

Dublin Port Cruise Development Cost Benefit Analysis Study

Indecon

Submitted to

Dublin Port Company

Prepared by

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www.indecon.ie

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Glossary of Terms and Abbreviations

ABR	Alexandra Basin Redevelopment
B&A	Bermello Ajamil & Partners Inc
CBA	Cost-Benefit Analysis
CLIA	Cruise Line International Association
CSO	Central Statistics Office
DCC	Dublin City Council
DPC	Dublin Port Company
GDP	Gross Domestic Product
GVA	Gross Value Added
Homeport / turnaround passenger	In this report the terms “homeport” and “turnaround” are used interchangeably and refer to circumstances where cruise passengers either commence or finish a cruise in Dublin.
Lo-Lo	Load-on/load-off
NWQE	North Wall Quay Extension
Ro-Ro	Roll-on/roll-off
Transit passenger	Transit passengers disembark for a number of hours to visit attractions or tour the city before re-embarking, typically on the same day

Executive Summary

Introduction

Indecon International Economics Consultants (Indecon) is a leading firm of research economists. Indecon was appointed by Dublin Port Company (DPC) to complete a socio-economic cost-benefit analysis (CBA) for the proposed cruise-related aspects of the wider Alexandra Basin Redevelopment (ABR) Project. This study was undertaken in conjunction with Bermello Ajamil & Partners Inc. ('B&A'), a leading practice with specialist expertise in the international cruise sector. B&A were responsible for producing independent cruise demand forecasts, which are used in the analysis. The objective of this socio-economic CBA is to estimate the wider socio-economic benefits associated with the proposed investment.

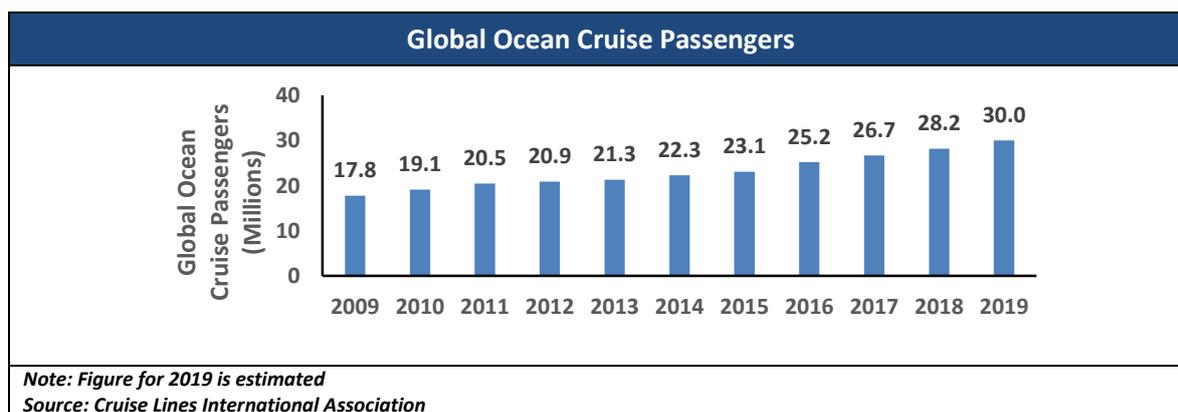
Dublin Port Company is a self-financing, private limited company, wholly owned by the State, whose business is to manage Dublin Port, Ireland's premier port. DPC has in place a Masterplan to guide the development of Dublin Port over the period from 2012 to 2040. The Masterplan presents a vision for future operations at the port and critically examines how the existing land use at Dublin Port can be optimised.

The ABR Project is the first major project to be brought forward under the Masterplan and it is currently under construction. The project forms part of a €1,024m ten-year capital expenditure programme (2019 to 2028). It involves the construction of approximately 3km of quay walls, deepening of the port's access channel and deepening of Alexandra Basin to accommodate larger sea going vessels as well as works associated with the conservation of the Port's Victorian industrial heritage. One of the options within the ABR Project is the development of North Wall Quay Extension (NWQE). The NWQE project would involve the removal of the eastern end of the quay and the provision of a new quay wall on both the north and south sides of the quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin. It would also provide 500m of deep berthage suitable for cruise ships up to 350m long on the south side of the quay, and 377m of berthage for cruise ships up to 333m long on the north side of the quay. Should it be completed, it is envisaged that the project would allow DPC to accommodate upwards of 200 cruise ship calls per annum. It is this investment in additional cruise capacity that is the subject of the analysis undertaken in this report. Indecon independently examines, both from a financial and broader socio-economic perspective, the impact of the proposed investment.

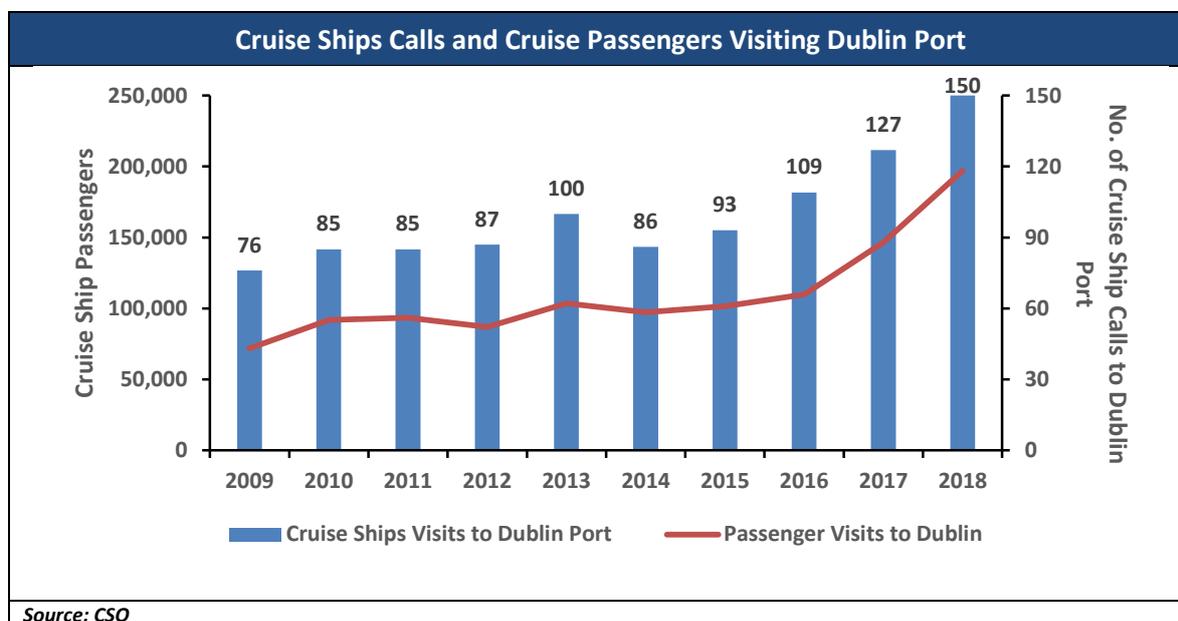
Indecon's analysis rigorously evaluates the financial and economic cost benefit impacts of a number of sub-options for the proposed development. This analysis has been undertaken in line with the relevant provisions of the Department of Public Expenditure and Reform's Public Spending Code and the Department of Transport, Tourism and Sport's Common Appraisal Framework.

Trends in Cruise Tourism

The global cruise sector has seen significant growth in recent years. The following figure outlines the figures for the global ocean cruise passengers since 2009. Total global cruise passengers increased from 17.8 million in 2009 to around 30.0 million passengers in 2019.



The following figure presents data on the number of cruise ships calling to Dublin Port and the number of cruise passengers since 2009. The number of cruise ships calling at Dublin Port had doubled from 2006 levels by 2018. Over the same period passenger numbers increased by 174% from 72,000 to 197,000. The growth in the cruise business in Dublin Port has thus outstripped the wider global and European trends, and is illustrative of the growing attractiveness of Dublin as a cruise destination.

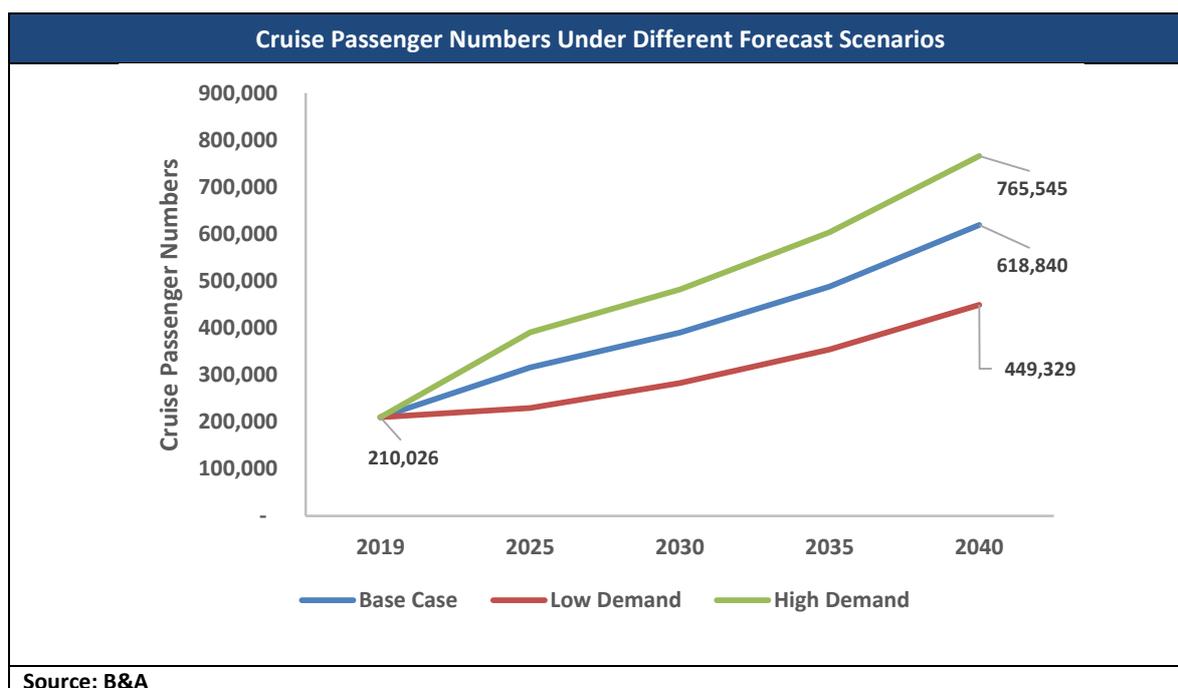


An input to the cost-benefit analysis concerns the likely future trajectory of demand for cruise calls at Dublin Port, assuming that there would be no capacity constraints faced by the port. Indecon's base case scenario assumes that Dublin continues to maintain its market share of an expanding cruise business market. The table and figure overleaf outline our forecasts, in terms of cruise calls, passenger numbers and revenue, under different scenarios. The base case scenario assumes that there is a potential for 183 cruise calls to Dublin Port by 2040, which would bring the level of activity to nearly 620,000 passengers in that year. This represents a very significant growth on the 197,000 cruise passengers who arrived in Dublin Port during 2018. The forecasts assume an increase in the number of passengers per ship, reflecting the international trend towards larger ship sizes.

Base Case Demand Scenario – Cruise Calls and Passenger Numbers					
	2018	2025	2030	2035	2040
Passenger numbers	196,899	316,095	389,695	487,820	618,840
Cruise Calls	150	146	155	168	183
Passengers per ship	1,313	2,166	2,511	2,911	3,375

Source: B&A

The next figure illustrates the different annual passenger forecasts under the base case, low- and high-demand scenarios. The high-demand scenario results in a much higher level of cruise passengers visiting Dublin Port by 2040 compared to the base case scenario.



Based on Fáilte Ireland figures for 2017,¹ the 145,000 cruise passengers arriving in Dublin Port in that year represented 4% of the total visits by holidaymakers to Dublin that year. Fáilte Ireland survey research undertaken in April-May 2019 provides up-to-date information on the spending patterns of cruise passengers visiting Dublin. The following table indicates an average spend for turnaround passengers of €184 and €54 for transit passengers.

These figures included estimated expenditure in Dublin by day tripper and also by those passengers who are homeport passengers. The figures include expenditure on accommodation, tours, entry to attractions, food and beverages and other expenditures. However, they exclude any pre-booked accommodation or pre-paid sight-seeing tours and therefore underrepresent the total expenditure impacts. However, as estimates of these other expenditure items are not available and to ensure that we do not overstate the economic benefits we use these estimates in our modelling.

Average In-Port Expenditure by Cruise Passenger Type	
Passenger Type	Average Expenditure
Turnaround passengers	€184
Transit Passengers	€54

Source: Fáilte Ireland

Indecon analysis indicates that the cruise sector makes a significant economic contribution to the cities included in cruise ship itineraries. The economic benefits of the boost to tourism in the economy can be significant. While tourists arriving on cruise ships typically do not spend a long time in any single city, they represent an important source of tourist expenditure.

¹ Fáilte Ireland "Profile of Tourism in Dublin 2017"

This is consistent with a number of studies which have been undertaken internationally on the impact of the cruise sector. For example, a study in the economic impact of the cruise sector in Barcelona concluded that the sector supported a total turnover of €796 million in Catalonia, a contribution to the GDP of €413.2 million and 6,759 full-time equivalent jobs.² Other studies have quantified the benefits of the cruise sector in the US, the UK, New Zealand, Malta and other cities and have demonstrated the potential benefits to the tourism sector.

Policy Context for Development of Dublin Port

Since 2012, freight volumes handed at Dublin Port have increased by 36%. Over this same period, Dublin Port's share of national port volumes has increased from 41% to 48%. The volume of freight moved on direct services between Dublin Port and Continental Europe is 2.4 times greater than moves over the UK land bridge. Because of Brexit, DPC will lose almost ten hectares of land leaving no spare land for temporary cruise terminal facilities for turnaround calls from 2021 onwards. There were 7,969 ship arrivals into Dublin Port in 2018. 150 of these were cruise ships. Despite the wider economic significance of the cruise sector, the cruise business accounts for only 2.5% of revenues for Dublin Port.

Cruise in the context of Dublin Port's Business			
	2016	2017	2018
Cruise revenue	€ 1,405,130	€ 1,944,199	€ 2,242,836
Total revenue	€ 81,633,000	€ 85,497,000	€ 90,374,000
Cruise revenue as %	1.7%	2.3%	2.5%
<i>Source: DPC</i>			

DPC's Masterplan 2040 recognises that the quality of air and sea access infrastructure is a critical element in serving the internationally traded side of the economy and must be of international standards in order to facilitate merchandise trade in a competitive manner. The Masterplan also recognises the port as a key for the national tourism sector as an important gateway for visitors to Ireland. With regard to the cruise sector, the Masterplan indicates that new cruise facilities will be required to further develop this business and cater for future growth.

DPC's recent Cruise Strategy Review concluded that DPC could not proceed with the NWQE investment unless it could be made financially viable and, if DPC didn't proceed, then the cruise business in Dublin Port would diminish over time as priority was given to the growing volume of cargo ships.

Economic Cost-Benefit Analysis of Cruise Development Options

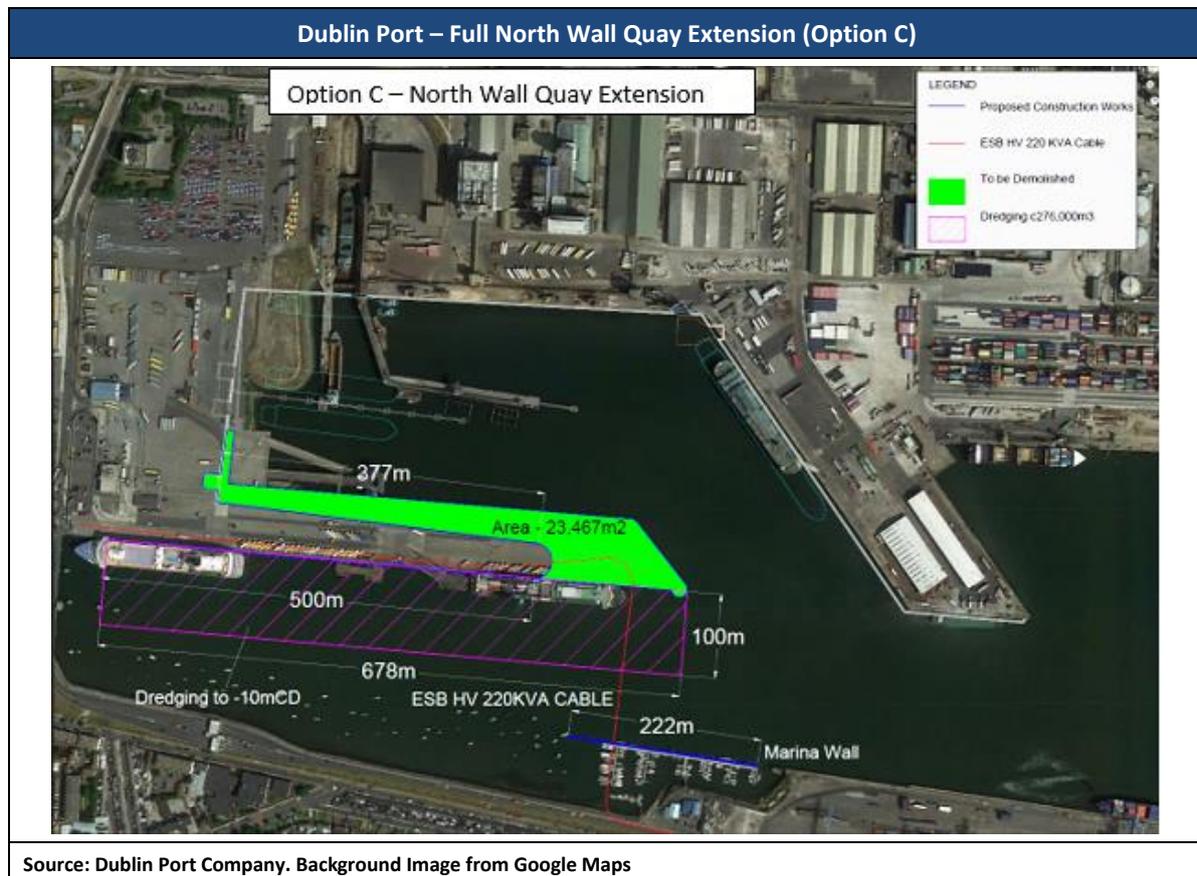
A range of investment options for investment was evaluated by Indecon. All of the options are compared to a 'do-minimum' investment option which has an estimated cost of €64 million and involves the removal of the eastern end of the existing NWQE and provision of a limited section of new pile wall on the south side of the Quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin. However, this option would not create berthage for cruise ships. This option is considered as the appropriate Do Minimum counterfactual scenario.

² "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf.

Option A envisages capital expenditure of €144 million. This option involves the removal of the eastern end of the existing NWQE and also provision of a limited section of new quay wall on the south side of the Quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin. This option would also involve a new quay wall along the north side of NWQE. This would provide 377 metres of berthage for cruise ships up to 333 metres LOA.

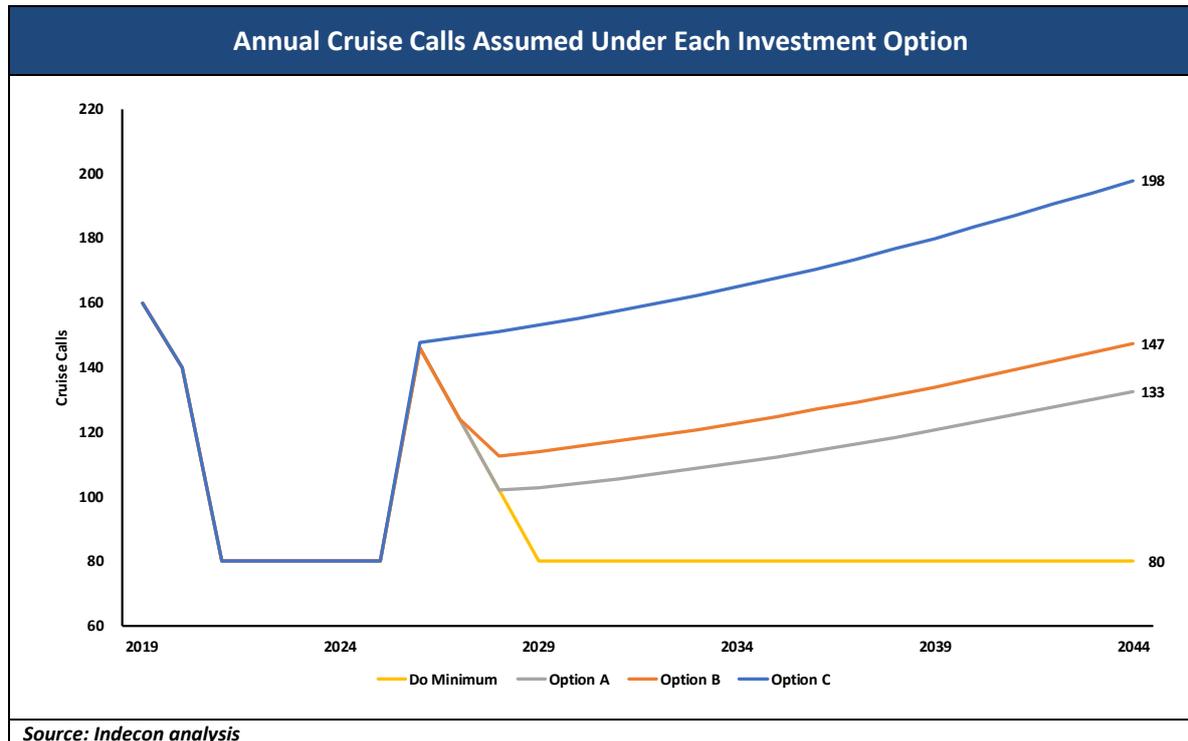
Option B is of a similar scale to Option B with a capital cost of €137 million. This investment option envisages the removal of the eastern end of the existing NWQE and provision of a new quay wall on the south side of the Quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin and would also provide 500 metres of deep berthage suitable for cruise ships up to 350 metres LOA on the south side of NWQE.

Option C is the most comprehensive option with envisaged capital costs of €172 million. This project would involve the removal of the eastern end of the existing NWQE and provision of a new quay wall on both the north and south sides of the quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin and 500 metres of deep berthage suitable for cruise ships up to 350 metres LOA on the south side of NWQE, and 377 metres of berthage for cruise ships up to 333 metres LOA on the north side of the quay. The location and key features of the full NWQE Option C is depicted in the figure below.



Scenarios for numbers of cruise calls

The following figure outlines the alternative annual cruise calls anticipated under each investment scenario over the period from 2019 to 2044.



Costs and benefits examined in economic appraisal

The costs included in the economic CBA are the capital costs for each investment option and estimated environmental costs of additional cruise visits to Dublin Port. The inclusion of environment costs is in line with best practice in cost benefit appraisals and is based on including estimates of the CO₂ costs per visitor in our modelling. We have excluded operational costs to DPC of any new investments as DPC envisage outsourcing the operation of the new port infrastructure and not directly incurring any ongoing operational expenditures.

The economic benefits included in the CBA are:

- Revenue to DPC;
- Tourism benefits to the wider economy in the form of additional gross value added (GVA);
- Value to Dublin Port of alternative uses for the infrastructure in the cruise off-season; and
- The residual value of the investment.

It should be noted that all of the costs and benefits presented in the following results are in addition to those which would occur in the 'Do Minimum' scenario. This ensures that the benefits and costs of the proposed investment options are reflected net of the counterfactual of what would have happened in the absence of these investments. The benefits of the anticipated 80 cruise ships per annum in the counterfactual are not attributable to the proposed investments and are thus excluded from the estimates of the net benefits presented in this section.

The following table summarises the findings of the economic cost-benefit modelling for the investment options. All values have been discounted at 4% in real terms. The benefit-cost ratio (BCR) illustrates the scale of the benefits relative to the costs for each investment option. The net benefit is the total benefit to the economy of the proposed investment option, including the additional GVA contribution of increased tourist expenditure, net of the costs of completing the investment. The baseline model findings suggest that Option C represents the greatest socio-economic return on investment with a BCR of 2.83. The next best option in terms of BCR is Option B. If the priority was maximising the contribution to the Irish economy, Option C represents the option with the highest economic benefit-to-cost ratio.

Cost-Benefit Analysis Findings Compared to 'Do-Minimum' Baseline Assumptions – GVA Model			
	Option A	Option B	Option C
Costs			
Capital Expenditure	67.49	61.21	91.06
Environmental Costs	8.58	10.30	24.61
<u>Total Costs</u>	76.08	71.51	115.67
Benefits			
Labour Income from Construction	0.00	0.00	0.00
Revenue to DPC	10.01	11.23	27.11
Additional GVA from Tourism Expenditure	148.77	154.86	262.79
Off-season benefits	8.76	7.99	11.82
Residual	18.61	16.98	25.12
<u>Total Benefits</u>	186.14	191.06	326.84
Net Benefit	110.06	119.55	211.18
BCR	2.45	2.67	2.83

Source: Indecon analysis

Financial Analysis of Proposed Cruise Development Options

The costs included in the financial modelling are restricted to the capital expenditure costs for each investment option. The financial benefits to DPC from the proposed investments include those outlined for the economic CBA:

- Tonnage dues (0.193 per gross ton in 2019);
- Visitor charges; €1.50 per passenger for port of call cruise ships and €3.50 per passenger for turnaround cruise ships;
- Pilotage;
- Benefits to DPC from alternative uses of the infrastructure in the cruise off-season; and
- Any franchise/licence payment from cruise terminal including imported vehicles on dedicated car carriers.

The following table presents a summary of the IRR for each option assuming no public subvention and no concession income. These baseline findings illustrate the financial unviability of the proposed investments by DPC relative to the Do Minimum scenario if there was no franchise/licence payment from operation of a cruise terminal. In such circumstances none of the investments which would provide facilities for cruise passengers are financially viable and all have negative net financial benefits.

Financial Modelling Findings Compared to 'Do-Minimum' Baseline Assumptions – Assuming No Concession Income		
	Net Benefit (€ Millions)	IRR
Option A	-56.2	-2.4%
Option B	-51.0	-2.3%
Option C	-59.9	-0.8%
<i>Source: Indecon analysis</i>		

Indecon also undertook additional modelling of alternative funding and revenue arrangements which reflect a scenario whereby DPC would, for the first ten years after the investment had been made, have a fixed and guaranteed revenue from franchise or concession/licence payments amounting to an assumed €7m per annum, before reverting to the variable pricing approach. Of note is that this assumes no additional tonnage or visitor charge above this fixed amount, while the only other source of revenue included is pilotage fees. The following table illustrates the Net Benefit and IRR for each investment scenario assuming that the envisaged concession agreement is in place. The IRRs in particular for each option are below 4.0% and are also much lower than the target financial returns expected by Dublin Port. If it was not feasible for Dublin Port to secure a long-term concession tenant who would pay a guaranteed income of a minimum of €7m per annum, the project would be likely to have negative IRRs unless there were alternative sources of revenue. As is the case throughout the modelling and results presented above, Options A to C in the table below are also evaluated net of the counterfactual/Do Minimum option.

Financial Modelling Findings Compared to 'Do-Minimum' Concession Agreement		
	Net Benefit (€ Millions)	IRR
Option A	-9.6	2.7%
Option B	-4.3	3.4%
Option C	-13.2	2.8%
<i>Source: Indecon analysis</i>		

Conclusions

This report has undertaken a comprehensive independent economic and financial analysis of a range of investment options under consideration by DPC which aim to increase the cruise ship capacity of Dublin Port. The findings of Indecon's analysis suggest that the investment in additional cruise capacity for Dublin Port is likely to yield a significant economic benefit to the wider economy. However, the capital investment to facilitate cruise business would not be financially viable for DPC, unless there is a guaranteed level of a minimum annual concession fee from a cruise terminal operator of €7m per annum, or alternative government or other support for the investment. Even at this level, the project would have a lower IRR than would normally be accepted by DPC. Indecon notes that any decisions on investment in cruise infrastructure would be considered by Dublin Port in the context of overall capital investment requirements.

1 Introduction and Background

1.1 Introduction

Indecon International Economics Consultants (Indecon) is a leading firm of research economists. Indecon was appointed by Dublin Port Company (DPC), to complete a socio-economic cost-benefit analysis (CBA) for the proposed cruise related aspects of the wider Alexandra Basin Redevelopment (ABR) Project.

Specifically, DPC is planning to invest in the construction of new multi-purpose berths at North Wall Quay Extension (NWQE). These berths would have the capacity to simultaneously accommodate multiple large cruise ships adjacent to the Tom Clark Bridge.

This study was undertaken in conjunction with Bermello Ajamil & Partners Inc. ('B&A'), a leading US-based architecture, engineering, planning, design and construction services practice. B&A were responsible for producing independent cruise market demand projections for cruise volumes at these new berths. The primary objective of this socio-economic CBA is to estimate the wider socio-economic benefits of the proposed investment.

1.2 Background

Dublin Port Company is a self-financing, private limited company, wholly owned by the State, whose business is to manage Dublin Port, Ireland's premier port. DPC has in place a Masterplan to guide the development of Dublin Port over the period to 2040. The Masterplan presents a vision for future operations at the port and critically examines how the existing land use at Dublin Port can be optimised.

The ABR Project is the first major project to be brought forward under the Masterplan. The project forms part of a €1,024m ten-year capital expenditure programme (2019 to 2028). It involves the construction of approximately 3km of quay walls, deepening of the port's access channel and deepening of Alexandra Basin to accommodate larger sea going vessels as well as works associated with the conservation of the Port's Victorian industrial heritage.

One of the options within the ABR Project is the development of North Wall Quay Extension (NWQE). The NWQE project would involve the removal of the eastern end of the existing NWQE and the provision of a new quay wall on both the north and south sides of the quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin and would also provide 500m of deep berthage suitable for cruise ships up to 350m long on the south side of the quay, and 377m of berthage for cruise ships up to 333m long on the north side of the quay. Should it be completed, it is envisaged that the project would allow DPC to accommodate upwards of 200 cruise ship calls per annum. It is this investment in additional cruise capacity that is the subject of the analysis undertaken in this report. Indecon independently examines, both from a financial and broader socio-economic perspective, the impact of the proposed investment.

Indecon's analysis rigorously evaluates the financial and economic cost benefit impacts of a number of sub-options for the proposed development.

1.3 Methodological Approach

As part of this study we completed the estimation of the financial and economic benefits of the proposed investment options and the formal CBA modelling. The CBA has been undertaken in line with the relevant provisions of the Department of Public Expenditure and Reform's Public Spending Code for major capital investment projects of this nature. The Indecon team has also ensured that the CBA has been undertaken in line with the relevant provisions of the Department of Transport's Common Appraisal Framework for Transport Projects and Frameworks. Beyond the relevant Irish guidance for CBAs of this nature, Indecon also noted the relevant guidance for projects of this nature from the European Commission Guide to Cost-Benefit analysis of Investment Projects and the European Investment Bank's guidance on the Economic Appraisal of Investment Projects.

1.4 Structure of Report

The remainder of this report is structured as follows:

- ❑ Chapter 2 presents the trends in the international cruise tourism sector as well as recent trends in cruise traffic in Dublin Port. This chapter also outlines in detail the cruise demand forecasts underlying the subsequent analysis and the key assumptions behind these forecasts;
- ❑ Chapter 3 outlines the wider policy context in which the proposed investments in cruise capacity would be undertaken in terms of both the wider Dublin Port Masterplan and other local and national policy objectives;
- ❑ Chapter 4 outlines the inputs and key assumptions in the socio-economic cost-benefit appraisal model before presenting the findings of this model for the proposed investment options; and
- ❑ Chapter 5 contains the findings of the financial model of the proposed investment options.

1.5 Acknowledgements and Disclaimer

Indecon would like to thank the various staff at Dublin Port for their assistance in completing this study. Thanks are due to Eamonn O'Reilly, Michael McKenna, Catherine Lynch, Michael Sheary and Brendan Considine. We are also grateful to Fáilte Ireland for their inputs to the study, particularly their willingness to share updated research on the nature of expenditure by cruise passengers in Ireland, and particular thanks are due in this regard to Mark O'Boyle and Caeman Wall.

The usual disclaimer applies and the views and analyses contained in this document are the sole responsibility of Indecon research economists.

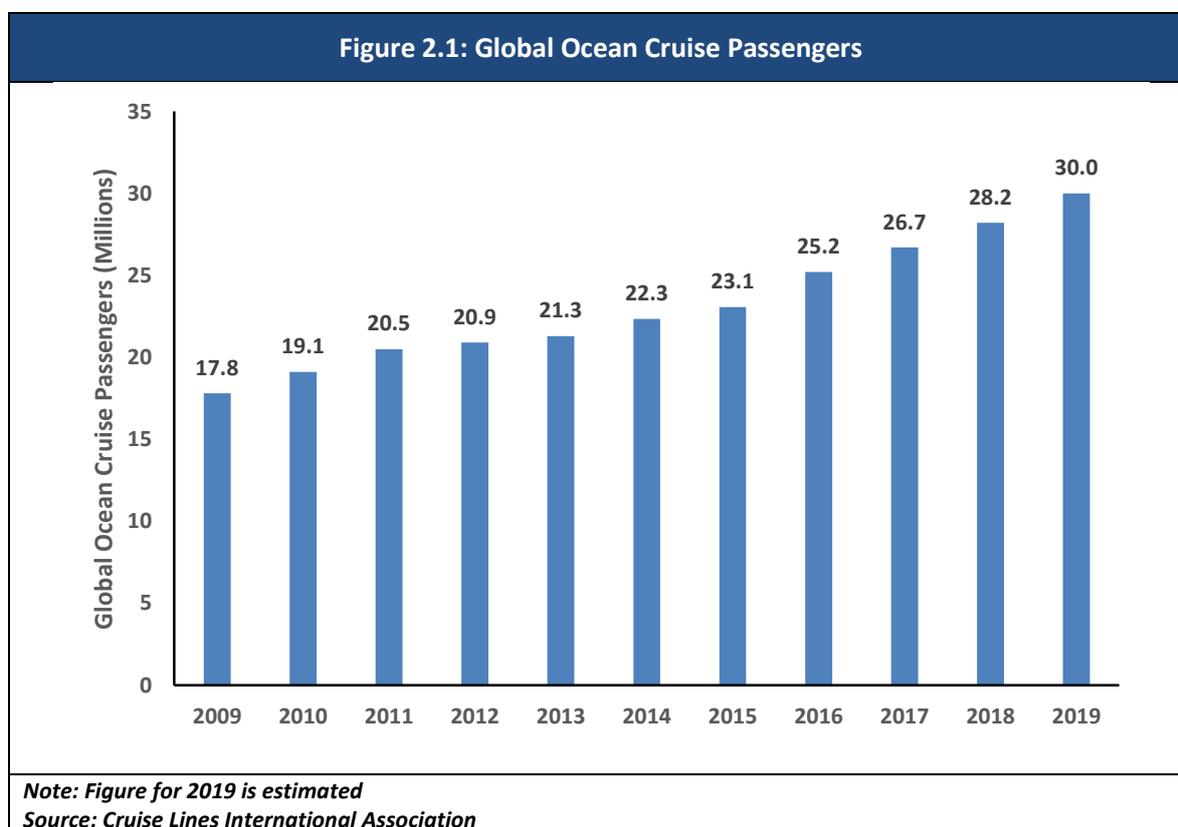
2 Trends and Prospects for Cruise Tourism

2.1 Introduction

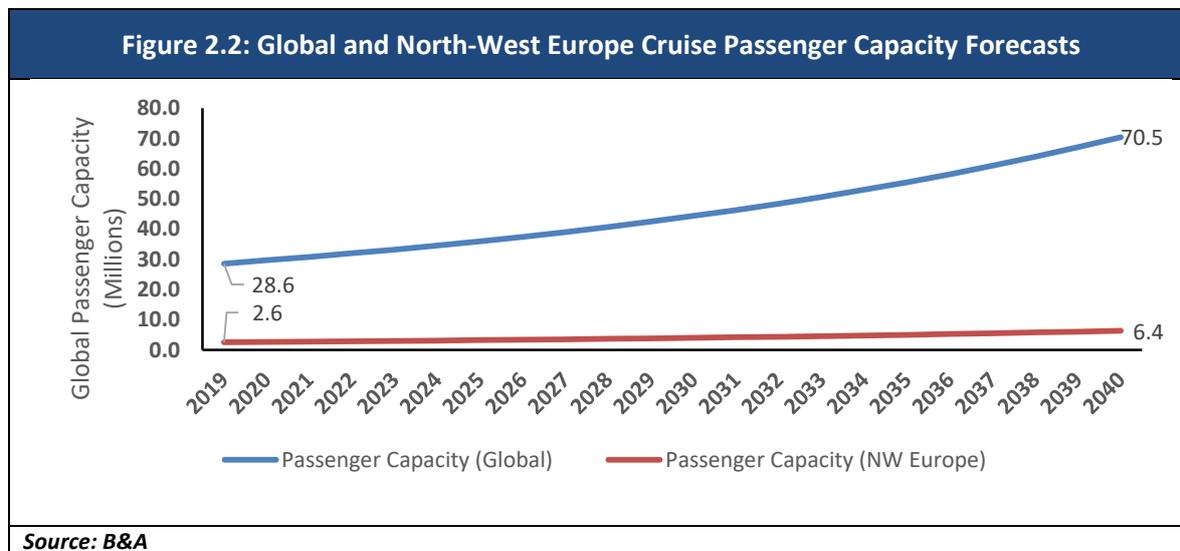
This chapter outlines the trends in the international cruise industry, as well as the recent performance of the cruise aspect of Dublin Port's business. Following this retrospective analysis of the trends in the cruise sector, we then turn to the projections for the cruise business in Dublin Port which are a key input into our economic and financial modelling. The chapter concludes with a discussion of the economic impact of cruise tourism.

2.2 International Cruise Industry

The global cruise sector has seen significant growth in recent years. The following figure shows the trend in global ocean cruise passengers since 2009. The figures from the Cruise Lines International Association indicate that total global cruise passengers increased from 17.8 million in 2009 to 28.2 million in 2018 (growth of 58%) with estimated continued growth to 30.0 million passengers in 2019.

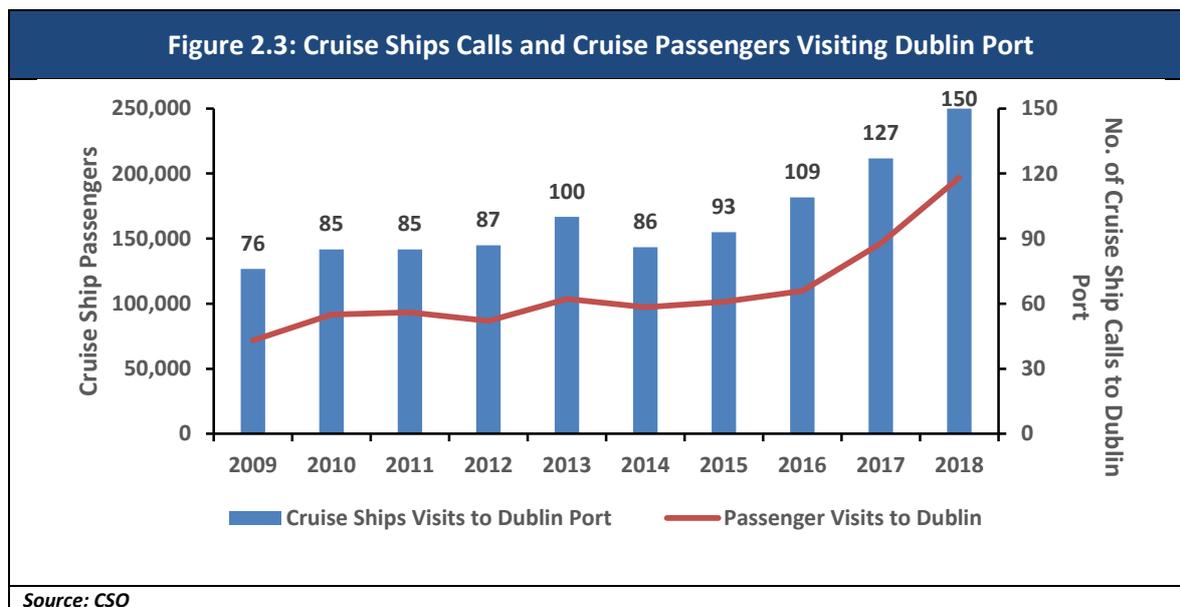


B&A’s projections for the global cruise sector anticipate growth to 70.5 million cruise passengers by 2040. This forecast takes into account new ship build trends, vessel capacity and withdrawals from service. The following figure illustrates these passenger capacity projections. We also include the projections for the North-West Europe sector as additional context.

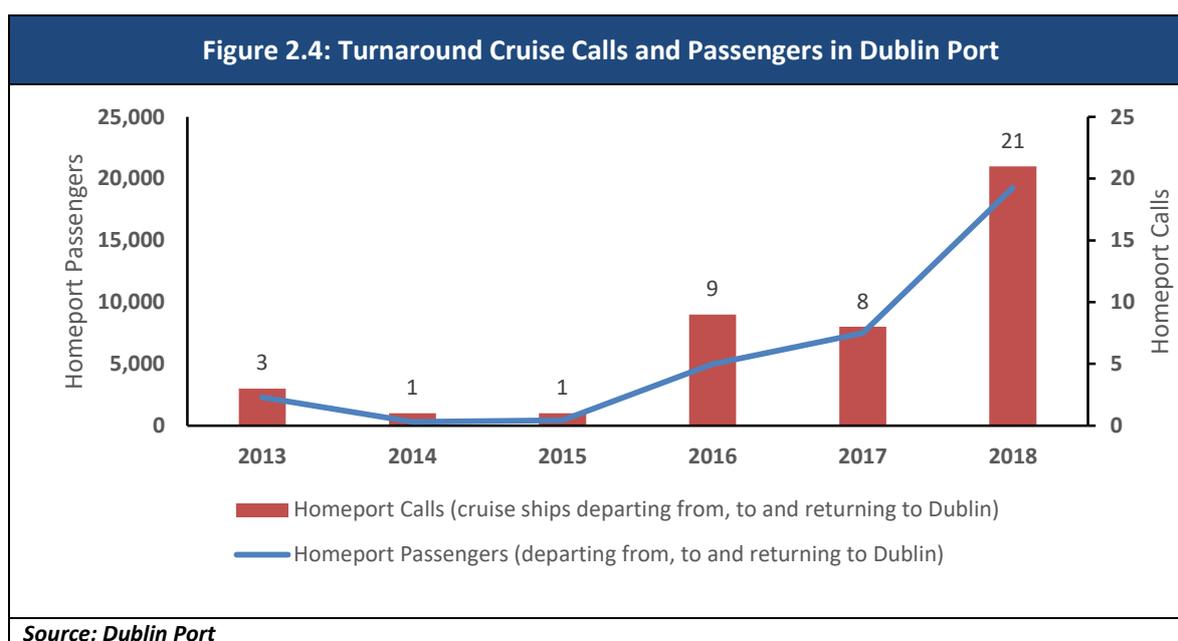


2.3 Cruise Tourism at Dublin Port

The following figure presents data on the number of cruise ships calling to Dublin Port and the number of cruise passengers since 2009. The number of cruise ships calling at Dublin Port doubled between 2009 and 2018. Over the same period passenger numbers increased by 174% from 72,000 to 197,000. This is illustrative of the growing attractiveness of Dublin as a cruise destination.



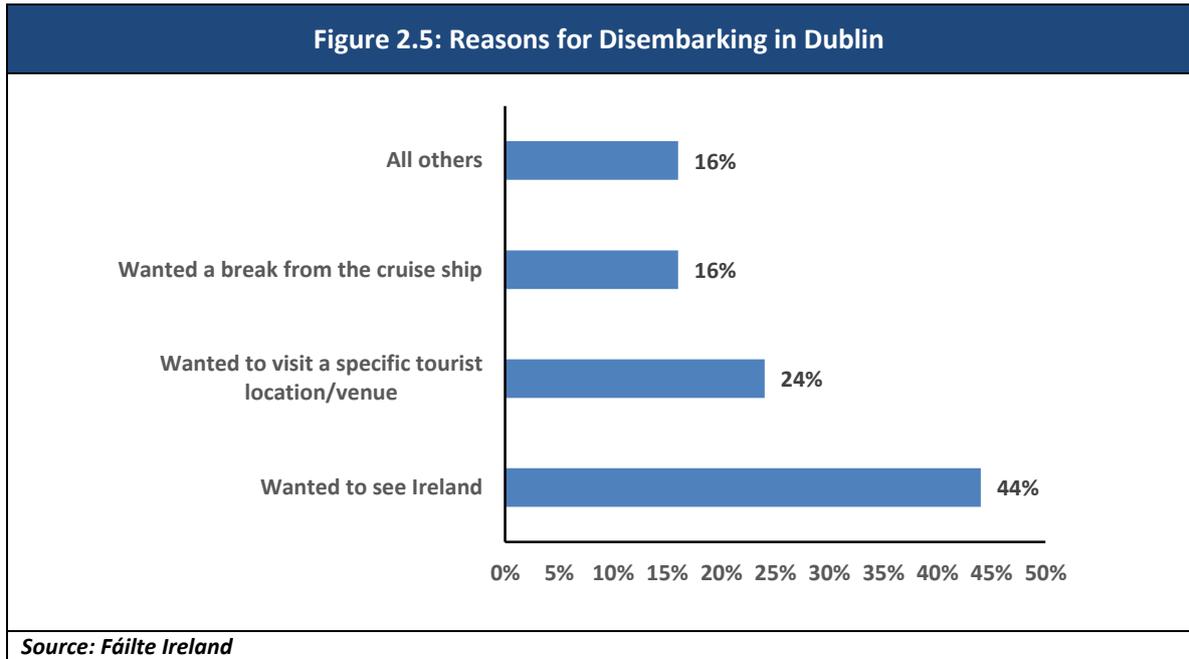
It is also useful to examine the trends in the growth of Dublin as a homeport³ for cruise ships. The following figure shows the number of cruise ships using Dublin Port as a turnaround port since 2013. Turnaround passengers have a significantly higher economic impact on the local economy as a proportion of these passengers will spend additional time in Dublin before and/or after their cruises. The following figures shows that Dublin Port has dramatically increased the number of homeport calls in recent years from between 1 and 3 per annum in 2013-2015, to 21 in 2018. A report produced by Cruise Ireland, “*Cruise Tourism on the Island of Ireland*”, outlined the potential for the growth of the cruise tourism sector and endorsed the contribution of DPC’s ABR Project in facilitating increased cruise tourism. This report suggested that, given Dublin’s international air connectivity, proximity, and ease of access between Dublin Airport and Dublin Port, there is an opportunity to grow the turnaround volumes.



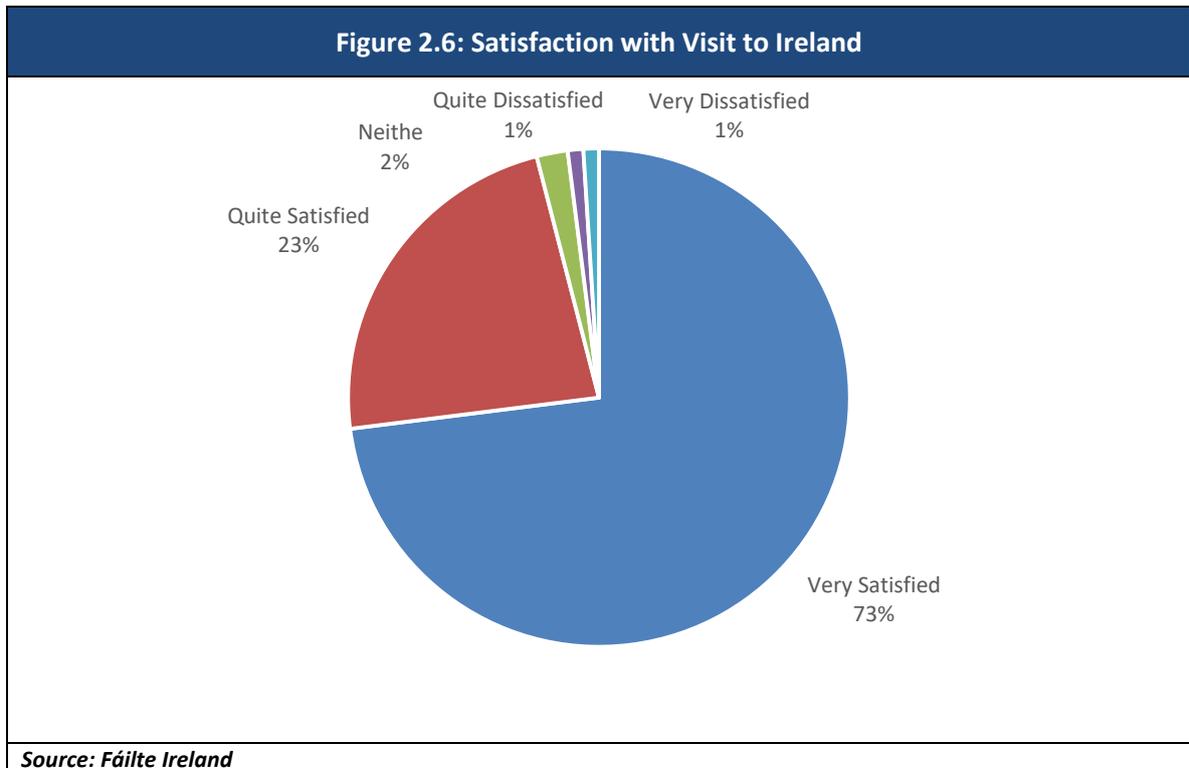
The majority of cruise passengers in Dublin Port are transit passengers who disembark for a number of hours to visit attractions or tour the city before re-embarking, typically on the same day.

Recent research from Fáilte Ireland explored the reasons why cruise passengers choose to disembark in Dublin on their cruise. The following figure outlines the findings of this research. The fact that 68% of individuals disembarked as they wanted to see Ireland or visit a specific tourist location indicates the attractiveness of Dublin as a cruise destination. This also highlights the potential expenditure benefits to the economy arising from cruise tourism.

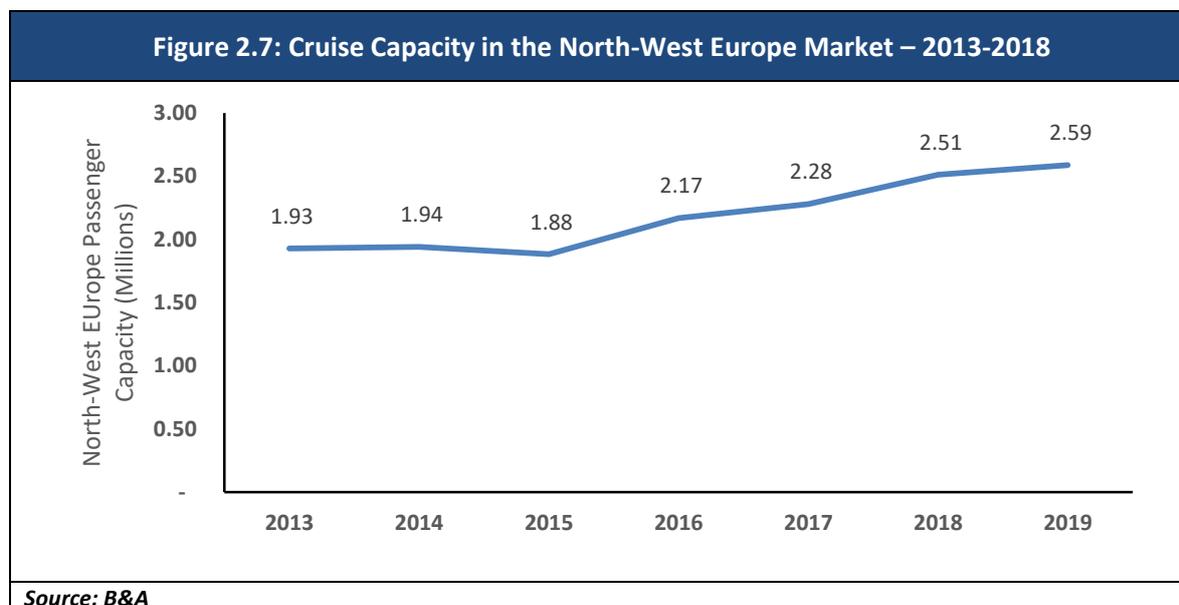
³ In this report the terms “homeport” and “turnaround” are used interchangeably and refer to circumstances where cruise passengers either commence or finish a cruise in Dublin. In some cases, all of the cruise passengers disembark to end their cruise and a new set of passengers embark to commence their cruise. In other cases, only a subset of passengers either disembark or embark in Dublin. This is referred to in the cruise industry as “interporting”. In this study, where the terms “homeport” and “turnaround” are used, they should be taken to include “interporting”.



The following figure further reinforces the attractiveness of Ireland as a cruise destination with 96% of respondents to the Fáilte Ireland survey indicating that they were very satisfied or quite satisfied with their visit to Ireland.



A core input to the cost-benefit analysis undertaken for this report concerns the likely future trajectory for cruise calls to Dublin Port assuming that there are no capacity constraints faced by the port. Our forecast represents the expected demand for cruise calls to Dublin Port or the potential demand for cruise calls which could be met by Dublin Port.



Our forecasts are based on a range of assumptions with regards to Dublin Port's market share of the North-West European cruise market. The following table outlines Dublin's market share in recent years.

Table 2.1: Dublin Port Market Share of North-West European Cruise Market

	Share of NE Europe Market
5-year Average	7.05%
3-year average	9.71%

Source: B&A

The projections include low demand, base case and high demand scenarios:

- For the low demand scenario, the forecast assumes a market share of expected regional market demand equal to the average of the five years from 2015 to 2019 (7.05%).
- The base case scenario assumes the three-year market share of 9.71%.
- The high-demand scenario assumes a 12% market share over the appraisal period.

Our forecasts take account of the increase in the world cruise market; deployment of new ships into the North Western Europe market and the value of Dublin to the marketplace. The high demand scenario also reflects additional deployment opportunities for Dublin.

It should be noted that the projections extend to 2040. However, the appraisal period for the cost-benefit analysis, in line with the guidance for port infrastructure investments outlined by the European Commission, is set for 25 years in our modelling. This appraisal period thus extends to 2044. In our modelling we assume that the projections continue to grow at the prevailing rate for

these additional years; however, we also test the sensitivity of the model findings based on assuming that demand remains flat for these additional years.

As outlined above, the base case scenario assumes that Dublin continues to maintain its market share of cruise business of an expanding market for all of the last three-year trend of 9.71% the appraisal period. The following tables outline the key B&A forecasts for cruise calls and passenger numbers. Table 2.2 outlines the forecast passenger numbers and cruise calls and in the base case demand scenario which assumes that there will be 183 cruise calls to Dublin Port by 2040 bringing nearly 620,000 passengers. This represents a very significant growth on the 197,000 cruise passengers who arrived in Dublin Port in 2018.

Table 2.2: Base Case Demand Scenario – Cruise Calls and Passenger Numbers					
	2018	2025	2030	2035	2040
Passenger numbers	196,899	316,095	389,695	487,820	618,840
Cruise Calls	150	146	155	168	183
Passengers per ship	1,313	2,166	2,511	2,911	3,375
Source: B&A					

Table 2.3 provides a breakdown of the forecast for homeport and transit passengers. This scenario assumes that one-third of cruise calls from 2025 onwards will be homeport calls and that, by 2040, Dublin Port will handle 210,000 homeport cruise passengers.

Table 2.3: Base Case Demand Scenario – Homeport and Transit Cruise Traffic					
	2018	2025	2030	2035	2040
Homeport Passengers (departing from, to and returning to Dublin)	19,258	107,472	132,496	165,859	210,406
Percent of Homeport Passengers	10%	34%	34%	34%	34%
Homeport Calls (cruise ships departing from, to and returning to Dublin)	21	31	37	44	53
Homeport Pax Per Call	917	3,451	3,627	3,812	4,006
Transit Passengers (calling on Dublin and homeporting in another port)	177,641	208,623	257,199	321,961	408,434
Percent of Transit Passengers	90%	66%	66%	66%	66%
Transit Calls (cruise ships calling on Dublin and homeporting in another port)	129	115	119	124	131
Transit Pax Per Call	1,377	1,817	2,168	2,595	3,121
Source: B&A					

Table 2.4 illustrates the gross tonnage and associated revenue under the base case demand scenario. This scenario forecasts aggregate gross tonnes of 16.5 million in cruise calls by 2040 with associated revenue of €6.8 million. In addition, revenue of €2.5m is forecast from passenger charges.

Table 2.4: Base Case Demand Scenario – Gross Tonnage and Revenue Forecast

	2018	2025	2030	2035	2040
Gross Tonnage (aggregate)	7,512,749	10,177,312	11,659,629	13,697,203	16,548,753
Gross Tonnage (Per Call)	50,085	69,740	75,130	81,736	90,243
Revenue Forecast - GT	1,419,575	2,887,099	3,742,249	4,973,924	6,799,106
Revenue Forecast - passenger charge	382,535	886,440	1,236,449	1,751,178	2,513,438

Source: B&A

For the low demand scenario, it is assumed the market capture average of the last five years (2015-2019) for Dublin of the regional market (7.05%) continues to be reflected in Dublin's future demand growth. The following tables summarise the low demand forecasts of cruise calls, passenger numbers and revenue. Table 2.5 shows that under the low demand scenario Dublin Port will see 133 cruise calls annually by 2040.

Table 2.5: Low Demand Scenario – Cruise Calls and Passenger Numbers

	2018	2025	2030	2035	2040
Passenger numbers	196,899	229,511	282,951	354,197	449,329
Cruise Calls	150	106	113	122	133
Passengers per ship	1,313	2,166	2,511	2,903	3,378

Source: B&A

Table 2.6 provides forecasts for homeport and transit passengers under the low demand scenarios. This assumes that one-third of cruise calls from 2025 onwards will be homeport calls and that, by 2040, Dublin Port will handle 153,000 homeport cruise passengers.

Table 2.6: Low Demand Scenario – Homeport and Transit Cruise Traffic

	2018	2025	2030	2035	2040
Homeport Passengers (departing from, to and returning to Dublin)	19,258	78,034	96,203	120,427	152,772
Percent of Homeport Passengers	10%	34%	34%	34%	34%
Homeport Calls (cruise ships departing from, to and returning to Dublin)	21	23	27	32	38
Homeport Pax Per Call	917	3,451	3,627	3,812	4,006
Transit Passengers (calling on Dublin and homeporting in another port)	177,641	151,477	186,747	233,770	296,557
Percent of Transit Passengers	90%	66%	66%	66%	66%
Transit Calls (cruise ships calling on Dublin and homeporting in another port)	129	83	86	90	95
Transit Pax Per Call	1,377	1,817	2,168	2,595	3,121

Source: B&A

Table 2.7 illustrates the gross tonnage and associated revenue under the low demand scenario. This scenario forecasts aggregate gross tonnes of 12 million by 2040 with associated revenue of €4.9 million. In addition, revenue of €1.8m is forecast from passenger charges.

Table 2.7: Low Demand Scenario – Gross Tonnage and Revenue Forecast					
	2018	2025	2030	2035	2040
Gross Tonnage (aggregate)	7,512,749	7,389,562	8,465,846	9,945,291	12,015,750
Gross Tonnage (Per Call)	50,085	69,740	75,130	81,736	90,243
Revenue Forecast - GT	1,419,575	2,096,270	2,717,179	3,611,476	4,936,708
Revenue Forecast - passenger charge	382,535	643,628	897,763	1,271,498	1,824,962
<i>Source: B&A</i>					

The high demand scenario assumes that the three-year growth rate of 12.01% prevails into over the appraisal period. The following tables summarise the high demand forecasts of cruise calls and passenger numbers. Table 2.8 shows that under the high demand scenario, Dublin Port will see 227 cruise calls annually by 2040, assuming no capacity constraints at the port.

Table 2.8: High Demand Scenario – Cruise Calls and Passenger Numbers					
	2018	2025	2030	2035	2040
Passenger numbers	196,899	391,030	482,078	603,465	765,545
Cruise Calls	150	181	192	207	227
Passengers per ship	1,313	2,166	2,511	2,911	3,375
<i>Source: B&A</i>					

Table 2.9 provides an analysis of homeport and transit passengers in the high demand scenario. This scenario assumes that, by 2040, Dublin Port will handle 260,000 homeport cruise passengers.

Table 2.9: High Demand Scenario – Homeport and Transit Cruise Traffic					
	2018	2025	2030	2035	2040
Homeport Passengers (departing from, to and returning to Dublin)	19,258	132,950	163,906	205,178	260,285
Percent of Homeport Passengers	10%	34%	34%	34%	34%
Homeport Calls (cruise ships departing from, to and returning to Dublin)	21	39	45	54	65
Homeport Pax Per Call	917	3,451	3,627	3,812	4,006
Transit Passengers (calling on Dublin and homeporting in another port)	177,641	258,080	318,171	398,287	505,260
Percent of Transit Passengers	90%	66%	66%	66%	66%
Transit Calls (cruise ships calling on Dublin and homeporting in another port)	129	142	147	153	162
Transit Pax Per Call	1,377	1,817	2,168	2,595	3,121
<i>Source: B&A</i>					

Table 2.10 illustrates the gross tonnage and associated revenue under the high demand scenario. This scenario forecasts aggregate gross tonnes of 20.5 million aggregate by 2040 with associated revenue of €8.4 million. In addition, revenue of €3.1m is forecast from passenger charges.

	2018	2025	2030	2035	2040
Gross Tonnage (aggregate)	7,512,749	12,589,987	14,423,708	16,944,317	20,471,867
Gross Tonnage (Per Call)	50,085	69,740	75,130	81,736	90,243
Revenue Forecast - GT	1,419,575	3,571,526	4,629,401	6,153,062	8,410,930
Revenue Forecast - passenger charge	382,535	1,096,583	1,529,566	2,166,319	3,109,283
<i>Source: B&A</i>					

2.4 Economic Contribution of Cruise Tourism

Based on Fáilte Ireland figures for 2017,⁴ the 145,000 cruise passengers arriving in Dublin Port in 2017 represented 4% of the total visits by holidaymakers to Dublin that year.

The latest research undertaken by Fáilte Ireland indicates significant spending by cruise passengers. This survey research was undertaken in April-May 2019 and represents up-to-date information on the spending patterns of cruise passengers visiting Dublin. The following table indicates an average spend for turnaround passengers of €184 and €54 for transit passengers. The figures include expenditure on accommodation, tours, entry to attraction, food and beverages and other expenditures. However, they exclude any pre-booked accommodation or pre-paid sight-seeing tours and, therefore, under-represent the total expenditure impacts.

Passenger Type	Average Expenditure
Turnaround passengers	€184
Transit Passengers	€54
<i>Source: Fáilte Ireland</i>	

The economic benefits of the boost to tourism expenditure in the local economy can be significant. While tourists arriving on cruise ships typically do not spend a long time in any single city, they represent an important source of tourist expenditure. Research undertaken by the OECD⁵ emphasised the potential for Dublin to develop the cruise sector and endorsed the proposed developments under the ABR Project to facilitate the realisation of the potential growth in the cruise sector.

The Fáilte Ireland research also outlined a breakdown of what passengers spent their money on while in port. This breakdown is illustrated in the following table.

⁴ Fáilte Ireland "Profile of Tourism in Dublin 2017"

⁵ OECD, "Cruise Shipping and Urban Development; The Case of Dublin"

Expenditure Type	Share of Spend (%)
Food & Beverage	28%
Taxi / ground transportation	6%
Retail purchases of watches & jewellery	6%
Retail purchases of clothing	15%
Local crafts & souvenirs	17%
Entertainment/Nightclubs/Casinos etc.	1%
Tour/Tour guide/Museums/Galleries etc.	9%
Any other retail purchases	1%
Any other expenditure	5%
Accommodation (not including pre-booked accommodation)	10%

Source: Fáilte Ireland

It should be noted that turnaround passengers will also contribute to the local economy via their expenditure on accommodation prior to or after their cruise⁶.

A number of studies have been undertaken internationally on the impact of the cruise sector on a range of cities. A study of the economic impact of the cruise sector in Barcelona concluded that the sector supported a total turnover of €796 million in Catalonia, a contribution to the GDP of €413.2 million and 6,759 full-time equivalent jobs.⁷ It is important to note that this study differs from the Barcelona study in that this study is a cost-benefit appraisal of an investment project while the Barcelona study focused on estimating the overall economic contribution of the port.

The findings regarding visitor the number and nature of visitors in the Barcelona study are outlined in the following table. The Barcelona study identified that cruise passengers who also stayed overnight in the city spent an average of €200 per day. The average expenditure of a 'day visitor' was €53.

Categories of Cruise Passenger	Average length of visit to the city	Cruise Passengers	
Day visitor - cruise passengers (not staying overnight)	4.3 hours	1,360,271	58%
Of which	4.2 hours	1,141,805	48%
- Tours of cruise passengers in transit (stop over)	4.7 hours	218,466	9%
- Tours of cruise passengers boarding or disembarking	2.6 nights	565,400	24%
Tourists - cruise passengers (stay at least one night in the city)	-	438,621	19%
Not visitors (cruise passengers travelling to or from the port without visiting the city)			
Total Cruise Passengers		2,364,292	100%

Source: "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf

⁶ While we note that the preceding table assigns 10% of expenditure to accommodation, for the purposes of our analysis we operate on the assumptions that turnaround passengers will spend significantly more on accommodation given their tendency to stay in the city for longer. We also assume that the majority of turnaround passengers will pre-book accommodation.

⁷ "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf

The Cruise Line International Association (CLIA), has estimated that the cruise sector contributed \$47.8 billion to the US economy in 2016.⁸ Recent research undertaken in the UK indicated that the cruise sector contributed £10.4 billion to the UK economy in 2017.⁹ The cruise sector in New Zealand was estimated to contribute to \$548 million in additional expenditure and 5,361 jobs in 2014.¹⁰ The New Zealand study assumed \$130 in average passenger expenditure. It has also been estimated that the cruise industry is responsible for €21.7 million in passenger expenditure and €40-€60 million additional expenditure by cruise operators in the Maltese economy.¹¹ Overall, the international evidence demonstrates the potential economic benefits of cruise tourism.

2.5 Summary of Findings

This chapter outlined the trends in international cruise tourism and recent trends in cruise traffic in Dublin Port. It also examined the forecasts for future demand for cruise tourism in Dublin Port which underlie the analysis undertaken subsequently in this report. The key findings from this chapter include:

- ❑ Total global cruise passengers increased from 17.8 million in 2009 to 28.2 million in 2018 (growth of 58%) with estimated continued growth to 30.0 million passengers in 2019.
- ❑ The number of cruise ships calling at Dublin Port doubled between 2009 and 2018. Over the same period passenger numbers increased by 174% from 72,000 to 197,000. The growth in the cruise business in Dublin Port has outstripped the wider global and European trends and is illustrative of the growing attractiveness of Dublin as a cruise destination.
- ❑ The base case demand projection scenario assumes that Dublin Port continues to capture its average share of the last 5-years of 9.71% of the total North-West Europe cruise market over the appraisal period. This scenario identifies that there will be 183 cruise calls to Dublin Port by 2040 bringing nearly 620,000 passengers. This total comprises 210,000 turnaround passengers and 410,000 transit passengers.
- ❑ A number of studies have been undertaken internationally on the impact of the cruise sector on a range of cities, and demonstrate the potential economic benefits of cruise tourism. One such study, on the economic impact of the cruise sector in Barcelona, accounted for the direct, indirect and induced impacts of cruise related spending, and concluded that the sector supported a total turnover of €796 million in Catalonia, a contribution to the GDP of €413.2 million and 6,759 full-time equivalent jobs.¹² Similar studies have quantified the benefits of the cruise sector in the US, the UK, New Zealand, Malta and other cities and countries.

⁸ CLIA, "The Contribution of the International Cruise Industry to the U.S Economy in 2016"

⁹ Report conducted by the Business Research & Economic Advisors (BREA) on behalf of Cruise Lines International Association: <http://cruisebusiness.com/index.php/news-section/more-news-category/7710-cruise-industry-contributed-10-4-billion-to-uk-economy-2017-clia>

¹⁰ Cruise New Zealand, "Economic Impact of the New Zealand Cruise Sector"

¹¹ Ministry for Tourism, "Contribution of the Tourism Sector to the Maltese Economy"

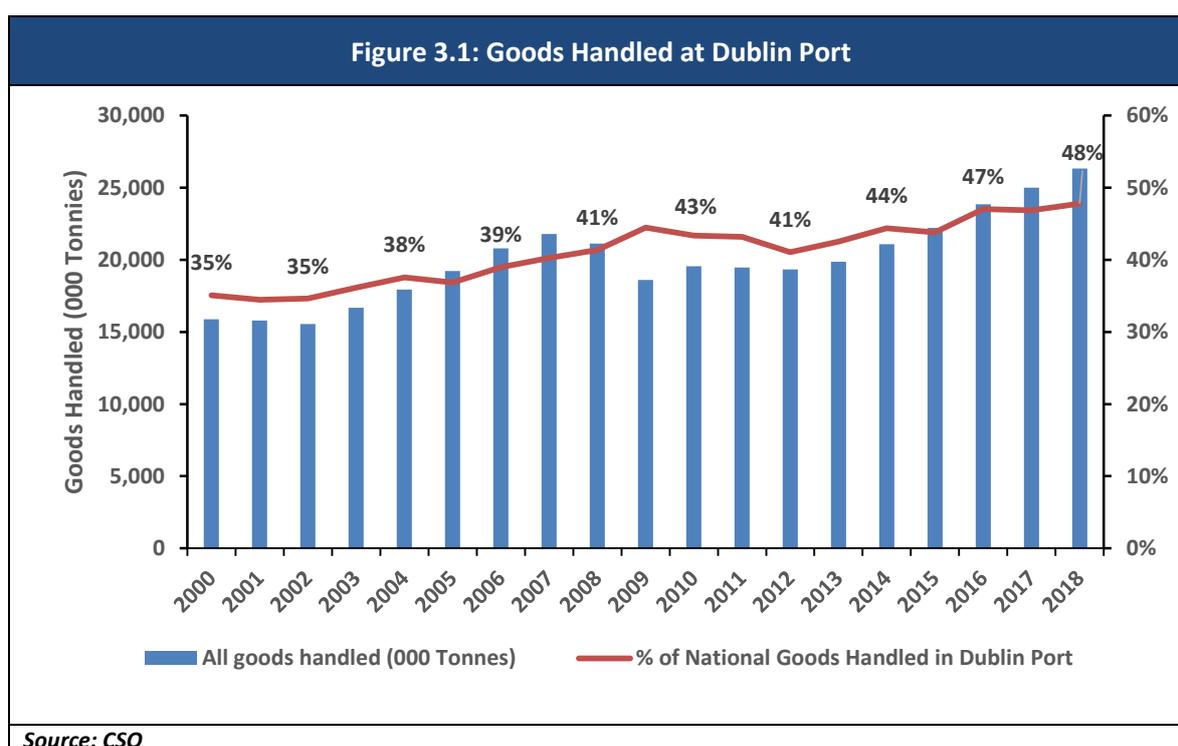
¹² "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf

3 Policy Context for Development of Dublin Port

3.1 Introduction

This chapter places the proposed investment in additional cruise infrastructure in Dublin Port in the context of the wider development plans for Dublin Port as well as the wider context of national ports policy, national tourism strategies and strategies for wider economic growth and development.

The following figure illustrates the increase in the overall volume of goods handled at Dublin Port in recent years, as well as the increasing importance of the port in the context of overall national port throughput. Since 2012, freight volumes handed at Dublin Port have increased by 36%. Over this same period, Dublin Port has increased its market share of all trade through Irish ports to 48%. This highlights the criticality of Dublin Port in the context of national port capacity.



Unitised freight accounts for 82% of Dublin Port's volume. Dublin, in turn, accounts for 86% of Ireland's unitised freight volumes, as illustrated in the following table.

Unitised freight volumes in Alexandra Basin will increase greatly as part of the ABR Project when Seatruck moves its Ro-Ro freight business to Alexandra Basin in Q1 2021. To put the scale of this move into context, Seatruck's annual volume of Ro-Ro freight is greater than that of Rosslare Harbour. Seatruck accounted for 17% of all arrivals in Dublin Port in 2018. Additionally, when Seatruck moves, existing cargo will be displaced onto Ocean Pier leaving very limited quayside space for cruise ships.

Table 3.1: Roll-on/Roll-off (units)	
	2018
All Irish ports	1,163,872
Dublin	1,031,897
Dublin as % of all ports	89%
<i>Source: IMDO</i>	

The volume of unitised freight (Ro-Ro and Lo-Lo combined) moved on direct services between Dublin Port and Continental Europe is 2.4 times greater than moves over the UK land bridge and it is expected that volumes on direct services to Continental Europe will increase. Because of preparations to respond to Brexit, DPC will lose almost ten hectares of land, leaving no spare land for temporary cruise terminal facilities for major turnaround calls from 2021 (in the absence of the proposed NWQE development). There were 7,969 ship arrivals into Dublin Port in 2018. 150 of these were cruise ships. As indicated in the following table, the cruise business accounted only 2.5% of revenues for Dublin Port in 2018.

Table 3.2: Cruise in the context of Dublin Port's Business			
	2016	2017	2018
Cruise revenue	€ 1,405,130	€ 1,944,199	€ 2,242,836
Total revenue	€ 81,633,000	€ 85,497,000	€ 90,374,000
Cruise revenue as %	1.7%	2.3%	2.5%
<i>Source: DPC</i>			

3.2 Dublin Port Masterplan

DPC's Masterplan 2040 recognises that the quality of air and sea access infrastructure is a critical element in serving the internationally traded side of the economy and must be of international standards in order to facilitate merchandise trade in a competitive manner. The Masterplan also recognises the port as a key for the national tourism sector as an important gateway for visitors to Ireland.

The Masterplan sets out a set of possible investment options for development depending on demand and capacity, and subject to securing planning and other necessary consents. Consistent with Project Ireland 2040 National Planning Framework, DPC envisages that growth will continue until 2040. As a consequence, Dublin Port will have to be developed as envisaged in this Masterplan to provide the port capacity needed to 2040. The importance of the freight element to DPC's business is emphasised in the Masterplan with particular focus on providing and efficiently utilising lands for Ro-Ro freight as the single biggest challenge addressed by the Masterplan.

With regard to the cruise sector, the Masterplan indicates that new cruise facilities will be required to further develop this business and cater for future growth. The Masterplan outlines DPC's assessment that the option of redeveloping North Wall Quay Extension best meets the objective of growing Dublin's cruise tourism business to its maximum potential. However, while recognising the potential future growth in the cruise sector, the Masterplan also outlines how the main attraction of the cruise industry is the generation of significant revenues for the Dublin region, with the actual contribution to DPC's revenues not being significant.

The cruise related investments outlined in the Masterplan aim to move cruise ship operations closer to the City. The ABR Project, which is a key part of the Masterplan's development proposals, provides for the creation of berths for large cruise vessels at a new location. This new location will allow cruise vessels to come as far upriver as the Tom Clarke Bridge and provide access for visiting passengers and crew to the city via the Luas. The Masterplan recognises that the development of a cruise turnaround business where cruise ships start and finish tours in Dublin is more valuable to the economy than a port of call operation. It is envisaged that this would require terminal facilities at the cruise berths.

3.3 Dublin Port's Cruise Strategy Review

DPC carried out an internal Cruise Strategy Review in October 2018. This review examined the proposed NWQE redevelopments in the context of the wider ABR Project. The Cruise Strategy Review emphasised the important role which Dublin Port plays in the wider cruise sector in Ireland. The cruise business in Dublin Port is more than half of the total business in the country, 54.3% of the number of ship calls and 55.3% of all cruise passengers. In this context, the Cruise Strategy Review highlighted that ports in Ireland more complement each other than compete with each other for cruise business. Most cruise ships which call to Dublin Port also include either Cork or Belfast in their itineraries. This was recognised as an important consideration as a decision not to proceed with the NWQE investment could not only lead to Dublin's cruise business declining. It could also have a negative impact on the cruise business in other ports.

One of the Cruise Strategy Review's key conclusions was that DPC could not proceed with the investment unless it could be made financially viable and, if DPC didn't proceed, then the cruise business in Dublin Port would diminish over time as priority was given to the growing volume of cargo ships.

Following on from the Cruise Strategy Review, DPC published a "*Cruise berthing policy from 2019 to 2021*" document in March 2019. This document set out how, due to the large growth in cargo volumes in Dublin Port (36% in the six years to 2018) and due to the impact of major construction works on berth availabilities, it had become necessary to manage future cruise bookings (as and from 2021) as follows:

- ❑ From 2021, DPC will accommodate cruise ships on three berths only:
 - a. Berth 8 on Sir John Rogerson's Quay (where DPC is limited to a maximum of 12 ships per annum);
 - b. Berth 18 on North Wall Quay Extension;
 - c. Berth 33 On Ocean Pier West (where the number of bookings will be limited as set out below).
- ❑ For Berth 33 in 2021:
 - a. No cruise ship bookings will be taken for Fridays, Saturdays, Sundays or Mondays on any week in the year;
 - b. For the period from 1st May to 31st August, no more than two cruise bookings will be accepted in any week for Tuesdays, Wednesdays and Thursdays;

- c. For the rest of the year no more one cruise booking will be accepted in any week for Tuesdays, Wednesdays and Thursdays;
 - d. The availability of Berth 33 for cruise ships in 2022 will be reviewed by 31st December 2019.
- ❑ From 2021, DPC will not take bookings for cruise turnarounds.
 - ❑ For 2021:
 - a. Cruise lines are asked to reconfirm their booking requests to the Harbour Office by 29th March 2019;
 - b. DPC will allocate bookings across the three berths available;
 - c. DPC will confirm acceptance/rejection of bookings together with the assigned berth by 30th April 2019;
 - d. Where there are more requests for bookings than DPC has capacity for, DPC will, at its sole discretion, decide which booking requests to accept.

DPC stated that the objective of this policy was to ensure that Dublin Port would not accept too many bookings in future years such that these could prevent construction works commencing on Alexandra Quay West. However, after 2023, when works on Alexandra Quay West are completed, the policy highlighted that it would be possible to again increase the number of cruise ships back towards 150 from in the order of 80 for the three years from 2021 to 2023.

3.4 Wider Policy Context

It is also important to highlight the wider national policy context in which Dublin Port operates and is developing. In terms of national development policies, Project Ireland 2040 was published by the Government in early 2018 and represents the Government's overarching policy initiative to advance economic and social progress. Project Ireland is made up of the National Planning Framework (NPF) to 2040 and the National Development Plan 2018-2027 (NDP). Ensuring high quality international connectivity is one of ten strategic outcomes identified in Project Ireland 2040. The National Development Plan 2018 – 2027 recognises the importance of high-quality international connectivity and commits to investment in Ireland's ports. It is in the context of this emphasis on the importance of Ireland's ports as facilitators of Ireland's international connectivity that potential investments in cruise infrastructure must be considered. Dublin Port's core business is freight, with the importance of this element of Dublin Port's business emphasised at a national planning level.

The Transport Strategy for the Greater Dublin Area, 2016 – 2035, published by the National Transport Authority, sets out how transport will be developed across the region. The Strategy emphasises the importance of facilitating the expansion of activity at Dublin Port into the future, as both a commercial and passenger port.

The Dublin City Development Plan recognises that Dublin Port will have a significant role to play in the future development and growth of the city while also recognising that proposals to accommodate cruise ships directly east of the Tom Clarke Bridge will further animate the campshires and general Docklands area and enhance the social and commercial environment of this urban quarter.

Dublin City Council's (DCC) Cruise Tourism and Urban Regeneration Local Action Plan 2011 sets the overall goal as to develop a strategy for the development of cruise traffic and the urban regeneration of the port area. This would create an urban quarter that facilitates sustainable and consolidated growth in Dublin City and articulates a new relationship between the city and the port through the development of the cruise tourism sector. The aims of this Local Action Plan include providing a dedicated cruise terminal and the development of facilities to handle multiple cruise vessels simultaneously. The stated objective of the Local Action Plan is to maximise cruise traffic and port heritage as a means to achieving social and economic regeneration.

Finally, DPC is subject to National Ports Policy (2013) which states that the ports sector should receive no Exchequer funding for infrastructure development and that Government is open to a variety of mechanisms for private-sector investment in the port sector including build-operate-transfer arrangements, or other similar proposals.

3.5 Summary of Findings

This chapter has outlined the broader policy context in which the proposed investments in additional cruise capacity at Dublin Port should be considered. The key findings of this chapter include:

- ❑ Since 2012, cargo volumes handed at Dublin Port have increased by 36%. Over this same period, Dublin Port's share of national port volumes has increased from handling 41% to 48%.
- ❑ There were 7,969 ship arrivals into Dublin Port in 2018. 150 of these were cruise ships.
- ❑ The Dublin Port Masterplan recognises that new cruise facilities will be required to further develop this business and cater for future growth prospects. The Masterplan also outlines how the main attraction of the cruise industry is the generation of significant revenues for the Dublin region, with the actual contribution to DPC's revenues not being significant.
- ❑ Project Ireland 2040 was published by the Government in early 2018 and represents the Government's overarching policy initiative to advance economic and social progress. The Plan recognises the importance of high-quality international connectivity and commits to investment in Ireland's ports. It is in the context of this emphasis on the importance of Ireland's ports as facilitators of Ireland's international connectivity that potential investments in cruise infrastructure must be considered. Dublin Port's core business is freight, with the importance of this element of Dublin Port's business emphasised at a national planning level.
- ❑ The development of Dublin Port's cruise infrastructure is aligned with the objectives of the Dublin City Development Plan and Dublin City Council's Cruise Tourism and Urban Regeneration Local Action Plan 2011.
- ❑ National Ports Policy rules out Exchequer funding for port projects and, instead, highlights the potential for public-private partnership arrangements (such as build-operate-transfer concession arrangements) to deliver port projects.

4 Economic Cost-Benefit Analysis

4.1 Introduction

This chapter outlines the key components and parameters of the cost-benefit appraisal of the alternative cruise development options identified by Dublin Port.

4.2 Cost-Benefit Analysis Parameters

The estimated economic costs and benefits of the different investment options are based on a number of technical assumptions, including:

- The discount rate;
- The shadow price of labour;
- The appraisal period;
- The treatment of VAT; and
- The shadow costs of public funds;

Each of these key parameters is discussed in detail below.

Discount Rate

The selection of an appropriate discount rate is required to complete an ex-ante CBA of this nature. The discount rate enables the estimation of the net-present value of both the costs and benefits of the proposed investment. For large scale capital projects, such as the investments considered in this report, a high discount rate tends to reduce the NPV because the benefits tend to materialise in later time periods whereas costs are incurred in earlier years. For the purposes of the CBA undertaken in this report, Indecon has discounted net costs and net benefits to **2019 prices using a discount rate of 4%**. This rate is in accordance with the latest technical paper from the Department of Public Expenditure and Reform published as part of the review of the Public Spending Code.¹³

Shadow Price of Labour

The shadow price of labour accounts for any deadweight involved in employment creation in a given project. Deadweight, in this context, refers to the fact that, depending on conditions in the wider economy and the relevant specific sector, employment creation from a project may not lead to additional employment in the economy equal to the number of jobs created in the project. This is due to the fact that these jobs are likely to be filled by those who would nonetheless have been in employment even in the counterfactual scenario in which the given project is not completed. The current DPER guidance recommends a value for this parameter of 80-100%. An 80% shadow price of labour assumes that only 20% of employment benefits from a given project should be treated as project additionality. A 100% shadow price of labour assumes a zero additional benefit from employment as a result of the investment.

¹³ The Department of Public Expenditure and Reform Technical Research paper is available at <https://igees.gov.ie/wp-content/uploads/2018/11/Central-Technical-Appraisal-Parameters.pdf>.

Indecon uses **100% as the value for the shadow price of labour** as its baseline parameter and tests an 80% shadow price of labour as a sensitivity.

Appraisal Period

The Public Spending Code states that the appraisal period should be equivalent to the useful economic life of the project. Indecon uses an **appraisal period of 25 years**.

Treatment of VAT

All costs and benefits of the proposed investments are included in this CBA exclusive of VAT. This is in line with best practice for carrying out socio-economic CBAs. As VAT is a transfer payment it is not appropriate for inclusion in an analysis of the net costs and benefits of an investment project. As such, all costs quoted in the subsequent sections are net of VAT.

Shadow Cost of Public Funds

The Public Spending Code guidance on the shadow cost of public funds prescribes a rate of 130% be applied to public funding. The shadow cost of public funds aims to account for the distortionary impact of taxation on the economy. The shadow cost of public funds aims to ensure that the costs to the economy of tax raising are reflected on the costs side of the appraisal. The shadow cost of public funds is applied to the exchequer portion of funding provided toward the cost of the project. In our analysis we do not assume any exchequer funding for the development. However, if the financial returns achieved by Dublin Port taking account of concession payments was not sufficient to achieve financial viability and if government grant funding was envisaged then 130% shadow price of public funds should be used. Indecon has followed the Public Spending Code and applied a **shadow cost of public funds of 130%**.

4.3 Investment Options for Inclusion in the CBA

In line with best practice for studies of this kind, the main investment option of the full redevelopment of NWQE is appraised both against the appropriate counterfactual scenario and against a number of other potential alternative investment options. All of the options are compared to the Do Minimum investment option, with benefits and costs for each option net of benefits and costs from the Do Minimum scenario.

The counterfactual 'Do Minimum' scenario and the alternative investment options were specified in consultation with DPC. DPC provided capital cost estimates for each of the investment options and the counterfactual option as well as insights into the likely cruise capacity under each option. This section outlines the nature of each of these investment options and their associated costs. Detailed illustrations of the proposed investment options are included in the annex to this report.

Counterfactual/Do Minimum Option

The Public Spending Code mandates the specification of an appropriate counterfactual scenario in the following terms: *"The counterfactual involves an assumption about the future state of the world in the absence of the project."* This option is generally specified as either a 'Do Nothing', in which no additional expenditure is incurred or, and often more realistically, a 'Do Minimum' scenario in which the minimum level of expenditure required to maintain the current assets/services is undertaken.

In consultation with DPC, a number of options were explored as potentially appropriate counterfactuals for inclusion in our cost-benefit analysis.

DPC provided Indecon with a number of investment options.

The Do Minimum Option has an estimated cost of €64 million and involves the removal of the eastern end of the existing NWQE and also provision of a limited section of new pile wall on the south side of the Quay. This will provide a manoeuvring area for vessels entering into and exiting the increasingly busy Alexandra Basin. This option would not create any additional berthage for cruise ships. This option is considered for the appropriate Do Minimum counterfactual scenario as DPC has outlined to the Indecon team that this option may need to be completed for operational reasons, independent of any implications for the cruise business.

The main components of this option include:

- Demolition of 10,187m² of area at eastern end of existing NWQE;
- New quay wall at eastern end of quay and for a short section of the southern quay;
- ESB 220 kV cable diversion;
- Dredging of 142,500m³
- Resurfacing of NWQE and adjacent yard;
- Ramp 6 relocation to allow continued use of the south side of NWQ as a Ro-Ro berth.

The key benefits of this investment option include providing a manoeuvring area which would allow uninterrupted use of new berths being constructed in Alexandra Basin and the ability to turn vessels up to 340m. However, under this option Dublin Port's ultimate cruise capacity is assumed to be restricted to 80 ships per annum.

Option A – new berth on the north side of NWQE only

Option A envisages capital expenditure of €144 million, or approximately €120 million when discounted at 4%. However, as discounted capital expenditure of €53 million is required in any case for operational reasons under the Do Minimum option, our modelling assumes discounted *additional* capital expenditure under Option A of €67 million.

The Do Minimum component of Option A involves the removal of the eastern end of the existing NWQE and the provision of a limited section of new quay wall on the south side of the Quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin.

In terms of providing capacity for cruise ships, Option A would provide a new 337m quay wall along the north side of NWQE. This would be sufficient for cruise ships up to 333m LOA.

The main components of this option include:

- Demolition of 23,467m² of existing quay;
- New quay wall along full length of north side of NWQE and for a short section of the southern quay;
- ESB 220 kV cable diversion;
- Dredging of 142,500m³
- Resurfacing of NWQE and adjacent yard;
- Marina 'wash wall' on south side of Inner Liffey Channel;

- ❑ Ramp 6 removal and relocation of P&O Ro-Ro operation (latter not costed);
- ❑ Shore power to allow cruise ships to plug into the grid and turn their diesel engines off

The option also provides the ability to dredge to -10m Chart Datum (CD) in the area between the north side of NWQE and the new Ro-Ro jetty in Alexandra Basin.

Option B – new berth on the south side of NWQE only

Option B is of a similar scale to Option B with a gross capital cost of €137 million. The discounted additional capital expenditure compared to the Do Minimum option is €61m. This investment option envisages the removal of the eastern end of the existing NWQE and provision of a completely new quay wall on the south side of the Quay. This would provide a manoeuvring area for vessels entering into and exiting from Alexandra Basin.

The main components of this option include:

- ❑ Demolition of 10,187m² of existing quay;
- ❑ New quay wall along full length of southern side of NWQ;
- ❑ ESB 220 kV cable diversion;
- ❑ Dredging of 276,000m³
- ❑ Resurfacing of NWQ and adjacent yard;
- ❑ Marina ‘wash wall’ on south side of Inner Liffey Channel;
- ❑ Ramp 6 removal and relocation of P&O Ro-Ro operation (latter not costed);
- ❑ Shore power to allow cruise ships to plug into the grid and turn their diesel engines off

The main benefits of this investment option are that it would enable the manoeuvring area to allow uninterrupted use of the new berths within the Alexandra Basin and the ability to turn vessels up to 340m LOA. There would be 13,280m² additional quay space compared to Options A.

In terms of providing capacity for cruise ships, Option B would provide a 500m long berth on the south side of NWQE dredged to -10m CD and capable of accommodating cruise ships up to 350m LOA. This south side berthage is more readily accessible and preferable than the berthage on the north side of NWQE in Option A – as the latter would be immediately opposite a heavily used new Ro-Ro jetty in Alexandra Basin. Also, the south side berthage in Option B is better in terms of prevailing south westerly winds than the north side berthage.

As no new quay wall is being provided on north side of NWQE in Option B, the existing quay wall limits the dredge depth to circa -8.5m CD at the new Ro-Ro jetty in Alexandra Basin. The retained quay wall on the north side would not be suitable as a berth for commercial traffic due to its proximity to this Ro-Ro jetty.

In terms of likely cruise capacity limitations under Options A and B, DPC has advised Indecon that under these scenarios the port would be unable to take more than one cruise booking on a given day. In considering the impact of this, Indecon has examined historical cruise data for Dublin Port and estimated the proportion of cruise visits which involved more than one cruise ship visiting the port on a single day. The following table shows the number of cruise visits and number of days on which there was a cruise ship visiting Dublin Port between 2016 and 2018.

This data indicates that should Dublin Port no longer be able to accommodate two cruise ships on any given day, based on the average of the past three years, Dublin Port may have to limit cruise calls by 26% annually compared to the full development of NWQE under Option C.

Table 4.1: Cruise Calls and Cruise Call Days			
Year	Total Cruise Calls	Cruise Call days	Days as a % of total calls
2016	109	87	79.8%
2017	127	97	76.4%
2018	151	104	68.9%

Source: Indecon analysis of DPC data

Option C – new berths on both the north side and the south side of NWQE

Option C is the most comprehensive cruise investment option, with gross capital costs of €172 million. The discounted additional capital expenditure compared to the Do Minimum option is €91m.

This option includes the Do Minimum elements of removing of the eastern end of the existing NWQE. It additionally provides new quay walls on both the north and south sides of the quay. This would provide a manoeuvring area for vessels entering into and exiting Alexandra Basin and would additionally provide 500m of deep berthage suitable for cruise ships up to 350m LOA on the south side of NWQE, and 377m of berthage for cruise ships up to 333m LOA on the north side of the quay.

The main elements of this investment option include:

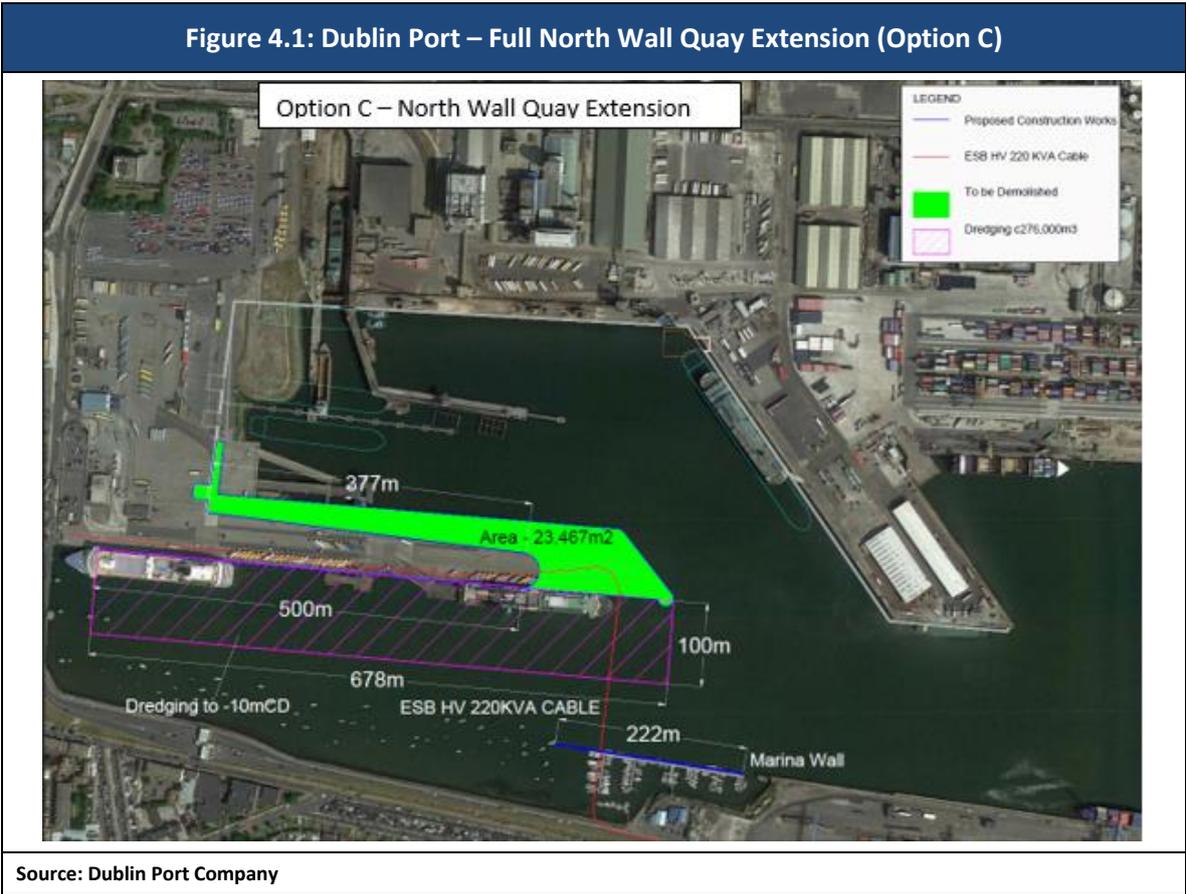
- Demolition of 23,467m² of existing quay
- New quay wall along full length of northern and southern sides of NWQE
- ESB 220 kV cable diversion
- Dredging of 276,000m³
- Resurfacing of NWQE and adjacent yard
- Marina 'wash wall' on south side of Inner Liffey Channel
- Ramp 6 removal and relocation of P&O Ro-Ro operation (latter not costed)
- Shore power to allow cruise ships to plug into the grid and turn their diesel engines off

The benefits envisaged under this investment option include:

- The manoeuvring area will allow uninterrupted use of the new berths within the Alexandra Basin and the ability to turn vessels up to 340m LOA.
- 877m of deeper multi-use berthage on the north and south sides of NWQE which can be used for cruise ships up to 350m LOA.
- Ability to dredge to -10m CD in the area between the north side of the quay and the new Ro-Ro jetty in Alexandra Basin.

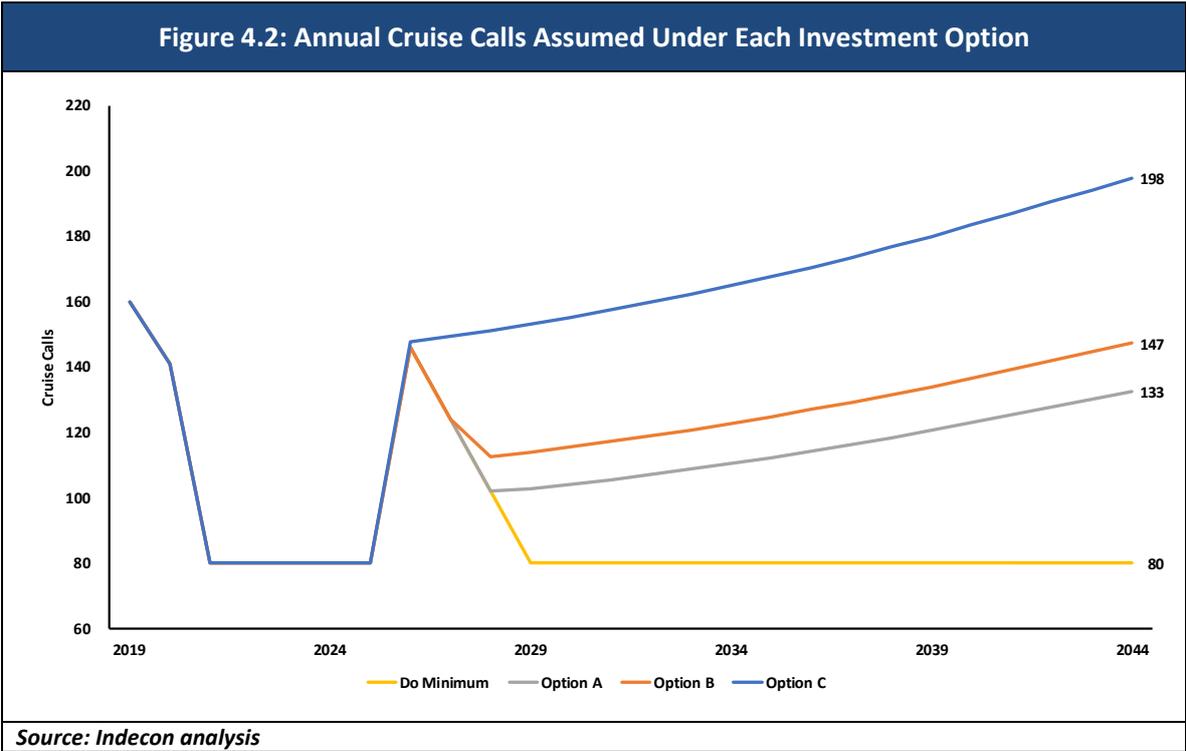
Option C would provide the capacity for DPC to accept upwards of 200 cruise calls per annum.

The location and key features of the full NWQE Option C is depicted in the figure below.

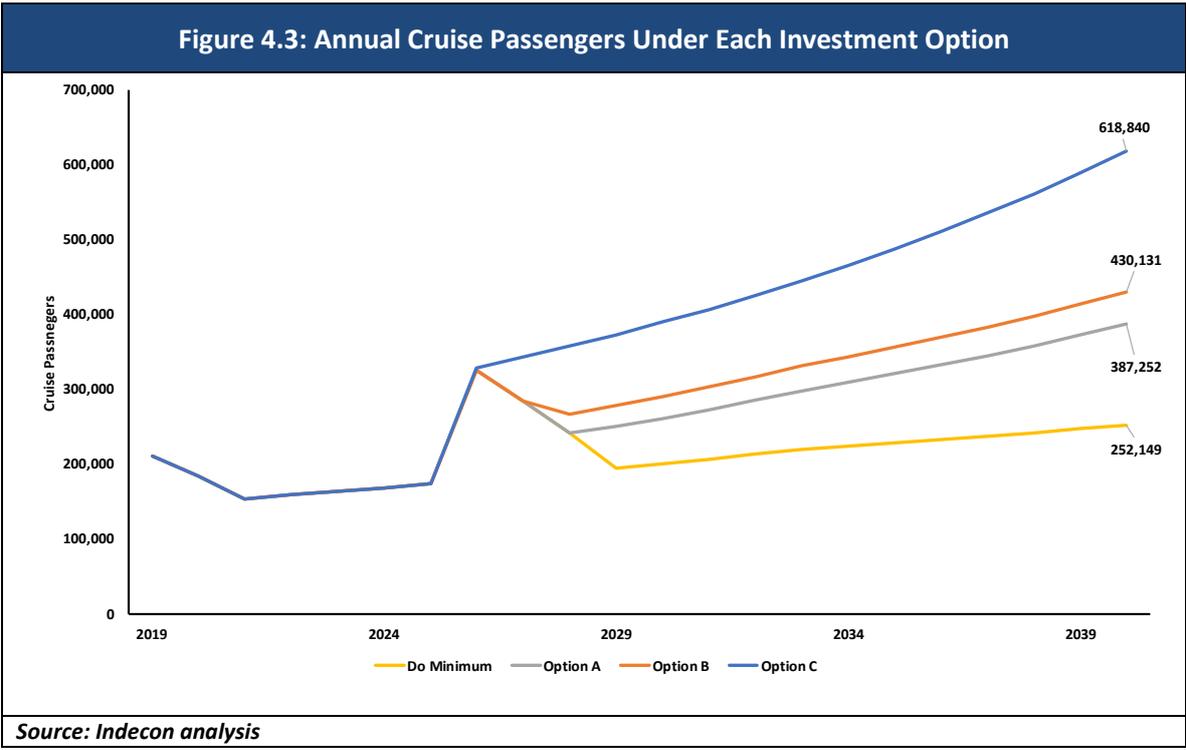


Cruise Calls and Passengers Under Each Investment Option

The following figure outlines the alternative annual cruise calls anticipated under each investment scenario. It should be noted that these assumptions are based on the base case unconstrained demand forecasts.



We also illustrate the differential forecasts for total cruise passengers under each investment option in the below figure.



4.4 Costs Included in the CBA

In this section Indecon discusses the costs included in the CBA. The costs included in the economic CBA are the capital costs for each investment option and the estimated environmental costs of additional cruise visits to Dublin Port. The inclusion of environmental costs is in line with best practice in cost-benefit appraisals, and is implemented in our modelling through inclusion of estimates of average CO₂ costs per visitor.

Capital Costs

In evaluating the economic and financial appraisals it is necessary to estimate the capital expenditure required to complete the envisaged investments. Indecon were provided by Dublin Port with detailed capital cost estimates for each of the proposed investment options. The following table outlines the cost estimates for each option.

Investment Option	Capital Cost	Additional Capital Costs compared to 'Do-Minimum'
Option A	€144,000,000	€80,000,000
Option B	€137,000,000	€73,000,000
Option C	€172,000,000	€108,000,000

Source: Indecon analysis of DPC data

Operational Costs

Indecon has been informed by DPC that there are likely to be no significant additional operational costs incurred by DPC under any of the investment options included in this CBA. This is because DPC envisage outsourcing the operation of any new infrastructure to a sub-contractor and not incurring any operational costs. With this in mind, we include no operational costs for DPC in any of our CBA scenarios.

Environmental Costs

An element of the socio-economic costs associated with additional cruise calls to Dublin is the potential environmental impact of these additional ships arriving to, departing from and spending time in Dublin Port. The Public Spending Code contains guidance on monetising the environmental costs on the basis of a euro price per tonne of CO₂ emitted. In order to estimate likely CO₂ emissions associated with cruise ships calling to Dublin Port, Indecon has estimated an average daily CO₂ emissions per cruise passenger. Existing research suggests that, internationally, each cruise passenger emits 0.82 tonnes of CO₂ over the course of their cruise.¹⁴ In order to estimate average daily emissions, we divide this figure by the average cruise length, which we assume is 8.76 days based on data available online.¹⁵ This provides an estimate of 0.09 tonnes of CO₂ per cruise day.

¹⁴ <https://www.tourismdashboard.org/explore-the-data/cruise-ship/>

¹⁵ CLIA Cruise Lines, "Contribution of Cruise Tourism to the Economies of Europe 2017"

We apply a reduction to this daily rate for the time spent in Dublin Port due to the capacity for the ships to utilise shore power while moored in the port and other requirements on cruise ships in port minimising their emissions. We assume that the average daily emissions are 25% of the overall average while in Dublin Port and thus assume an average daily CO₂ emissions per passenger of 0.07 tonnes per day.

Having estimated the emissions associated with cruise ship visits to Dublin, we then utilise the latest Public Spending Code guidance on the carbon price to monetise these costs.¹⁶ The following table outlines the price of carbon utilised in our CBA modelling.

Table 4.3: Costs of Carbon					
	2019	2025	2030	2035	2040
€ per tonne of CO ₂	23	66	100	128	163
<i>Source: Public Spending Code</i>					

4.5 Economic Benefits Included in the CBA

Revenue to DPC

A benefit of the proposed investments will be the additional income flowing to DPC due to a higher number of cruise calls on an annual basis. There are four components of cruise revenue which accrue to Dublin Port. These revenue components include:

- Tonnage dues;
- Visitor charges;
- Pilotage; and
- Potential concession fees.

In our economic analysis we do not include any potential concession fee as a benefit but this is considered further in our financial appraisal.

Tonnage dues are charged on the basis of the tonnage of the vessel. Visitor charges are based on the number of passengers on the vessel. There are differing rates of visitor charges for turnaround passenger and transit passengers. The following table outlines the tonnage dues and visitor charges assumed in our analysis for 2019. In line with the information provided to us by DPC, in our analysis we assume that these fees rise by 2.5% per annum for the duration of the appraisal period.

Table 4.4: Tonnage dues and Visitor Charges	
Charge	2019 Rate
Transit cruise visitor charge (each)	€ 1.50
Turnaround cruise visitor charge (each)	€ 3.50
Tonnage dues (per Gross Tonne)	€ 0.19
<i>Source: DPC</i>	

¹⁶ Department of Public Expenditure and Reform "Valuing Greenhouse Gas Emissions in the Public Spending Code"
<https://igees.gov.ie/wp-content/uploads/2018/11/Valuing-Greenhouse-Gas-Emissions.pdf>

Pilotage revenue relates to the charges imposed by Dublin Port on ships using harbour pilots during their entry and exit of the Port. DPC have indicated to Indecon that the current pilotage charges are €4,300. We include the net contribution of this cruise revenue in our analysis. We apply a contribution rate of 36.7% to these charges, based on the average contribution rate of pilotage revenue between 2016 and 2018. As with the above other charges, we assume that these charges will increase by 2.5% a year in our analysis.

DPC have advised Indecon that under the envisaged sub-contracting of the operation of any new cruise infrastructure, it is likely that the visitor charge will accrue to the operator of the cruise infrastructure and not to DPC. As such, we exclude cruise visitor charge revenue in our CBA modelling.

Labour Income from Construction

There will be headline employment benefits during the construction phase of the NWQE project. The following table outlines the envisaged level of expenditure on labour during the construction phase of each investment option. These figures are unadjusted for the shadow price of labour.

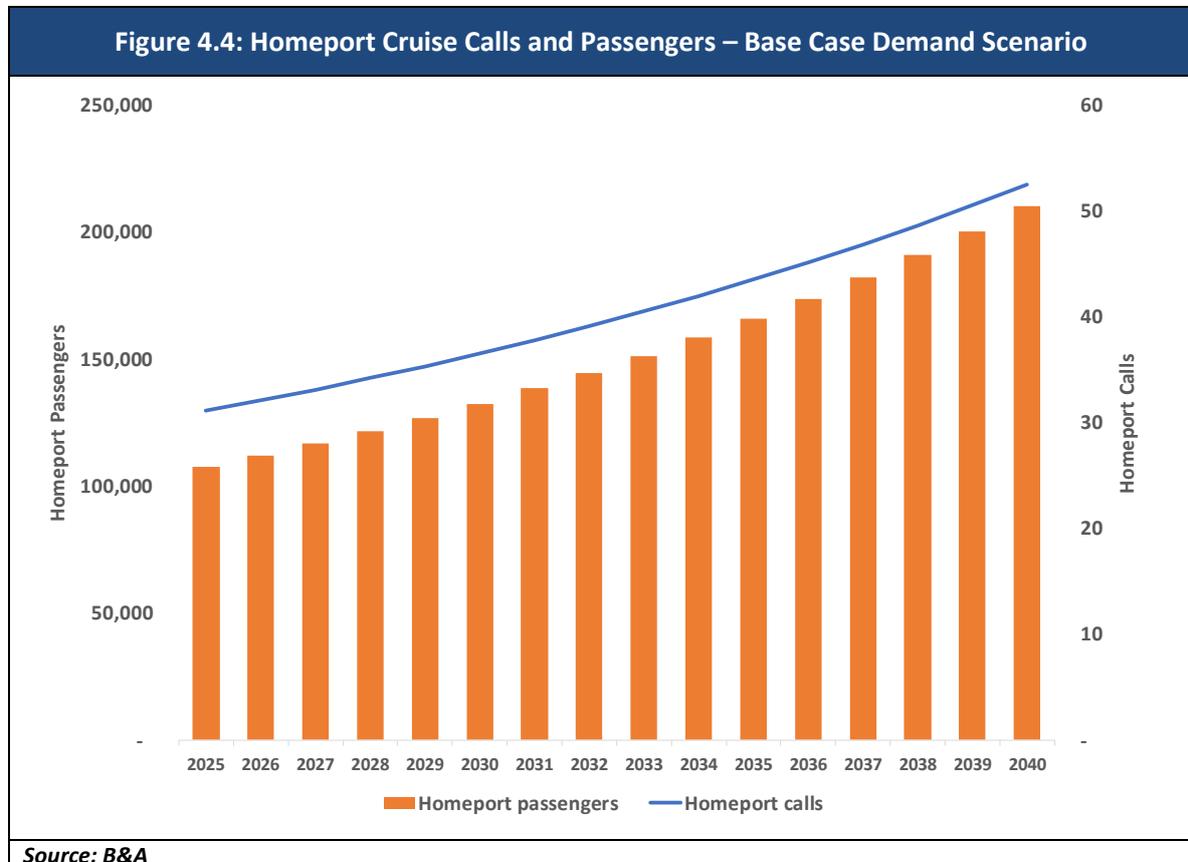
Table 4.5: Labour Expenditure During Construction Phase	
Investment Option	Labour Expenditure Compared to 'Do-Minimum'
Option A	€27,360,000
Option B	€26,030,000
Option C	€32,680,000
<i>Source: DPC</i>	

However, it is important to note that, given the current performance of the construction sector in Ireland, there is likely to be very significant deadweight associated with this employment. For the purposes of formal cost-benefit modelling, it is important that all employment benefits are considered net of deadweight. The Public Spending Code suggests that the appropriate shadow price of labour, a metric used to account for deadweight, ranges from 80-100%. However, the code recommends the application of a 100% shadow price in the current economic environment, while the latest cost-benefit guidance used by Enterprise Ireland and IDA Ireland in appraising projects also suggests that the appropriate shadow price of labour for projects in Dublin is 100%. As such, while the construction phase of the proposed development will support direct employment and associated incomes, this employment is unlikely to represent significant additionality to the wider economy. Therefore, for the purposes of our cost-benefit modelling, we assume an 100% shadow price of labour in our baseline modelling, but we also include a sensitivity based on a shadow price of 80% (see Section 4.7 below).

Tourism Benefits

The cruise passengers arriving in Dublin via Dublin Port contribute to the local economy via their expenditure on local goods and services during their time in Dublin. There are different levels of expenditure in the local economy from those passengers who are using Dublin Port as the homeport for their cruise (turnaround passengers) and other passengers for whom Dublin is a stop on their cruise itinerary (transit passengers). Homeport passengers are likely to spend more time in the city and higher levels of expenditure.

The potential for Dublin Port to develop as a turnaround port for cruise ships is a significant driver of the wider potential economic benefits of the proposed investments. DPC has indicated that they have had queries from cruise operators which indicate that there is significant demand for Dublin Port to operate as a homeport. This potential growth is reflected in the B&A projections for future unconstrained demand for cruise calls to Dublin Port. The following figure illustrates both the projected number of homeport cruise calls and homeport cruise passengers in the base case demand projection from completion of the investment project in 2025 to 2040.



For the purposes of assessing the overall economic benefits to the tourism sector of cruise passengers arriving in Dublin Port, Indecon has used the latest research undertaken by Fáilte Ireland on average spending by cruise passengers in April-May 2019. The following table indicates an average spend for turnaround passengers of €184 and €54 for transit passengers. However, as estimates of these other expenditure items are not available and to ensure that we do not overstate the economic benefits we use these estimates in our modelling.

The figures include expenditure on accommodation, tours, entry to attraction, food and beverages and other expenditures. However, they exclude any pre-booked accommodation or pre-paid sight-seeing tours and therefore underrepresent the total expenditure impacts.

Table 4.6: Average In-Port Expenditure by Cruise Passenger Type	
Passenger Type	Average Expenditure
Turnaround passengers	€184
Transit Passengers	€54
<i>Source: Fáilte Ireland</i>	

The research also outlined a breakdown of what passengers spent their money on while in port. This breakdown is illustrated in the following table.

Table 4.7: Passenger Expenditure by Type	
Expenditure Type	Share of Spend (%)
Food & Beverage	28%
Taxi / ground transportation	6%
Retail purchases of watches & jewellery	6%
Retail purchases of clothing	15%
Local crafts & souvenirs	17%
Entertainment/Nightclubs/Casinos etc.	1%
Tour/Tour guide/Museums/Galleries etc.	9%
Any other retail purchases	1%
Any other expenditure	5%
Accommodation (not including pre-booked accommodation)	10%
<i>Source: Fáilte Ireland</i>	

The Fáilte Ireland research suggests that, on average, turnaround passengers spent 1.3 nights in Ireland before embarking on their cruise and one night in Ireland following the completion of their cruise.

Figures published by Fáilte Ireland in 2017 suggest that the average daily rate for a hotel in Dublin in 2017 was circa €135. We utilise this figure in our estimation of the additional revenue benefits to the accommodation sector in Ireland from turnaround passengers who stay in Dublin before and/or after their cruise.

An additional important assumption with regards to the benefits of turnaround passengers is the percentage of these passengers who may be Irish residents undertaking a cruise starting and ending in Dublin Port. These passengers are unlikely to represent similar benefits to the Irish economy as any expenditure they do undertake in the days before or after their cruise would likely have taken place in the absence of the cruise. Thus, we take account of this potential deadweight issue by not including any expenditure from these Irish turnaround passengers in our analysis. In our baseline modelling **we assume that 50% of turnaround passengers are Irish**. We test the implications of changes to this assumption in sensitivity analysis.

With regards to the expenditure by crew disembarking in Dublin, on the advice of DPC, we assume a **low disembarkation percentage of 5% for crew**. We assume that those crew members who do disembark spend a similar amount to transit passengers.

An important assumption in calculating the benefits of the cruise passenger expenditure in the local economy is the proportion of passengers who disembark and visit Dublin during the time in which their cruise ship is in Dublin Port. Up-to-date reliable data on disembarkation rates is not readily available for Dublin. A 2012 Fáilte Ireland study assumed that 77% of passengers disembarked in Dublin.¹⁷ Studies undertaken of the cruise sector in Barcelona¹⁸ and Helsinki estimated disembarkation rates at 58% and 96%, respectively. In our baseline analysis we assume a **disembarkation rate of 77% for transit passengers** and test the sensitivity of the model findings to alternative assumptions.

We include in our findings an estimate of the impact of tourism benefits in terms of net tourist expenditure in the Irish economy. This estimate is indicative of the impacts of the additional cruise tourists on the revenue of businesses in Ireland. However, it should be noted that this net additional expenditure approach would overstate the gross value-added benefits to the economy due to the import context of tourism expenditures.

In our analysis we therefore also estimate **the gross value added (GVA)** of this additional expenditure to the Irish economy. We estimate the GVA contribution of additional tourism expenditure using GVA effects multipliers calculated from the Indecon model of the Irish economy. This model is based on the latest input-output tables available from the CSO and provides an estimate of the impacts of expenditure in particular areas of the economy on overall economic activity. The GVA effects multipliers account for the import content of inputs to each sector and provide an insight into the additional value-added to the Irish economy from expenditure by tourists arriving in Dublin via cruise ships in Dublin Port.

We employ a weighted average multiplier in our analysis based on the Fáilte Ireland survey data which indicates that the majority of tourist expenditure is undertaken in the retail and food and beverage services sectors of the economy. Our analysis also includes an estimate of the indirect benefits from tourist expenditure on the Irish economy. The indirect effect estimates the impact of direct expenditure on the wider economy via supply chains of the firms who produce additional output as a result of additional tourism expenditure.

The following table presents an illustrative example of the estimated GVA contribution of a single transit passenger's one day expenditure of €54.00. Applying the direct and indirect GVA effects multipliers to this figure provides an estimate of the GVA impact of this additional €54 tourism expenditure of €41.22.

Transit passenger daily expenditure	€54.00
Estimated direct GVA effects multiplier	0.62
Direct GVA contribution of transit passenger	€33.41
Estimated indirect GVA effects multiplier	0.14
Indirect GVA contribution of transit passenger	€7.81
Total direct and indirect GVA impact	€41.22
<i>Source: Indecon</i>	

¹⁷ Fáilte Ireland "Cruise Tourism in Ireland Research Report -2010"

¹⁸ "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf

Value of alternative uses in off-season

The new cruise infrastructure will also provide additional non-cruise capacity for Dublin Port in the months which constitute the cruise off-season. Quantifying this benefit to DPC in financial terms is challenging given the uncertainty around what this additional capacity can be used for and what DPC would have done with this additional traffic in the absence of the additional capacity. With this uncertainty in mind, we take two approaches to assessing the benefits of the new infrastructure in the cruise off-season.

It was noted in the Cruise Strategy Review that *“the berths at NWQE are intended to not only provide capacity for cruise ships. They are also intended to provide capacity for dedicated car carriers. In 2017, our trade vehicle volume was 99,383 units. Of this total, 62,292 were carried on dedicated car carriers which we would plan to berth on NWQE in the future thereby freeing up berth capacity on Alexandra Quay West and on Ocean Pier for unitised cargo.”*

In light of this, we include in our modelling an estimate of the benefits to Dublin Port of this additional capacity for car carriers in the cruise off-season. This benefit is estimated based on the latest Dublin Port charging structure for roll-on/roll-off cargo carrying vehicles. We also assume that the volume of trade vehicles utilising the additional berthing facilities remains constant over the appraisal period. Under these assumptions, we estimate an annual benefit to Dublin Port of €830,000 under Option C. We assume that this benefit will increase by 2.5% per annum in line with the projections for increases in other DPC revenues.

Given the uncertainty surrounding the benefits of the additional capacity in the off-season, we also include an estimated benefit which equates to 15% of the capital cost of the investment options, spread over the appraisal period. To avoid underestimating the potential benefits to DPC of the new infrastructure in the cruise off-season, we use this estimate based on 15% of the capital costs in our baseline mode. We include the alternative estimate as a sensitivity.

Residual Value of the Asset

The final benefit included in our modelling is the residual value of the investment. This benefit represents the value of the asset at the end of the 25-year appraisal period, accounting for depreciation. For the purposes of our modelling we assume straight-line depreciation in the asset values and that the value of the asset will depreciate to zero over a 50-year period. We take the value of the asset as the total value of the capital spending.

4.6 Results of Cost Benefit Analysis Modelling

Indecon’s cost-benefit modelling has included the relevant costs and benefits for each of the investment options. The analysis has been undertaken in line with the relevant guidance from the Public Spending Code in terms of discount rate, the shadow cost of labour and guidelines on the cost of carbon.

It should be noted that all of the costs and benefits presented in the following results are in addition to those which would occur in the ‘Do Minimum’ scenario. This ensures that the benefits and costs of the proposed investment options are reflected net of the counterfactual of what would have happened in the absence of these investments. The benefits of the anticipated 80 cruise ships per annum in the counterfactual are not attributable to the proposed investments and are thus excluded from the estimates of the net benefits presented in this section.

The following table illustrates the findings of the economic cost-benefit modelling for the investment options. All values have been discounted at 4% in real discount rate. The benefit-cost ratio (BCR) illustrates the scale of the benefits relative to the costs for each investment option. The net benefit is the total benefit to the economy of the proposed investment option, net of the costs of completing the investment.

Table 4.9 presents the CBA findings using the additional tourism expenditure as the key benefit to the wider economy. This version of the model provides a benefit-cost ratio of 4.36:1 for Option C. However, as discussed in our previous analysis, utilising net tourism revenue does not measure the gross value added to the wider economy.

Table 4.9: Cost-Benefit Analysis – Tourism Expenditure Model			
	Option A	Option B	Option C
Costs			
Capital Expenditure	67.49	61.21	91.06
Environmental Costs	8.58	10.30	24.61
<u>Total Costs</u>	76.08	71.51	115.67
Benefits			
Labour Income from Construction	0.00	0.00	0.00
Revenue to DPC	10.01	11.23	27.11
Tourism Expenditure	249.12	259.32	440.07
Off-season benefits	8.76	7.99	11.82
Residual	18.61	16.98	25.12
<u>Total Benefits</u>	286.50	295.52	504.12
Net Benefit	210.42	224.01	388.45
BCR	3.77	4.13	4.36
<i>Source: Indecon analysis</i>			

Table 4.10 presents our preferred model which utilises an estimate of the additional GVA from tourist expenditure as the actual net benefit to the economy. The baseline model findings suggest that Option C represents the greatest socio-economic return on investment with a BCR of 2.83. The next best option in terms of BCR is Option B. If the priority was maximising the contribution to the Irish economy, Option C represents the option with the highest economic benefit-to-cost ratio and also the highest net benefit (€211.2m at 2019 values).

Table 4.10: Net Cost-Benefit Analysis: GVA			
	Option A	Option B	Option C
Costs			
Capital Expenditure	67.49	61.21	91.06
Environmental Costs	8.58	10.30	24.61
<u>Total Costs</u>	76.08	71.51	115.67
Benefits			
Labour Income from Construction	0.00	0.00	0.00
Revenue to DPC	10.01	11.23	27.11
Additional GVA from Tourism Expenditure	148.77	154.86	262.79
Off-season benefits	8.76	7.99	11.82
Residual	18.61	16.98	25.12
<u>Total Benefits</u>	186.14	191.06	326.84
Net Benefit	110.06	119.55	211.18
BCR	2.45	2.67	2.83

Source: Indecon analysis

While we exclude any taxation benefits from our CBA model on account of these tax receipts constituting transfer payments, it is nonetheless useful to note the potential revenue implications for the exchequer of each of the proposed investment options. Assuming a blended VAT rate of 18.3%, the following table provides indicative estimates of the exchequer impact of the proposed investment options based on the level of tourist expenditure likely under each option. The figures in this table are presented in net-present value terms. Indecon estimates a potential exchequer benefit over the appraisal period of €62.8 million for Option C.

Table 4.11: Cost-Benefit Analysis Findings Compared to 'Do-Minimum' Baseline Assumptions			
	Option A	Option B	Option C
Exchequer Benefit (€ Millions)	35.6	37.0	62.8

Source: Indecon analysis

4.7 Cost-Benefit Model Sensitivity Analysis

In line with best practice and the requirements of the Public Spending Code, we subject our baseline model findings to sensitivity analysis. Our baseline-model is based on examining the additional GVA benefits of tourist expenditure. This approach takes account of the import context of tourist expenditure. This sensitivity analysis examines the degree to which any single underlying factor or assumption is driving the baseline model findings and explores how robust the model findings are to changes in key parameter values and assumptions.

We begin our sensitivity analysis by examining the sensitivity of the baseline model findings to alternative discount rates. The lower 3% discount rate increases the BCR for all options. The higher 5% discount rate reduces the BCR for all options. However, the BCR remains very significantly above unity in Options A, B and C. Moreover, Option C remains the most beneficial investment option in terms of net economic contribution.

Table 4.12: Cost-Benefit Analysis Findings – Alternative Discount Rates			
3% Discount Rate			
	Option A	Option B	Option C
Net Benefit (€ Millions)	139.65	149.73	262.59
BCR	2.73	2.96	3.11
5% Discount Rate			
	Option A	Option B	Option C
Net Benefit (€ Millions)	85.94	94.87	169.16
BCR	2.20	2.41	2.57
<i>Source: Indecon analysis</i>			

We also test the sensitivity of our model to alternative demand forecasts for cruise calls to Dublin Port. Our baseline modelling utilises the mid-scenario demand forecast. We test the implications of the low and high demand forecasts in the following table.

The low demand scenario brings the BCR for Option C down from 2.83 to 2.14. Even in the low demand scenario, the investment in additional cruise capacity presents a significant economic gain to the wider economy (with an NPV of €118.6m at 2019 values). The high demand scenario increases the BCR of Option C to 3.33.

Table 4.13: Cost-Benefit Analysis Findings – Alternative Demand Projections			
Low Demand Scenario			
	Option A	Option B	Option C
Net Benefit (€ Millions)	53.72	60.94	118.61
BCR	1.78	1.96	2.14
High Demand Scenario			
	Option A	Option B	Option C
Net Benefit (€ Millions)	159.44	170.68	295.12
BCR	2.93	3.17	3.33
<i>Source: Indecon analysis</i>			

We have also tested the implications of alternative values for a range of other key model parameters. The following table illustrates the sensitivity of the model findings to alternative assumptions with regard to disembarkation rates. Our baseline model assumes a disembarkation rate of 77%, based on previous Fáilte Ireland research. Other studies have indicated disembarkation rates ranging from 57.6%¹⁹ to 96%. We test the implications of these higher and lower disembarkation rates for our cost-benefit findings.

The overall BCR is not particularly sensitive to changes in the disembarkation rate. This is largely due to the assumption that all turnaround passengers will spend time in Dublin around their arrival and departure from the city. The fact that turnaround passengers also spend significantly more than transit passengers also limits the impact of transit passenger disembarkation rates to the BCR and overall net benefit.

Table 4.14: Cost-Benefit Analysis Findings – Alternative Assumptions on Disembarkation Rates			
57.6% Disembarkation Rate			
	Option A	Option B	Option C
Net Benefit (€ Millions)	116.39	124.38	208.85
BCR	2.53	2.74	2.81
96% Disembarkation Rate			
	Option A	Option B	Option C
Net Benefit (€ Millions)	103.87	114.82	213.45
BCR	2.37	2.61	2.85
<i>Source: Indecon analysis</i>			

Another underlying assumption is the level of expenditure of turnaround and transit passengers while in Dublin. We test the implications of average spending which is 25% and 50% less than assumed in our baseline model. We also test the implications of average spending being 25% higher than assumed in our baseline model.

Even with average expenditure of only 50% of that assumed in the baseline models, the BCRs for Options A, B and C range from 2.04 to 2.23. A 25% higher expenditure than assumed in the baseline model leads to an increase in the BCR for Option C from 2.83 to 3.12.

¹⁹ "Economic Impact of Cruise Activity: The Port of Barcelona", available at http://www.ub.edu/irea/working_papers/2016/201613.pdf

Table 4.15: Cost-Benefit Analysis Findings – Alternative Assumptions on Average Spend			
25% Lower Spend			
	Option A	Option B	Option C
Net Benefit (€ Millions)	94.51	102.47	176.90
BCR	2.24	2.43	2.53
50% Lower Spend			
	Option A	Option B	Option C
Net Benefit (€ Millions)	78.96	85.40	142.63
BCR	2.04	2.19	2.23
25% Higher Spend			
	Option A	Option B	Option C
Net Benefit (€ Millions)	125.61	136.62	245.45
BCR	2.65	2.91	3.12
<i>Source: Indecon analysis</i>			

The following table illustrates the results of the cost-benefit model when we use alternative assumptions with regards to the cruise capacity of Dublin Port under the counterfactual scenario. We undertake this scenario analysis as there is uncertainty around the likely future path of cruise capacity in the counterfactual and the ultimate level at which this capacity will be maximised. This uncertainty is due to the fact that the precise cruise capacity in the counterfactual will depend on the growth in non-cruise traffic in Dublin Port. This non-cruise traffic will depend on several unknown factors including economic growth in Ireland, global economic growth and the nature of trade into and out of Ireland.

Table 4.16 illustrates the impacts on the overall benefits of the investment options when we assume that there is less pressure on Dublin Port's infrastructure from increased cargo traffic and the cruise calls in the counterfactual are limited to 100 per annum rather than 80 and an alternative scenario in which there is more pressure on Dublin Port's cargo capacity and cruise calls are limited to 60 calls per annum in the counterfactual scenario. The BCRs remain significantly positive in the scenario in which there is greater cruise capacity in the counterfactual with the BCR for Option C falling to 2.75.

Table 4.16: Cost-Benefit Analysis Findings – Alternative Assumptions on Counterfactual Cruise Capacity			
100 Cruise Calls Per-annum			
	Option A	Option B	Option C
Net Benefit (€ Millions)	94.95	104.10	193.60
BCR	2.33	2.56	2.75
60 Cruise Calls Per-annum			
	Option A	Option B	Option C
Net Benefit (€ Millions)	126.72	136.24	228.75
BCR	2.57	2.79	2.90
<i>Source: Indecon analysis</i>			

We test the implications of higher than anticipated capital costs for the investment options. We increase capital costs for all options by 5% and 10%. Increases in the capital costs decrease the BCR. However, the BCR remains high under all additional capital cost scenarios.

Table 4.17: Cost-Benefit Analysis Findings – Alternative Assumptions on Capital Costs			
5% Higher Capital Costs			
	Option A	Option B	Option C
Net Benefit (€ Millions)	108.06	117.74	208.47
BCR	2.36	2.58	2.73
10% Higher Capital Costs			
	Option A	Option B	Option C
Net Benefit (€ Millions)	106.05	115.92	205.76
BCR	2.28	2.49	2.65
<i>Source: Indecon analysis</i>			

As indicated in Section 4.5, a shadow price of labour of 100% is applied in the base case model to ensure consistency with the Public Spending Code and other guidance. However, as a sensitivity, Indecon has also tested the impact of altering the shadow price of labour, with the table below containing the results of the modelling using an 80% shadow price of labour. Under this alternative assumption, the economic BCRs increase slightly from the baseline case, due to the inclusion of some of the construction labour income as a benefit, with Option C having a BCR of 2.86.

Table 4.18: Cost-Benefit Analysis Findings – Alternative Assumptions on Shadow Price of Labour			
80% Shadow Price of Labour			
	Option A	Option B	Option C
Net Benefit (€ Millions)	112.63	121.87	214.64
BCR	2.48	2.70	2.86
<i>Source: Indecon analysis</i>			

Our final sensitivity test includes estimates for the value of the new berthing spaces in the cruise off-season based on the likely revenue accruing to DPC from diverting two-thirds of their commercial vehicle traffic through the new infrastructure. This alternative assumption lowers the BCRs slightly but does not have a major impact on the model findings.

Table 4.19: Cost-Benefit Analysis Findings – Alternative Assumptions Benefits in Cruise Off-Season			
	Option A	Option B	Option C
Net Benefit (€ Millions)	107.51	117.22	207.73
BCR	2.41	2.64	2.80
<i>Source: Indecon analysis</i>			

4.8 Summary of Findings

This chapter has outlined the key inputs and findings of the socio-economic cost-benefit appraisal for the proposed investment options. The key findings from this chapter include:

- The estimated economic costs and benefits of the different investment options were estimated based on a number of technical assumptions:
 - 4% discount rate to 2019 values
 - 100% shadow price of labour
 - 25-year appraisal period
 - VAT was excluded
 - 130% opportunity costs of public funds
- The costs included in the economic CBA are the capital costs for each investment option and estimated environmental costs of additional cruise visits to Dublin Port.
- The economic benefits included in the CBA are:
 - Tourism benefits to the wider economy based on research by Fáilte Ireland in 2019;
 - Value to Dublin Port of alternative uses for the infrastructure in the cruise off-season; and
 - The residual value of the investment.
- In assessing tourism expenditure benefits, a number of key assumptions were applied to the projected cruise tourist numbers:
 - Only 50% of turnaround passenger come from abroad, each spending €184;
 - 77% of transit passengers disembark and spend €54, on average;
 - 5% of crew members disembark and spend €54, on average.
- The findings of the baseline CBA modelling (based on GVA benefits from tourism expenditure) indicate that Option C, the comprehensive NWQE development option, provides the highest BCR of 2.83 and would create a net economic benefit of €211.2m at 2019 values.
- The findings of the baseline models were also subject to a range of sensitivity analyses including alternative demand scenarios and visitor expenditure as well as other key modelling parameters. The findings of the model are robust to these sensitivity analyses in terms of Option C remaining the most attractive of the three options and the BCR for all options remaining above unity in all scenarios tested.

5 Financial Analysis of Proposed Cruise Development Options

5.1 Introduction

This section examines the merits of each investment option purely from the financial perspective of DPC. This is important as DPC operates as a commercial business.

5.2 Key Parameters and Assumptions

The financial modelling is undertaken using the same investment options specifications and demand projections outlined in the preceding sections of this report. We also continue to use the 4% discount rate specified in the Public Spending Code. As the financial analysis focuses solely on the cash flow implications for DPC, we do not utilise the shadow price of labour or undertake any monetisation of the social costs of carbon emissions.

5.3 Financial Costs and Benefits Included in Model

The costs included in the financial modelling are restricted to the capital expenditure costs for each investment option. As with the economic cost-benefit analysis, Indecon has been instructed by DPC that DPC will not incur any operational expenses under the investment options as they intend to outsource the operation of the new cruise infrastructure.

The financial benefits to DPC from the proposed investments include those outlined for the economic CBA:

- Tonnage dues
- Visitor charges
- Pilotage
- Benefits to DPC from alternative uses of the infrastructure in the cruise off-season
- Concession fees/government grants

Tonnage dues are charged on the basis of the tonnage of the vessel. Visitor charges are based on the number of passengers on the vessel. There are differing rates of visitor charges for turnaround passenger and transit passengers. The following table outlines the tonnage dues and visitor charges assumed in our analysis for 2019. In line with the information provided to us by DPC, in our analysis we assume that these fees rise by 2.5% per annum for the duration of the appraisal period.

Table 5.1: Tonnage dues and Visitor Charges (2019 prices)	
Charge	2019 Rate
Transit cruise visitor charge (each)	€ 1.50
Turnaround cruise visitor charge (each)	€ 3.50
Tonnage dues (per Gross Tonne)	€ 0.193
<i>Source: DPC</i>	

Pilotage revenue relates to the charges imposed by Dublin Port on ships using harbour pilots during their entry and exit of the Port. DPC has indicated to Indecon that the current pilotage fees are €4,300. We include the net contribution of this cruise revenue in our analysis. We apply a contribution rate of 36.7% to these fees, based on the average contribution rate of pilotage revenue between 2016 and 2018. As with the above other charges, we assume that these fees will increase by 2.5% a year in our analysis.

We also include the envisaged benefits to DPC of using the new infrastructure in the cruise off-season in our financial model as a benefit to DPC.

DPC has advised Indecon that under the envisaged sub-contracting of the operation of any new cruise infrastructure, it is likely that the visitor charge will accrue to the operator of the cruise infrastructure and not to DPC. As such, we exclude cruise visitor charge revenue in our financial modelling, as was the case in the economic cost-benefit modelling.

5.4 Findings of Financial Modelling

Indecon has assumed that DPC funds the capital investment and has calculated the net present value of the benefits discounted at 4% to 2019 values (NPV) and the internal rate of return (IRR) for each investment option. The following table presents a summary of the NPV and IRR for each option assuming no public subvention and no concession income. These baseline findings illustrate the financial unviability of the proposed investments by DPC relative to the Do Minimum scenario. If there was no franchise/licence payment from operation of a cruise terminal, none of the investments which would provide facilities for cruise passengers are financially viable from DPC's perspective as a commercial company and all have very negative net benefits.

	Net Benefit (€ Millions)	IRR	Benefit Cost Ratio
Option A	-56.2	-2.4%	0.17
Option B	-51.0	-2.3%	0.17
Option C	-59.9	-0.8%	0.34

Source: Indecon analysis

The above analysis assumes a discount rate of 4% when calculating the net benefit, aligned with the rate utilised in the economic cost-benefit analysis. However, for Commercial Projects undertaken by Commercial Semi-State Bodies, the Public Spending Code instructs that cash flows for commercial projects be discounted using the relevant cost of capital or a project specific rate. The following table shows the NPV for each investment option using a range of discount rates. Even utilising a discount rate of 3%, the NPV for DPC remains negative.

Discount Rate	Net Benefit (€ Million)		
	3%	5%	7%
Option A	-53.9	-57.4	-57.5
Option B	-48.8	-52.1	-52.1
Option C	-54.1	-63.7	-67.3

Source: Indecon analysis

5.5 Implications of Assuming Concession or Other Incomes

We also undertook additional modelling of alternative financing and revenue arrangements which reflect a scenario whereby DPC would, for the first ten years after the investment had been made, have a fixed and guaranteed revenue from franchise or licence payments of €7m per annum before reverting to the variable pricing approach. This assumes no additional tonnage or visitor change above this fixed amount and the only other source of revenue included is pilotage fees. The following table shows the NPV and IRR for each investment scenario assuming that the envisaged concession agreement is in place. The IRRs for each option are below 4.0% and are much lower than the target financial returns expected by Dublin Port. If it was not feasible for Dublin Port to secure a long-term concession tenant who would pay a guaranteed income of a minimum of €7m per annum, then the project would be likely to have negative IRRs unless there were alternative sources of revenue. Options A, B and C were evaluated net of the counterfactual Do Minimum scenario.

Table 5.4: Financial Modelling Findings – Concession Agreement			
	Net Benefit (€ Millions)	IRR	Benefit Cost Ratio
Option A	-9.6	2.7%	0.86
Option B	-4.3	3.4%	0.93
Option C	-13.2	2.8%	0.85

Source: Indecon analysis

As with the baseline analysis, we test the implications of alternative financial discount rates with the envisaged concession in place. The following table outlines the findings of this analysis. At a 3% financial discount rate, there is a small positive net benefit for DPC for Option B.

Table 5.5: Financial Modelling Findings – Concession Agreement - Alternative Discount Rates			
Discount Rate	Net Benefit (€ Million)		
	3%	5%	7%
Option A	-2.4	-15.1	-22.4
Option B	2.7	-9.7	-17.1
Option C	-2.6	-21.4	-32.3

Source: Indecon analysis

Implicit in the above analysis is that DPC could raise the required finance for each proposed investment option. However, we note that DPC's annual accounts indicate net debt of €91.6 million²⁰ and additional borrowing will be needed to finance the construction of port infrastructure for its core cargo business as part of its ten year €1,024m capital programme from 2019 to 2028. In such circumstances it is questionable whether Dublin Port could finance the required investment without a concession agreement or other funding sources. While Indecon has not evaluated this in detail, a critical issue for DPC is whether, in a context of negative NPVs, can the proposed investment be financed? Our preliminary assessment is that any financing may have to be off the company's balance sheet. This is something which should be considered further by DPC.

²⁰ Dublin Port Annual Report and Financial Statements 2018

5.6 Financial Model Sensitivity Analysis

We test the implications for the financial model analysis to a range of alternative assumptions. In the following scenario, Indecon assumes that this €7 million per annum concession would increase in line with DPC's port charges over this period at 2.5% annually, whilst using the 4% discount rate assumption. As shown in the following table, Option B has a positive net benefit of €0.9 million when concessions grow at a rate of 2.5% per annum.

	Net Benefit (€ Millions)	IRR	Benefit Cost Ratio
Option A	-4.4	3.4%	0.94
Option B	0.9	4.1%	1.01
Option C	-8.0	3.3%	0.91

Source: Indecon analysis

As with the baseline analysis, we test the implications of alternative financial discount rates with the envisaged concession in place. The following table outlines the findings of this analysis. At a 3% financial discount rate, there is a small positive net benefit for DPC for each option, with Option B having the highest net benefit (€8.5 million).

Discount Rate	Net Benefit (€ Million)		
	3%	5%	7%
Option A	3.4	-10.4	-18.8
Option B	8.5	-5.1	-13.4
Option C	3.3	-16.7	-28.6

Source: Indecon analysis

We also test the sensitivity of our model to alternative demand forecasts for cruise calls to Dublin Port. Our modelling utilises the mid-demand scenario forecast, including a €7 million concession agreement. We test the implications of the low and high demand forecasts in the below table.

Table 5.8: Financial Modelling Findings – Concession Agreement - Alternative Demand Projections			
Low Demand Scenario			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-4.5	1.2	-5.4
BCR	0.93	1.02	0.94
IRR	3.4%	4.2%	3.5%
High Demand Scenario			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-14.0	-9.1	-20.7
BCR	0.79	0.85	0.77
IRR	2.0%	2.5%	2.0%
<i>Source: Indecon analysis</i>			

The following table illustrates the impacts on the overall financial impacts of the investment options when we assume that there is less pressure on Dublin Port's infrastructure from increased cargo traffic and the cruise calls in the counterfactual are limited to 100 per annum rather than 80 and an alternative scenario in which there is more pressure on Dublin Port's cargo capacity and cruise calls are limited to 60 calls per annum in the counterfactual scenario.

Table 5.9: Financial Modelling Findings – Concession Agreement - Alternative Assumptions on Counterfactual Cruise Capacity			
100 Cruise Calls Per-annum			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-16.9	-11.6	-20.5
BCR	0.75	0.81	0.77
IRR	1.6%	2.2%	2.1%
60 Cruise Calls Per-annum			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-2.3	3.0	-5.9
BCR	0.97	1.05	0.94
IRR	3.7%	4.4%	3.5%
<i>Source: Indecon analysis</i>			

In the next table we test the implications of higher than anticipated capital costs for the investment options. We increase capital costs for all options by 5% and 10%. Increases in the capital costs decrease the BCR. The IRR falls further below the discount rate of 4% in each scenario.

Table 5.10: Financial Modelling Findings – Concession Agreement - Alternative Assumptions on Capital Costs

5% Higher Capital Costs			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-11.7	-6.2	-16.0
BCR	0.84	0.90	0.83
IRR	2.5%	3.1%	2.6%
10% Higher Capital Costs			
	Option A	Option B	Option C
Net Benefit (€ Millions)	-13.8	-8.1	-18.9
BCR	0.81	0.88	0.81
IRR	2.3%	2.9%	2.4%
<i>Source: Indecon analysis</i>			

5.7 Summary of Findings

This chapter has outlined the inputs and findings of the financial modelling undertaken by Indecon for each of the proposed investment options. The key findings of this chapter include:

- ❑ The costs included in the financial modelling are restricted to the capital expenditure costs for each investment option net of the Do Minimum option. As with the economic cost-benefit analysis, Indecon has been instructed by DPC that DPC will not incur any operational expenses under the investment options as they intend to outsource the operation of the new cruise infrastructure.
- ❑ Indecon has calculated the NPVs and IRR for each of the investment options assuming no concession income. The IRR for each option indicates that unless there is a concession income from an operator of a cruise terminal, other sources of revenue from government or from the cruise sector, none of the options are financially viable.
- ❑ If Dublin Port was able to secure a guaranteed income of €7m per annum from an operator of a cruise terminal or from cruise companies using the Port for a 10-year period the financial returns would provide a market IRR of between 2.7% to 3.4%, depending on the option chosen.
- ❑ It is important to emphasise that any given level of guaranteed income which makes investment by DPC financially viable does not guarantee that DPC could finance the required investment.
- ❑ The findings of the baseline financial modelling were also subject to a range of sensitivity analyses including alternative demand scenarios and capital costs. In all cases the IRR for the investment projects remained below 4% for Option C.

Annex 1 Illustrations of Investment Options

