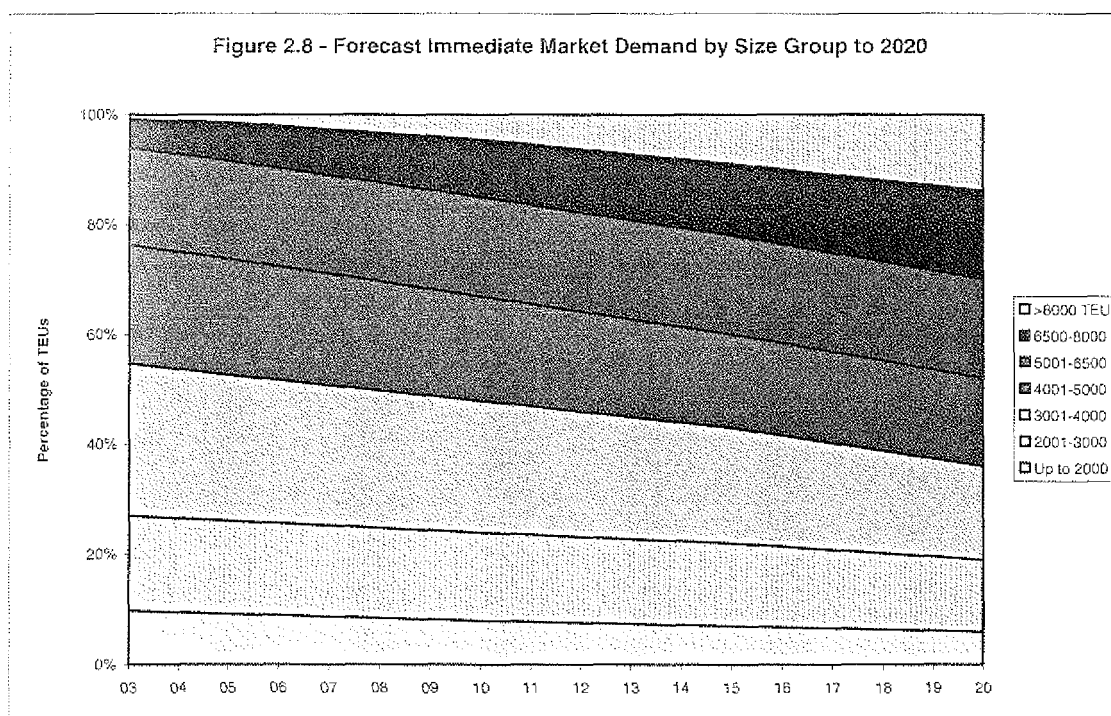
increased use of transshipment operations. This analysis formed part of a detailed project evaluating the technical and market outlook for 12,000TEU+ container vessels⁵.

The comparative position at the three competing locations – Antwerp Scheldt, Rotterdam Delta and WCT – is further considered in Table 2.14. In this analysis the available water depth is summarised at Low Tide and also during a narrow tidal window. The implications for maximum vessel draught are also defined. In addition the alongside berth depth in each terminal is also summarised.

WCT offers a considerable improvement over the position at the Antwerp river terminals and has a controlling water depth of some 14.7m. With a keel clearance allowance of 10 per cent, this indicates a maximum draught at all tides of 13m. There is a significant tidal range – which is of more relevance at this location given the shorter time period to/from the open sea – and within this window a maximum vessel draught of 15.7m is indicated. Whilst accessibility is not as good as at Rotterdam, this does represent a very significant and generally competitive capability (without a requirement for dredging).

In summary, it is clear that Antwerp is at a major disadvantage with regard to vessel draught and access restrictions. As the market develops these will become a constraint to the role of the port. The issue of the further deepening of the Scheldt is therefore important with regard to the competitive position of WCT versus Antwerp terminals. There is sufficient demand for deepsea containers to justify both the development of WCT and the deepening of the Scheldt. However, if deepening is delayed then the importance of WCT will become even more pronounced. WCT developments should be at least partially seen as an answer to these emerging difficulties.

An estimate has been made of the future development of Immediate Market demand in terms of ship size category and the results are detailed for the Base Case in Figure 2.8.



It is apparent that the issue of larger vessels will become very important in the regional market and an assessment of the potential market share of each class of vessel under the three identified demand scenarios has been prepared. This is summarised in Table 2.15.

⁵ 'Ultra Large Container Ships – a market study' OSC, 2000/2001 – commissioned by Lloyd's Register of Shipping.

Table 2.15
Forecast Immediate Market Container Port Demand by Ship Size to 2020
 - '000TEUs

	Up to 2000 TEU	2001-3000 TEU	3001-4000 TEU	4001-5000 TEU	5001-6500 TEU	6500-8000 TEU	>8000 TEU	Total
Base Case								
03	1.30	2.26	3.65	2.84	2.33	0.68	0.11	13.17
04	1.31	2.33	3.71	2.93	2.43	0.83	0.16	13.69
05	1.35	2.46	3.86	3.08	2.59	1.01	0.21	14.56
06	1.39	2.58	4.01	3.20	2.75	1.18	0.32	15.41
07	1.43	2.70	4.16	3.31	2.92	1.36	0.44	16.31
08	1.47	2.82	4.31	3.43	3.10	1.56	0.57	17.26
09	1.51	2.95	4.47	3.55	3.29	1.78	0.72	18.26
10	1.54	3.09	4.63	3.67	3.49	2.02	0.88	19.33
11	1.58	3.19	4.72	3.76	3.64	2.22	1.10	20.20
12	1.61	3.29	4.81	3.85	3.81	2.42	1.33	21.11
13	1.64	3.40	4.89	3.93	3.98	2.64	1.59	22.07
14	1.67	3.51	4.98	4.02	4.15	2.88	1.86	23.06
15	1.69	3.62	5.06	4.11	4.34	3.13	2.16	24.10
16	1.71	3.65	5.05	4.21	4.50	3.40	2.48	25.00
17	1.72	3.69	5.03	4.31	4.67	3.68	2.83	25.92
18	1.73	3.71	5.00	4.42	4.84	3.98	3.20	26.88
19	1.73	3.74	4.97	4.52	5.02	4.30	3.59	27.87
20	1.74	3.76	4.92	4.63	5.21	4.63	4.01	28.91
Low Case								
03	1.30	2.26	3.65	2.84	2.33	0.68	0.11	13.17
04	1.31	2.33	3.71	2.93	2.43	0.83	0.16	13.69
05	1.35	2.46	3.86	3.08	2.59	1.01	0.21	14.56
06	1.38	2.56	3.99	3.18	2.74	1.17	0.31	15.33
07	1.41	2.67	4.12	3.28	2.89	1.35	0.43	16.14
08	1.44	2.78	4.25	3.38	3.05	1.54	0.56	17.00
09	1.48	2.89	4.38	3.48	3.22	1.75	0.70	17.90
10	1.51	3.01	4.52	3.58	3.40	1.97	0.86	18.85
11	1.53	3.10	4.59	3.66	3.55	2.16	1.07	19.66
12	1.56	3.20	4.67	3.74	3.70	2.35	1.29	20.51
13	1.59	3.29	4.74	3.81	3.85	2.56	1.54	21.39
14	1.61	3.39	4.81	3.89	4.02	2.79	1.80	22.31
15	1.64	3.49	4.88	3.96	4.19	3.02	2.08	23.27
16	1.64	3.52	4.86	4.05	4.34	3.28	2.39	24.08
17	1.65	3.54	4.84	4.15	4.49	3.54	2.72	24.93
18	1.66	3.57	4.80	4.24	4.65	3.82	3.07	25.81
19	1.66	3.59	4.76	4.34	4.81	4.12	3.44	26.71
20	1.66	3.60	4.71	4.43	4.99	4.43	3.83	27.65
Enhanced Globalisation								
2003	1.30	2.26	3.65	2.84	2.33	0.68	0.11	13.17
2004	1.32	2.35	3.74	2.95	2.45	0.83	0.16	13.80
2005	1.37	2.51	3.94	3.15	2.64	1.03	0.21	14.86
2006	1.43	2.66	4.14	3.30	2.84	1.22	0.33	15.90
2007	1.49	2.81	4.34	3.46	3.05	1.42	0.45	17.02
2008	1.55	2.98	4.55	3.62	3.27	1.65	0.60	18.22
2009	1.61	3.15	4.77	3.79	3.51	1.90	0.76	19.50
2010	1.67	3.34	5.00	3.97	3.77	2.19	0.95	20.88
2011	1.72	3.49	5.17	4.11	3.99	2.43	1.20	22.11
2012	1.78	3.65	5.33	4.26	4.22	2.69	1.48	23.40
2013	1.84	3.82	5.50	4.42	4.46	2.97	1.78	24.78
2014	1.89	3.99	5.66	4.57	4.72	3.28	2.12	26.24
2015	1.95	4.17	5.83	4.73	5.00	3.61	2.49	27.78
2016	1.98	4.24	5.85	4.88	5.22	3.94	2.88	28.98
2017	2.00	4.30	5.86	5.03	5.44	4.29	3.30	30.22
2018	2.02	4.36	5.87	5.18	5.68	4.67	3.75	31.52
2019	2.04	4.41	5.86	5.34	5.93	5.07	4.23	32.88
2020	2.06	4.47	5.84	5.50	6.18	5.50	4.75	34.29

Source: Ocean Shipping Consultants Ltd.

Forecast Immediate Market Growth Rates

The annual demand growth anticipated for total demand in the region under each scenario is detailed in Table 2.16. It is apparent that in the short term some acceleration in demand growth is forecast – with this resulting from the faster underlying economic growth that is projected for the region. The gradual maturing of the trades will then see growth rates decline, although these will remain strong under the Enhanced Globalisation scenario.

Table 2.16

Forecast Immediate Market Demand Growth Under Various Scenarios

- annual average percentage

	Low Case	Base Case	Enhanced Globalisation
2003-05	5.17	5.17	5.17
2006-10	5.30	5.83	7.04
2011-15	4.30	4.52	5.88
2016-20	3.52	3.70	4.30

Source: Ocean Shipping Consultants Ltd.

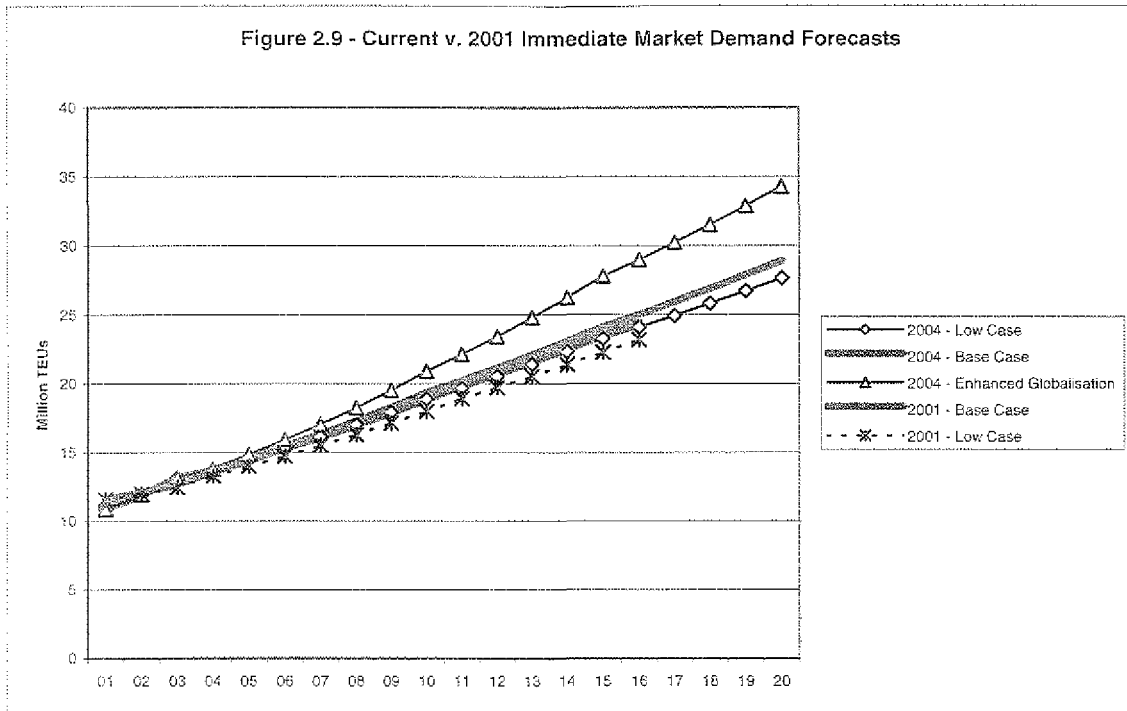
On this basis it is clear that strong and robust growth has been identified for the Immediate Market (and the North Continent market as a whole). The Immediate Market will maintain market share and demonstrate sustained expansion across a range of economic conditions. Within this demand the greatest growth will be noted in the deepsea and transshipment sectors – with specific reference to the Asian trades. These sectors will be dominated by larger classes of vessels where terminal and access water depth will be critical. The WCT project is correctly configured to meet this changing demand base.

Current Projections v. Earlier Forecasts

Figure 2.9 summarises the projections that were developed of the Immediate Market for the WCT study of 2001 and compares them with the current outlook. Several points should be noted:

- The re-basing of regional demand (to net-out ro-ro containers) makes direct comparisons difficult. However, it is clear that the overall outlook has not significantly altered and that there has been a marginal increase in the Base Case outlook.
- The new projections extend to 2020 and it is apparent that the pattern after 2015 will essentially represent a continuation of the earlier trends.
- The major difference is the introduction of the Enhanced Globalisation scenario. It is not clear if this pattern will continue or be sustained for the entire forecast period. However, it is certain that the process of globalisation has further stimulated demand in the region and that there is the *potential* for such accelerated demand growth in the region.

Our projections confirm the earlier outlook and identify considerable additional potential in the market that was not as apparent in 2001.



SECTION 3 – CAPACITY DEVELOPMENT AND THE NEED FOR THE WCT TERMINAL

3.1 Introduction

The analysis in Section 2 summarised the future range of potential demand growth in the overall North Continent port market and further focused attention on the immediate potential WCT market.

Against this background, this Section summarises the following:

- The current status of major container terminal investment programmes in the region.
- The forecast availability of deepwater container berths.
- The most likely course of future capacity development for the North Continent container handling sector – both with and without the WCT project.
- The changes in the supply side of the equation that have been noted since 2001.
- The major issues that will impact on the future market role of WCT.

An analysis is developed of the future development of regional container port supply and demand balances over the period to 2010. This draws together the capacity projections here developed with the demand forecasts from Section 2. This provides an overall estimation of capacity-utilisation rates under various scenarios for the period.

The Section concludes with a review of the effect of these factors on the development at WCT.

3.2 Regional Container Port Capacity Development

OSC have been maintaining analyses of the development of the capacity of regional container ports for some years and the accompanying data summarises the most likely course for capacity from the current perspective. Capacity has been estimated on the basis of design capabilities of the terminals. In some instances the actual volumes of a particular terminal may be exceeded. This does not necessarily represent high efficiency at a particular location but may well reflect severe and localised port congestion, with inefficiencies moved elsewhere in the transport chain.

Furthermore, it is clear that there are pressures in the North European region to significantly up-rate the capacity of individual terminals without – necessarily – investing directly in new quays or new yard areas. For example, in Felixstowe the current productivity improvement programme is designed to squeeze additional capacity from the existing terminals. This pattern will be repeated elsewhere in the range and will have the effect of boosting capacity at existing terminals.

Having said this, however, the most important influence will be the addition of new terminals in the range, with this directly boosting development of capacity. The lead-times associated with the introduction of new handling capacity indicate that a fairly comprehensive picture of the availability of regional capacity can be derived over the medium term to – say – 2012.

Beyond this date, although the structure of major plans is fairly clear the timing is far less certain. What is more, these further developments will be dependent on the level of the market in the short term. This analysis is, therefore, designed to provide a review of the general level of the regional port market in the interim period.

The following analysis evaluates the development of port capacity in the North Continent markets with specific reference to the identified Immediate Market for WCT. The study uses these projections to assess the implications of these projects on the future overall supply/demand balance.

North Continent Port Projects and Capacity Developments

Table 3.1 provides an overview of major port development projects in the North Continent region and identifies their capacity and the most likely timeframes for development. This is based not simply upon quoted or planned timings but, rather, represents a critical assessment of the actual 'most likely' courses of development. There have been considerable changes noted with regard to the timing of planned developments since the analysis conducted in 2001.

It is apparent that virtually all of the major ports are currently scheduling very significant capacity additions. Furthermore, given the highly competitive structure of the regional port industry (and the role of state investment in infrastructure projects) most of these major proposals seem certain to proceed almost irrespective of the supply/demand balance. Aside from the position with regard to WCT, the major uncertainties within this project listing may be summarised as follows:

- After several years of uncertainty it now seems that a financing agreement has been secured between the City of Rotterdam and the Dutch Government for the development of the Maasvlakte II project – although the final structure of the project remains unclear. It would now seem possible that capacity could be introduced from 2010 onwards.
- The schedule for the proposed deepening of the River Scheldt remains unclear. Although some political settlement between Belgium and the Netherlands seems certain, the actual implications for the container terminals in Antwerp are a major uncertainty. This will have an effect not simply on the competitive position of the terminals with regard to deepwater access but will also impact on the actual capacity of the terminals at Antwerp. This is of direct and immediate relevance to WCT.

Whilst major uncertainties remain there have also been some clarifications:

- After prolonged uncertainties over timing the Euromax project at Rotterdam is now proceeding. It seems likely that capacity will be introduced from 2006.
- In Germany the proposed Wilhelmshaven container terminal now seems likely to proceed, although the associated timeframe is uncertain. This will have the effect of altering the supply/demand balance in the range as a whole – with these effects being focused on demand for the largest classes of container carriers.

It remains necessary to adopt a critical review of the major competing port development projects that are underway in order to define the 'most likely' course of the supply side of the port equation to be defined.

Northern France

Le Havre's Port 2000 project is designed to double the port's container handling capacity by 2006. Planned development consists of two phases of four berths and two berths respectively, with the second phase currently scheduled to follow immediately on the heels of the first. Construction on the Euro 0.56bn programme commenced in early 2002. A further Euro 72m have been budgeted for inland road and rail connections, Euro63mm of which is

intended for rail. The infrastructure costs of the entire project are put at Euro640m, and are being state financed. Another six berths are planned thereafter to complete a continuous quay of twelve berths totalling 4,200m, but have not yet been scheduled.

The intention is to accommodate the largest vessels with draughts of 14.5m, but depth of up to 17m could be provided in the long term, if required by future larger vessels. The following agreements have been announced for the Port 2000 project:

- MSC and Terminaux de Normandie (Perrigault) have an agreement with the port authority to use two berths at the new terminal;
- CMA/CGM and its partner, Générale de la Manutention Portuaire (now part-owned by P&O Ports and CMA/CGM), have a similar agreement for a further two berths;
- Maersk Sealand and Perrigault (parent of Terminaux de Normandie) have signed a letter of intent covering the remaining two.

Around 50 per cent of Le Havre's hinterland comprises the Paris region and – although there is clear scope to take a larger share of this market – the possibilities for a further extension in the broader region are somewhat problematic. A large part of the planned growth in demand at the port will be funded by greater transshipment operations.

At Dunkirk, the Quai de Flandres is being extended from 470-780m, and access draught is being increased from 13-14.5m. Completion is scheduled for 2004 and depth alongside has been increased from 14.5m to 16.5m. Central and regional government and the port authority are financing the FF370m cost of the project. In 2002, the Inter Ferry-Boats/port authority joint company, which operates the terminal, commissioned a super post-panamax crane, capable of reaching across 22 containers; it has options on two more.

There are also plans to build two new berths, totalling 400m, at Rouen over 2003-05.

Despite these major plans it must be stressed that French container ports have generally recorded an unsatisfactory development since the mid-1980s. These difficulties are essentially structural and administrative and are not attributable to any lack of physical capacity. For example, at present the Port Authority is the direct employer of the crane drivers. It is no coincidence that average crane productivity in the major French ports is around 20 moves per hour. This compares with a rate of around 39 at Antwerp and underlines the lack of flexibility of operations. The cranes are used for fewer hours per day and achieve lower productivity during operation.

These issues must be addressed if the potential role of the ports is to be realised. The inward investment from international operators such as P&O Ports, MSC and Maersk Sealand has the potential to alter this situation but we remain cautious about the true scope for increasing productivity and reforming the stevedore sector. It seems likely that despite massive investment Le Havre will continue to under perform other competing ports over the medium term. For this reason developments are peripheral to the Immediate Market.

Belgium

In addition to the Left Bank terminal developments, the most significant programme at Antwerp centres on dredging of the river to allow vessels drawing up to 13.1m to access the port independent of tidal conditions (with a keel clearance of 12.5 per cent). Following approval by the Dutch and Flemish governments, a joint task force (called ProSes) is expected to complete the necessary studies for the deepening of the River Scheldt by the end of 2004. However, it is anticipated that this is unlikely to be completed before 2008. The two alternatives being considered allow access on all tides to vessels drawing 12.5m and 13.1m, respectively. In the longer run this will be a very important determinant of the competitive position of the port and for WCT.

There have been some significant changes in the structure of the Deurganckdok project and this will alter the capacity of the port.

Table 3.1
North Continent: Anticipated Containerport Investment

Port	Operator	Project	Berthage - metres	Annual Cap. - m TEUs	By End
<u>Western Sector</u>					
Le Havre	MSC/Perrigault	Port 2000 - I	700	0.65	2004
	CMA-CGM/P&O Ports		700	0.65	2005
	Maersk Sealand/Perrigault	Port 2000 - II	700	0.65	2006
Dunkirk	PA/Inter Ferry Boats	Flanders Quay extension II	100	0.15	2004
Rouen	Port Authority	Grand Couronne	400	0.20	2005
Antwerp	Hesse-Noord	Left Bank West I	1260	1.80	2005
	Hesse-Noord	Left Bank West II	400	0.70	2006
	P&O Ports	Left Bank East II	1370	0.80	2005
	P&O Ports	Left Bank East III - 1	500	0.70	2007
	P&O Ports	Left Bank East III - 2	580	0.80	2008
	P&O Ports	Left Bank East III - 3	unknown	1.20	unknown
	Hesse-Noord	Left Bank West III - 1	1080	0.41	2009
	Hesse-Noord	Left Bank West III - 2		0.41	2010
	Hesse-Noord	Left Bank West III - 3		0.41	2011
	Hesse-Noord	Left Bank West III - 4		0.41	2013
Potential additional capacity with Scheldt deepening ¹				1.10	2008+
Vlissingen	Hesse-Noord N/PA	Westerschelde CT	900	0.70	2008
			450	0.50	2009
			450	0.50	2010
			815	0.70	2011
Rotterdam	P&O Nedlloyd	Euromax	900	0.90	2007
			900	0.90	2008
	not known	Maasviakte II	1500	1.50	2010
			1500	1.50	2012
Amsterdam	IMCA	Cornelder CT		0.20	2004
<u>Eastern Sector</u>					
Hamburg	HHLA	Altenwerder CT - II	700	0.80	2005
Bremerhaven	Eurogate	CTIV	850	0.90	2007
			850	0.90	2009
Wilhelmshaven	Eurogate	Deep-sea terminal	1700	0.90	2008
				0.90	2010+

Source: Ocean Shipping Consultants Ltd

¹ For an explanation of the potential importance of deepening the River Scheldt on capacity at Antwerp, see the analysis detailed below from page 45.

Delays to construction resulted from opposition to development by residents in the nearby village of Doel, who succeeded in obtaining a court ruling against zoning plans for the northern extremity of the first terminal. However, these have now been resolved and the project is being accelerated.

The first of the four Deurganckdok terminals will be a 74h facility on the west of the dock, with quay length of 1,650m. This is now expected on stream in 2006 and was to be operated by a Hesse-Noord Natie/MSC joint venture. However, in late 2002, MSC pulled out of the joint venture, in favour of using the expanded capacity available at the Delwaidedok following the merger of Hesse-Natie and Noord Natie. The entire West Dock Phases I and II will now be operated by Hesse-Noord, and this will include the CP Ships traffic originally scheduled for the east side of the dock.

P&O Ports has been awarded the concession for the entire eastern side of the dock, on the condition that it yields up the former Seaport Terminal to MSC in the Delwaidedok. The merger of adjacent Hesse-Noord terminals in the Delwaidedok allowed capacity to be boosted from 0.25-1.75m TEU/year and has provided a hub terminal for MSC². The further move will give P&O Ports an uninterrupted 2500m of quay line.

There is scope for further dock construction after the Deurganckdok has been completed, although the feasibility of such developments will be primarily linked to the deepening programme.

Zeebrugge's port capacity is currently estimated at some 1.6m TEU/year. A significant proportion of containers handled at the port – and counted in port statistics – are handled by ro-ro, with container terminal operations focused on the Hesse Noord joint venture (OCHZ) and the Flanders Container Terminals (FCT). There is as yet no demand at the FCT and the Seaport Terminal is no longer operational. The market position of Zeebrugge remains highly uncertain.

The position of Zeebrugge is complex. On the one hand, major investment in quays and associated marine works has been undertaken, and water depth is very competitive. This has resulted in some inward investment from stevedoring companies – especially as a result of congestion in Antwerp. However, demand growth has been disappointing. The port suffers from poor barge links, which are critical in this market. Despite low handling charges, good water depth and a good location in relation to the shipping lanes, the port has yet to accelerate demand as envisaged.

The Netherlands

Delta West is the last of the four terminals planned at Rotterdam's Delta Terminal, with 870m of quay added during 2002 to the existing 600m. Meanwhile, the Delta Multi-User Terminal has been being converted into a dedicated terminal for Maersk Sealand. 900m of quayage was transferred to the Maersk Sealand Terminal in 2001 and the remaining 750m in mid-2002. The terminal is equipped with nine super post-panamax cranes. It is wholly owned by Maersk Sealand, the disposal of ECT's stake being a condition imposed by the European Commission on Hutchison Ports' acquisition of a majority stake in ECT.

The anticipated commissioning of the Euromax Terminal, P&O Nedlloyd and ECT's joint venture to build and operate a container terminal at the northwest tip of the Maasvlakte, has been delayed by at least a year to 2007, and possibly later. With 850m quay and 55h of terminal space, the facility will offer depth of 16.6m and capacity to handle 0.9m TEU/year initially. Phase 2 will add 650m, double the terminal area and capacity and take the depth to 19.6m if required.

² It is possible that the capacity of the Delwaidedok could be boosted further (to up to around 3m TEU). However, its location behind the lock makes such an outcome commercially unlikely.

The delay in the project is clearly related to the uncertainties concerning the Maasvlakte II programme, but also the unclear position with regard to P&O Ports and P&O Nedlloyd has made the situation more complex. Now that a solution has been arrived at with regard to the shipping line P&O Nedlloyd are proceeding with port investments – in competition with P&O Ports.

Although Rotterdam remains the largest individual container port in the North Continent range, it is operating in a highly competitive environment. Despite the consolidation of the greater part of container handling in the early 1990s under the ECT group, the level of competition from Antwerp has remained at high levels. Further competition has also been noted from both Bremerhaven and Felixstowe for the transshipment sector.

The following major uncertainties have faced the industry:

- Despite heavy investment, productivity in automated container handling has yet to be fully accepted in the market.
- Average costs for container handling in Rotterdam are significantly higher than in competing Belgian ports (although lower than in Germany).
- Two new dedicated (line-owned) facilities are under development – the Maersk Delta and Euromax terminals.
- Delays with the Maasvlakte II have made planning problematic.

This means that Rotterdam will remain vulnerable to competitive pressures for the next few years, thus providing a major further opportunity for Antwerp and WCT.

At Amsterdam, the 0.95m TEU/year capacity Ceres Paragon Terminal was completed in 2001, with its 400m indented berth, but did not attract any customers. In 2002, NYK acquired New Jersey-based Ceres Terminals. The terminal has still to attract any long-term customers and is a prime example of an innovative terminal that has been developed in the wrong place – behind the lock with poor intermodal linkages.

Table 3.2
North Continent Container Port Capacity Projections to 2012 - with WCT
- million TEUs

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Dunkirk	0.35	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Zeebrugge	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Antwerp	5.80	5.80	8.40	9.10	9.80	10.60	11.01	11.42	11.83	12.24
- with Scheldt Deepening	5.80	5.80	8.40	9.10	9.80	11.10	12.11	12.52	12.93	13.34
Vlissingen	0.00	0.00	0.00	0.00	0.00	0.70	1.20	1.70	2.40	2.40
Rotterdam	9.05	9.05	9.05	9.05	9.95	10.85	10.85	12.35	12.35	13.85
Amsterdam	1.10	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Total Immediate Market	17.90	18.40	21.00	21.70	23.30	25.70	26.61	29.02	30.13	32.04
Other French Ports	2.50	3.15	4.00	4.65	4.65	4.65	4.65	4.65	4.65	4.65
German Ports	10.30	10.30	11.10	11.10	12.00	12.90	13.80	13.80	14.70	14.70
Total	30.70	31.85	36.10	37.45	39.95	43.25	45.06	47.47	49.48	51.39
- with Scheldt Deepening	30.70	31.85	36.10	37.45	39.95	43.75	46.16	48.57	50.58	52.49

Source: Ocean Shipping Consultants Ltd.

Having considered individual port projects, attention is now turned to the future development of port capacity in the region. Although the North European market consists of several discrete regions – for example, the Immediate Market, the transshipment market, etc. – there is a considerable degree of overlap in the market. As such, it is necessary to consider the development of capacity from the following perspectives:

- The North Continent range – Le Havre-Hamburg.
- The Immediate Market – Dunkirk-Amsterdam.

In order to define the broad effects of the development decision that is taken with regard to the WCT development at Vlissingen, the analysis considers the effect of proceeding as planned with these developments and their cancellation.

Table 3.2 summarises the capacity development of the North Continent container terminal in the period to 2012. This time horizon represents the greatest distance over which such an analysis can be reasonably projected, given construction lead times and the role of interim demand growth in triggering the pace of additional capacity investment.

It is estimated that at the end of 2003, the total capacity of the North Continent container handling market was some 30.7m TEU per annum. Within this total, the capabilities of the Immediate Market was 17.9m TEU, with Antwerp's effective economic capacity placed at an estimated level of 5.8m TEU and Rotterdam contributing a further 9.1m TEU of capacity. These ports together accounted for some 83 per cent of Immediate Market capacity. It should be noted, however, that some congestion was noted at Antwerp since 2002 and that inefficiencies are inherent in the capacity utilisation rate currently being recorded at the port.

On the basis of the investments summarised in Table 3.1, it is estimated that capacity in the Immediate Market will increase by some 30 per cent by 2007 and then expand by a further 38 per cent in the period to 2012, when total capacity will reach 32m TEU. Considerable delays have been noted in the provision of new capacity in contrast to the position in late 2001.

Table 3.3
North Continent Container Port Capacity Projections to 2012 - without WCT
- million TEUs

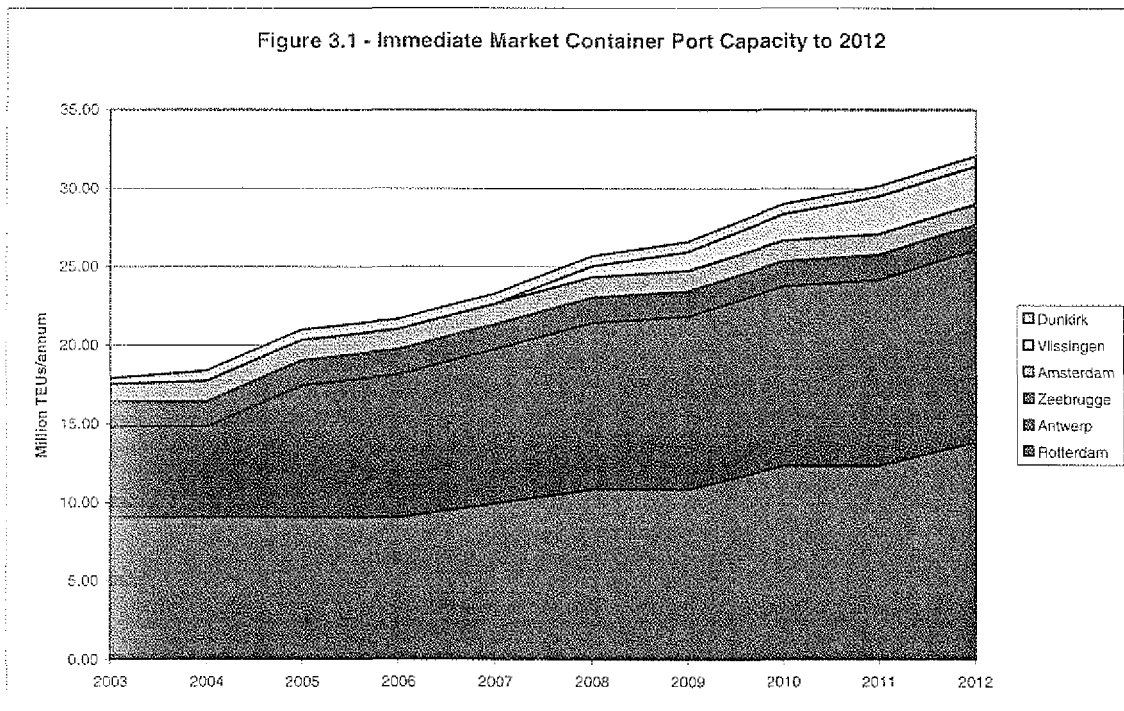
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Dunkirk	0.35	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Zeebrugge	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Antwerp	5.80	5.80	8.40	9.10	9.80	10.60	11.01	11.42	11.83	12.24
- with Scheldt Deepening	5.80	5.80	8.40	9.10	9.80	11.10	12.11	12.52	12.93	13.34
Vlissingen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rotterdam	9.05	9.05	9.05	9.05	9.95	10.85	10.85	12.35	12.35	13.85
Amsterdam	1.10	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Total Immediate Market	17.90	18.40	21.00	21.70	23.30	25.00	25.41	27.32	27.73	29.64
Other French Ports	2.50	3.15	4.00	4.65	4.65	4.65	4.65	4.65	4.65	4.65
German Ports	10.30	10.30	11.10	11.10	12.00	12.90	13.80	13.80	14.70	14.70
Total	30.70	31.85	36.10	37.45	39.95	42.55	43.86	45.77	47.08	48.99
- with Scheldt Deepening	30.70	31.85	36.10	37.45	39.95	43.05	44.96	46.87	48.18	50.09

Source: Ocean Shipping Consultants Ltd.

Within this total, Antwerp's capability will increase to 12.2m TEU in 2010 (even if Scheldt deepening does not proceed in this timeframe) and will account for – around 38 per cent of anticipated capacity of the Immediate Market in 2012.

If the WCT project does not proceed then the overall increase in the capacity of ports in the Immediate Market will develop more slowly and grow by 65 per cent between 2003-2012 to reach a total of 29.6m TEU per annum. The position is summarised in Table 3.3

The capacity of the Immediate Market with WCT is further summarised in Figure 3.1.



3.3 The Supply/Demand Balance in the Antwerp Immediate Market

The revised overall development of the North Continent and Immediate Market container port supply/demand balance is summarised in Table 3.4. This is quantified in terms of a simple co-efficient of supply and demand that estimates the utilisation rates of total capacity set against total demand on an annual basis. This does not provide the required degree of analysis in the current context, and a more focused analysis is clearly also necessary that focuses on the qualitative competitive position of the various locations. However, given the degree of competition between regional ports and the gradual breakdown in national barriers for port development the degree of overall supply and demand is clearly highly relevant.

In the mid-1990s, capacity utilisation in the North Continent was running very high at some 90 per cent. Congestion at Antwerp and Hamburg co-incident with a period preceding capacity additions at other major ports. Utilisation rates fell back sharply to more typical levels over 1996/97, at between 84/85 per cent. For the range as a whole, the current phase is clearly one of the take-up of new capacity and it is estimated that utilisation rates peaked at 83 per cent in 2000. They have since fallen back somewhat to around 80.3 per cent in 2003.

The position in the Immediate Market is complex, however. The overall utilisation rate was 73.6 per cent in 2003, significantly lower than for the entire North Continent market.

However, this overall position is misleading, as utilisation rates vary widely between ports in the region:

- At Zeebrugge, capacity utilisation is at very low levels of around 50 per cent. The position for lo-lo capacity is considerably weaker.
- At Rotterdam, utilisation rates are significantly below what could be achieved, as a result of generally low (but improving) productivity.
- Amsterdam's new terminal is unused.
- The new facilities at Dunkirk have yet to be fully appreciated, and demand remains low as a consequence³.

The position in Antwerp is quite different. It can be argued that capacity is effectively fully utilised⁴. Indeed, demand equalled the capacity identified for existing terminals in 2002. The merger of Hessenatie and Noord Natie has freed some capacity in the port, but it is apparent that utilisation rates are too high, and port efficiency is suffering.

Table 3.4

North Continent and Regional Container Port Supply Demand Projections to 2010 - with

WCT

Million TEUs

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Base Case										
<i>North Continent</i>										
Demand - mTEU	24.64	25.62	27.25	28.84	30.52	32.30	34.19	36.18	37.81	39.52
Capacity - mTEU	30.70	31.85	36.10	37.45	39.95	43.25	45.06	47.47	49.48	51.39
Utilisation - %	80.3	80.4	75.5	77.0	76.4	74.7	75.9	76.2	76.4	76.9
<i>Immediate Market</i>										
Demand - mTEU	13.17	13.69	14.56	15.41	16.31	17.26	18.26	19.33	20.20	21.11
Capacity - mTEU	17.90	18.40	21.00	21.70	23.30	25.70	26.61	29.02	30.13	32.04
Utilisation - %	73.6	74.4	69.3	71.0	70.0	67.2	68.6	66.6	67.0	65.9
Low Case										
<i>North Continent</i>										
Demand - mTEU	24.64	25.62	27.25	28.70	30.22	31.82	33.51	35.28	36.8	38.38
Capacity - mTEU	30.70	31.85	36.10	37.45	39.95	43.25	45.06	47.47	49.48	51.39
Utilisation - %	80.3	80.4	75.5	76.6	75.6	73.6	74.4	74.3	74.4	74.7
<i>Immediate Market</i>										
Demand - mTEU	13.17	13.69	14.56	15.33	16.14	17.00	17.90	18.85	19.66	20.51
Capacity - mTEU	17.90	18.40	21.00	21.70	23.30	25.70	26.61	29.02	30.13	32.04
Utilisation - %	73.6	74.4	69.3	70.6	69.3	66.1	67.3	65.0	65.3	64.0
Enhanced Globalisation										
<i>North Continent</i>										
Demand - mTEU	24.64	25.83	27.81	29.77	31.86	34.11	36.51	39.08	41.38	43.81
Capacity - mTEU	30.70	31.85	36.10	37.45	39.95	43.25	45.06	47.47	49.48	51.39
Utilisation - %	80.3	81.1	77.0	79.5	79.7	78.9	81.0	82.3	83.6	85.3
<i>Immediate Market</i>										
Demand - mTEU	13.17	13.80	14.86	15.90	17.02	18.22	19.50	20.88	22.11	23.40
Capacity - mTEU	17.90	18.40	21.00	21.70	23.30	25.70	26.61	29.02	30.13	32.04
Utilisation - %	73.6	75.0	70.8	73.3	73.0	70.9	73.3	72.0	73.4	73.0

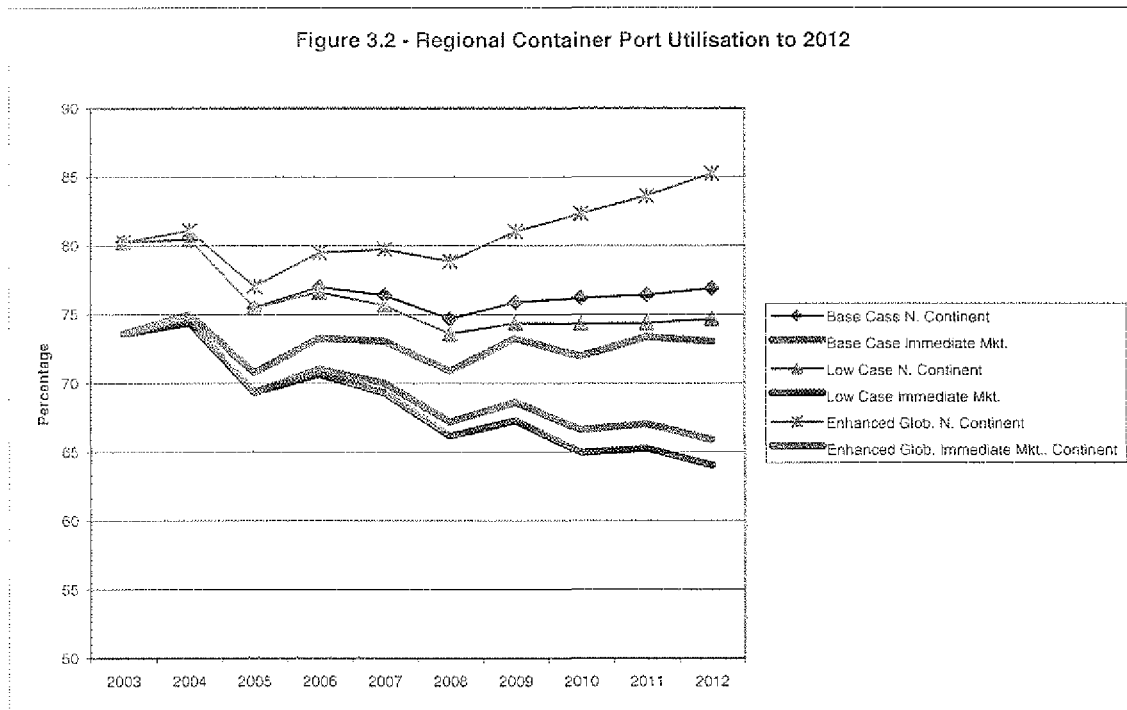
Source: Ocean Shipping Consultants Ltd.

³ The degree to which facilities at Dunkirk and Amsterdam will contribute capacity remains unclear. Although this capability physically exists it is not certain that they will offer a true alternative. If the capacity of these terminals were adjusted downwards, this would positively influence regional capacity-utilisation rates.

⁴ Although it varies on a port-specific basis, utilisation in excess of 92/93 per cent of rated capacity invariably causes congestion difficulties, with transport inefficiencies spilling over into other parts of the transport chain. This is manifested in vessel and truck queuing and other difficulties.

Despite these divergences, the balance of the Immediate Market remains significant in assessing the future role of WCT. Under Base Case conditions, the steady provision of new capacity in the Left Bank will see utilisation rates fall to below 70 per cent from 2005. Over the balance of the study period overall utilisation rates will remain at these levels. This reflects the general direction of the anticipated market balance for the entire North Continent range. Under the low demand case, the utilisation rate is somewhat weaker across the board. There is, of course, a more positive picture generated under the Enhanced Globalisation demand scenario.

The future balance of the market under these various conditions is summarised further in Figure 3.2.



Market Implications

There is a danger that over-capacity will be recorded in the Immediate Market in the period after 2005 (if no further major delays are noted in other significant port projects). This may have the effect of other terminals lowering prices in an attempt to divert traffic from Antwerp.

However, the position is much more complex than this would suggest. The competitive situation at Antwerp has been – and should continue to be – a major advantage. The development of the WCT should really be understood as an extension of Antwerp with the provision of deepwater facilities. WCT will build on the competitive position of Antwerp, which may be summarised as follows:

Efficient, highly productive and low cost container handling;

- A major local market;
- A comparatively balanced container flow situation;

- An established 'critical mass' for container handling;
- Strong intermodal links.

The only vulnerability of Antwerp is that the Scheldt is less than ideally configured for the largest vessels (with regard to water depth) that will trade on the dynamic Asian routes. The development of WCT provides such local capabilities.

Current Forecasts v. Earlier Projections

Generally speaking the development of the balance of supply and demand that was identified and projected at the end of 2001 has been realised. Table 3.5 compares the estimated immediate Market utilisation rates that were projected in 2001 to the current revised position. The major change has been the increased utilisation that is anticipated in the short term, with this primarily resulting from the delays in developing the Left Bank terminals. The overall outlook is for a stabilisation of capacity-utilisation rates from 2007 under the Base Case conditions.

Table 3.5
Current Forecast Utilisation Rates v. 2001 Projections
- percentage

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Immediate Market - Base	73.6	74.4	69.3	71.0	70.0	67.2	68.6	66.6	67.0	65.9
Immediate Market - Low	73.6	74.4	69.3	70.6	69.3	66.1	67.3	65.0	65.3	64.0
Immediate Market - Enhanced Globalisation	73.6	75.0	70.8	73.3	73.0	70.9	73.3	72.0	73.4	73.0
2001 Immediate Market - Base	83.8	76.6	72.7	69.6	67.3	69.5	67.4	71.1	na	na
2001 Immediate Market - Low	81.9	74.3	70.1	67.0	64.6	66.6	64.4	67.8	na	na

Source: Ocean Shipping Consultants Ltd.

The other major change stems from the introduction of the Enhanced Globalisation demand projections. Under these conditions (which are now seeming increasingly likely to be realised) there will be a much more rapid recovery in demand utilisation rates from 2007 than was anticipated in our earlier forecasts. The outlook is also detailed in Figure 3.3.

Deepsea Regional Port Capacity Development to 2010

The overall development of the supply/demand balance is, however, only one aspect of the market. Table 3.6 provides a summary of port capacity that can handle the largest classes of container ship. In the current analysis this is taken as the capability to berth Maersk S-Class / K-Class and P&O Nedlloyd Southampton class vessels on a reasonable tidal window. This is somewhat subjective evaluation but it is apparent that neither Hamburg nor Antwerp with their riverine locations can provide an adequate capability. Some of the ports under review can handle these vessels on a tidal window and are thus partly competitive. However, the restrictions thus entailed are an increasing difficulty for ports and as vessel sizes increase further will become prohibitive.

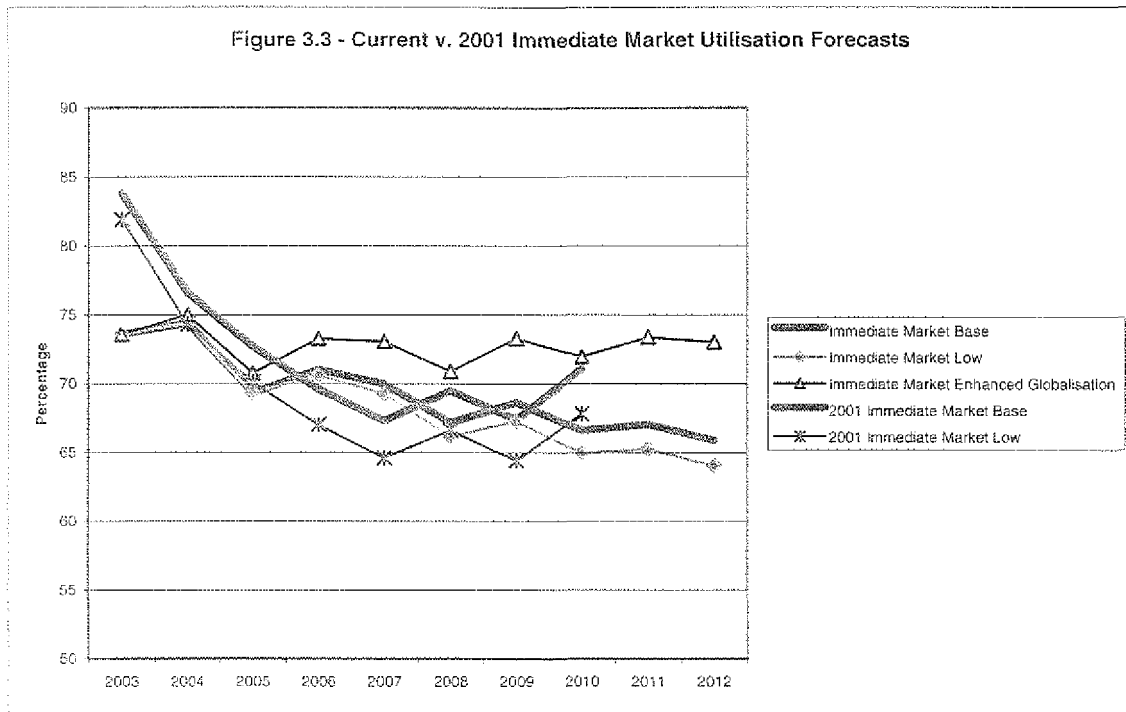


Table 3.6
North Continent Deepwater* Container Port Capacity to 2012 (with WCT)
 - million TEUs/annum

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Dunkirk	0.00	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Zeebrugge	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Antwerp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vlissingen	0.00	0.00	0.00	0.00	0.00	0.70	1.20	1.70	2.40	2.40
Rotterdam	5.50	5.50	5.50	5.50	6.40	7.30	7.30	8.80	8.80	10.30
Amsterdam	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immediate Market	6.30	6.60	6.60	6.60	7.50	9.10	9.60	11.60	12.30	13.80
<i>WCT Share - %</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>7.7</i>	<i>12.5</i>	<i>14.7</i>	<i>19.5</i>	<i>17.4</i>
Le Havre	0.00	0.65	1.30	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Bremerhaven	0.50	0.50	0.50	0.50	1.40	1.40	2.30	2.30	2.30	2.30
Hamburg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wilhelmshaven	0.00	0.00	0.00	0.00	0.00	0.90	0.90	0.90	1.80	1.80
Total	6.80	7.75	8.40	9.05	10.85	13.35	14.75	16.75	18.35	19.85

* - Terminals that can berth vessels drawing 14.5m on an acceptable tidal window

Source: Ocean Shipping Consultants Ltd.

At present, Rotterdam Delta terminals are highly competitive from this perspective, with only limited additional capacity at Zeebrugge and Bremerhaven currently available. Future investments will modify this position, with major new facilities at WCT (and potentially Wilhelmshaven) adding to this capacity.

Total capacity – thus defined – is placed at some 6.8m TEU in 2003, with ECT enjoying a market share of nearly 85 per cent in the Immediate Market. Indeed, only Zeebrugge has significant capacity in this range and other problems are restricting the role of this port's terminals. It is essential that alternative deepwater facilities be provided in the Immediate Market.

It is forecast that the capacity of 14.5m+ terminals in the Immediate Market will increase by some 33 per cent in the period to 2007, with a further expansion of some 64 per cent forecast for the balance of the study period. Despite this expansion, the market share of WCT in these markets will peak at 19.5 per cent in 2011. In the second half of the current decade the focus of competition for the deepwater trades will be between Rotterdam and Vlissingen, with sufficient demand anticipated for both facilities.

WCT's terminals will thus become of central significance for the handling of the largest classes of vessels in the North Continent market.

The Impact of Scheldt Deepening on Regional Capacity

At present the capacity of the existing facilities at Antwerp and the new Left Bank terminals is limited by the level of berth occupancy that can be achieved for the largest vessels.

The major uncertainty centres on the ability of the port to berth the current and anticipated next generation vessels. These considerations directly affect the capacity of the port and will also determine the future role of the port.

Essentially the following alternatives are identified:

- Continued expansion within existing water depth conditions. This will be characterised by a continued emphasis on the local market, with more distant shipments and transshipment activities taking a secondary role in port development.
- A broader expansion of demand following the dredging of the Scheldt. Under these conditions, a sustained and more broadly based expansion in demand can be anticipated, with transshipment and longer-haul inland movements taking a larger market share.

Capacity at Antwerp will develop in two distinct patterns under each scenario.

The essential point with regard to Antwerp relates to tidal constraints and will become increasingly important as vessel sizes increase. The reason for this is that, even if quay-utilisation rates were to be extended beyond current levels (in order to reduce vessel waiting times), the requirement for larger vessels to await a tidal window for arrival/departure would result in continued delays beyond what is regarded as 'acceptable' in current market conditions.

Essentially the argument is as follows:

- Berth length is the key determinant of capacity in most terminals (including Antwerp), providing there are no other constraints to access with regard to channel depth, etc.
- Under current flows of cargoes for Scheldt terminals and with calculated crane productivity (which is high), it is noted that around 4 per cent of vessels are forced to queue for around half of the time spent handling cargo (assuming turnaround in 13 hours). This is a commercial limit and has been exceeded on occasion in the past two years, with resulting criticism of service standards at the port.

- This limit *could* be exceeded, but with the penalty of undermining the competitive position of Antwerp. Although the advantages of Antwerp are very strong, these would not overwhelm the arguments for switching to terminals with more available capacity.
- If it were attempted to boost key line utilisation to 1400TEU/m+ (which would be possible for land use rates available with RTG/RMG yard operations), then such pressures would be encountered. They would be even greater, if quay utilisation was matched to higher-intensity yard systems, such as overhead bridge cranes.
- Congestion could increase by between 50-100 per cent, i.e. 6 to 8 per cent of vessels would be delayed for more than half the time taken for container handling. This would exceed the commercial limit and undermine the other locational advantages of Antwerp.

Whilst similar considerations apply at all terminals, the unique Antwerp point is that the largest vessels are already tide-dependent. This means that vessels drawing 13.5m+ have a window of four hours for departure twice a day. Therefore, even if more cranes were provided in an effort to boost quay use there would still be a delay for a proportion of vessels that will have to wait at the berth for departure. It is an irony of the situation that the faster the handling time, the higher the waiting time becomes as a proportion of it, and therefore the more unacceptable it becomes.

Until vessels can berth freely (i.e. not on a tidally dependent basis), there will continue to be an effective limit to terminal productivity, that is based upon berth use and not yard systems. However, with deepening of the Scheldt, this issue will not be important. Effectively, Scheldt deepening will increase the capacity of the Antwerp deepwater terminals by allowing unrestricted vessel access, which will enable more gantry crane investment to translate into higher quay utilisation rates and higher berth occupancy levels.

Deepening the Scheldt will provide a capacity windfall for the existing river and planned Left Bank terminals. The current situation effectively limits the capacities of common-user facilities.

The effect of deepening the Scheldt on the overall balance of supply and demand in the Immediate Market is detailed in Table 3.7.

Table 3.7
The Effect of Scheldt Deepening on Regional Port Utilisation
- million TEUs

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
With Scheldt Deepening										
Immediate Market Capacity	17.90	18.40	21.00	21.70	23.30	25.70	26.61	29.02	30.13	32.04
Base Case Demand	13.17	13.69	14.56	15.41	16.31	17.26	18.26	19.33	20.2	21.11
Utilisation - %	73.6	74.4	69.3	71.0	70.0	67.2	68.6	66.6	67.0	65.9
Without Scheldt Deepening										
Immediate Market Capacity	17.90	18.40	21.00	21.70	23.30	25.00	25.41	27.32	27.73	29.64
Base Case Demand	13.17	13.69	14.56	15.41	16.31	17.26	18.26	19.33	20.2	21.11
Utilisation - %	73.6	74.4	69.3	71.0	70.0	69.0	71.9	70.8	72.8	71.2

Source: Ocean Shipping Consultants Ltd.

Whilst there will be an effect the overall direct implications for capacity utilisation – and, therefore, the market role of WCT – are seen to be limited. Deepening of the Scheldt would not undermine the position of the proposed terminal.

Considerable capacity additions are scheduled for the North Continent range in general and the Immediate Market in particular. If these proceed on the schedules estimated there will be a decline in capacity-utilisation rates in the middle of the decade although the position will then recover. The relative advantages of WCT – principally its deepwater – indicate that a significant requirement for the project will be noted against this background. This suggests that the balance at WCT will be significantly more favourable than in the total market. Without these investments only Rotterdam will have a major role for the Immediate Market and there are questions over the ability of the port to deliver capacity within the required timeframe following the completion of current projects.

SECTION 4 – THE COMPETITIVE POSITION OF THE WCT TERMINAL

4.1 Introduction

This study has summarised a review of supply and demand trends in the regional container port market and has identified a requirement for modern – highly productive – container handling facilities in the region. Attention is now turned towards the criteria that govern the successful development of a major container terminal in the European market and the degree to which the proposed WCT facilities will meet these requirements. These issues have been considered in some depth in our earlier reviews and this Section should be reviewed in conjunction with those analyses. The review here conducted provides a full update of the issues involved in determining the competitive position of WCT.

The criteria that will determine the competitive position of the WCT project may be summarised as follows:

- Marine access and capacity considerations;
- The location of the terminal in relation to its hinterlands;
- The costs of transiting the facility;
- The productivity of the terminal.

The following represents a review of the current and anticipated position of WCT when viewed from these perspectives. The analysis concludes with a comparative ranking of WCT when viewed against existing terminals operating in these markets. For the transshipment market the competitive terminals will be those located at Antwerp (Schedt), the Delta and Euromax Terminals at Rotterdam and Felixstowe. For import/export containers competitive pressures will be focused on Zeebrugge and all terminals in Antwerp and Rotterdam.

4.2 Marine Access and Capacity Considerations

The development of container ship sizes and the implications for regional port demand have already been considered in Section 2. Given the importance of these developments for the establishment of a transshipment terminal at Vlissingen, it is necessary to consider these developments in some more detail. Table 4.1 presents a summary of the development of large container vessels since the late 1960s. Here it is apparent that the trend towards larger vessels is well established and that this still has some way further to advance. It is anticipated that the current largest vessels on order (9000-10,000TEU) will be deployed on the Asian-Europe trades and will thus become an important factor for the major terminals in North Europe. Further, it is anticipated that vessels of up to 12,500TEU will be introduced in the current decade. At present, such vessels can only be berthed at Rotterdam (on all tides) and at Felixstowe (with a tidal window). Antwerp will not really be suitable for such Ultra Large Container Ships.

Table 4.1
Design Development of Large Container Vessels

	TEUs	LOA (m)	Beam (m)	Design draft (m)
First generation: 1968	1,100			
Second generation: 1970-80	2-3,000	213	27.4	10.8
Panamax: 1980-90	3-4,500	294	32.0	12.2
Post-panamax: 1988-95	4-5,000	280-305	41.1	12.7
Fifth generation: 1996-2005	6,400-7,500	300-347	42.9	14.0-14.5
Current development stage	8,000-9,000	330-380	43-47	14.5
Ultra large container carriers: - 2007 & later	12,500	380-400	58-60	14.5-15.0

Source: Ocean Shipping Consultants Ltd

Throughout the period since the early 1990s the progressive increase in vessel sizes – particularly with regard to draft – has placed pressures on Antwerp to deepen the River Scheldt. To date, the developments put in hand have been generally sufficient to maintain the required degree of accessibility. Of course, as vessel sizes increase further, then these considerations will become of increasing importance to the competitive position of each terminal.

The progressive introduction of larger vessels into the trades will see greater strains placed on the regional ports. As is summarised in Table 4.2, at present only the Rotterdam Delta terminals have the ability to berth the anticipated classes of vessels that will be introduced. However, it is clear that WCT will also provide this capability – albeit within a tidal window – and that this will allow an alternative to Rotterdam to be offered. It is also apparent that Antwerp will not be able to offer access to these vessels.

Table 4.2
Theoretical Terminal Accessibility for Competing Terminals and WCT
- percentage of time accessible by ship size

	7500TEU	8500TEU	12500TEU
Antwerp – Scheldt Terminals	0	0	0
Rotterdam - Delta	100	100	100
Vlissingen - WCT	75	61	49

Note - on the basis of vessels operating at design draft

Source: Ocean Shipping Consultants Ltd.

The relative nautical accessibility of the proposed WCT facilities is very important in their competitive position and the situation is considered in more detail in Table 4.3. Here it is apparent that a significant tidal window will be offered for the largest class of vessels. This is a major factor justifying the development of the project.

The assumptions used in this table are as follows: for a 7500TEU vessel we have assumed a design draft of around 14.25m, for an 8500TEU vessel the draft is placed at 14.5m and for the potential 12500TEU vessel the design draft is 14.8m. Of course, given the pattern of trade these vessels will seldom be fully-laden and effective drafts will be somewhat lower. Nevertheless, the relative advantage of WCT versus Antwerp is seen to be very important for the current and anticipated larger vessel classes.

Table 4.3
The Nautical Accessibility of the Westerschelde Container Terminal

draught (m)	Ascent		Tidal Window		Descent
	%	hours/tide	%	hours/tide	
12.5	100	12hr 25min	100	12hr 25min	
13.0	100	12hr 25min	100	12hr25min	
13.5	91	11hr 20min	74	9hr15min	
14.0	75	9hr 20min	64	8hr	
14.5	61	7hr 35min	50	6hr 15min	
15.0	49	6hr	36	4hr 35min	

Hypotheses:

vessel speed : 14 knots

keel clearance : 15% (Belgian territory)

12.5% (Dutch territory)

Source: Hesse-Noord Natie/OSC Ltd.

A further comparative analysis has been developed of the ports and terminals that will be competing with WCT in the forecast market. This summarises the current productivity of these terminals, their facilities (in terms of berth length and depth). Their location as coastal or riverine facilities and their intermodal linkages are also detailed. The clear focusing of the competitive market at Rotterdam and Antwerp is apparent, as is the peripheral position of other ports. The position is detailed in Table 4.4.

As was underlined in our earlier review, a further important point that must be stressed with regard to the development of new capacity at WCT is the changing requirements of the major shipping lines. As the process of line merger and acquisitions gathers pace in the next few years the market will be characterised by ever-larger individual customer requirements. This will also be driven by the continued importance of alliance operations – even where equity involvement is limited. These large customers will increasingly require extensive individual terminals with continuous quayage and large areas. The incremental expansion of existing facilities – even where possible – will not be correctly formatted to meet these requirements. This need for large terminals for individual customers is of over-riding importance for large scale container ports.

The developments proposed at WCT are correctly designed to cope with the demands of these very large customers using ultra large new generation container vessels. This will generate a significant competitive advantage for the port.

Table 4.4
Facilities Offered by Competing Terminals

Port/Terminal	Quay Length	Depth	Location	Hinterland Links	Productivity - TEU/gantry	Productivity TEU/berth m.
<u>Dunkirk</u>						
Quai de Flandres	600	13.3	Coastal	Rail - Yes Barge - No		
Quai de Lorraine	530	13.3	Coastal	Rail - Yes Barge - No		
<i>Total</i>					<i>26,800</i>	<i>142</i>
<u>Zeebrugge*</u>						
OCHZ East	1050	14.0	Coastal	Rail - Yes Barge - No		
OCHZ West	725	13.0	Coastal	Rail - Yes Barge - No		
Flanders CT	1180	15.0	Coastal	Rail - Yes Barge - No		
<i>Total</i>					<i>33,327</i>	<i>124</i>
<u>Antwerp (Scheldt)</u>						
HNN	1180	14.3	River	Rail - Yes Barge - Yes		
HNN	1124	14.5	River	Rail - Yes Barge - Yes		
<i>Total (Scheldt)</i>					<i>125,625</i>	<i>873</i>
<u>Rotterdam</u>						
Delta	3100	16.7	Coastal	Rail - Yes Barge - Yes		
Home	1600	13.0	River	Rail - Yes Barge - Yes		
<i>Total (Delta & Home)</i>					<i>106,600</i>	<i>745</i>
<u>Amsterdam</u>						
Ceres	615	13.0	Interior	Rail - Yes Barge - Poor		
<i>Total</i>					<i>na</i>	<i>na</i>

* - io-to only

Source: Ocean Shipping Consultants Ltd.

4.3 The Location of WCT in Relation to its Hinterland

WCT is located directly between the major markets of Antwerp and Rotterdam, both of which record a significant local market ('Bill of Lading Antwerp' or 'Bill of Lading Rotterdam'). The terminal will be very well located in relation to these markets and will enjoy a significant role in serving Antwerp – especially where larger vessels are used that cannot directly access the Scheldt terminals.

In addition to these direct considerations relating to the placing of the port in relation to its hinterland, other related qualitative advantages are also apparent. The major centre of industrial and trade activity focused on Antwerp generates major additional advantages for the port. For example, the stuffing and stripping of the containers by the local freight industry is a vital aspect of the competitive position of the port. WCT will be relatively well placed to serve this sector.

Indeed, Antwerp enjoys a virtually unique position in the North Continent port range, as a result of the very strong level of local demand. This situation – combined with efficient and low cost container handling – provides a very strong incentive to call at Antwerp (thus transiting

the Scheldt). Indeed, the importance of the local cargo base has contributed to Antwerp's status as a 'must call' port for most major deepsea lines. Three key factors are of importance here:

- The favourable balance of container flows and strong export bias of the port;
- The size of container consignment typically handled at the ports' terminals;
- The actual importance of the local market in contrast to the situation in Rotterdam.

With regard to the balance of container flows, this effect has been quantified and it is estimated that in the current market for every tonne of containerised cargo discharged at Antwerp some 1.3 tonnes are loaded. This is far in excess of the situation in any other North Continent port. This reflects the strong manufacturing base of the immediate hinterland.

Table 4.5

Major North Continent Ports - Deepsea Call Efficiency Ratio

- TEU handled as a percent of vessel capacity

	Percentage	Index
2000		
Antwerp	23.3	100
Hamburg	20.3	87
Rotterdam	17.0	73
Bremerhaven	14.3	61
Le Havre	8.5	37
2003		
Antwerp	27.7	100
Hamburg	22.7	82
Rotterdam	18.5	67
Bremerhaven	19.5	70
Le Havre	3.4	12

Source: Antwerp Port Authority/OSC Ltd.

A further indicator of the importance of the local market in total demand is illustrated in Table 4.5. This analysis quantifies the size of consignment handled at Antwerp in relation to average (two-way) vessel capacity. This currently stands at some 28 per cent in Antwerp with this being significantly higher than at any other port. This reflects the importance of the port as an export location. In most other ports serving the North Continent, there is a bias in favour of imports – it is a major advantage of Antwerp that export volumes exceed imports.

In addition, the structure of port demand differs markedly between Antwerp and the other ports under review. Although major customers are highly significant within overall port demand, a relatively high proportion of container traffic is handled for a multitude of smaller shippers. Many freight forwarders use Antwerp as a groupage port, and around 15 per cent of containers handled are stuffed or stripped in the immediate locality. This is a proportion significantly higher than any other regional port.

The importance of 'Bill of Lading Antwerp' containers in the total cargo base is well illustrated by the distribution of containers in terms of distance from the port.

It is estimated that some 28 per cent of containers handled via Antwerp are to/from markets within a radius of 50km. This represents the immediate hinterland of the City and associated markets. This is far higher than for Rotterdam, where the corresponding proportion is just 13

per cent. Rotterdam's hinterland is more broadly distributed, representing the port's role as a major gateway for the Ruhr and central Europe. The most significant distance for Rotterdam is the 150-200km radius. WCT will benefit from its relatively good position with regard to the major Antwerp cargo base and will also be competitive in serving the broader market currently served by Rotterdam. WCT will be able to play a role in both market sectors and allow a centralisation of broader regional and Antwerp focused business in a single call. In this regard the lack of an immediate local hinterland will be far less significant than has been noted in Zeebrugge.

In the current and forecast market, the provision of highly productive intermodal links will be equally important in determining the pace of successful terminal development in the region. It will be essential to offer both effective rail *and* barge handling at any new terminal that is to be developed for a major pan-European market role.

A review of the developments planned in the region indicates that these capabilities are at the forefront of major terminal planning:

- Rotterdam is extremely well placed in this regard, offering direct rail links between both the Delta and Home terminals into the continental rail infrastructure. This has been manifested in the development of significant daily container train services. Similarly, dedicated barge facilities are very important for onward distribution from these terminals.
- In Antwerp, the development of barge volumes has been a major success story in the past few years and this seems certain to continue. Rail links are less than optimal and this is reflected in a relatively low share for this transport mode – although significant additional investment is being targeted at this sector.
- The development at Zeebrugge has been disappointing and one of the major factors restricting progress has been the lack of efficient barge links to/from the port. It is unlikely that sufficient investment will be made available to rectify this position and this will continue to constrain development.

Table 4.6

North Continent: Modal Shares of Major Port Container Throughput 1998-2003

- percentage of port volumes

	Rail			Road			Barge			Transshipment		
	1998	2001	2003	1998	2001	2003	1998	2001	2003	1998	2001	2003
Rotterdam	11.0	10.0	8.0	39.0	37.5	40.0	26.0	30.0	32.0	24.0	23.0	20.0
Antwerp	6.9	7.6	8.0	57.1	53.1	50.0	24.5	25.9	26.0	11.5	13.4	16.0
Le Havre	12.3	9.1	8.6	73.0	67.8	57.4	1.1	2.5	3.3	13.7	20.5	30.7
Zeebrugge	34.3	39.0	38.4	50.4	45.4	52.6	15.0	8.6	4.5	0.4	7.0	4.5
Dunkirk	9.0	13.5	20.5	90.0	82.5	76.7	1.0	4.0	2.7	0.0	0.0	0.0
Hamburg	19.1	17.9	17.2	45.1	43.6	41.8	0.1	0.9	1.0	35.7	37.6	40.1
Bremerhaven	16.0	16.2	15.0	31.4	27.9	33.0	0.9	0.9	1.0	51.7	55.0	51.0

Source: Ocean Shipping Consultants Ltd.

WCT will offer highly efficient facilities for both rail and barge operations. In the latter sector a dedicated barge-handling terminal will constitute a major part of the investment. In this regard, the facilities scheduled for Vlissingen will be highly competitive, with a minimal requirement for road-hauled containers. This will constitute a major advantage for the project. With regard to WCT rail links, a shorter connection (the new 'Sloelijn') from the port area to the existing

railway line through Zeeland (the 'Zeeuwse lijn') should be developed and a further link will be built to Antwerp ('Line 11'). These will further boost the competitive position of the terminal.

The relative modal distribution of container flows in the Immediate Market is detailed in Table 4.6 for the period since 1998.

In summary, it is apparent that WCT is extremely competitively placed with regard to its hinterland. It will enjoy a competitive position to service demand in both the local Rotterdam and Antwerp markets and will also enjoy an optimal location with regard to its intermodal and transshipment hinterlands. Although the lack of local business (i.e. in the Vlissingen locality) will be a limitation, the location of the port at the centre of the rapidly expanding Immediate Market – and its competitive features – should offset concerns in this regard.

4.4 The Costs of Transiting the Facility

Having determined the competitive locational position of WCT, attention is now focused on the *total* costs of shipping containers via particular terminals and provides an overview of competitive cost structures for both import/export and transshipment containers. This represents a summary and update of earlier analyses developed concerning these sectors. In this analysis three cost sectors are focused on, these being:

- Container Handling Charges – the actual typical structure of stevedore charges;
- Port Dues and Vessel Charges – those costs directly billed to the vessel during port transit;
- Shipping Costs – the underlying costs to the shipowner for operating his service into each terminal.

A review of costs in each sector is aggregated to provide a picture of the total costs entailed in transiting a particular port. When a shipping line is evaluating the economics of a particular port call (or establishment of a hub operation), it is the total costs that are of primary importance. Of course other factors are also assessed, but the current analysis provides an authoritative review of the current competitive position perceived from the narrow cost-based perspective.

Stevedoring Charges

A series of detailed analyses of actual charges paid for container handling in the regional terminals has been developed during the period since 1992 – with this utilising typical consignment sizes and a review of specific costs by sector. For WCT it will be the development of container handling charges in both the import/export and transshipment markets that is of relevance.

Clearly, the actual level of stevedoring charges that will be levied at WCT must be uncertain. In this review it is assumed that the charges raised by Hesse-Noord at their major Scheidt terminals in Antwerp will be realised at the new facilities. Given comparative cost structures (and a lack of complex existing work practices) this is seen as a reasonable assumption.

Import/Export Container Handling Charges in the Regional Market

In our analysis of the regional stevedoring market the following points may be made:

- Rotterdam is significantly cheaper than German ports. This will be important in competing for the developing eastern markets in the next few years;

- In 2001 costs at the ECT Delta terminal were more than 25 per cent higher than at the River Scheldt berths. A major recent trend has been a narrowing of this gap – to around 7 per cent at present. This reflects growing congestion at Antwerp and moves to improved productivity in Rotterdam;
- Antwerp stevedores are very efficient in contrast to the current operational and cost standards that have been noted at ECT.

On this basis it is assumed that stevedoring charges of around \$97-60 per container could be achieved at WCT – this level is some 6 per cent cheaper than at the Delta terminals in Rotterdam. It may be that container handling could be achieved at a cheaper rate in Vlissingen but for the sake of caution the rates achieved in Antwerp have been used in the analysis.

These costs are detailed in Table 4.7.

Table 4.7
Built-Up Costs for Import/Export Containers via Immediate Market Ports in 2003
- import/export containers

	Zeebrugge	Antwerp Scheldt	Antwerp Inner	Rotterdam Delta	Rotterdam Waalhaven	Vlissingen*
4000TEU Vessel						
US\$ per container						
Vessel Costs	22.06	27.07	40.77	17.84	23.77	16.32
Port Charges	13.15	18.73	23.26	23.56	23.53	16.11
Stevedoring Charges	60.69	97.61	67.90	103.98	90.19	97.61
Total	95.90	143.41	131.93	145.38	137.49	130.04
Percentage						
Vessel Costs	23.0	18.9	30.9	12.3	17.3	12.5
Port Charges	13.7	13.1	17.6	16.2	17.1	12.4
Stevedoring Charges	63.3	68.1	51.5	71.5	65.6	75.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
6500TEU Vessel						
US\$ per container						
Vessel Costs	31.45	37.70	na	25.65	na	23.36
Port Charges	14.01	21.22	na	29.23	na	18.29
Stevedoring Charges	60.69	97.61	na	103.98	na	97.61
Total	106.15	156.53	na	158.86	na	139.26
Percentage						
Vessel Costs	29.6	24.1	na	16.1	na	16.8
Port Charges	13.2	13.6	na	18.4	na	13.1
Stevedoring Charges	57.2	62.4	na	65.5	na	70.1
Total	100.0	100.0	na	100.0	na	100.0

* - assumes stevedoring charge as at Antwerp Scheldt terminals

Source: Ocean Shipping Consultants Ltd.

Transshipment Container Handling Charges in the Regional Market

Whilst there is a relation between the handling costs associated with import/export containers and the transshipment market, the overall position is seen to be fundamentally distinct. This situation has developed rapidly over the past few years as the scale of the transshipment market has increased. This sector is seen to be even more competitive and it is also necessary to include an appraisal of cost structures in UK ports (basically, Felixstowe) in this analysis.

A degree of stratification of the transshipment market is noted in the region. On the one hand there is an established focus for transshipment between the triangle of Felixstowe, Antwerp and Rotterdam. In this region, established transshipment markets are focused on the western and north-western European markets and the actual level of transshipment costs is fairly low. Very significant flows are transshipped between Belgium, the Netherlands and the UK.

A secondary (and more rapidly developing) sector is focused on the eastern region of the Baltic/Scandinavian markets. In this market, competition is more directly focused amongst the German ports and Rotterdam, with the typical costs involved seen being significantly higher. The Vlissingen terminals will be competing in both market sectors.

Table 4.8

Built-Up Costs for Transshipment Containers via North Continent Ports in 2003

- transshipment containers

	Antwerp Scheldt	Rotterdam Delta	Felixstowe	Vlissingen*
US\$ per container				
Deepsea Shipping				
Vessel Costs	37.70	25.65	21.00	23.36
Port Charges	21.22	29.23	25.53	18.29
Total	58.92	54.88	46.53	41.65
Feeder Shipping				
Vessel Costs	28.16	13.59	12.63	13.12
Port Charges	20.52	16.75	14.89	13.58
Total	48.68	30.34	27.52	26.70
Stevedoring Charges	129.93	120.00	149.48	129.93
TOTAL	237.53	205.22	223.53	198.28
Percentage				
Vessel Costs	27.7	19.1	15.0	18.4
Port Charges	17.6	22.4	18.1	16.1
Stevedoring Charges	54.7	58.5	66.9	65.5
Total	100.0	100.0	100.0	100.0

* - assumes stevedoring charge as at Antwerp Scheldt terminals

Source: Ocean Shipping Consultants Ltd.

Table 4.8 summarises the current competitive costs for transshipment container handling in the region. Some general points may be made:

- The differential identified between the competing terminals has declined as the general market has become more competitive in the past few years;
- In terms of service, little differentiates Felixstowe, the Scheldt and the Delta and this further focuses competition on the cost component;
- Antwerp has significantly increased its share of this business – primarily as a result of the relocation of business from Felixstowe. Lack of capacity in UK ports has seen the import/export market account for a much larger share of business in these terminals since 2000.

- Germand ports are considerably more expensive, but they are competing for a somewhat different transshipment hinterland. The price advantage of Rotterdam (and other locations) suggests scope for further competition for the eastern hinterland;
- The additional cost penalties associated with transiting the Scheldt will undermine the role of these terminals in this highly competitive sector in the longer run – especially when ship size also becomes an issue.

It is reasonable to assume that WCT could be operated on a stevedoring charge basis at least comparable with that offered by Hesse-Noord at its existing River Scheldt terminals.

Port Dues and Vessel Charges

In addition to stevedoring charges, another major cost sector is represented by the various charges that are levied by Port Authorities – and other agencies – for the utilisation of dock facilities and for access to the berths.

This represents a highly complex area. The charging structure is seen to be different in each port and there are also great differences between the various locations served within each port. Alternatives have been included in the current analysis, with these being:

- *Deepsea Operations - I.* This assumes the regular berthing of a 4000TEU fully-cellular containership with a GRT of 55,500t, LOA 295m and a draught of 12m. This will regularly call at the identified port but will only appear a maximum of six times per annum. At each call 1530 containers are handled;
- *Deepsea Operations - II.* This assumes the regular berthing of a 6500TEU fully-cellular containership with a GRT of 91,650t, LOA 347m and a draught of 14.5m. This will regularly call at the identified port but will only appear a maximum of six times per annum. At each call 1530 containers are also handled;
- *Feeder Operations.* This assumes the regular berthing of a 1000TEU fully-cellular containership with a GRT of 11680t, LOA 160m and a draught of 7.5m. This will call around 52 times per annum and thus qualify for appropriate discounting. At each call the vessel will discharge 300 containers and load 300 containers. This represents a more intensive use of the hub port.

These conditions are to be seen as representative of the market under review and also to reflect conditions associated with intensive transshipment operations.

Tables 4.7 and 4.8 also summarise the competitive level of port charges on a per container basis for the major regional ports in terms of US dollars. It is important to note that:

- A wide difference in charges is noted between the smaller vessels trading in the feeder sector and the major deepsea liners. This is partially due to the assumptions made about numbers of containers handled, but also underlines the orientation of port charges towards the larger vessel classes. This position is noted in each port.
- Rotterdam is significantly more expensive than any of the Belgian ports for berthing deepsea container vessels (at least in deepsea terminals). The port is around 26 per cent more expensive than its Belgian competitors. In some cases the scope for negotiation is greater in Belgium and actual differences may be greater.
- The indicated charge levels applicable at Vlissingen are seen to be highly competitive within the range as a whole.

These differentials are a reflection of the requirement for Antwerp to offset the higher charges associated with traversing the Scheldt to reach the terminals. The greater flexibility noted at Antwerp is also a reflection of these considerations.

Shipping Costs

So far, this analysis has concentrated on the development of stevedoring charges and the various port dues that are incurred in berthing container vessels at the major terminals. Whilst each of these cost categories is of great importance the actual location of a particular terminal in relation to its hinterland markets is also of equal significance in defining its competitive position. Thus, for example, the time penalty associated with traversing the Scheldt estuary has always been a major disadvantage of calling at Antwerp in contrast to – say – Rotterdam. The costs associated with this have forced the port to minimise costs incurred in other sectors – stevedoring and port dues.

By bringing together cost and time estimations, it is possible to provide an authoritative estimation of the overall costs involved (from a vessel trading perspective) for the use of different ports.

Rotterdam currently enjoys the cheapest vessel trading costs from arrival to departure, with this estimated at some \$27,300 for a 4000TEU unit. The corresponding figures for the Antwerp terminals are much higher at \$41,400 for the Scheldt terminals and \$62,400 for the inner terminals. This is the direct result of the longer transit time involved in reaching the berths and leaving. Given the focusing of competition between the Scheldt and the Delta, it is interesting to note that this equates to a per-container cost advantage for Rotterdam of some \$5. Whilst it is clear that this does not offset higher charges in other sectors, it is a clear benefit.

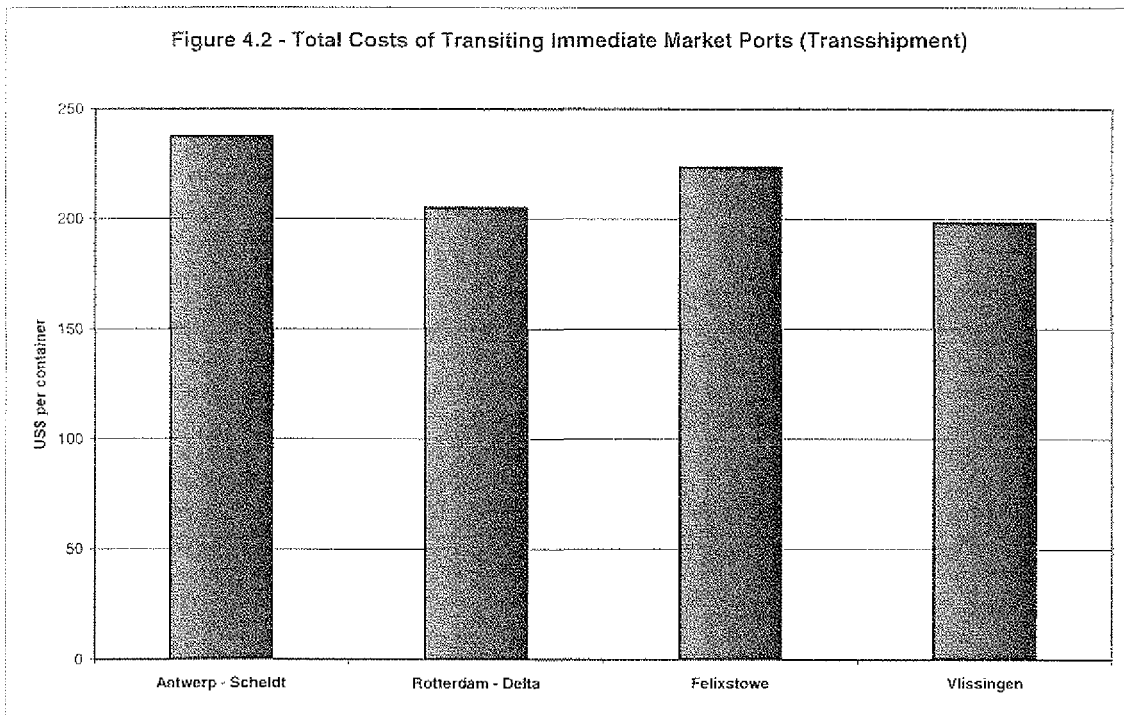
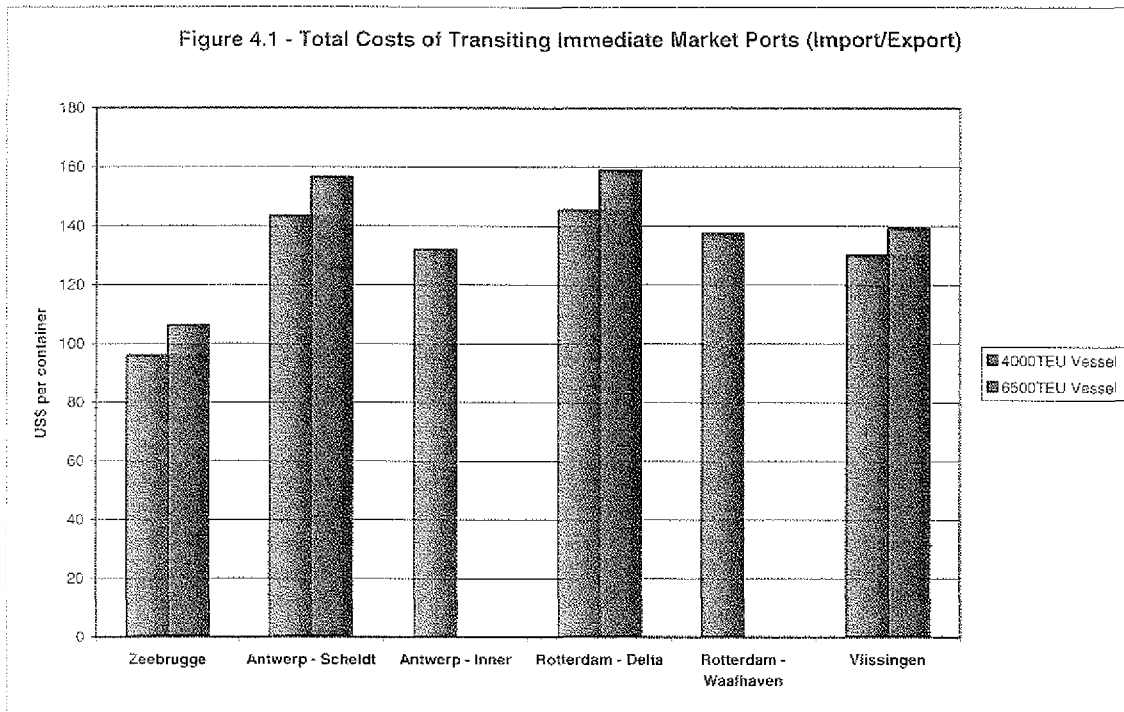
It is the one of the major conclusions of this study that the overall competitive position of WCT is a function of the interaction of costs in various sectors. Thus, the actual costs associated with trading vessels via each port represent only a single aspect of the competitive position. However, it is clear that the location of the planned facilities generates considerable advantages in contrast with Antwerp and these are of the same magnitude as for the Delta terminals in Rotterdam.

In the case of vessel trading charges, it is clear that the location of the facilities, and the relatively rapid handling rates assumed, together generate a highly competitive cost structure. This is most pronounced, of course, in competition with river ports where a significant time penalty is always incurred. The position of WCT is very favourable from this perspective.

A parallel analysis has been developed with regard to a typical feeder trade. Once again a clear distinction is noted between, on the one hand, Rotterdam and Felixstowe where the overall time associated with port access is limited, and on the other hand the river ports of Antwerp and Hamburg where considerable further time (and cost) penalties are incurred. Vlissingen will clearly mirror Rotterdam in this regard.

In terms of per container costs, it has been calculated that the time costs associated with calling at Rotterdam and Felixstowe are very similar at \$13.6 and \$12.6, respectively. This firmly locates the focus of competition for transshipment in the region between these two terminals. Costs at Antwerp are considerably higher and this will represent an increasing barrier in the development of feeder operations via these ports. It is apparent that WCT would also offer a highly competitive per container cost structure, with this currently being estimated at some \$13.1 per unit.

The overall costs of using the different ports are further summarised in Figures 4.1 and 4.2. Figure 4.1 details the total import/export costs (stevedoring, port charges and vessel costs) for each terminals with 4000TEU and – where possible – 6500TEU capacity vessels. It is clear that WCT is considerably cheaper than either the Antwerp Scheldt or Rotterdam Delta terminals. With a total cost of some \$130 per container – this is 9.3 per cent cheaper than the Scheldt and 10.6 per cent cheaper than the Delta terminals.



With regard to the transshipment market, the total estimated costs of transiting Vlissingen will be around \$198 per container. This is much cheaper than either Felixstowe or the Antwerp Scheldt terminals (\$224 and \$238, respectively) and is seen to be marginally cheaper than the position at the Rotterdam Delta terminals. This indicates a competitive position for this business sector.

On the basis of this detailed analysis (which brings together all the major cost sectors relevant for port transit) and by making some reasonable assumptions concerning the planned terminal at Vlissingen with regard to port dues and stevedoring costs, then the position is seen to be very positive. This is seen to be true for both the both the import/export and transshipment container markets. From the built-up cost perspective the project would thus seem to be very competitive. The development of cost structures since 2001 have confirmed the position and the differential advantage of WCT is still clearly apparent.

4.5 The Productivity of the Terminal

The productivity (or utilisation rates) of major regional terminals in the North Continent market for the period since 1995 is summarised in Table 4.9. The major terminals in Belgium and the Netherlands are seen to be considerably more productive than competitive German terminals. Within the Immediate Market it is clear that utilisation rates at Hesse-Noord's terminals in Antwerp are significantly higher than average, and the productivity of these facilities has sharply increased since 2000.

Table 4.9
Major North Continent Terminals: Productivity Indicators 1995-2002

	1995	1999	2002
HIN (former Hessenatie) Scheldt Terminals - Antwerp			
TEUs per Berth Metre	579.0	932.0	924.0
'000 TEUs per Terminal Hectare	11.9	19.2	19.0
'000 TEUs per Container Gantry	113.7	137.3	136.1
HNN (former Noord Natie) Scheldt Terminals - Antwerp			
TEUs per Berth Metre	-	433.0	819.0
'000 TEUs per Terminal Hectare	-	9.2	17.4
'000 TEUs per Container Gantry	-	97.4	115.2
ECT - Delta Terminals - Rotterdam			
TEUs per Berth Metre	770.8	917.8	846.0
'000 TEUs per Terminal Hectare	13.2	15.5	11.4
'000 TEUs per Container Gantry	134.6	119.6	87.4
HHLA Terminals - Hamburg			
TEUs per Berth Metre	431.5	568.1	790.0
'000 TEUs per Terminal Hectare	9.3	12.8	15.0
'000 TEUs per Container Gantry	64.4	57.5	110.0
Eurogate Terminals - Bremerhaven			
TEUs per Berth Metre	425.0	717.6	810.0
'000 TEUs per Terminal Hectare	8.6	8.8	15.5
'000 TEUs per Container Gantry	72.5	179.4	126.7

Source: Ocean Shipping Consultants Ltd

This position is further confirmed by a review of handling rates secured at major container terminals in the Immediate Market for 1998/2003, with this analysis being summarised in Table 4.10. This presents a quantification of typical container handling rates on an hourly basis during the actual container handling aspect of container operations. This 'through-the-ship' estimate does not relate to peak handling rates, but rather what can be regularly achieved during the handling of large vessels with high consignments. This data has been collated from reports from major shipping lines using one or more of these terminals.

The fastest handling rates are secured at the major Antwerp River Scheldt terminals where hourly rates of 135 moves are recorded. These rates have significantly improved in the

period since 1998. There has been a similar productivity increase in Rotterdam, but the differential between these locations has been maintained. It is also important to note that the speed of container handling at the Antwerp Inner Docks and at Zeebrugge is reported to be significantly slower.

Productivity rates at the existing Hesse-Noord terminals in Antwerp are already very high. There is seen to be only little scope for the further addition of capacity within the conventional handling framework utilised by the major stevedores. Indeed, the position is currently characterised by worsening congestion as productivity rates increase to such a level where service standards decline. Other ports in the region have not reached the levels of sustained productivity regularly recorded at Antwerp.

Table 4.10
Optimised Handling Rates at Major Container Terminals 1998-2003

- number of containers per hour*

Terminal Location	Containers/hour - 1998	Containers/hour - 2000	Containers/hour - 2003
Zeebrugge	102	104	104
Antwerp - River Scheldt	121	135	135
Antwerp - Inner Terminals	95	95	95
Rotterdam - Delta	112	120	123

- for deepsea services

* - overall average 'through the ship'

Source: Ocean Shipping Consultants Ltd.

It is reasonable to assume that WCT could be operated on a stevedoring productivity rate that is comparable with that offered by Hesse-Noord at its existing River Scheldt terminals. This indicates that productivity will potentially be very high and competitive at WCT.

4.6 The Competitive Position of the WCT versus Other Immediate Market Locations

This analysis has detailed the competitive position of WCT as a location for container handling from a variety of perspectives and the position is clearly one of a very positive market position. This Section concludes by presenting a subjective assessment of the overall competitive position of the port in contrast with other locations in the Immediate Market.

Table 4.11 summarises the competitive position of WCT in relation to other existing and potential locations from the following perspectives:

- Marine access and capacity considerations;
- The location of the terminal in relation to its hinterlands;
- The costs of transiting the facility;
- The productivity of the terminal;
- The adequacy of hinterland links.

WCT is seen to score very positively in each sector. The terminal is seen to be highly competitive with regard to marine access considerations (especially with regard to the next generation of vessels) and will offer effective and competitive through costs and intermodal linkages. In addition, the transfer of Hesse-Noord stevedoring techniques to the project should result in a highly competitive productivity level.

The only slight difficulty relates to the lack of an immediate (or local) hinterland. This, by itself, need not be a problem given the highly competitive specification offered by the terminal as a whole. The facility will enjoy a broad sea and landside hinterland and will also be able to compete for the Antwerp and Rotterdam markets given its relative proximity to both regions.

Table 4.11
The Competitive Position of WCT Versus Other Immediate Market Ports*

	Antwerp	Zeebrugge	Vlissingen	Rotterdam	Amsterdam
Marine access, capacity for largest vessels	***	*****	*****	*****	***
Position in relation to local market	*****	***	***	*****	***
Built-Up Costs	****	*****	*****	***	***
Terminal Productivity	*****	***	*****	***	*****
Intermodal capability	****	**	*****	*****	***
Total	21	18	23	21	17

- higher ranking indicates greater competitive advantage

Source: Ocean Shipping Consultants Ltd.

This review indicates that WCT will be the most competitive location for the required container terminal capacity. The other ports have severe capacity, inland links and cost constraints that will limit the pace of development. Furthermore, it is far from clear that the required developments can be provided within an acceptable timeframe. All these factors firmly count in favour of the WCT developments.

It has not been necessary to modify this conclusion in the period since the earlier (2001) review.

4.8 WCT: a SWOT Analysis

The analyses in this paper has been established that:

- There will be a significant increase in demand for container handling in the Immediate Market.
- The introduction of new capacity will be clearly required if this demand is to be accommodated.

- WCT is a highly competitive location for planned additional port capacity and developments in the shipping markets will favour the Vlissingen project.

This Section provides a summary of the market position of the proposed terminal investments in the form of a 'SWOT' analysis – strengths, weaknesses, opportunities and threats.

The following analysis summarises the competitive position of WCT in each of the major sectors of the existing and forecast hinterland:

- Local Demand – essentially Antwerp/Rotterdam and environs;
- The Rest of the Immediate Market;
- The Broader North European Markets;
- The Transshipment Markets.

Local Demand

In contrast to both Antwerp and Rotterdam, there is no local market for containers at Vlissingen. It has been a major strength of both of the existing ports that a large number of containers are 'Bill of Lading' to local destinations. However, such are the advantages identified with regard to vessel access and costs, that a significant role can be anticipated in these markets – especially as the Antwerp and Rotterdam terminals become congested.

Already there is a high degree of competition between these two locations for 'swing cargo' between the ports and considerable numbers of containers are repositioned – by barge – between Antwerp and Rotterdam terminals. The recent establishment and expansion of low cost barge transfer between the two ports indicates the ease with which WCT could serve both local markets.

The development of WCT would provide an ideal location for these cargoes and result in a minimal cost – especially when linked to identified low transit charges and access to the largest classes of vessels. The actual distances involved in delivery to both Rotterdam and Antwerp are very limited and WCT is equally well placed to serve both markets.

The Rest of the Immediate Market

The low costs and high productivity anticipated for WCT – together with access to the largest vessels – indicate that Vlissingen will be a highly attractive location for lines seeking to centralise their services for the entire Immediate Market. In these markets the competitive position will continue to depend upon the provision of new and deeper water facilities.

There will be an accelerating requirement for deepwater berths – especially in the Asian trades. It will be difficult to provide these in Antwerp and costs are very high in Rotterdam. These conditions will favour the market role of WCT in this sector.

The Broader North European Markets

The hinterland of the WCT will extend across the whole of northern Europe. The port will compete directly with existing terminals in Rotterdam and Antwerp and – on the basis of the analysis summarised in this Section – will clearly have a major role to play. The port will offer competitive marine access at a cost level significantly lower than in Rotterdam. Further, highly competitive barge and rail links will form an integral part of the project, although at WCT the developments of these links will take some time to be fully integrated.

The Transshipment Markets

The transshipment of containers at hub ports has been a growing trend in the major world and European markets since the mid-1990s. This is a natural consequence of the continuing increase in vessel sizes and the concentration in port calls. WCT will be ideally configured to serve these requirements. The advantages centre on marine access, low costs and anticipated high productivity. The provision of a deepwater extension to the Port of Antwerp is a major feature of the WCT project.

This will be a major feature of the WCT cargo base and will allow a competitive option to Rotterdam Delta to be developed within the western part of the North Continent port range.

The relative position of WCT in each sector is summarised in Table 4.12.

It should be noted that the development of demand and supply since 2001 has closely followed the anticipated part. Further, the development of competitive pressures in the Immediate Market and in the broader north Europe region has confirmed the competitive position of the proposed Vlissingen terminal. A strong and competitive case has been established for the development of the project.

Table 4.12
Summary SWOT Analysis for WCT by Market Sector

Market Sector	Strengths	Weaknesses	Opportunities	Threats
<u>Local Demand - Antwerp, Rotterdam & Immediate Region</u>	<ul style="list-style-type: none"> * Good marine access for largest vessels * Single call possible to serve both Markets * High terminal productivity * Competitive costs v. Rotterdam * Presence of a major stevedore 	<ul style="list-style-type: none"> * Lack of local market base - no 'Bill of Lading' Vlissingen 	<ul style="list-style-type: none"> * Optimum location to deepwater terminal * Lack of dredging requirement * Possibilities for fresh labour relations 	<ul style="list-style-type: none"> * Delays will restrict short/medium term development of the project * Rotterdam efficiencies boosted
<u>The Rest of the Immediate Markets</u>	<ul style="list-style-type: none"> * Good marine access for largest vessels * Single call possible to serve entire Immediate Market * High terminal productivity * Competitive costs v. Rotterdam * Presence of a major stevedore 		<ul style="list-style-type: none"> * Optimum location for deepwater terminal * Lack of dredging requirement * Minimal environmental impact * Delays at Maasvlakte II boost short term position * Lack of entrenched labour relations difficulties 	<ul style="list-style-type: none"> * Delays will restrict short/medium term development of the project * Rotterdam efficiencies boosted
<u>The Broader North European Markets</u>	<ul style="list-style-type: none"> * Good marine access for largest vessels * Single call possible to serve entire Immediate Market * High terminal productivity * Competitive costs v. Rotterdam * Presence of a major stevedore and rail 	<ul style="list-style-type: none"> * Competitive intermodal linkages already established from other ports which will contribute to this demand 	<ul style="list-style-type: none"> * Optimum location to deepwater terminal * Lack of dredging requirement * Minimal environmental impact * Delays at Maasvlakte II boost short term position * Lack of entrenched labour relations difficulties * Scope to develop optimum uncongested intermodal links 	<ul style="list-style-type: none"> * Delays will restrict short/medium term development of the project * Rotterdam efficiencies boosted * Development delays allows German terminals to take market share

Market Sector	Strengths	Weaknesses	Opportunities	Threats
<u>The Transshipment Market</u>	<ul style="list-style-type: none"> * Good marine access for largest vessels * High terminal productivity * Competitive costs v. Rotterdam * Presence of a major stevedore * Optimum placement for dynamic market sector 		<ul style="list-style-type: none"> * Optimum location to deepwater terminal * Lack of dredging requirement * Minimal environmental impact * Delays at Maasvlakte II boost short term position * Lack of entrenched labour relations difficulties * Delays in UK port development boosts transshipment potential 	<ul style="list-style-type: none"> * Delays will restrict short/medium term development of the project * Rotterdam efficiencies boosted * Planning delays eased in UK boost competition * Delays in development favour German terminals

Source: Ocean Shipping Consultants Ltd.

SECTION 5 – THE MARKET JUSTIFICATIONS FOR THE WCT DEVELOPMENTS

5.1 Introduction

This study has developed extensive analyses of the regional container port markets and has demonstrated both the requirements for additional container handling capacity and also the competitive position of the proposed WCT terminal. The arguments of this study may be summarised as follows:

- A rapid and sustained increase in immediate regional container port demand has been identified. This will expand at an annual average rate of between 4.6-5.6 per cent until at least 2020.
- This demand will be focussed on the provision of deepwater capacity. It will be vital to berth the largest classes of vessels within an acceptable tidal window.
- This demand will become increasingly concentrated as the lines consolidate and require much higher capacity terminals offering large areas, continuous quayage and the scope for steady expansion.
- It is forecast that under the Base Case an additional 6.2m TEU of capacity will be required for this region by 2010, with a further need for 9.6m TEU of additional capacity generated between 2010/2020. Under the Enhanced Globalisation scenario the corresponding figures are 7.7m TEU and 13.4m TEU respectively.

Massive new capacity will be required that must be optimally located and configured to meet market requirements and to minimise environmental impact. The proposed facilities at WCT will provide a useful contribution to providing this new capacity, with the focus being on the berthing of the largest vessels and development of the transshipment market.

5.2 Alternative Capacity Solutions

In addition to the development of WCT, this capacity could (at least in theory) be provided by combinations of the following:

- Increased productivity of existing terminals;
- Expansion of capacity at Rotterdam;
- Further developments at Amsterdam;
- Expansion of capacity at Zeebrugge;
- The development of capacity at Antwerp.

It has been established in this study that, in terms of the facilities to be provided, the WCT option is highly competitive in comparison with other possibilities. Further, it is also apparent

that the addition of smaller capacity terminals at other locations will not be well suited to the development of regional demand. Also, the timing of these developments remains unclear.

Firstly, with regard to boosting productivity in existing terminals, the projections of supply and demand summarised in Section 3 already incorporate a significant increase in productivity levels at the major regional terminals. It is apparent from this analysis that, although significant improvements can be made and are anticipated, this cannot solve the problem of required capacity expansion. New terminals will be required to meet demand.

Development at Rotterdam

Rotterdam is currently suffering from emerging capacity constraints for deepwater operations. In the medium term this will be partially offset by the capacity at the P&O Nedlloyd Euromax terminal. However, delays that have been noted with the Maasvlakte II project mean that it is unlikely that massive new capacity will be available at the port before 2007 at the earliest, with further capacity after 2010.

- Over the medium term Rotterdam will not have the capability to provide required capacity to fully service the market. In the meantime, increasing congestion will be noted.
- Rotterdam is a competitive solution for the Immediate Market as a whole, but it does have significantly higher costs for container transit (although its position in the entire North Continent market is much more positive).
- A review of market conditions indicates that even when the Maasvlakte II project is initiated, there will be sufficient demand to justify both these deepwater facilities and also the proposed WCT project.
- At present, the Rotterdam Delta facilities (i.e. ECT and Maersk Delta) enjoy a near monopoly position with regard to deepwater in the Immediate Market. The situation has been further underlined by the recent takeover of the smaller stevedore Hanno by ECT. This could, of course, change when the final ownership of the existing Maasvlakte terminals is resolved. The development of new WCT facilities and the introduction of new stevedores into the market will boost competition in the region.
- The port is configured as a major terminal serving the central and eastern European regions and is in direct competition with German ports for these markets. It is also a major transshipment location. Despite this, other problems such as relatively high costs and poor productivity have resulted in a decline in market share of late.
- A clear market opportunity has been identified for WCT over and above and in competition with the deepwater Rotterdam facilities.

In the light of these factors, it is clear that, although the new facilities at Vlissingen will compete directly with the deeper terminals in Rotterdam, there is room for developments at both locations. Also, the continuing delays with Maasvlakte II further emphasise the requirements for WCT investments to provide necessary capacity within the required timeframe to meet forecast demand. Our estimations further indicate that there will be sufficient demand to absorb capacity at WCT, the Delta and Maasvlakte II. The capacity proposed at Rotterdam is not a full alternative to WCT.

Development at Amsterdam

Considerable marketing effort has been directed towards developing a customer base for the new Ceres container terminal in Amsterdam. Although this will undoubtedly introduce new and highly efficient handling capabilities, there are several drawbacks that indicate this cannot be a solution to identified needs. Indeed, the failure of the terminal to secure a major customer in the two years since its inauguration confirms the difficulties with this location.

- It has been estimated that, following Phase II development, the terminal will offer an estimated 1.8m TEU of capacity. Although useful, this will be ultimately constrained and will not provide the total capacity needed. Further, there are clear question marks over the actual further development of the terminal. This would further reduce the feasibility of this port as an alternative location for identified demand.
- The location of the terminal is problematic. The inlet dock configuration has the possibility to offer very efficient container handling – up to 250 containers per hour has been quoted. However, the access through the IJmuiden lock and then to/from the terminal will delay vessel turnaround. The impact of this on total port turnaround times is likely to be prohibitive.
- There are major uncertainties with regard to the sufficiency of the intermodal links. In contrast to both Rotterdam and WCT, there are restrictions on barge handling and severe road congestion can be anticipated.
- The capacity, as offered, will not cater for the current largest and anticipated future container vessels. This will restrict the role of the port.

Amsterdam still has the potential to offer a useful addition to the regional container handling market – although the actual failure to attract customers must call this into question. It is apparent that the facility will *not* be competitive with the existing and planned deepwater terminals at Rotterdam and Vlissingen.

Development at Zeebrugge

Zeebrugge is less than optimally located for large-scale container terminal development, and this has been manifest in the lack of lo-lo customers at the deepwater terminals. The following constraints have been identified:

- Virtually all containers for the Antwerp market would have to be trucked to the locality with this generating a major adverse environmental impact. The so-called rail-barge system will only contribute a limited capability.
- Further development of volumes at the port would not deliver the capacity required to meet identified regional demand.
- The port is severely penalised by inadequate intermodal connections (especially for barging). Attempts to rectify this shortfall have not been successful.

Even if further capacity were to be considered at Zeebrugge – say to around 2m TEU of capabilities – then the following would still constrain development:

- It is not clear over what timeframe this could be provided.
- It would not be sufficient to meet demand.
- The inland links and the need to position containers to/from Antwerp would generate a severe environmental impact.
- The existing failure to develop container flows at the port underlines the lack of appeal of this location from a market perspective.

It should, however, be noted that the potential timeframe to increase capacity in Zeebrugge, should it be chosen for development, could be short as there are no environmental constraints and no extensive dredging would be required.

Development at Antwerp

Further capacity is clearly required at Antwerp and the Left Bank project is seen to offer the correctly configured facilities to meet this demand¹. Other development possibilities within Antwerp are severely constrained:

- With regard to further developments at the existing Right Bank Scheldt terminals, it is apparent that these facilities are already approaching maximum utilisation. Further, it is not possible to significantly increase the capacity of either the Europa or Noordzee Terminals due to technical and operational constraints. A limited increase is possible, but this would not be sufficient to provide anything like the required capacity.
- In the older Delwaidedock it is apparent that this terminal has been losing market share to the River Terminals. The costs of transiting the lock make this location un-competitive for large volume container lines, although it will continue to be used as an interim solution. It is clear that a continued reliance on this location will result in a rapid decline in the relative efficiency of Antwerp in the market and this cannot represent a long-term solution. Although MSC has decided to upgrade its terminal at this location this is a reflection of current capacity constraints in the port. As new optimised capacity comes on-stream this location will become increasingly obsolete.
- There are other sites on the Left Bank Terminals behind the locks, but these facilities will not be competitive due to the time and cost penalty associated with transiting other locks. These factors alone count against alternative developments of the Left Bank.

It is clear that the development of new facilities in Antwerp will have to be focused on the Left Bank. There are, however, constraints that will have a limiting effect on the port. These centre on marine access. Even if the proposed dredging programme is finally authorised, Antwerp will not be accessible to the largest vessels – except under restricted conditions. This factor confirms the requirements for both the Left Bank *and* WCT developments in the market. These facilities should be viewed as complementary to the proposed WCT terminals, with each serving distinct – yet related – markets.

A Combination of Smaller Volume Capacity Developments

A review of planned capacity developments suggests that the combined capacity of smaller facilities and improved productivity could contribute to partially meeting this requirement. However, any such approach will be the subject of several major constraints that indicate that in actual terms this is not a true alternative:

- It is far from clear that such capacity could provide anything like the total anticipated need. Further, it seems extremely unlikely that this alternative could be developed in time to meet anticipated demand growth.
- As has been noted with regard to each alternative location when considered in isolation, there would be a massive requirement to truck containers handled at these ports to/from the Antwerp locality. The major environmental penalties identified in this study will remain under this alternative.
- From a market perspective, this would place considerable additional costs on the shippers and – as has already been illustrated with regard to Zeebrugge where capacity exists – the lines and cargo owners have not developed this alternative.

Combination alternatives will not provide the required capacity that will be needed to meet anticipated demand growth.

¹ 'Port of Antwerp: Deurganckdock Study', OSC May 2001

5.3 Conclusions

There is a clear and pressing requirement for the development of new deepwater container handling capacity in the identified Immediate Market. The other suggested locations for development all involve considerable constraints with regard to marine access, costs and hinterland links. The proposed WCT facilities are seen to be highly competitive from each criteria of appraisal and will provide the required solution to deepsea regional container handling needs within an acceptable timeframe.

Vlissingen will be at least as competitive as Rotterdam and from some viewpoints will be the superior development. Given the delays with Maasvlakte II it is apparent that there will be a lack of capacity for the largest vessel sizes by the end of the decade, even with the addition of Euromax. The WCT project will provide an answer these problems. Indeed, WCT represents the only alternative to Maasvlakte II that can be developed in time for anticipated demand growth.

In the next decade demand will grow in these sectors at a pace that will justify both an expanded Delta and also the WCT terminals. The decision to proceed with WCT will not result in an over-capacity situation.

The development of market conditions since the earlier analyses have not significantly altered these conclusions. Indeed, faster demand growth, renewed uncertainty over capacity provision and a further acceleration in the introduction of larger vessels makes the case for WCT even more pressing.

SECTION 6 – THE TRANSSHIPMENT MARKET

6.1 Introduction – the growth in transshipment demand

As a result of the shift in favour of larger classes of vessels and the move to concentrate container handling at major hub ports, the outlook for European transshipment demand is very positive. This comprises both ‘hub-and-spoke’ and ‘relay’ movements.

- **Hub-and-spoke:** As ship sizes continue to increase and shipping line mergers and alliances continue, the economic advantages of reducing the number of port calls become ever more pronounced. These advantages flow directly from the high capital costs associated with containership and main port construction and the time penalties involved in calling at several ports with small consignment sizes and throughput volumes. The trend to fewer port calls will continue and will favour the larger, centrally placed ports in the region.

Transshipment already has a significant place in the European market and its share is expected to continue increasing. The major lines will continue aiming to serve port regions by as few direct calls as possible, and thus the role of hub-and-spoke container distribution will continue to strengthen.

- **Relay:** The relay sector is driven by different factors, although, from a port perspective, the requirement to move containers between vessels is similar. The aim of relay transshipment is to extend service coverage and flexibility by linking two or more mainline services – typically east-west services with north-south services. This enables carriers to increase the number of revenue earning legs on their larger vessels.

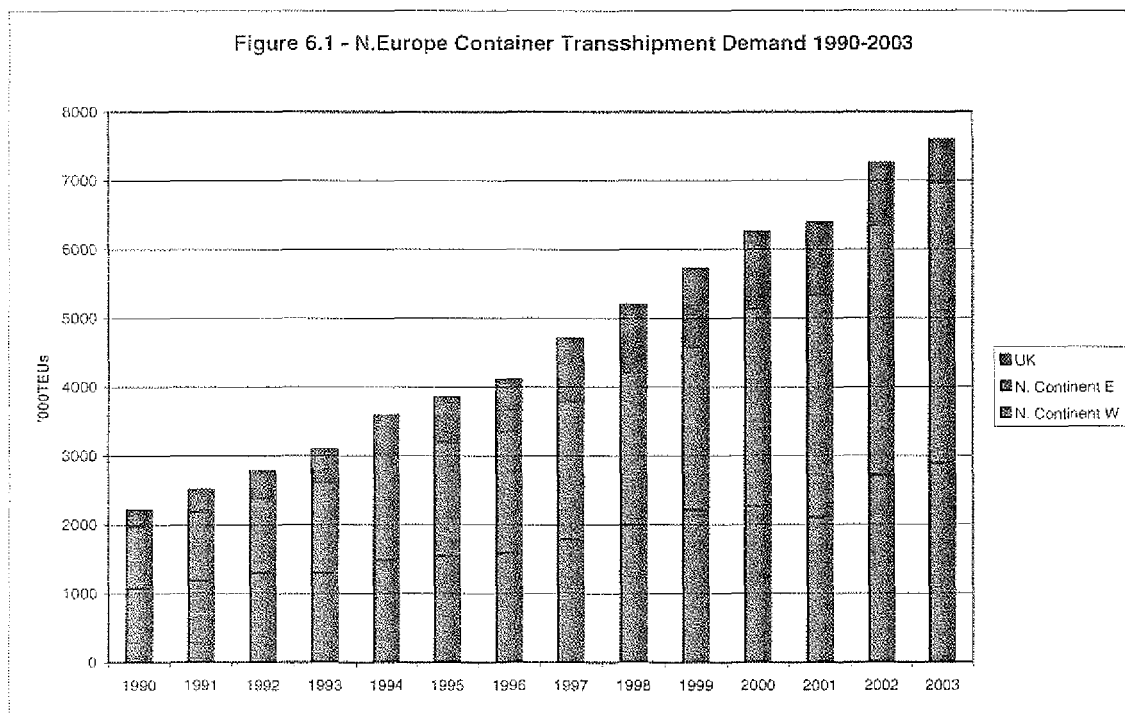
Table 6.1
North Europe Container Transshipment Market by Type 1990/2003

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
'000 TEUs														
N. Continent W	1080.0	1190.0	1300.0	1300.0	1490.0	1549.0	1592.3	1790.5	1999.0	2224.6	2268.6	2114.6	2727.5	2899.2
N. Continent E	894.6	995.3	1090.5	1320.8	1541.7	1647.1	1755.2	2008.3	2205.2	2351.6	2867.2	3231.8	3618.5	4064.5
UK	240.8	323.2	389.4	475.0	552.7	653.4	759.2	914.8	991.2	1148.0	1120.7	1050.0	905.9	626.2
Total	2215.4	2508.5	2779.9	3095.8	3584.4	3849.5	4106.7	4713.6	5195.4	5724.2	6256.5	6396.4	7251.9	7589.9
Percentage														
N. Continent W	48.7	47.4	46.8	42.0	41.6	40.2	38.8	38.0	38.5	38.9	36.3	35.1	37.6	38.2
N. Continent E	40.4	39.7	39.2	42.7	43.0	42.8	42.7	42.6	42.4	41.1	45.8	50.5	49.9	53.6
UK	10.9	12.9	14.0	15.3	15.4	17.0	18.5	19.4	19.1	20.1	17.9	16.4	12.5	8.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

The development of the transshipment sector will, therefore, be a compound of economic growth-induced demand and the policies of major operators in converting direct flows into transshipped flows. Given the importance of major customers within the transshipment market – and their propensity to switch between terminals and ports – actual demand is likely to progress unevenly.

Total North European transshipment demand increased by more than 240 per cent between 1990-2003 to reach 7.59m TEU in 2003 (see Table 6.1). The share of the eastern north continent region rose from 40 per cent to an estimated 54.6 per cent over the period. This has been the result of the increasing importance of feeder volumes for Baltic ports in Finland, Russia and the Baltic States, all serving the CIS markets. More recently, there has been a significant transfer in traffic from Rotterdam to the German ports, some of it accompanying the establishment of a dedicated terminal at Bremerhaven for Maersk Sealand.



For most of the 1990s, the UK gained share from the north continent, but after reaching a peak of 20.1 per cent in 1999, its share has fallen back to just 8.3 per cent in 2003. This has accompanied a tightening of capacity in the UK and a conscious decision by the port of Felixstowe to concentrate more of its available resources on import/export volumes. As planned capacity additions in the western north continent come on stream in the next few years, accompanied by a further narrowing of the supply/demand balance in the UK until at least mid-decade, so this migration of transshipment from the UK to the north continent is likely to continue.

Although there is competition between hub ports in each of the sub regions, it is apparent that the actual locations of different ports are a marginal factor in port choice. Although the German ports are more favourably located for the Baltic (and UK/Benelux ports are better placed for the western markets), it is clear that this business can be undertaken at any of the regional ports. Indeed, a central location – such as that offered by WCT – will allow penetration of all of the markets under review.

The position is further detailed in Figure 6.1.

Table 6.2
The Structure of North European Transshipment Demand 1990/2002

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
000TEUs													
N.Continent	374.5	449.1	495.0	592.4	682.6	729.0	801.5	887.5	1054.4	1294.0	1309.2	1198.5	1074.0
Scan/Baltic	569.3	650.7	730.8	893.7	1060.8	1238.6	1448.8	1661.6	1762.0	1877.2	2133.5	2378.9	2628.8
UK/Ireland	764.8	830.9	944.9	998.1	1134.8	1127.0	1118.7	1235.1	1335.4	1465.9	1584.3	1575.1	2089.6
Others	506.8	577.7	609.2	611.5	706.2	754.9	737.7	906.6	1043.5	1087.1	1229.6	1244.0	1459.5
Total	2215.4	2508.5	2779.9	3095.8	3584.4	3849.5	4106.7	4713.6	5195.4	5724.2	6256.5	6396.4	7251.9
Percentage													
N.Continent	16.9	17.9	17.8	19.1	19.0	18.9	19.5	18.8	20.3	22.6	20.9	18.7	14.8
Scan/Baltic	25.7	25.9	26.3	28.9	29.6	32.2	35.3	35.3	33.9	32.8	34.1	37.2	36.3
UK/Ireland	34.5	33.1	34.0	32.2	31.7	29.3	27.2	26.2	25.7	25.6	25.3	24.6	28.8
Others	22.9	23.0	21.9	19.8	19.7	19.6	18.0	19.2	20.1	19.0	19.7	19.4	20.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.5	100.0	100.0	100.0	100.0	100.0

Source: Ocean Shipping Consultants Ltd.

A further analysis has been developed which focuses on the actual importance of each transshipment region for transshipment/feeder operations and the results are summarised for the entire North European market in Table 6.2. Strong growth has been noted in each region and this is forecast to continue over the future period. The following trends are important:

- From the mid-1990s there was a sharp increase in the share of Scandinavia and the Baltic in total regional demand. This increased in proportional terms from around 30 per cent to a peak of 37 per cent in 2001. This trend will continue as economic growth in the region accelerates and there is increased integration of the local economies into the EU.
- The role of the UK as a feeder market has declined from a peak of 34 per cent in 1992 to a low of 24.6 per cent in 2001. This has followed from the increased importance of major UK ports as load centres and the concentration on direct call business. More recently, renewed demand growth has been noted, as port capacity limits in the UK have redirected some business in favour of smaller UK ports.
- There has been an increase in container volumes feedered between North Continent ports, and this resulted in an increase in market share for this sector. More recently, there has been some decline in the significance of this sector.

6.2 The Economics of Transshipment

The competitive position of transshipment and feeder services represents a complex interrelation between the costs of shipping, port and terminal handling and associated costs and the structure of the particular trade under review. This represents the interplay of fixed and variable costs and is influenced directly by the consignment size and the structure of inland transport costs for final delivery. Essentially, this represents a micro-economic analysis and the correct competitive position of direct versus transshipped delivery is seen to vary widely on a case-specific basis.

The degree to which transshipment demand will develop in the future will be a function of numerous interrelated factors. These will include:

- The further increase in vessel sizes and the moves to reduce port calls in the North Europe port range.
- The related issues of port and terminal accessibility for the largest classes of vessels.
- The future development of built-up costs for direct calls versus transshipped operations.
- The local balance of supply and demand in a particular port market – i.e. the availability of capacity for transshipment operations.
- The degree of shipping line investment in dedicated terminals – with this effectively anchoring a line in a particular port.
- The further development of relay operations linking deepsea services at a particular terminal.

In analysing the development of the economics of direct versus transshipped container delivery, it is necessary to identify other major cost sectors in addition to built-up container handling charges. These include:

- Feeder container freight rates – deliveries from the hub port to the destination port.
- Stevedoring charges – the additional cost of 'double handling' at the hub port.
- The structure of regional trades.
- Inland cost structure – use of small vessels often allows delivery to the 'most convenient' local port rather than to a major deepsea gateway.

Case Study – serving the UK by continental transshipment

For a market the size of the UK, the total volume of trade usually justifies shipping lines offering direct calls; the transshipment of containers presents a significantly higher cost structure.

In analysing the economics of direct versus transshipped container delivery, it is necessary to identify major cost sectors. This results in a complex analysis of the relative costs of direct versus transshipped operations for the UK that is based upon micro-economic analyses. In the current context the overall position is summarised as follows:

Table 6.3 provides a sample calculation that identifies the relevant cost for direct versus feedered container shipments into the UK market. This is based upon current cost structures and typical deployment patterns. This calculation defines the cost difference per container for a direct call versus transshipment for a consignment size of 200 containers. In this example, the cost differential favours the direct call by £69.28 per container. Clearly, the direct call option is preferable for this trade pattern, saving the shipping line a total of £13,856 per call. This simplified example illustrates the existing strong position of direct calls in the UK market.

Using the same methodology, Figure 6.2 compares the costs for direct calls with that of transshipment across a range of consignment sizes, to derive the resulting cost advantage or disadvantage by consignment size. It is clear from this that direct calls at UK ports are justified for all but the smallest consignments. Note that beyond 240 containers (roughly 350 TEU), there is no further reduction per TEU for the transshipment option; this is because the capacity of the feeder vessels used on these trades is currently around 350 TEU.

For the smallest consignment sizes, nevertheless, it remains more economic to utilise the transshipment option: for a consignment size of 50 containers, there is a £176.85 per container advantage for choosing this option in current market conditions. The transshipment advantage decreases with increasing consignment size and, beyond a certain volume, the cost advantage swings in favour of direct calls. This cost advantage increases progressively with the size of consignment (principally as a result of spreading marine charges over a greater number of boxes). The cut-off point will vary according to prevailing market conditions: at current cost structures, the cut-off point is a consignment size of around 105 containers.

As the number of containers increases, the savings multiply rapidly. The implication of these cost structures for typical customers of the major UK container ports can be calculated as follows:

	<i>Transshipped</i> £ per box	<i>Direct</i> £ per box	<i>Differential</i> £ per box	<i>Total</i> £
<i>Large customer (1,500 boxes)</i>	255.24	76.69	178.55	267,825
<i>Medium customer (900 boxes)</i>	255.24	86.39	168.84	151,956
<i>Small customer (300 boxes)</i>	255.24	134.93	120.31	36,093

Table 6.3

Sample Calculation – Built-Up Cost Differential for Transshipped Containers versus Direct Call

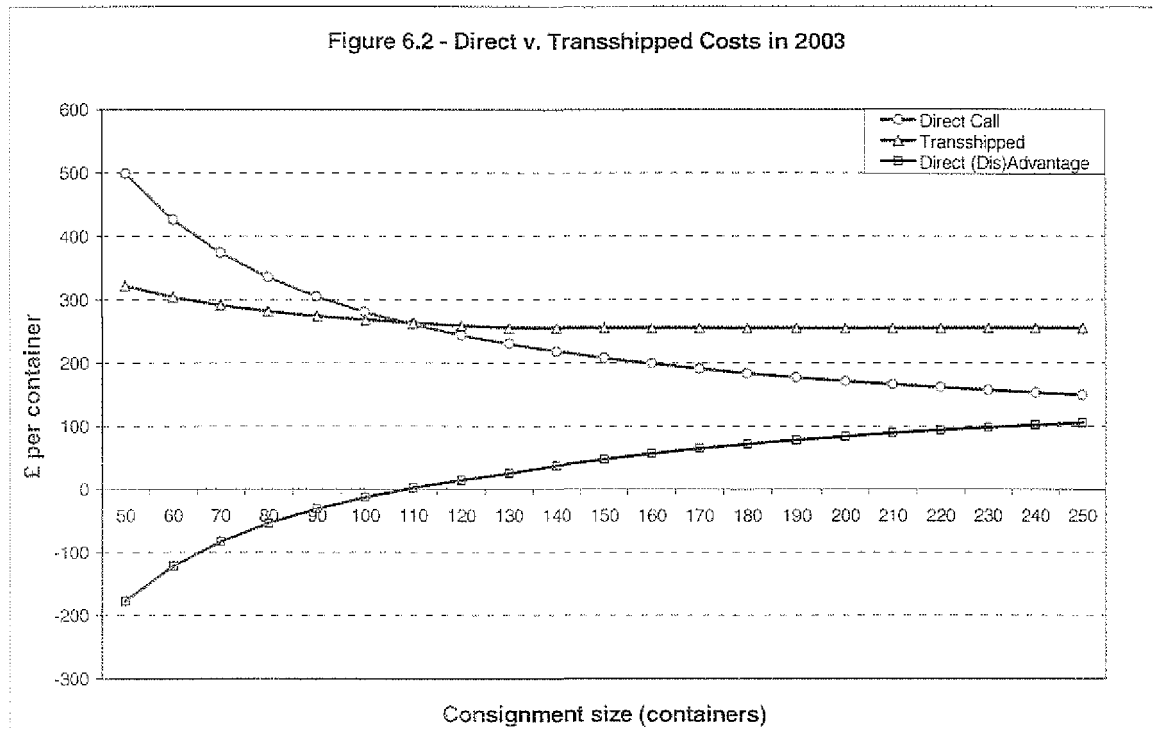
<i>Cost for 200 containers</i>	£ per container	Total (£)
<u>Direct Shipment</u>		
Marine Charges - Felixstowe		21,840.53
Handling Charges – Felixstowe	62.13	12,425.25
Total		34,265.78
Charge per container		171.33
<u>Transshipped Containers</u>		
Marine Charge – Rotterdam	24.99	4,998.54
Handling Charge Rotterdam	68.90	13,780.73
Marine Charges – Immingham		5,431.89
Handling Charge – Immingham	49.24	9,847.18
Shortsea freight rate	102.99	20,598.01
Inland saving*	-32.67	-6,534.00
Total		48,122.35
Charge per container		240.61
<i>Felixstowe (dis)Advantage</i>		69.28

* - using local port instead of Felixstowe

Source: Ocean Shipping Consultants Ltd

Of course such analyses are always dependent upon specific market conditions. For example, the size of deepsea vessels is increasing – as are the sizes of vessels that will be used on the feeder trades. At the same time the costs of inland delivery from a deepwater port in contrast to a (perhaps more favourably sited) local port will also change as congestion worsens in a particular market.

Having said this, however, the pace of demand growth for each of the feeder trades under review is determined by these micro-economic analyses, together with the specific position of a particular line's (or consortium's) trading pattern. What is clear, however, is that there will be strong further demand growth noted in the transshipment sector and that this will constitute a major market opportunity for WCT.



The Structure of Regional Container Trades

The structure of the European container feeder and shortsea trades is extremely complex, with many different services linking the major trading regions and the hub ports. In the current analysis, attention is directed towards the structure of some representative – relatively high volume – feeder trades. Typically, the deployment of feeder services is characterised by a series of port calls providing a weekly port rotation. This reflects the structure of deepsea calls and minimises the through transport time for feeder operations.

Table 6.4
Representative European Feeder Schedules

- seven day round voyages

North Continent to Ireland	North Continent to UK	North Continent to Scandinavia/Baltic
Rotterdam - 0	Rotterdam - 0	Hamburg - 0
Dublin - 2/3	Grangemouth - 2	Helsinki - 2/3
Le Havre - 4/5	Immingham - 3/4	Gothenburg - 4/5
Rotterdam - 6/7	Felixstowe - 5/6	Bremerhaven - 5/6
	Rotterdam - 6/7	Hamburg - 6/7
1487 nautical miles	938 nautical miles	1898 nautical miles

Source: Ocean Shipping Consultants Ltd.

Table 6.4 summarises some typical deployments on the European trades. They are examples that are representative of the type of services linking the major north continent hub ports with the North Sea, western arc and Scandinavia/Baltic markets. The provision of services on a weekly basis is seen to be a key priority on these trades and the resulting choice of typical vessel is thus a function of the total volumes shipped on a particular trade and the market share of the operator under consideration.

6.3 Forecast Transshipment Demand

Projection of the future development of transshipment demand is a highly complex undertaking. It involved the analysis of comparative shipping economics for direct versus feeder operations. This is a dynamic process, with larger vessels being introduced for both the deepsea and feeder legs of the trades. It is also determined by the relative importance of a particular market within the services offered by a specific operator. Other factors such as port capacity, access considerations, etc. are all also relevant. In addition, the particular strategic stance of a major shipping line with regard to relay operations is also highly relevant to market growth.

It is estimated that transshipment will continue to grow at a pace greater than that anticipated for the import/export market, with the flexibility offered by hub and spoke and relay operations continuing to be more important than direct calls. This is the pattern that has been noted since the mid-1990s and is also seen in other major world port regions. It should be noted that there will be direct services developed, for example, into the Baltic, but that these markets will also be served by transshipped containers from western ports.

Table 6.5

North Europe: Forecast Total Container Transshipment Demand by Port Region to 2020
m TEUs

	Base Case	Low Case	Enhanced Globalisation
2003	7.6	7.6	7.6
2004	8.5	8.4	8.6
2005	9.2	9.0	9.4
2006	9.8	9.6	10.3
2007	10.5	10.1	11.3
2008	11.3	10.7	12.3
2009	12.0	11.4	13.4
2010	12.9	12.1	14.7
2011	13.7	12.6	15.6
2012	14.5	13.2	16.6
2013	15.4	13.8	17.7
2014	16.3	14.4	18.9
2015	17.2	15.0	20.1
2016	18.2	15.6	21.1
2017	19.2	16.3	22.2
2018	20.3	16.9	23.3
2019	21.4	17.6	24.4
2020	22.5	18.3	25.6

Source: Ocean Shipping Consultants Ltd

Despite these specific factors, the most significant factor determining the level of transshipment demand will be the pace of trade growth between Europe and distant (principally Asian) markets. These issues are considered in more detail elsewhere in this

study, but Table 6.5 summarises the pace of anticipated total North European transshipment demand growth through to 2020. Under the Base Case an increase in demand of nearly 200 per cent is anticipated, with this representing a highly dynamic sector. There is also seen to be considerable further upside for these projections under the 'Enhanced Globalisation' scenario. Here, demand could increase by 240 per cent.

This clearly represents a major opportunity for a terminal (such as WCT) that will be correctly formatted and located to meet these requirements.

6.4 The Transshipment Operations of Major Shipping Lines

The development of the regional transshipment market will also be closely influenced by specific decisions taken by the major shipping lines. The trend towards the development of dedicated terminals will serve to anchor those lines that have invested in such facilities in particular ports. The following developments should be considered:

- *Maersk Sealand* has established dedicated (joint venture) terminals at both Rotterdam and Bremerhaven. It seems certain that these investments will continue to focus transshipment business for this line at those ports. This indicates that the scope for further investment at WCT may be limited.
- *The Grand Alliance* (comprising Hapag-Lloyd, MISC, NYK, OOCL and P&O Nedlloyd) is currently committed to terminal investment at Rotterdam (Eruomax) and Altenwerder in Hamburg. Although Grand Alliance business is handled at these facilities, these terminal investments have been undertaken by lines on a national basis – P&O Nedlloyd is funding the Eruomax and Hapag is investing in Hamburg. It seems certain that major constituent players will place further investment in regional container ports.
- *MSC* is a major player in the regional feeder and relay business. Until recently the line's business was focused at Felixstowe. A lack of capacity at the port has seen a reorganisation of regional transshipment and new dedicated facilities have been established at the Delwaidedok in Antwerp. In addition, a joint venture terminal is also to be established at Bremerhaven. The investment at Antwerp does not really represent a long term solution for the line and this could be a candidate for the WCT project.
- *The New World Alliance* has not committed to dedicated terminals in the regional market, although this has been the strategy in other major world port regions. Volumes are somewhat smaller for this grouping, although transshipment is significant. These lines will continue to use various facilities and will constitute potential customers for WCT.
- *The United Alliance* is in a similar position and it is thought unlikely that dedicated terminals will be developed, at least in the medium term. Once again transshipment will be handled at the most efficient and convenient available port.
- *The Cosco Alliance* (Cosco, Yangming and K-Line) has also failed to develop a dedicated terminal approach in northern Europe, although Cosco has invested in capacity in the Mediterranean. Once again, port operations will be spread between the regional terminals.
- *Evergreen* is a major player in the Asia-Europe trades and has not committed to terminal investment in the north. It seems likely that this will change given investment decisions in other regions and this line is known to be actively seeking a dedicated terminal arrangement in northern Europe.

Other developing lines include *China Shipping* and *CMA-CGM*, both of whom are shipping increasing volumes via European ports. China Shipping has yet to establish long term

commitments in regional ports and investment from CMA-CGM is currently confined to Le Havre.

It is apparent that there remain significant opportunities for 'common-user' transshipment in the north European market and this will allow a major player such as WCT to develop a significant market role. There is also clear scope for the establishment of dedicated terminals at the location.

6.5 Implications for WCT

Market conditions for WCT in the transshipment market are favourable for the following reasons:

- Transshipment has been a highly dynamic part of the North European market and has expanded rapidly. This is forecast to continue.
- The economics of transshipment have been favourable to growth and developments in deepsea shipping will sustain this position.
- Major shipping lines serving the market have only begun to commit to terminal investment and there will be considerable opportunities in both the 'common-user' and dedicated terminal sectors.
- The terminal is well located to serve the various component sectors of the transshipment market.

As is detailed in Section 4, the terminal will be competitive in this sector.

SECTION 7 – THE DISTRIBUTION OF WCT CONTAINER FLOWS

7.1 Introduction

This study has identified the following important conclusions with regard to the establishment of the WCT deepwater container handling facilities at Vlissingen:

- On the basis of anticipated port demand and capacity analysis there is a clear requirement for additional deepsea and transshipment orientated container terminals;
- The Vlissingen location is seen to be highly competitive from the perspective of port dues and shipping costs in serving both the western part of the North Continent range and also with regard to the broader regional transshipment market;
- With efficient management, there is every reason to expect that this potential can be realised over the study period. Hesse-Noord Natie will provide this capability.

These factors indicate a positive outlook for WCT. This analysis seeks to provide an estimation of the inland distribution of these containers over the forecast period.

7.2 The Distribution of Forecast Container Flows

The development of a new container terminal at Vlissingen will significantly modify the North Continent container port market in general, and will have a considerable impact on the narrower Antwerp-Rotterdam competitive sector. The development of the terminal should be seen as an extension of the planned facilities at the Deurganckdok in Antwerp, although there are considerable further advantages over and above this location. In addition, the terminals will also be competing directly with the facilities at Rotterdam – most specifically ECT, Maersk Delta and Euromax at the Delta – and thus will develop their own distinct cargo base. In the longer term the port will be competing with the Maasvlakte II terminals.

It is clear that a further breakdown of the likely structure of the WCT demand base is necessary. Each one of these identified categories will record significantly different advantages and disadvantages in the developing market and it is necessary to consider these sectors separately.

The following cargo groupings have been identified in the current analyses:

- The local Vlissingen hinterland;
- The immediate local Antwerp hinterland;
- The local Rotterdam market;
- The more distant Antwerp/Rotterdam hinterland;
- Transshipment.

The Local Vlissingen Hinterland

At present, there is no significant market for containerised goods in the immediate locality of Vlissingen. As such, this will retain a limited role within overall terminal volumes. However, it is clear that the existence of a significant flow of containerised goods via the port will act as a catalyst to limited local development. Such a pattern has been noted in other parallel situations of terminal investment – for example, in Felixstowe a limited local market has evolved in an essentially rural locality.

Similarly, it should be noted that no local industrial base existed at the establishment of the Delta terminals in Rotterdam. In terms of distance to major industrial/consumption areas the distance between the Delta and Rotterdam is not significantly different from the distance between Vlissingen and Antwerp.

On this basis, there is scope for the immediate local market to generate some terminal volumes but this is forecast to remain limited, especially as the port gears up for high volume intermodal longer-haul shipments. Our earlier analysis indicated a preliminary estimation for the local market of around 16,000TEU per annum. It is not thought that higher volumes will be secured unless a major distribution zone is added to the development.

The Antwerp Local Hinterland

A very significant volume of total Antwerp containers is destined/sourced in the immediate local market. It is estimated (by the Antwerp Port Users' Association) that around 28 per cent of containers shipped via Antwerp (inner docks and River Scheldt terminals) are originated or destined to within a 50km radius of the port. This cargo is dominated by the local forwarders and is invariably defined as Bill of Lading Antwerp. This is a far lower proportion than is noted at Rotterdam where a comparable estimate is placed at just 13 per cent. The most significant distance grouping for Rotterdam is cargoes to/from destinations in the 150-200km range.

Of the existing Antwerp cargo base, it is estimated that around 25 per cent of containers handled via the port utilise carrier haulage (that is to say, onward arrangements are made by the line), with the balance utilising merchant (third party) haulage. This proportional market share is considerably lower than that noted at Rotterdam, where the figure is closer to 40 per cent.

For that part of the market where carrier-controlled haulage is dominant, the actual terminal (or port) utilised for container handling is largely irrelevant to the cargo owner. The shipping line is here free to select whichever port is either the cheapest, most efficient or most convenient with regard to shipping schedules and marketing priorities. In this case there will be no difficulties incurred in specifying WCT rather than the Scheldt terminals.

However, there *are* clear difficulties incurred in that part of the cargo base where the Bill of Lading is Antwerp and merchant haulage is the distribution mode. This cargo is not considered 'delivered' until it arrives at the various defined Antwerp terminals. It is apparent that the operators of WCT – if they are to actively compete for this cargo – will have to undertake to deliver these containers to Antwerp. This can be achieved by either trucking the containers from WCT to Antwerp or by barging. This is not regarded as an over-riding restriction on demand growth in this sector.

Under current market structures, there already exists a significant flow of barged containers between Antwerp and Rotterdam as part of the distribution of cargoes between these ports (often for similar reasons). As such, it would be a fairly straightforward matter to develop similar operations between Vlissingen and Antwerp to provide the required degree of services for this sector of the cargo base. It must be stressed, however, that this represents a limited part of the cargo base and cost benefits in other sectors could be utilised to offset these

additional expenditures. This sector is confined to those containers that are Bill of Lading Antwerp and are limited to the immediate regional cargo base.

Some further remarks are necessary with regard to these questions. The requirement to deliver containers to the actual port specified on the Bill of Lading represents a legacy of long established regional cargo distribution patterns. It is our view that this will come under pressure from two perspectives:

- There will be increased pressure to move from these local requirements to an 'Antwerp/Rotterdam' Bill of Lading. The shipping lines and stevedores both criticise the current position and this complicates the direct competition between terminals. There will be resistance to these moves but – over the timeframe of this study – some modification can be anticipated.
- The major shipping lines are very interested in increasing their control over the inland distribution of containers in order to minimise total costs. Although there are regulatory difficulties in this sector, it seems certain that the role of the shipping lines in offering door-to-door services can only increase in the next few years. If carrier haulage increases market share, this will further eliminate the importance of port-specific Bills of Lading in the total regional market.

Increased pressures for such developments have been noted in the past few years as Antwerp has become more congested.

There will be some difficulties in developing the WCT share of this cargo base. However, there are indications that the structure of the market is shifting away from these difficulties. If, however, it proves necessary to offer a delivery service to directly compete for these markets, then this can be provided.

Cargo Diverted from the Rotterdam Market

Superficially it would seem that the problems identified above with regard to the local Antwerp cargo base would be mirrored with regard to competition for Rotterdam cargoes. To a certain extent this will be true for those cargoes that are shipped to the local Rotterdam hinterland (for example, Heineken, flower bulbs, Philips traffic, etc.). In these cases, a Bill of Lading specifying Rotterdam would seem to offer considerable competitive advantages. However, a closer examination of the structure of the market indicates that the pressures are far less significant here.

Firstly, the lines are in a far stronger position of to exert market power at Rotterdam than they are at Antwerp. It is estimated that the role of carrier haulage is considerably higher in Rotterdam at some 45 per cent. Furthermore, this sector is seen to have expanded fairly significantly in the past two years. The local immediate hinterland accounts for a significantly smaller proportion of total port volumes than is the case at Antwerp. These factors, together, serve to reduce the importance of 'Bill of Lading Rotterdam' considerations in the total cargo base.

Once again, for that part of the business that is so affected, it will be possible to arrange for cargo delivery to Rotterdam if required. However, this will account for a smaller proportion of the envisaged throughput and will not unduly influence the successful development of the project.

The More Distant Antwerp/Rotterdam Hinterland

The shipment of containers to/from more distant markets that are already utilising the Scheldt and Maasvlakte terminals will also – to a lesser extent – be influenced by similar considerations. However, the role of local Antwerp forwarders is far less significant in these

more distant markets. Indeed, it has been suggested that the current situation for Antwerp cargoes has been a factor restricting the penetration of Antwerp into the more distant European hinterland. It is certainly the case that the port has a geographically more limited hinterland than does Rotterdam, with this also being reflected in a lower market share for railed containers – although this sector has increased in importance in the past few years.

Whilst 'Bill of Lading' factors are relevant to the more distant pan-European distribution of containers, this will not be a critical factor for the attraction of these cargoes to WCT. For distant distribution of containers away from the immediate port hinterland, the market is already highly competitive. There is already seen to be strong and immediate competition between Rotterdam and Antwerp. The effect of adding new capacity at WCT would be to add another alternative terminal to the available options. In this context, it is reported that the cheapest (through-cost) option will be by far the most significant factor determining port choice.

On this basis, a terminal at Vlissingen should be well placed to compete directly for the more distant Antwerp/Rotterdam hinterland. If necessary, the additional costs of delivering containers to/from Antwerp could be accommodated, but this will be of far less significance for this sector of the cargo base.

Transshipment

As has been detailed in this study, the proposed WCT facilities will be well placed for penetration of the container transshipment markets. The facility is correctly located and formatted for this business and it is reasonable to assume that a steady expansion in demand from this sector could be secured. For the North Continent market as a whole a transshipment ratio of around 24 per cent is currently noted (i.e. 24 per cent of all reported moves in regional hub terminals are sea-sea transshipment). It would be reasonable to estimate that WCT could record a greater market share given its capabilities and a progressive move towards a transshipment ratio should be attainable at the terminal.

7.3 Total Demand Build-Up at WCT

In the light of these combined considerations an estimate of the hinterland development for WCT has been forecast and this is summarised under Base Case conditions in Table 1 and in Figure 7.1.

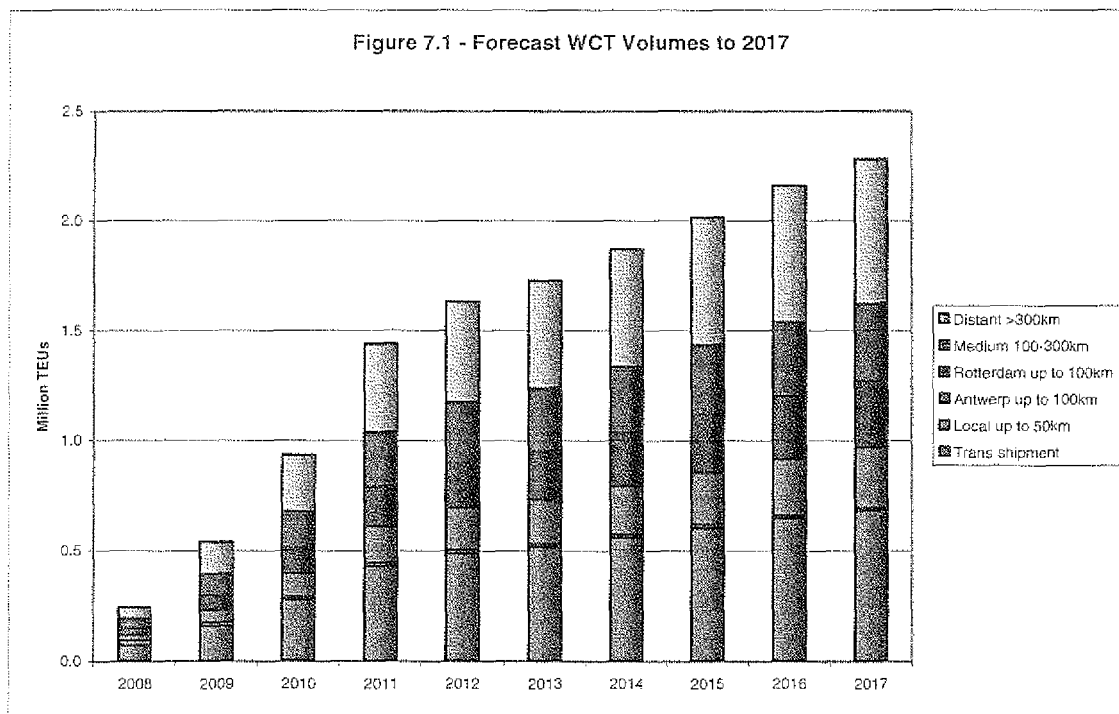
Over and above transshipment, the immediate Antwerp and Rotterdam localities will be of great importance in total port demand – with a combined market share of some 26 per cent at the end of the study period. The scale of local demand region suggests an additional 15 per cent of business will be generated within a radius of between 100/300km. In the longer run it will be growth of long-haul intermodal shipments that offer the greatest potential and it is estimated that – providing investment is made in this sector – a very high long haul market share of around 29 per cent could be noted by 2016.

All such projections are, of course, conjectural, but it is clear that WCT has the potential for a wide and diverse continental hinterland and will be competitive in all markets currently served by Rotterdam and Antwerp.

Table 7.1
Forecast Base Case WCT Volumes to 2017

	Capacity	Trans-shipment	Local up to 50km	Antwerp up to 100km	Rotterdam up to 100km	Medium 100-300km	Distant >300km	Total
Million TEUs								
2008	0.700	0.074	0.021	0.026	0.030	0.045	0.050	0.245
2009	1.200	0.162	0.014	0.059	0.067	0.096	0.143	0.540
2010	1.700	0.281	0.014	0.105	0.116	0.164	0.256	0.935
2011	2.400	0.432	0.016	0.164	0.180	0.247	0.401	1.440
2012	2.400	0.490	0.016	0.188	0.206	0.274	0.458	1.632
2013	2.400	0.518	0.015	0.201	0.220	0.284	0.490	1.728
2014	2.400	0.562	0.014	0.219	0.241	0.301	0.535	1.872
2015	2.400	0.605	0.014	0.237	0.262	0.318	0.580	2.016
2016	2.400	0.648	0.013	0.256	0.284	0.336	0.622	2.160
2017	2.400	0.684	0.013	0.271	0.303	0.351	0.658	2.280
Percentage								
2008		30.0	8.8	10.5	12.3	18.2	20.3	100.0
2009		30.0	2.5	10.9	12.3	17.9	26.5	100.0
2010		30.0	1.5	11.2	12.4	17.5	27.4	100.0
2011		30.0	1.1	11.4	12.5	17.2	27.9	100.0
2012		30.0	1.0	11.6	12.6	16.8	28.1	100.0
2013		30.0	0.8	11.6	12.7	16.5	28.4	100.0
2014		30.0	0.8	11.7	12.9	16.1	28.6	100.0
2015		30.0	0.7	11.8	13.0	15.8	28.8	100.0
2016		30.0	0.6	11.8	13.2	15.6	28.8	100.0
2017		30.0	0.6	11.9	13.3	15.4	28.8	100.0

Source: Ocean Shipping Consultants Ltd.



SECTION 8 – THE CRITICAL CAPACITY OF THE WCT

In order to provide a significant contribution to the North European container port market it will be necessary that the WCT provide sufficient capacity to attract, adequately service and maintain large volume shipping line customers. Although a somewhat smaller terminal would still be useful, the proposed terminal – with a phased capacity of up to 2.4m TEUs per annum – is well sized to provide such a capability. It would be unwise to try to significantly reduce the size of the terminal, as this would undermine the role of the facility in the developing container port market.

The rationale for the requirement for a large capacity terminal is summarised in this Section of the analysis. The following perspectives must be evaluated:

- Market considerations;
- Commercial considerations;
- Logistics considerations;
- Operational considerations.

The following points should be considered in the current context:

Market Considerations

The past few years have seen a process of concentration in ownership of container shipping lines and have also seen the development of relatively long-lasting consortia between some of the major shipping lines. When these trends are considered in conjunction with the steady increase in vessel sizes that has been recorded, it is apparent that the size of stevedoring contracts has increased sharply.

Table 8.1 presents a summary of the volumes of containers handled at major terminals in Antwerp and Rotterdam in 2002. At Antwerp, the largest customer is currently MSC, which shipped some 1.5m TEU via HNN terminals in that year and has since expanded further. In addition, other major lines include the Grand Alliance members and also CP Ships. In both cases, demand is currently approaching 0.5m TEU per annum and will continue to expand. The same position is noted at Rotterdam, where the Grand Alliance accounted for more than 1m TEU in 2002 and Maersk Sealand shipped more than 0.6m TEU via its own terminal in the port.

It is apparent from this summary that major lines and groupings require capacities of between 0.5 and 1m TEU per annum at ports in the Immediate Market (and some generate considerably larger demand). It will be vital for WCT to provide the capabilities to handle such demand from the outset. This means that a minimum requirement for the terminal will be for around 700m of deepsea berths and corresponding back-up land, with additional barge handling facilities. This will constitute the minimum requirement for Phase I, and should be rapidly expandable to around 1000-1100m.

The regional market is also forecast to expand at growth rates of between 5.4-7 per cent per annum in the period to 2010 and then between 4-6 per cent in the following period. Within this total, the deepsea and transshipment sectors (the primary potential markets for WCT) will expand at a considerably more rapid pace. This means that not only will significant initial

capacity have to be provided but, also, the terminal must be able to offer capacity to meet rapidly expanding requirements for large customers.

The minimum requirement for a single front rank customer would be for at least two major deepsea berths – perhaps of 400m and 350m – together with an additional berth to handle feeder and other secondary containers. This would allow the shipping line to enjoy berthing on arrival (i.e. with no queuing) and would meet the requirements of such very high volume front rank hub port customers. This indicates that, for a single customer, a minimum berth length of around 1km (400m plus 350m plus 250m) would be required and that 1.1km would be more desirable and allow for further demand growth.

Table 8.1
Container Terminal Volumes for Major Shipping Lines in Antwerp and Rotterdam in 2002

Port	Terminal/Operator	Customer	Million TEUs	
<u>Antwerp</u>	HNN	MSC	1.551	
		CP Ships	0.374	
		Maersk-Sealand	0.130	
		Deimas OT Africa	0.139	
		Hapag Lloyd	0.128	
		OOCL	0.118	
		P&O Nedlloyd	0.118	
		Evergreen	0.107	
		United Arab	0.090	
		Others	1.151	
		Total	3.906	
		P&O Ports	P&O Nedlloyd	0.204
			CMA-CGM	0.155
	Hamburg Sud		0.065	
	K-Line		0.055	
	Hyundai MM		0.031	
	Others	Others	0.205	
		Total	0.715	
		Others	0.156	
		Port Total	4.777	
<u>Rotterdam</u>	ECT Delta	<i>Grand Alliance</i>	1.010	
		<i>New World Alliance</i>	0.403	
		Hapag-Lloyd	0.201	
		Hanjin	0.246	
		CMA-CGM	0.129	
		Others	0.659	
		Total	2.447	
	Maersk Delta	Maersk-Sealand	0.604	
		Safmarine	0.085	
		<i>New World Alliance</i>	0.150	
		Others	0.147	
		Total	0.986	
	ECT Home	Evergreen	0.205	
		Cosco	0.111	
		Others	0.737	
		Total	1.053	
	Hanno/Uniport	Yangming	0.135	
		K-Line	0.095	
		Hanjin	0.085	
		China Shipping	0.080	
Zim Israel		0.055		
Others		0.075		
	Total	0.525		
	Others	1.504		
	Port Total	6.515		

Source: Ocean Shipping Consultants Ltd.

From the perspective of what the market will require, a minimum 1km of berthing would be necessary with a capacity of at least 1m TEUs. However, from the viewpoint of commercial considerations a requirement for double this capacity is indicated (see below).

Commercial Considerations

The costs of developing a container terminal decline on a unit of capacity basis as the facilities increase in size. That is to say, the costs of developing WCT will be heavily loaded towards the initial quay construction, together with marine works and associated infrastructure investment. The subsequent introduction of further phases of capacity will involve considerably lower costs than the initial phase. In terms of scale economies, therefore, it is very important to maximise the capacity of the WCT facilities.

In addition, given the type of customers that will be targeted for the WCT, it is also of some commercial importance to allow the facilities to meet the need of two large lines or consortia. This will significantly widen the customer base of the terminal and allow a more balanced commercial development. These considerations further count in favour of the development of capacity to the proposed level of around 2.4m TEU as soon as is possible.

Large-scale individual customers require access to two or three berths from the outset of operations. Such high volume transshipment operators require capacities of between 0.5-1m TEU each and it will be a very important commercial consideration to allow WCT to handle the requirements of at least two separate customers and also to offer additional common-user capacity. This will be necessary to ensure that the operators of WCT are not unduly dependent upon a single large customer. Such capacity-related issues are very important when assessing the commercial feasibility of a terminal such as WCT.

From the viewpoint of commercial considerations it is, therefore, very important not to unduly restrict the capacity of the WCT project. It must be large enough to benefit from the scale economies of large operations and must also be big enough to accommodate the needs of more than one front-rank operator together with providing additional capacity for smaller customers.

The development of a terminal with a berth line of 2.4km is well suited to such commercial requirements. However, the terminal would still enjoy a useful role in the market if the needs of two large customers could be met. This could be achieved on a minimum berth length of 2km, but 2.2km would be preferable.

Logistical Considerations

Investment in supporting logistics is much easier to justify if the level of container demand is high. For example, it will be necessary to maximise barge volumes at the terminal if the required investments necessary for dedicated barge handling are to be justified. Similarly, the provision of expanded rail capacity for the terminal will also require relatively high volumes to justify the scale of investment required.

These considerations further confirm that the terminal must offer significant capacity, which is correctly identified as up to 2.4m TEU on a phased basis. If capacity were to be constrained by a smaller facility it would be difficult to justify large scale supporting logistics investments and significantly higher volumes of containers could be forced to rely on the road network.

Similar considerations also apply with regard to transshipment. A significant 'critical mass' is required if this business is to be maximised. Once again, any reduction in the size of the terminal would limit potential in this business sector.

In both cases, large-scale capacity with frequent daily rail, barge and feeder links will be necessary to provide a competitive terminal. This means that a capacity of 2m TEU is the

minimum that could generate such traffic and once again the minimum required berth length will be in the order of 2km.

Operational Considerations

It is also important to maximise capacity of the terminal when the position is viewed from the priorities of operational issues – that is to say, from the perspective of terminal operation. If high capacity equipment is to be installed for ship to shore handling and in the container yard then it will be necessary to ensure high volume handling. Without such levels of demand it will not be possible to benefit from scale economies.

A further point is that a significant capacity will be required if the possibility of dedicated terminals is to be realistically offered at WCT, with the further capacity to handle demand on a common-user basis also being a requirement.

Conclusion

It would be an error to try to significantly restrict the capacity of the WCT by limiting either berth length of terminal area. That is to say, say a terminal with a capacity of just 0.5-1m TEU would not allow the anticipated role for the project to be competitively developed. The proposed capacity of around 2.4m TEU per annum is well suited to the requirements of the market place and represents a highly valuable contribution to regional port requirements. A much smaller facility would be far less attractive and would have a much more questionable role in the identified North European container port business.

The minimum capacity of WCT when viewed from different perspectives would be as follows:

- From a market perspective (for a single major user), 1000-1100m and around 1m TEU plus per annum. The terminal would seek to serve more than one customer, however.
- From a commercial perspective – two major customers must be accommodated, with this indicating a minimum berth length of 2000m and a preferred length of 2200m. Capacity would be 2m TEU plus.
- In terms of associated logistics a capacity of some 2m TEU per annum would be required to allow the regular and sophisticated links necessary to link the terminal to its rail, barge and feeder hinterlands. This indicates a minimum berth length of 2000m.
- In terms of operational considerations a capacity of 2m TEU represents the required minimum capability.

In summary, it is clear that the phased development to 2.4m TEU capacity is well suited to meet this requirement, but could be reduced to a minimum berth length of 2000m and still enjoy a comprehensive market role. There are arguments that 2200m may be more appropriate, however.

SECTION 9 – WCT AS A SHORTSEA TERMINAL

It has been suggested that the container handling facilities at Vlissingen could be developed as a terminal that is orientated towards trade to and from other North European markets and that it could be formatted as a short-sea terminal, with smaller capacity berths and a much more restricted terminal footprint. There are severe difficulties associated with such a strategy and these are summarised in this Section:

- Shortsea traffic is growing more slowly than the deepsea and transshipment markets.
- Intra-European and feeder containers are intimately linked – they are shipped on the same vessels as part of the same services.
- There is no lack of capacity for intra-Europe operations – there is sufficient small-scale terminal capacity to meet anticipated demand.
- Successful ports handle all business sectors. Antwerp and Rotterdam handle shortsea traffic as well as deepsea shipping.

The Pace of Demand Growth

As is detailed in Section 2 of this study, the pace of growth in the shortsea (intra-Europe 'door-to-door') market is seen to be considerably slower than in the deepsea and related transshipment markets. Since 1995, intra-Europe demand has increased by some 60 per cent, whilst deepsea demand has grown by more than 76 per cent. This situation is forecast to continue over the period to 2020 and much faster growth will be noted for deepsea traffic. This is the direct result of the globalisation of world trade, with Asian suppliers increasing their share of EU manufactured imports.

It should also be noted that the intra-European market is highly competitive, with lo-io container movements only accounting for a proportion of demand in this sector. Ferry and ro-ro operations are equally important and offer a flexible solution for large parts of the business. Although the share of containers has increased in the intra-regional trades, it remains unlikely that growth will be noted at the rates achieved in the deepsea sector.

Shortsea Container Shipping Trends

The idea that shortsea container operations could be successfully developed as a separate market sector is problematic. As has been demonstrated in this study, intra-European shipments of containers are funded by both local market cargoes and by feeder operations. Increasingly, these two market sectors are shipped on the same vessels and services and, indeed, the needs of the feeder sector have become the dominant sector for shortsea container shipping in the past few years.

Given this structure it will be increasingly the case that shortsea and feeder operations are handled in the same ports (and often at the same terminals) and the idea of developing facilities that were not able to provide for the dominant feeder aspect is misguided.

The Availability of Shortsea Capacity

It is important to note that there is no lack of capacity in the region's ports for smaller shortsea terminals. These are located in the major ports and also in the secondary ports of the region which include Rouen, Dunkirk, Terneuzen, Moerdijk, etc. There is significant capacity

available in these ports and it is clear that a general situation of over-capacity is in existence in this sector. It is not clear that terminals located in Vlissingen would enjoy any specific advantages in contrast to existing facilities and it is more likely that utilisation rates would be low for such a project.

The Critical Mass Arguments for Antwerp and Rotterdam

It is also apparent that the successful ports of Antwerp and Rotterdam have grown because they have allowed the development of a 'critical mass' of container demand. All types of cargo – deepsea, shortsea and transshipment – are handled at the ports and the resulting level of potential interchange between services and warehousing and logistics operations are a major factor contributing to this success.

The development of shortsea facilities at Vlissingen could never match these capabilities and it would be very unlikely that this location would be chosen in preference to either of the established gateway ports.

Conclusion

In the extremely unlikely event that deepsea container shipping lines were not to be attracted to WCT the suggestion that an alternative role could be developed for the terminal that focused on intra-European operations is seen to be unrealistic. The type and levels of investment that would be required are quite different and no specific demand had been identified for such operations at Vlissingen. The concept of the WCT is as a fully-featured and modern deepsea orientated facility – other possibilities are quite distinct and offer far less potential for successful development.