DUBLIN PORT POST 2040 DIALOGUE

November 2020

A series of seven papers published by Dublin Port Company to facilitate the long-term planning of the additional port infrastructure that will be needed on the east coast of Ireland by 2040 once Dublin Port has reached its capacity limit

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 1

WHY DUBLIN PORT IS WHERE IT IS

28th September 2020

1

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 1

WHY DUBLIN PORT IS WHERE IT IS

28th September 2020

The Danish academic, Bent Flyvbjerg, defines megaprojects as large-scale, complex ventures that typically cost $1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational, and impact millions of people[1].

The 20 year project to build new port infrastructure on the east coast of Ireland is, by this definition, a megaproject. The definition applies equally to the project to build new port facilities to augment the existing facilities in Dublin Port or to the project to build a replacement port which would allow the lands of Dublin Port to be redeveloped for other purposes. Dublin Port Company is planning on the basis that it may have to build the former. Some people believe that the latter should be built. Both are megaprojects.

Whichever port project might ultimately be built, it needs to be thought through very carefully. Megaprojects are environmentally challenging and, as a general rule, tend to be far more expensive to build than ever envisaged when being planned. In many cases, megaprojects end up being even more expensive than anticipated at the time construction contracts are awarded because of unforeseeable risks which cannot be transferred to contractors except at enormous cost, and at levels most project promoters would balk at.

The capacity of megaprojects to waste capital is enormous and, particularly where public money is involved, it is unquestionably a good thing to avoid a megaproject if at all possible.

A good starting point to thinking about the project to build new port facilities on the east coast of Ireland is to understand why Dublin Port is where it is.

All ports are the product of large scale anthropogenic interventions into the natural environment and it is in the nature of ports that the scale of this intervention, being underwater, is not readily visible nor easily appreciated. Such interventions are needed to provide the fundamental prerequisite for any port – an access channel into a sheltered area where berths for ships can be provided.

In some cases, such as in Cork, Falmouth and Sydney, nature provides a natural harbour with deep water where port facilities can be constructed.

On the east coast of Ireland, however, there are no deep water harbours and most of the ports are built on small rivers.

1 *The Oxford Handbook of Megaproject Management*, edited by Bent Flyvbjerg, 2017

The single most important attribute of any port is its depth of water. In Dublin Port, there is 7.8 metres of water available at the lowest tide[2]. This is the ruling depth for the port and the rise of the tide is additional to this.

With a ruling depth of 7.8 metres, the depth of water available in Dublin Port varies across the annual phases of the tides between two extremes:

- The Highest Astronomical Tide (HAT) expected in Dublin Port is 4.5 metres (implying a depth of water in the approach channel and fairway of 12.3 metres).
- The Lowest Astronomical Tide (LAT) is -0.1m giving 7.7 metres of water[3].

Between these two extremes, the depth of water is best described by reference to the mean levels of spring tides and neap tides.

The current ruling depth of 7.8 metres allows Dublin Port accept ships with draughts of up to 10.2 metres on most days in the year but within a tidal window.

Ships with draughts of up to 7.5 metres can enter the port without tidal restriction on most days over the course of the year. In practice, the maximum draught for ships operating daily fixed time schedules (notably Ro-Ro ferries) is 6.8 metres.

The channel depth in Dublin Port is currently being increased to 10.0 metres and this will increase the maximum draught of ship that can be accommodated on most days during the year from 10.2 metres to 12.4 metres (with a tidal restriction).

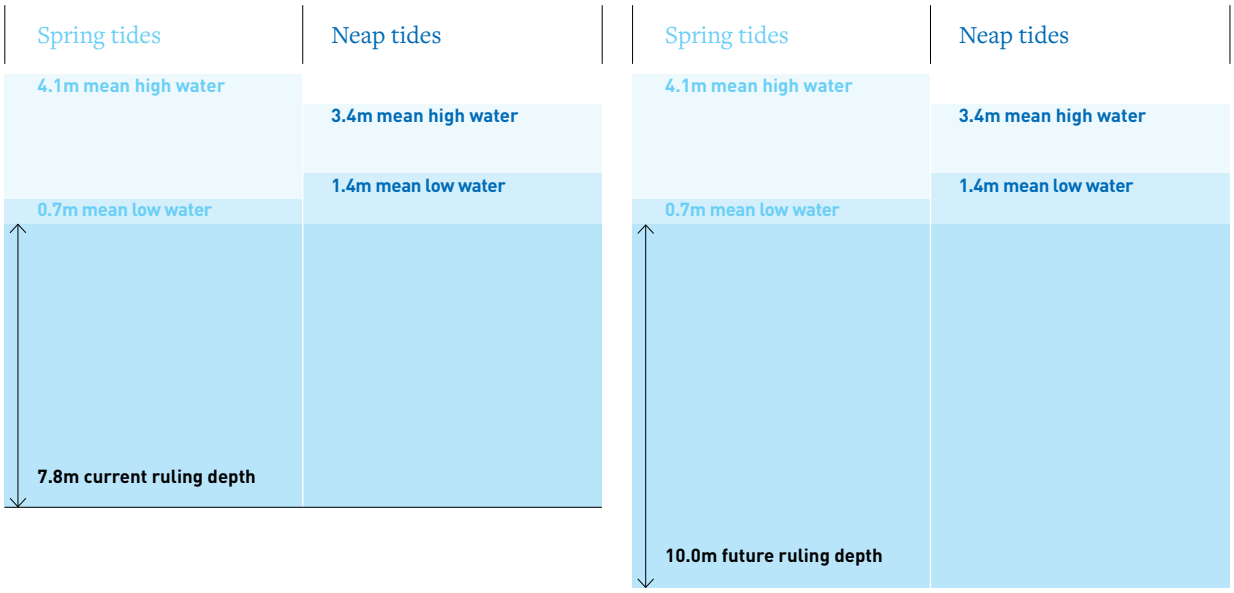
It will also allow ships with draughts of up to 9.7 metres enter the port at any stage of the tide on most days of the year (with no tidal restriction). In practice, a channel of 10.0 metres will allow ships with draughts of up to 9.0 metres to enter Dublin Port on every day of the year.

Current ruling depth: 7.8m	**Mean high water**	**Channel depth**	**Max draught***	**Mean low water**	**Channel depth**	**Max draught***
Spring tides	4.1m	11.9m	10.9m	0.7m	8.5m	7.5m
Neap tides	3.4m	11.2m	10.2m	1.4m	9.2m	8.2m

* Assumes an under keel clearance of 1.0m

Future ruling depth: 10.0m	**Mean high water**	**Channel depth**	**Max draught***	**Mean low water**	**Channel depth**	**Max draught**
Spring tides	4.1m	14.1m	13.1m	0.7m	10.7m	9.7m
Neap tides	3.4m	13.4m	12.4m	1.4m	11.4m	10.4m

* Assumes an under keel clearance of 1.0m



2 Where heights on land are measured against Ordnance Datum (OD), the depth of water in ports is normally measured against a local datum referred to as Chart Datum. Chart Datum normally equals or is very close to lowest astronomical tide. In Dublin LAT is 0.1 metre Chart Datum. Chart Datum is 2.51 metres below OD. The figure of 7.8 metres used here is 7.8 metres below Chart Datum.

3 HAT and LAT are the highest and lowest tides which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions. Extreme weather conditions can add or take away up to one metre of water depth.

By international standards, Dublin Port is a shallow port. For example, Europe's largest port, Rotterdam, has a channel 24 metres deep, Barcelona has 16 metres and Helsinki's Vuosaari Harbour has 11 metres.

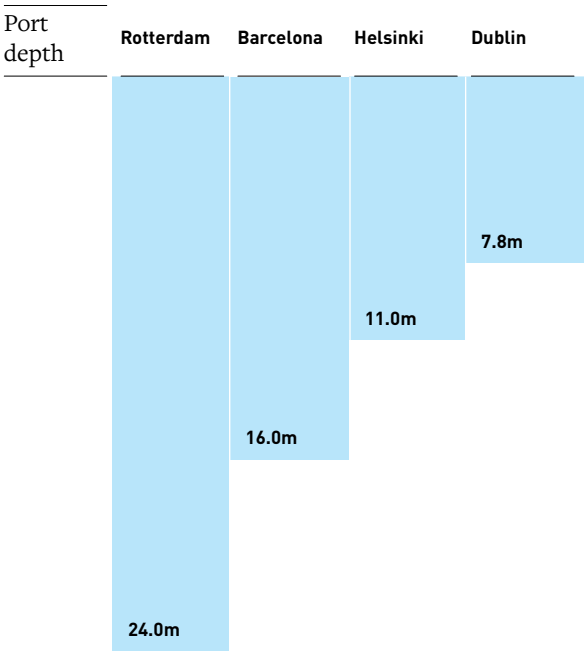
However, by the standards of the east coast of Ireland, Dublin Port is a deepwater port with considerably greater water depth available than in any of the eight other ports in the range from Greenore to Waterford.

Where Dublin Port has 7.8 meters of water plus whatever is on the tide, all of the other eight ports have less and, in most cases, considerably less. Worst off of all is Dundalk where there is almost no water at all in the approach channel at low tide and where the berths at the port's quay walls dry out altogether and ships have to rest on the river bed.

Port / Harbour	Location	Owner	Ruling Depth metres below CD	Relative scale[4]
Greenore	Carlingford Lough	Doyle Shipping Group	5.9m	3.9%
Dundalk	Castletown River	Dublin Port Company	Dries out	0.3%
Drogheda	River Boyne	Drogheda Port Company	2.2m	5.8%
Dublin	River Liffey	Dublin Port Company	7.8m	100.0%
Wicklow	Leitrim River	Wicklow County Council	2.7m	0.6%
Arklow	Avoca River	Wicklow County Council	3.4m	0.0%
Rosslare	Harbour on the Irish Sea	Irish Rail	6.2m	7.7%
New Ross	River Barrow	Wexford County Council	3.0m	1.4%
Waterford	River Suir	Port of Waterford Company	6.5m	7.0%

Because of this greater depth, Dublin Port has a far higher cargo throughput than any of these eight ports either individually or in aggregate. Dublin Port's scale is fundamentally a function of the port's depth of water.

Where deep water was available (or created), population centres grew and, as a consequence, trade volumes grew. Dublin City and Dublin Port have a basic underlying relationship which needs to be understood and appreciated. Even though the availability of deep water was limited, proximity to Britain motivated the development of settlements on the east coast of Ireland. Whereas the Vikings landed at a number of locations on the east coast, including at Annagassen in Co. Louth, it was in Dublin that their settlement prospered and grew for over a thousand years.



4 Based on cargo throughputs as reported by the CSO for 2019

Over these many years, the Liffey was canalised, the port moved eastwards to access deeper water as ships got bigger and two sea walls were built. The idea of moving Dublin Port to another location requires a project that in relatively few years would replicate developments which have taken centuries to achieve. The project is, of course, feasible but only at an enormous cost and subject to all of the well-understood risks associated with megaprojects.

New port facilities for the hinterland served by Dublin Port today will need to be in reasonable proximity to that hinterland. This implies an east coast location. To this day, the country’s population is concentrated on the east coast and specifically around Dublin Port.

The locations of ports are inherently related to settlement patterns – one drives the other in a feedback loop – and this is very clear from a comparison of Ireland with Britain.

Ireland is sparsely populated with only 70 people per square kilometre and with no short sea trading routes to the west and relatively long distances on trading routes to the south.

Britain, on the other hand, is a relatively densely populated island (282 people per square kilometre in Britain as a whole and 430 in England alone) with large populations and ports on its west, south and east coasts corresponding to the short trading distances to Ireland, on the one hand, and to France, Belgium and the Netherlands on the other.

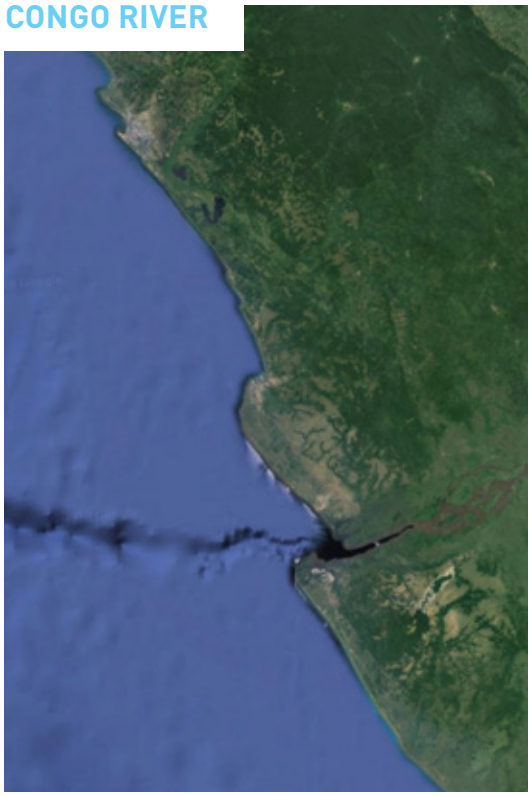
It is no trivial matter to sunder the relationship between a port and its hinterland in pursuit of any objective however attractive or worthy that objective might appear to be. If a new port for Dublin is to be built, then the location will need to be chosen so as to replicate as closely as possible all of the advantages which the location of the current port on the banks of the River Liffey gives.

The core challenge to build a new port is to create a sheltered area with access to deep water. This was possible in Dublin, firstly, because of the shelter of Dublin Bay and of the River Liffey and, secondly, because of the building of Dublin's two sea walls.

The depth of water in a river port is primarily determined by the flow in the river. The more tonnes of water that flow out of the mouth of the river, the greater the depth of water. This is most easily seen in a huge river such as the Congo. The Congo River is 4,700 kilometres long and drains an enormous land area in Central Africa. The average flow rate over the course of the year is 41,000 tonnes of water per second and this huge and powerful flow of water scours out a deep channel. At the mouth of the Congo River, depths vary between 200 metres and 300 metres as the river's torrential outflow surges into the Atlantic. The 130 kilometre long Congo plume (30 kilometres longer than the sailing distance from Dublin to Holyhead) gives some sense of the incredible power of this scouring flow.

Ireland is a small island, no more than 480 kilometres from top to bottom and no more than 280 kilometres from side to side. Being a small island, the rivers are also small and our largest river, the Shannon, is 360 kilometres long with an average annual flow rate of 208 tonnes per second.

CONGO RIVER



© Google Earth

	Length km	Average flow rate tonnes per second
Congo	4,700	41,000
Shannon	360	208
Liffey	125	14

"The story of the building of the North Bull Wall and the earlier construction of the Great South Wall is one of considerable engineering ingenuity and these two walls succeeded in increasing the port's ruling depth from two metres to almost five metres in just 54 years.

Even by comparison with the Shannon, the River Liffey is a puny river. It is only 125 kilometres long and has an average flow rate of 14 tonnes of water per second. With such a low flow rate, a bar of sand and sediment inevitably forms across the mouth of a river and so it was in Dublin that the channel into the port was shallow and meandering until the North Bull Wall was built in the early part of the nineteenth century.

The story of the building of the North Bull Wall and the earlier construction of the Great South Wall is one of considerable engineering ingenuity and these two walls succeeded in increasing the port's ruling depth from two metres to almost five metres in just 54 years.

Even by the standards of modern large port projects, the training walls built in the eighteenth and nineteenth centuries to define the shape of Dublin Port as it is today are impressive structures. The Great South Wall is 4,800 metres long and the North Bull Wall is 2,700 metres long. Their combined length is 7,500 metres.

From 2007 to 2013, the Port of Barcelona completed a major port expansion project which included the building of 6,900 metres of new quay walls.

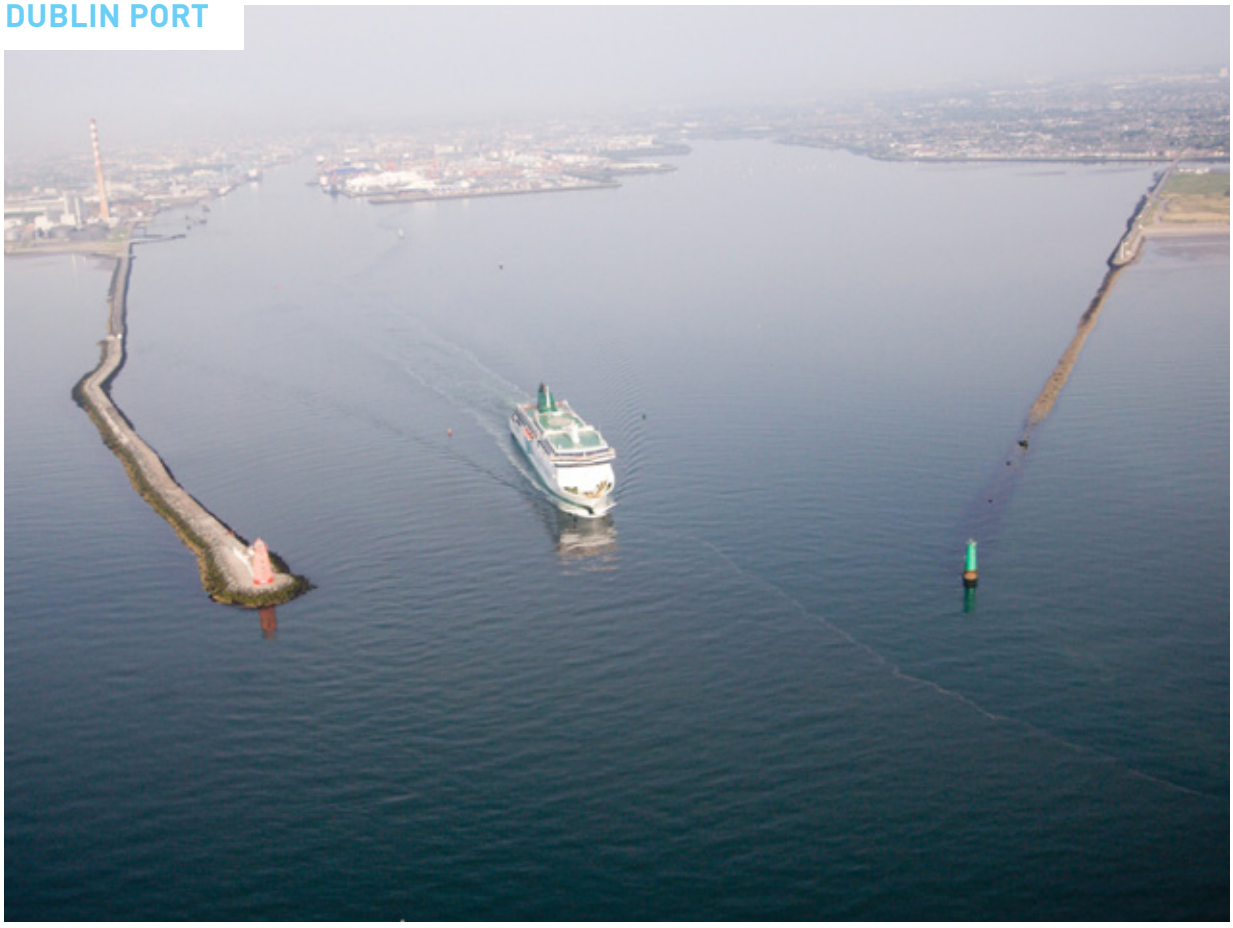
In the absence of a natural harbour or another large river to accommodate a new port on its banks anywhere along the east coast of the country, the building of a new port will require the construction of very long harbour walls. The training walls in Dublin Port are more than two and a half times the length of the walls that were needed to create Dun Laoghaire Harbour. Dun Laoghaire Harbour's East Pier is 1,300 metres long and its West Pier is 1,500 metres long. Their combined length is 2,800 metres.

Even before new quays, jetties and berths are built elsewhere, the creation of a new harbour by the construction of enormous walls reaching out into deep water in the Irish Sea is itself a megaproject. Before any decision is taken to initiate such a megaproject, it is worth looking at what happened in other port cities for precedents that might be relevant and relatable to Dublin.

Dublin City is what it is because of Dublin Port and Dublin Port is where it is because of the combination of natural shelter (afforded by Dublin Bay and the River Liffey) and engineering ingenuity (in the eighteenth and nineteenth centuries).

We are at an inflection point in the long history of Dublin and its relationship with its port. The port is approaching its maximum capacity and we must plan now for the provision of additional port capacity elsewhere on the east coast to be available 20 years from now in 2040. In deciding where such additional capacity might be developed, it is worthwhile looking to see what lessons can be drawn from other European port cities.

DUBLIN PORT



COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 2

HOW HAVE OTHER EUROPEAN PORT CITIES DEVELOPED?

28th September 2020

2

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 2

HOW HAVE OTHER EUROPEAN PORT CITIES DEVELOPED?

28th September 2020

As is the case in Dublin, most ports in Europe (91%) are located in or very close to an urban area[1] and each port has grown over many years based primarily on local geography. It follows from this that there are few hard and fast lessons which can be learned from what has happened in ports in other countries which can be easily applied in Dublin.

It is, of course, a valid question and it is worth looking at how other European port cities have developed in order to give perspective to what has happened in Dublin over centuries and to suggest options for future development here.

The development of ports in six other European port cities is considered below. These ports are in the Baltic (Copenhagen and Helsinki), the North Sea (Rotterdam), Spain (Bilbao and Barcelona) and in Italy (Genoa). Some are very much larger than Dublin (notably Rotterdam), one is about the same size in cargo throughput terms (Bilbao) and the two Baltic ports are each less than half the size.

There are notable similarities between the development of Dublin Port and that of Europe's largest port, **Rotterdam**.

Between 2008 and 2012 the Maasvlakte 2 project expanded the Port of Rotterdam by the construction of a four kilometre dyke in the North Sea behind which 2,000 hectares of additional port area (land and water) including 1,000 hectares of port land was created by infill.

Port	Tonnes (2019)
Rotterdam	469m
Genoa	68m
Barcelona	66m
Dublin	38m
Bilbao	35m
Copenhagen	15m
Helsinki	15m

1 *Trends in EU Ports Governance 2016*, European Sea Ports Organisation; a survey of 86 European ports in 19 member states. https://www.espo.be/media/Trends_in_EU_ports_governance_2016_FINAL_VERSION.pdf

PORT OF ROTTERDAM

The Maasvlakte 2 project was the fourth major expansion of the port in the post war period. This series of projects progressively moved the centre of gravity of the Port of Rotterdam downriver along the estuary of the Rhine and, ultimately, into the North Sea as summarised below[2].

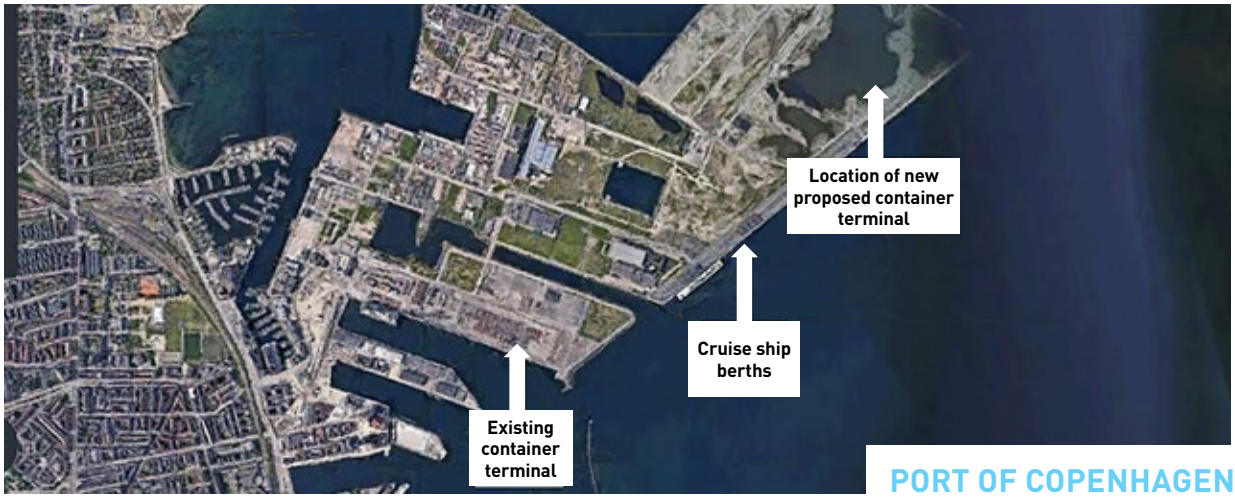
Project	**Construction period**	**Gross port area** hectares	**Net port land** hectares
Botlek	1952-1955	1,100	835
Europoort	1958-1960	2,205	1,701
Maasvlakte 1	1986-1973	2,630	1,761
Maasvlakte 2	2008-2012	2,000	1,000

The progressive development of the Port of Rotterdam over 60 years mirrors the development of Dublin Port over a longer period of 160 years from the construction of North Bull Wall between 1819 and 1824 up to the completion of the final eastward expansion of Dublin Port by infill into Dublin Bay in the 1980s.

It does not seem likely that the Port of Rotterdam will increase its size by any further infill into the North Sea. Similarly in Dublin, there will be no further expansion of the port by infill into Dublin Bay. Permission to do this was sought over a 31 year period from 1979 before being decisively rejected by An Bord Pleanála in 2010. Since then, Dublin Port Company has accepted this reality and, in Masterplan 2040, has explicitly ruled out the option of further expansion by infill into the bay.

"The progressive development of the Port of Rotterdam over 60 years mirrors the development of Dublin Port over a longer period of 160 years.

2 *Lobby For Land*, Dirk Koppenol, 2016



The **Port of Copenhagen** provides a second useful case study. In Copenhagen, new berths for cruise ships have been built on infilled land. The relocation of the port's container terminal to a new facility two kilometres away in the Outer Northern Harbour, adjacent to these cruise ship berths, is under construction and is due to be completed at the end of 2021.

The new container terminal is being constructed on made ground created by infilling the sea. It is a relatively small container terminal with a land area of 8.5 hectares and with a capacity, using Dublin Port land utilisation benchmarks, of 340,000 TEU per annum. It is designed to be capable of being expanded by additional infill in the future, if required. The new container terminal is small by comparison with the three container terminals in Dublin Port and by comparison with the 14 hectare Ringaskiddy Container Terminal currently under construction in the Port of Cork.

Before deciding to build the new container terminal, CMP Ports (the operator of the ports of Copenhagen and Malmö), considered the option of moving container handling operations from Copenhagen to existing facilities in the adjacent port of Malmö. CMP additionally considered moving the terminal to the Port of Köge 25 kilometres south of Copenhagen. The option of exiting the container business entirely was also considered. Ultimately, however, the decision was taken to maintain container handling capacity in the Port of Copenhagen.

What has happened in Copenhagen provides no useful insights into what should happen in Dublin. Doing in Dublin what happened in Copenhagen would involve more and more infill of Dublin Bay.

In the **Port of Genoa**, on Italy's Ligurian coast, the expansion of the port's container handling capacity was achieved by the construction of a new container terminal at a nearby location 10 kilometres along the coast. The older SECH container terminal is located close to the centre of the city and is still in operation. It has a land area of 20 hectares, 526 metres of quay wall and a water depth of 15 metres.

The newer Voltri Container Terminal became operational in 1994. It is much bigger with 116 hectares of land and 1,400 metres of quay wall. The water depth at Voltri is also 15 metres.

There is no equivalent option to build a new facility on the east coast of Ireland where such deep water is readily accessible. A similar distance north of Dublin Port would take you to Malahide and the Rogerstown Estuary. To the south, it would take you to Killiney Bay.

PORT OF BARCELONA

© Google Earth

The **Port of Barcelona** has been considerably expanded by a southern extension and some of the old historic port was redeveloped as a tourist attraction prior to the 1992 Olympics notably as the Port Vell area. Today this area houses a large aquarium, a shopping mall and marina facilities for pleasure craft.

The major development of the industrial port facilities in Barcelona included the two kilometre diversion of the Llobregat river and the completion of a major project between 2007 and 2013 to construct 6,900 metres of new harbour walls. This comprised a 2,100 metre extension to the port's existing eastern breakwater and the construction of a new 4,800 metre long southern breakwater.

An equivalent approach in Dublin would involve the infilling and redevelopment of Sandymount strand. Incredibly, just such an approach was considered as an option by Dublin Port & Docks Board in *Studies in long term development in the Port of Dublin* published in 1972. More recently, the infilling of Sandymount Strand and also of the Tolka Estuary have been suggested to provide new housing.

Impressive though the development and expansion of the Port of Barcelona are, a similar approach to expand Dublin Port is not conceivable. The example of Barcelona does, nonetheless, serve to highlight the huge size of breakwaters which a major port development project would require.

PORT OF HELSINKI

© Google Earth

The **Port of Helsinki** has been cited as the definitive case study demonstrating how Dublin Port should be moved to a new location, specifically to a new port to be built at Bremore, 25 kilometres north of Dublin. This is what happened in Helsinki when a new harbour was constructed 20 kilometres away at Vuosaari.

Following the construction of the new harbour at Vuosaari between 2003 and 2008, much of the activities in Helsinki's West Harbour were transferred there and port lands were freed up for urban development.

However, notwithstanding the movement of much of the Port of Helsinki's cargo handling activities to Vuosaari, ferry operations (passengers and accompanied freight) and cruise ship operations have continued in Helsinki's West Harbour and South Harbour.

Two container terminals were constructed at Vuosaari alongside nine berths for Ro-Ro freight ships. The total land area of the new Vuosaari Harbour is 150 hectares, 90 hectares of which was created by infilling the sea. Significantly, and in contrast to Dublin, there were no petroleum importation facilities in the Port of Helsinki that had to be relocated.

The development of the new harbour was greatly facilitated by there being a redundant brownfield shipyard in Vuosaari. One of the main challenges to replicate Port of Helsinki's approach on the east coast of Ireland is to find a suitable location in which to build a new port. Unlike Helsinki, there are no brownfield sites adjacent to deep water available and any development north or south of Dublin would have to be a greenfield development.

VUOSAARI HARBOUR

© Google Earth

Finally, there is the **Port of Bilbao** on the northern Spanish coast.

The port is situated on the Nervion River, an even smaller river than the Liffey (75 kilometres long with an average flow rate of 10 tonnes per second).

As in Dublin, port facilities have been pushed downriver over decades and are now concentrated at the mouth of the river where the Nervion flows into the deep waters of the Bay of Bilbao and the wider Bay of Biscay. As the port facilities moved downriver, the vacated riverside sites were redeveloped, notably in the case of the Guggenheim Museum. The redevelopment in Bilbao is equivalent to the Docklands development in Dublin.

Where Dublin has expanded inside the eighteenth century Great South Wall and the nineteenth century North Bull Wall, in Bilbao a 2,600 metres long outer breakwater was constructed in the 1970s and new port areas and berths were constructed by infill into the sea where deep water (in the region of 30 metres) is available.

An equivalent, but unimaginable, development in Dublin to mirror what has happened in Bilbao would be the construction of a large breakwater running southwards from Howth Head into Dublin Bay with new port facilities constructed on the south side of Howth Head and along the length of Bull Island.

PORT OF BILBAO

As in Dublin, Bilbao's port facilities have been pushed downriver and are now concentrated at the mouth of the river.

The dogged determination to develop Dublin Port in the eighteenth and nineteenth centuries was for the very good reason that there were no better or easier alternative options available. The development path that was followed in Dublin resembles the path followed elsewhere, notably in Rotterdam and Bilbao where the ports migrated downriver to the sea as far as they could go.

Options to expand Dublin Port along the coast in a similar manner to Genoa or Barcelona are not conceivable. Likewise, the expansion of Dublin Port by infilling the sea in the way the Port of Copenhagen has done in the Oresund is not an option for Dublin.

Finally, there is no brownfield site available on the east coast of Ireland equivalent to the redundant Vuosaari shipyard which could be redeveloped to allow the relocation of cargo handling activities from Dublin Port as happened in Helsinki.

Port expansion and development options are limited everywhere by geography. They are also constrained by the same environmental laws which are paramount in decision making by planning authorities throughout Europe.

Local geography is the decisive factor that has determined the nature and scale of port developments in all of the ports of Rotterdam, Copenhagen, Genoa, Barcelona, Helsinki, Bilbao and Dublin.

By comparing what has happened in other European port cities, it is clear that the proposed movement of the cargo handling activities in Dublin Port to a new port built on a greenfield site would be an unusual development. There is no good reason or precedent for Ireland undertaking a uniquely challenging, environmentally impactful and enormously expensive megaproject to build a new port for Dublin.

Having looked at what lessons can be learned from other European port cities, a look back at how Dublin Port developed over the past three centuries also provides useful insights as we consider options for Dublin Port's future development.

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 3

THE SHAPING OF DUBLIN PORT IN THE NINETEENTH CENTURY

28th September 2020

3

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 3

THE SHAPING OF DUBLIN PORT IN THE NINETEENTH CENTURY

28th September 2020

Although it is not certain, a new port may need to be built on the east coast of Ireland by 2040. Building such a port is a huge undertaking and requires careful consideration from two distinct perspectives.

Firstly, the need for the proposed new port must be established. Secondly, the location, design, cost and environmental impacts of the proposed new port need to be determined.

These perspectives are not mutually independent and they cannot be considered sequentially; they have to be considered in tandem with feedback between them. If costs and environmental impacts are unfeasibly high, then need can be trumped.

The decision to build new port facilities is ultimately a binary choice. However, deep thinking is required to ensure the correct choice is made. This is as true today, as we consider the long-term future of Dublin Port, as it was in centuries past when choices had to be made as to how Dublin would be provided with the port infrastructure it needed.

Dublin Port's first port authority, the *Ballast Office Committee*, was established in 1707 and its main contribution was to initiate the near century long project to build the Great South Wall.

The construction of the Great South Wall commenced in 1716 with the building of wooden pile structures to provide a physical barrier to prevent the movement of sand from Sandymount strand into the port's entrance channel and also to provide shelter for ships.

The stone wall, as we know it today, was built in stages. Between 1748 and 1759 a section from what is now the Pigeon House Harbour was built back to Ringsend. Between 1760 and 1767 the Poolbeg Lighthouse was constructed and work on building the stone wall westwards to what became the Pigeon House Harbour continued until 1784. The still-standing Pigeon House Hotel was completed in 1793.

The situation in Dublin Port in 2020 is comparable to that in 1800. Today we are looking to decide what port facilities should be built on the east coast of Ireland to meet the needs of the city 20 years from now in 2040.

In 1800, construction of the Great South Wall had been completed and consideration was being given to the additional works needed to make Dublin Port more easily and safely accessible. This challenge was explicit in the name of Dublin Port's second port authority, *The Corporation for Preserving and Improving the Port of Dublin*, which had been established in 1786. This corporation was known colloquially as the *Ballast Board*.

The Ballast Board was established during the era of canal building in Ireland and, while the Great South Wall was being built, the Royal and Grand canals were also being constructed to link Dublin, city and port, to the Shannon. The canals greatly increased the hinterland of the port and the continued improvement of Dublin Port was a matter of national importance to the extent that, in 1800, the *Directors General of Inland Navigation* were given statutory responsibility for improving the port.

For a period of more than 20 years from 1800, the next major port project (after the completion of the Great South Wall) was considered, debated, planned and, ultimately, realised by the construction of the North Bull Wall, between 1819 and 1824.

It is not at all unusual for large construction projects to have long gestation periods and, even by the standards of today, the North Bull Wall was a large project.

In the UK, the building of a third runway at Heathrow was proposed in 2003 and today, 17 years later, is still the subject of debate and controversy. In Southampton, the British Transport Docks Board purchased lands at Dibden Bay in 1967 to provide capacity for the future expansion of the Port of Southampton. This expansion was ultimately ruled out in 2003 following a public enquiry which sat for 120 days and lasted over a year – 36 years from concept to refusal.

In Germany, the Berlin Brandenburg Airport is finally due to open this year some 29 years after the corporation to develop the new airport was established and 14 years since construction work commenced. Elsewhere in Germany, the Port of Hamburg's project to deepen the River Elbe commenced in 2019, 17 years after it was first proposed.

In the Netherlands, the Maasvlakte 2 project to expand the Port of Rotterdam was originally proposed in 1969 and completed 43 years later in 2012.

Similarly long timescales apply to major construction projects and developments in Ireland

Dublin Port Tunnel

11 years from the proposal to build the tunnel (in the Dublin Transport Initiative report of 1995) to the tunnel opening in 2006.

Eastern Bypass

49 years since first suggested in a 1971 study report by An Foras Forbartha, *Transportation in Dublin*; unlikely to be built within the period of Dublin Port Company's Masterplan 2040, if ever.

Corrib gas

19 years from discovery to gas coming ashore.

Dublin Gateway

31 years from a first application in 1979 (by Dublin Port & Docks Board) for a Harbour Works Order for an eastern expansion of the port opposite Clontarf to An Bord Pleanála refusing permission for the Dublin Gateway project in 2010.

Galway Bypass

21 years since first proposed in 1999; multiple legal challenges culminating in an EU Court of Justice ruling in 2013; €600m approved by cabinet in 2018; currently awaiting an An Bord Pleanála oral hearing.

Irish Glass Bottle site

14 years since its sale to DDDA at a price of €16.5m per acre; construction works are yet to commence.

Dublin waste to energy plant

20 years from its being proposed in 1997 to its opening in 2017.

What is true today both in Ireland and internationally was true more than 200 years ago when the Directors General undertook public consultation on plans to improve Dublin Port. The problems of Dublin Port were ultimately resolved in 1824 when the project to construct the North Bull Wall was completed at a cost of £103,055.

The consultation process was informed by the publication of an 84 page document comprising reports and correspondence by experts (including Thomas Hyde Page of the Royal Engineers, Captain Willian Bligh, Captain Daniel Corneille and John Rennie). The foreword to this document set out the objectives of the public consultation very clearly:

> *The Directors General of Inland Navigation in Ireland, to whom, in Pursuance of the Act of the 40th Year of His Majesty's Reign, the Improvement of the Harbour of Dublin is committed, have caused the following Reports to be printed, with a Map annexed to each, upon which is delineated a sketch of the Works proposed by the several Reports to be constructed for the Purpose. The Sketch will elucidate the Report, and give a general Idea of the Design. Any Person wishing for more accurate Information may consult the Plans at large at the Navigation-House, No. 19 Merrion-Street, with the Reports of Borings, Soundings, and Experiments made respecting the Bar and other Parts of the Harbour.*
>
> *The Directors General request to be favoured with the Information and Opinion which the Reader may be enabled to form upon these Plans, from scientific, practical, or local Knowledge upon the Subject, with the Foundation of any Objections which he shall make, and his Ideas for the Improvement of that Plan which principally meets his Approbation.*

There was a number of options for improving Dublin Port and the way forward was not clear. The challenges faced by the Directors General (and by the Ballast Board) are redolent of the more recent challenges to build the new Children's Hospital in Dublin where issues of the co-location of facilities (paediatric, maternity and adult) had to be considered alongside the decision on the location for the new hospital (including at the Mater, at the Connolly Hospital in Blanchardstown and at St. James's Hospital). There were many different expert views but a choice had to be and, ultimately, was made.

The approach taken by the Directors General was to bring together the considered and varying views of different experts, shown in a series of six maps, and request feedback. The reports of the four experts included a retrospective analysis by John Rennie of earlier proposals from the previous century (notably by Captain John Perry).

The proposals of Thomas Hyde Page are shown in Map 1 and these are described by Page in a letter to the Directors General dated 7th September 1800, around the time that Captain William Bligh arrived in Dublin.

Page's main concern was with the safety of ships particularly during bad weather when ships had to wait for the tide in order to get across the bar and into Dublin Port. He proposed the creation of deep water anchorages at Dalkey Sound and at Sandycove. He suggested using loose rocks in the area (*pierres perdues*) to create rough breakwaters from Dalkey Island into Killiney Bay and also on a line joining Dalkey Island with Lamb Island and on to Maiden Island. At Sandycove, Page suggested that two piers be built in the relatively deep water close to the shore to provide a sheltered anchorage.

Given that this was the era of canal building, there had been proposals for new canals to link the Liffey both to the south of the bay at Dalkey or Sandycove and to the north at Ireland's Eye and Page mentions proposals by Councillor William Vavafour, William Jessop (an engineer on the Grand Canal Docks project) and Thomas Rogers (in an 1800 pamphlet).

Page suggested that the pier at Sandycove could be constructed so as to give access to a ship canal which would provide a connection to the Grand Canal.

On the north side of the bay, Page took a similar approach and described the development of a safe anchorage between Howth Head and Ireland's Eye by the building of two breakwaters. Again he suggested that a canal could be run back to the city, this time linking into new docks he had proposed to be built in the North Lotts, plans for which he had earlier prepared for the Royal Canal Company.

Page additionally supported previous suggestions of the Directors General to build a training wall from the North Lotts and pointed to the possibility of this wall and other shorter walls inducing tidal scour which could deepen the channel.

Finally, Page suggested constructing a small island to the east of the Poolbeg Lighthouse to, again, beneficially direct the channel into the port.

While Page was conscious of the expense of his various suggestions, notably the piers at Sandycove, he believed them to be justified in order to prevent loss of life at sea:

> *... but whether or not the expense might be justified by commercial considerations, the country would have certain cause to rejoice, if thereby our brave seamen were preserved from the dreadful consequences of shipwreck.*

Subsequent to describing his proposals, Page provided two sets of cost estimates.

The first set of estimates is dated 23rd September 1800 for works in Dalkey and Sandycove to a total cost of £1.5m.

Improvement of the anchorage at Dalkey Sound	£246,979
Pier A at Sandycove	£189,706
Pier B at Sandycove	£1,014,600
Total	**£1,451,285**

In presenting these estimates, Page was again clearly conscious of the scale of what he was proposing and noted the following below his table of costs:

> *N.B. Notwithstanding the magnitude of this Estimate, the object is worth the expenditure, and if it should appear that by preventing shipwreck in the Bay of Dublin, there would be an annual saving of many lives, and property to an immense amount, the United Parliament of England and Ireland would not hesitate in voting at least one hundred thousand pounds a year towards the progressive improvement of the Navigation.*

Page's second set of cost estimates are dated 29th November 1800 and related primarily to proposed works at Ireland's Eye, in Howth and in the channel itself in Dublin Port.

Piers at Ireland's Eye (850 yards) and Howth (800 yards)	£86,400
North Wall / Bank of the Liffey (7,000 yards)	£168,000
Raise the bar to create an island half a mile long	£79,200
Total	**£333,600**

None of the above cost estimates addressed the cost of building either of the ship canals or the cost of building new docks at North Lotts.

It is clear from Page's letters that many of the ideas he suggested were current at the time and there seems to have been an orthodox view on the efficacy of building canals and docks to solve the problems of Dublin Port.

Had this approach been followed, solving the problems of Dublin Port would have been very much more expensive than ultimately proved necessary.

Map 1 — The works proposed by Thomas Hyde Page

As Page corresponded with the Directors General, Captain William Bligh was surveying Dublin Bay on behalf of the Admiralty at the request of the Lord Lieutenant, Marquis Cornwallis.

In addition to completing his detailed survey in the winter of 1800, Bligh sent a report dated 12th January 1801 to the Directors General based on this survey in which he looked at the possibility of making improvements to Dublin Bay, Dun Laoghaire, Bullock, Dalkey and Howth.

When he came to describing the improvements that were possible, and which he recommended, Bligh was very clear that the prime objective of providing solutions to the problems of Dublin Port for the benefit of Dublin City could best be achieved by focussing on the harbour as it was:

> *There is to be attended to, as the principal part of our design, the welfare of the City, and it is my opinion, that should not be lost, even if a better harbour could be found in its neighbourhood; this however is not the case, and therefore the result of all my observations will, I hope, remove its difficulties as much as can be done, and promote its convenience.*

While Bligh recognised the benefits of providing safe anchorages in Dun Laoghaire and at Howth, he roundly dismissed the idea of building canals and he also dismissed the possibility that the channel in Dublin Port could be improved by anything other than manual labour:

> *It is necessary for me too, to premise that I consider all schemes as visionary, which pretend to cleanse Dublin Harbour by any artificial means except bodily labour, and any other ways for ships going to Dublin to take but the present channel. I impress it strongly as a principle, that a canal and the Liffey would destroy each other, as both would be too burthensome to keep up, and that the general bias would at last go in favor of the latter. The Canal would then become only a lateral advantage, and it would be very doubtful if all the conveyances through it would ever repay the expense of making it, or even be sufficient to keep it clear, and at all useful for the few purposes it would be applied to.*

Where Page seemed to consider any level of expense to be justified to provide a safer harbour, Bligh's focus was on making the most of what was there. Bligh took the constraints of the bar as they were as a given and focussed, instead, on providing a better channel to the port's berths. He suggested building a sea wall parallel to the Great South Wall. The purpose of this new wall was twofold:

> *This wall is for two purposes, one of which is to confine the sediment of the Liffey to itself, and limit the labour in keeping it clear; the other to avoid whatever comes from Ballybough and Clontarf.*

While Bligh believed that his wall would cause the stream to take out a great part of the mud of the river, he said that manual labour would be needed to level the river bed to make it safe for ships to rest on without being damaged. In Bligh's words, *It is the harbour to be complained of and not the bar.*

Bligh was an expert mariner and his report deals in great detail with wind, currents and tidal conditions, with the nature of the sea bed and with the responsibilities of ships masters to safely work within these known conditions.

Where Bligh was adamant in his opinion of what should not be done (i.e. building canals) and was dismissive of any solution that might propose to reduce the bar in Dublin, he believed that the limitations of Dublin Port needed to be accepted for what they were and that what could be done to improve the situation by way of a limited construction and manual labour should be done.

Bligh's pragmatism and the limitations of his perspective are evident in the closing words of his report:

> *The object is to provide a remedy, if we can, for the present evil, and to prevent if possible its recurrence; but when we go out of the beaten path, out of the usual track, beyond the known, tried, proved, practical remedy, we should always bear in mind, this most important truth, "that nothing is so dangerous as too ready an indulgence of vain hopes; too rash a resort to a plausible theory, which although at a glance, it may be inviting to the sight; may be found by experience to be delusion in the feeling and defective in its general foundation."*
>
> *Nothing but palpable experience can be depended on.*

In contrast to the expansive and expensive works proposed by Page and Bligh's very conservative and limited approach, there was a simpler and ultimately successful solution to the problems of Dublin Port. This was to build the North Bull Wall as we know it today and this had been recommended by the Ballast Board to the Directors General. The approach was put forward by two members of the Ballast Board, George Macquay and Leland Crosthwaite. Their solution was not novel, having been suggested 15 years previously in 1786 by an engineer from Newcastle, William Chapman.

On 28th August 1801, the Directors General requested the Ballast Board to send them details of...

> *the plan which you would recommend to be carried into execution upon this idea, with every circumstance respecting the depths of waters and shoals, the tides and currents, and their effects both upon the flood and upon the ebb, that the whole may be laid before able engineers for their opinion.*

In making this request, the Directors General sent a copy of Bligh's report to the port authority.

In its response of 13th October 1801, the Ballast Board showed a very clear appreciation of how the building of a north wall would impound a large volume of water which, as the tide ebbs, could be directed in a concentrated flow towards the bar thereby scouring it to provide a deeper entrance channel. More particularly, the Ballast Board's letter to the Directors General shows a deep understanding of the dynamic interaction between the wall they proposed to build (the North Bull Wall) and the Great South Wall (referred to below as *the works on the south side*):

> *The Corporation will just here observe, that it has been their object to interfere as little as possible with nature in the plan they have proposed, where its efforts appear to be usefully directed, but on the contrary, and this they doubt not, an examination of the charts of the harbour will point out, to give it all due assistance; and further, that the work now recommended will receive protection and security from the works on the south side, which in their turn will receive the like advantages from the proposed work; each by this means not only carrying its own objects, but adding in a considerable degree to the value and security of the other.*

On the same day as the Directors General asked the Ballast Board for details of the approach proposed by Macquay and Crosthwaite, they also wrote to Captain Daniel Corneille for his opinion of the Ballast Board's idea. Corneille submitted his report on 7th September 1801 and, based on his investigations and surveys, concluded that:

> *... I am persuaded that the idea suggested by the Corporation, of erecting a pier or embankment from the Point of Clontarf Sheds, to the Spit Buoy would materially improve the entrance into the Harbour of Dublin.*

Corneille's interpretation of the port authority's suggested approach involved the construction of two walls as marked in red in Map 3. Although he didn't produce detailed costings at that stage, he did provide estimates of £16 10s 4d per foot for the longer breakwater marked A and £25 14s 0d for breakwater B.

For its part, the Ballast Board had noted in its response to the Directors General that:

> *The works already executed by the Corporation, have so exhausted their funds as to leave them inadequate to the undertaking of that now recommended; should the means, however, of executing it, or any other works which they may consider likely to benefit the harbour, be put into their hands, they will endeavour to administer them in the most useful manner.*

Corneille made a subsequent submission to the Directors General in 1802 which refined his ideas based on additional experiments and investigations he had carried out. His refined concept is shown in Map 6 of the Directors General's consultation document. It is a curved wall 7,260 feet long which Corneille estimated could be built for £24 per foot to give a total cost of £174,240.

The fourth main contributor to the Directors General's consultation document was John Rennie. Rennie was an eminent engineer and was subsequently responsible for the construction of Howth Harbour and Dun Laoghaire Harbour.

When challenged in 1802 to contribute to the topic of how to solve the problem of Dublin Port, Rennie observed that:

> *The improvement of Dublin Harbour is perhaps one of the most difficult subjects which has ever come under the consideration of the Civil Engineer, and therefore it ought to be treated with great caution and judgement. Many and various are the projects which have been brought forward for that purpose, and each project seems to have considered all plans improper except his own. How far I may fall into the same error when the general subject of the improvement of Dublin Harbour comes before me, must be left to the judgement of others to determine.*

Rennie examined a similar set of options to those considered by the Page. However, he dismissed the idea of going to any expense to develop anchorages in both Dalkey and Howth.

Rennie noted that the extent of sand in Dublin Bay and the smallness of the Liffey and Dodder combined to make Dublin such a poor harbour. Rennie further noted that immense sums of money had been spent on the Great South Wall, enabled... *by the liberality of the late Irish Parliament* and he went on to say that unless the port can be improved... *the spirited inhabitants of Dublin will be prevented from sharing the commercial advantages of the British empire.*

Map 2 — Captain William Bligh's proposed solutions

Map 3 — Captain Daniel Corneille's first proposed approach to implementing the solution proposed by the Ballast Board

Map 6 — Captain Daniel Corneille's final proposal

Rennie reviewed the history of the efforts to improve Dublin Port since 1707 and described a 1725 proposal by Captain John Perry to build a harbour at Sutton Creek and link it back to the Liffey at Ringsend by building a canal.

Rennie noted that the Ballast Office Committee had rejected Perry's plan in 1726 and continued, at great expense, to complete the Great South Wall. He compared a 1725 survey by Gabriel Stokes (which indicated that there was 1½ to 2 feet of water at the bar) to Bligh's survey of 1800 (which indicated 5 to 5½ feet on low water on an ordinary spring tide) and remarked, somewhat dismissively, that... *this is all the advantage that seems to have been gained on the Bar by the expenditure of upwards of £200,000.*

Before proceeding to outline his preferred options for the resolution of Dublin Port's problems, Rennie simultaneously dismissed the solution proposed by the Ballast Board while also describing the essence of the Ballast Board's ultimately successful solution:

> *From the little good that has been produced by the extensive works already executed in improving the depth of water on the Bar in Dublin Harbour, I cannot say I have any very sanguine hopes of much good being produced by any works which can be added at a moderate expense. The scouring away of bars is but an uncertain operation at the best, and can only be done by bringing additional water to act on them, or by confining the action of what water there is to a narrower channel.*

Rennie finally settled on a set of proposals based largely on the prevailing wisdom of building canals including Perry's plan of 1725. Rennie presented five sets of cost estimates including three options for canals – Perry's Sutton creek idea and two options for canals on the south of Dublin Bay, one to Dun Laoghaire and the other to Sandycove.

Rennie's canals were to be 20 feet deep, 160 feet wide at the surface with a bed width of 80 feet.

1	North Pier and embanking the South Bull	£252,384
2	Extensions to the Great South Wall (770 yards)and the new North Pier (1,100 yards)	£403,488
	Total for works in Dublin Port	**£655,872**
3	Canal from North Lotts to Sutton	£657,157
4	Canal from Grand Canal Docks to Dun Laoghaire	£489,734
5	Canal from Grand Canal Docks to Sandycove	£705,054

Based on correspondence with Captain Joseph Huddart, Rennie ultimately settled on Dun Laoghaire over Sandycove.

Notwithstanding Rennie's reaction to the £200,000 cost of constructing the Great South Wall, he suggested works to a cost many multiples of this amount.

It is not evident that the consultation process initiated by the Directors General resulted in any useful consensus.

Two experts (Page and Rennie) identified very expensive sets of options which were heavily influenced by the canal orthodoxy of the day.

A third expert (Bligh) dismissed the idea of building any canal and instead focussed on a limited set of options which sought to make the best of a bad lot by accepting the limitations of the bar and making the most of the shallow channel in the port.

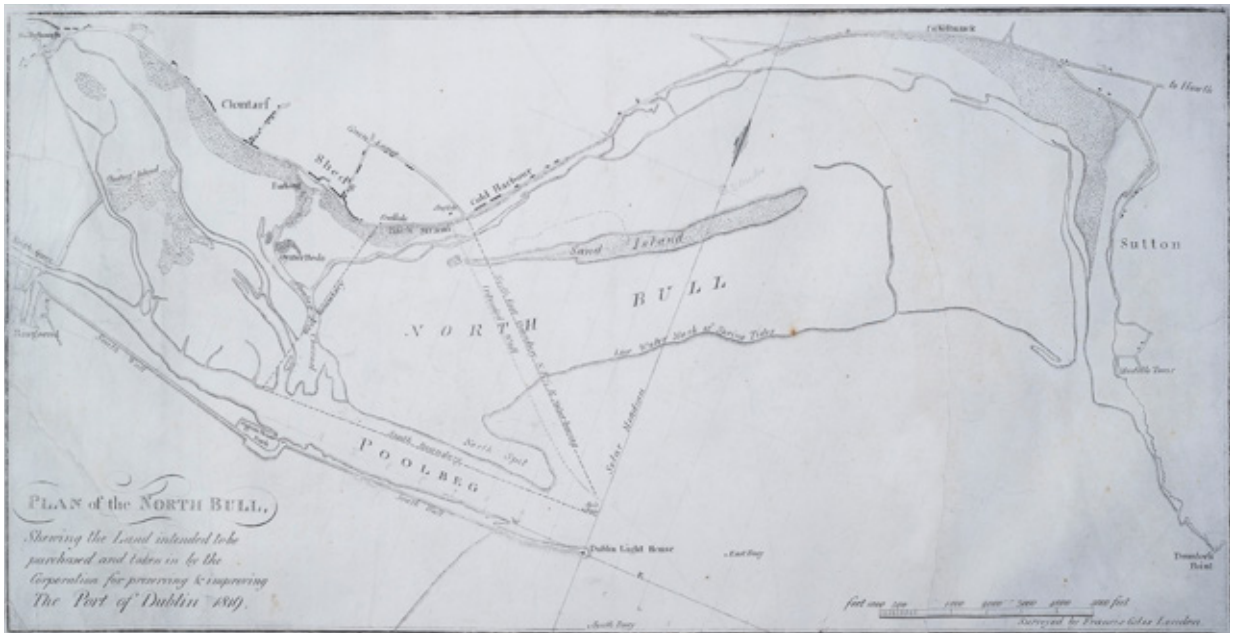
Only the option put forward by the Ballast Board offered an economic (albeit uncosted) and effective possible solution to the problems of Dublin Port. Despite being endorsed by a fourth expert, Captain Corneille, no decision was taken for a considerable time.

It was only in 1818 that the Ballast Board initiated the project to build the North Bull Wall by commissioning Francis Giles to carry out a new survey of the outer harbour and the bar. In May 1819, the Ballast Board approved the project based on a report by George Halpin and Giles.

Map 4 — John Rennie's proposed harbour at Sandycove with a canal linking it to the Grand Canal

Map 5 — John Rennie's final choice of options

Francis Giles' survey of 1819 showing the proposed location for the North Bull Wall



The benefits foreseen by the Ballast Board of assisting nature to deepen the channel came to pass. Over a matter of decades, the problems of Dublin Port were overcome as tidal scour gradually reduced the height of the troublesome bar and the business of Dublin Port prospered within the sheltered waters enclosed by the port's two sea walls.

In 1881, Isaac John Mann, Assistant Engineer to the Dublin Port and Docks Board, published *River Bars – Notes on their formation and on their treatment by 'induced tidal scour', with a description of the successful reduction by this method of the bar at Dublin*.

Mann gave a detailed and wide-ranging description of the nature of bars, wave action, currents and scour. He then described the construction of the Great South Wall and also of the North Bull Wall. Having described the contributions of Page, Bligh, Corneille and Rennie, Mann observed that:

> *The expensive and elaborate schemes for the improvement of Dublin harbour which have been enumerated, although emanating from some of the highest engineering and nautical authorities of the time, were ultimately superseded by the much simpler expedient of a northern pier or Great North Wall...*

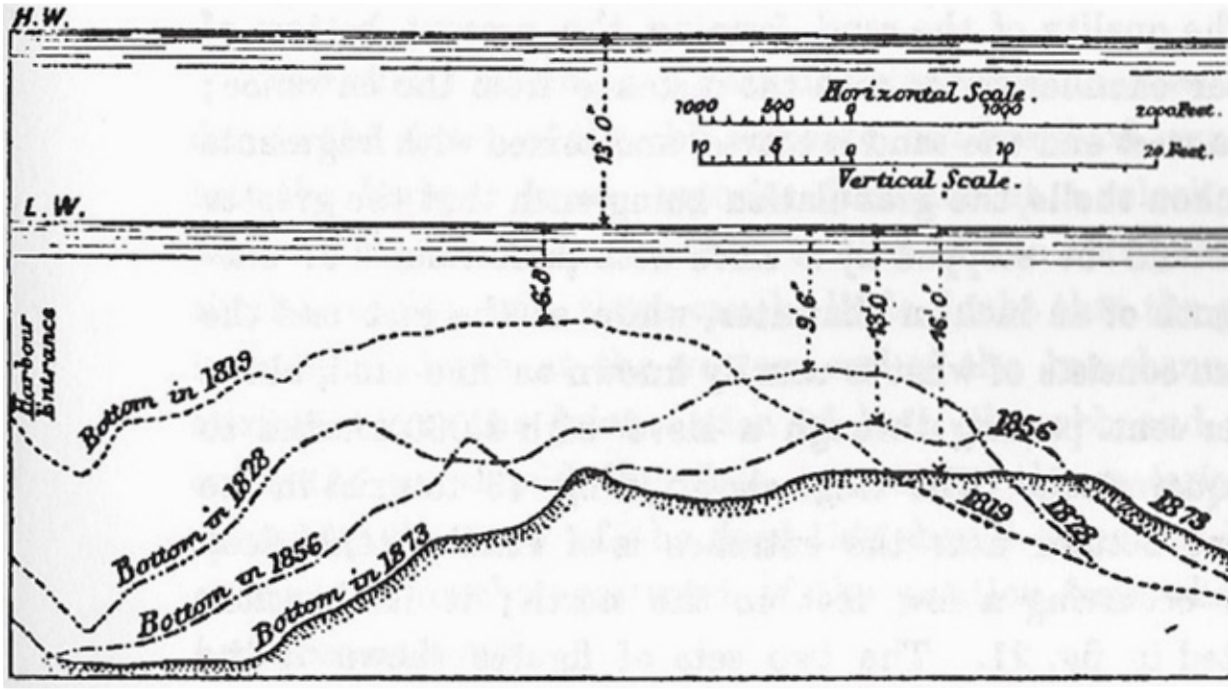
Mann noted that the North Bull Wall had, by August 1822, been built to an initial length of 5,500 feet and, following consultation with Thomas Telford, the length was extended first by 500 feet and subsequently by an additional 300 feet. At each stage the intensity of the scouring effect achieved was assessed and the wall was extended to reduce the gap between the North Bull Wall and the Great South Wall, thereby increasing the force of the water on the ebbing tide.

The progressive lengthening continued until the wall reached its ultimate length of 9,000 feet with the first 5,600 feet above high water at all stages of the tide and the remaining 3,400 only beneath water at high tide.

Mann provided a chart showing the results of surveys carried out in 1819 by Giles and subsequently by others in 1828, 1856 and in 1873. The chart shows how the initial effect of the tidal scour was primarily to push the bar further out to sea but that ultimately, after 54 years, the height of the bar was greatly reduced.

Mann tabulated the increasing depth at the bar noting that it increased at an average rate of two inches per annum between 1819 and 1873 and increased the depth of water available for ships entering the port by 9' 6" (or almost three metres).

Chart showing the progressive reduction of the bar in Dublin Port between 1819 and 1873, I.J. Mann, 1881



Date	Minimum depth on bar at low water	Interval years	Increase of minimum depth	Rate of increase of minimum depth per year	Depth on bar at standard high water
	ft. in.		ft. in.	in.	ft. in.
1819	6 6	—	—	—	19 6
1822	8 6	3	2 0	8·0	21 6
1828	9 6	6	1 0	2·0	22 6
1838	10 6	10	1 0	1·20	23 6
1855	13 0	18	2 6	1·66	26 0
1873	16 0	17	3 0	2·11	29 0

Total increase of minimum depth between 1819 and 1873,—9 ft. 6 inches.
Average rate of increase a little over two inches per annum.

Mann also remarked on the cost of the wall noting how cheap it was by comparison with many of the alternative schemes which had previously been proposed:

> *In the present instance, it can be safely affirmed that no modern method would have answered the purpose more effectively or with smaller cost than the method adopted. The building of the wall occupied nearly five years, being commenced in 1819 and completed as it now stands in 1824; the total cost was £103,055, or, on the average, rather more than £11. 10s. per foot forward.*

Finally, Mann provided a table showing the increase in the business of Dublin Port over the 70 years from 1805 to 1875 by reference to the average aggregate tonnage of ship arrivals. Whereas the 2.2% average annual increase may not, at first sight, seem large, the compounding impact of this rate of increase over 70 years resulted in a near fivefold increase in the business of the port.

Average annual tonnage entering the port in five-year periods.		Increments
	tons	
1801–5	346,225	
1806–10	357,947	11,722
1811–15	371,574	13,627
1816–20	340,017	31,557
1821–25	366,472	26,455
1826–30	472,189	105,717
1831–35	525,308	53,119
1836–40	552,379	27,071
1841–45	596,822	44,443
1846–50	765,329	168,507
1851–55	874,532	109,203
1856–60	950,715	76,183
1861–65	1,215,149	264,434
1866–70	1,447,502	232,353
1871–75	1,618,876	171,374

The long-term planning challenges which the Ballast Board and the Directors General of Inland Navigation grappled with from 1800 required them to consider a wide range of schemes, some very much more expensive than the scheme favoured by the port authority and ultimately constructed by them. The Directors General relied on the opinions of external experts among whom there were opposing opinions.

The judgement of the port authority at the time, the Ballast Board, seems to have carried insufficient weight. Although the approach suggested from those who were most familiar with Dublin Port ultimately proved to the optimum one, and even though one expert agreed with this approach, nothing happened to address the known problems in Dublin Port for 16 years.

During that time, ships continued to come to grief and lives were lost, notably on 19th November 1807 when two ships (*Prince of Wales* and *Rochdale*) were driven ashore at Blackrock and Seapoint in extreme weather and nearly 400 lives were lost. This tragedy was decisive in the decision to build Dun Laoghaire Harbour as a harbour of refuge.

There are parallels between what happened in Dublin Port in the early nineteenth century and the challenges faced by the port today.

Where Dublin Port Company is proceeding with the development of Dublin Port to its ultimate capacity by 2040 and is beginning to consider what additional port facilities might be constructed to meet growth in demand thereafter, others vocally favour the commencement of a project to entirely relocate the port away from Dublin Bay to some other location on the east coast.

In the early 1800s, those proposing alternative development options to that favoured by Dublin Port Company's predecessor, the Ballast Board, at least tried to estimate the costs of what they were proposing and this greatly facilitated the public consultation initiated by the Directors General of Inland Navigation. Although the consultation appears to have been indecisive, the best and most cost efficient solution was ultimately implemented.

Today, incredibly, it seems that cost is no obstacle to what would be the largest megaproject ever undertaken in the country and at a time when the national debt is soaring from €200 billion towards €230 billion as a result of the coronavirus pandemic.

There are lessons to be learned from history.

Dublin Port Company has prepared and will publish designs and costings for the enormous suggested project to move Dublin Port. Just as higher cost and unsuitable solutions were considered and discounted in the early 1800s before the correct solution was decided on and implemented, it is important now, 20 years before new port facilities might be needed in 2040, to look at alternative suggestions, however unrealistic they might be, and ensure that correct choices are made.

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 4

AN OVERVIEW OF THE CALLS TO MOVE DUBLIN PORT

28th September 2020

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 4

AN OVERVIEW OF THE CALLS TO MOVE DUBLIN PORT

28th September 2020

There has been no shortage of grandiose suggestions over the past fifty years as to how Dublin Port should be developed. Starting in the 1960s, the port authority (Dublin Port and Docks Board) put forward expansion plans which led to considerable public opposition[1]. This put a strain on the relationship between the Port and the City to the extent that subsequent ideas about greatly reducing the scale of port operations or moving the port entirely emerged over the 30 years from 1990.

These ideas included:

- ESB International's 1990 study *Port Infrastructure in Ireland – Requirements and Proposals*
- The Progressive Democrat's 2006 proposal *A New Heart for Dublin*
- Dublin City Council's 2007 *A Vision for Dublin Bay*
- The Irish Academy of Engineering's 2018 *Brexit: Implications for Transport Infrastructure Investment*

None of these four proposals considered the scale or feasibility of what they suggested in any level of detail and the idea of moving Dublin Port periodically reappears, presented as an inevitability, oblivious to the realities or consequences of what is proposed.

A Vision for Dublin in 2050, Dublin Chamber of Commerce, 2017

1 1965: https://www.rte.ie/archives/2020/0416/1130897-dublin-port-and-docks/
1972: https://www.rte.ie/archives/2017/0718/891167-dublin-bay-development/

For example, in 2017 the Dublin Chamber of Commerce produced a video[2] showing *A Vision for Dublin in 2050*. The video includes a flyover of the city of the future coming in along the Liffey and over an imagined landscape not altogether unlike a *Blade Runner* cityscape. The accompanying 48 page document contains not a single mention of how the port infrastructure required to meet the needs of the Dublin of the future would be provided.

It is ironic that the conditions where the realities of Dublin's port infrastructure requirements could be so blithely overlooked were created by Dublin Port and Docks Board itself and it is instructive to look at how this happened.

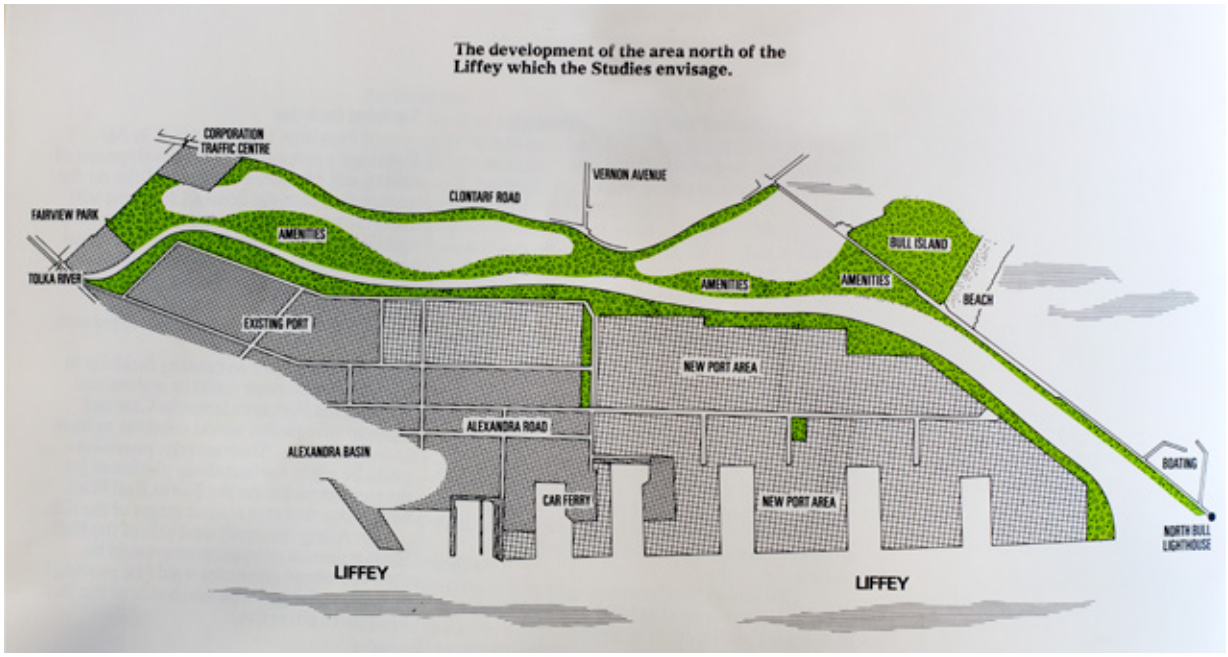
In the mid-1960s, Dublin Port and Docks Board suggested that the long-term development of Dublin Port might include an enormous infill of Dublin Bay. This infill would create 800 hectares of made ground for port activities and a further 400 hectares for housing. On the north side of the port, much of the Tolka Estuary would have been infilled. To the south, a new bend of bay would have been created by a huge infill from the Poolbeg Lighthouse all the way to Blackrock.

This vision was included as ... *the ultimate overall development which might take place catering for port industries, housing and amenities* in a 1972 publication by Dublin Port and Docks Board entitled *Studies in long term development of the Port of Dublin*. These studies were undertaken in conjunction with third parties, including planners from Rotterdam, a former Chief Traffic Advisor from the British Ministry of Transport, an Irish landscape architect and an ESRI economist.

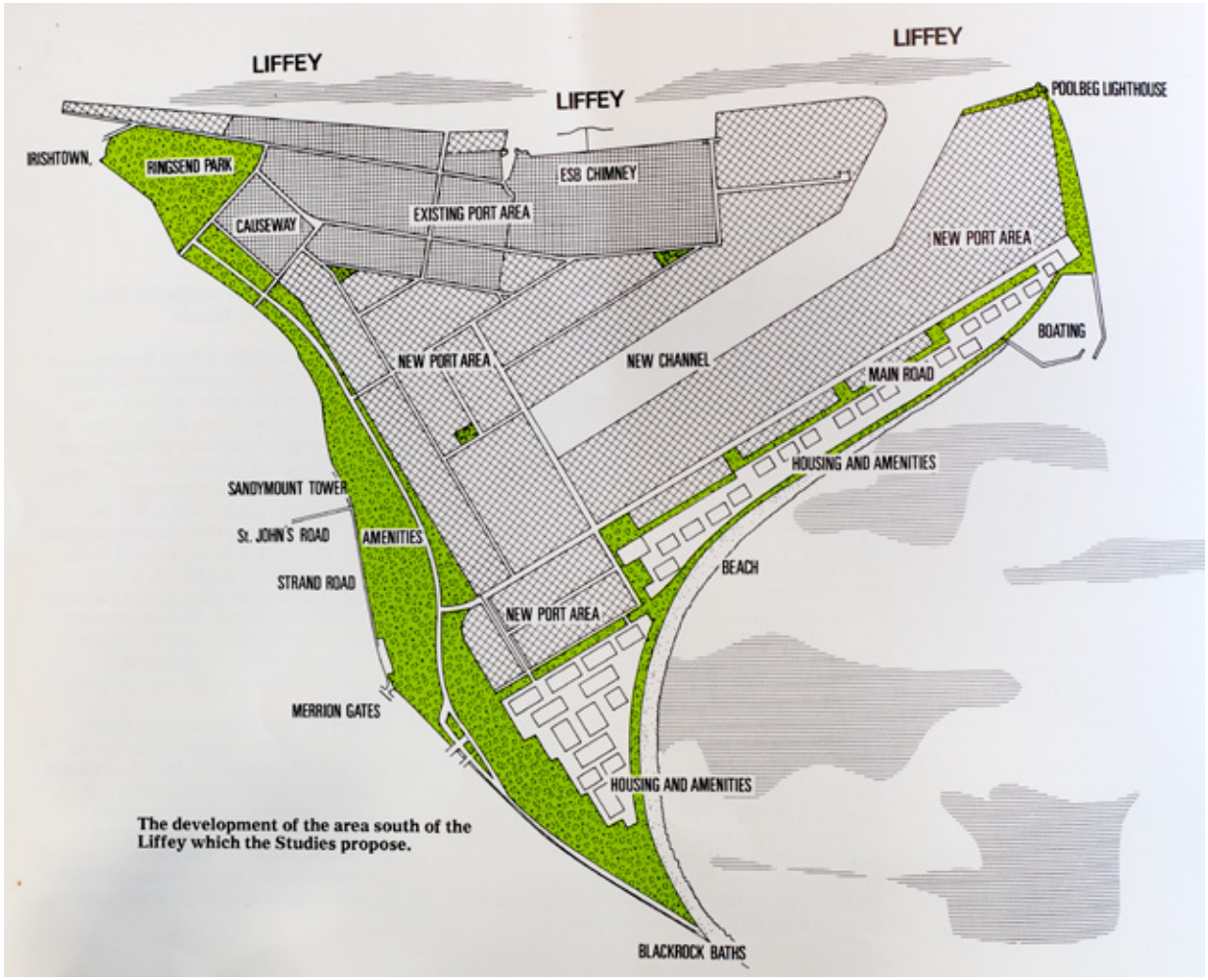
Given the opposition that already existed in 1972 to the idea of infilling Dublin Bay, the presentation of the port board's ideas was defensive right from the opening words of the Introduction to the study report:

> *It is unusual in a document such as this to refer in any great detail to the anticipated public reaction to the proposals which it contains.*
>
> *However, the situation is significantly different in that the public has been aware for some years of general proposals for long term developments at Dublin Port following the publication by Dublin Port and Docks Board in November 1965 of an outline sketch.*

Dublin Port and Docks Board vision for the ultimate development of Dublin Port north of the Liffey, 1972



2 https://youtu.be/8GrJQWqI85Q



Dublin Port and Docks Board vision for the ultimate development of Dublin Port south of the Liffey, 1972

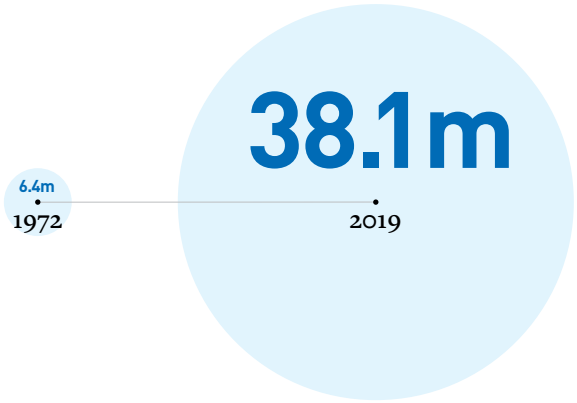
A few paragraphs later, the Introduction says:

> *There is, unfortunately a line of criticism which tends to claim that everything the Board proposes is wrong and that therefore everything in the long term development proposals may be wrong. It would be most unfortunate if in the process of a 'right or wrong the Board is wrong' approach, these critics lost sight of the fact that they are in a position to influence the final shape of long term developments by a thoughtful, probing examination of all the factors involved.*

The scale of the controversial vision was enormous by any standard. The total additional 1,200 hectares of made land suggested in 1972 compares to the creation of 1,000 hectares of made land in the Port of Rotterdam's Maasvlakte 2 development which was completed in 2012.

The volume of cargo passing through Dublin Port's 260 hectares has increased sixfold since 1972

Gross tonnes



To put these figures into perspective, Dublin Port's land area today is 260 hectares. In 1972, the port's throughput was 6.4 million gross tonnes. In 2019, it was 38.1 million gross tonnes. Over the intervening 47 years when the suggested quadrupling of the Port's land area would presumably have taken place, the cargo throughout on the same 260 hectares has increased sixfold.

In retrospect, it is clear that the thinking behind *Studies in long term development of the Port of Dublin* could not have foreseen the impact of containerisation or the transition away from coal to energy sources (such as gas and renewables) which did not require port facilities. Although the approach of the port board was the same approach that had so successfully developed Dublin Port over the previous 250 years, it was outdated. In the 1960s and 1970s, public scrutiny and environmental impact assessment of large infrastructural projects was becoming the norm.

The thinking in Dublin Port and Docks Board in 1972 was old thinking and the idea of hugely infilling Dublin Bay was, at that stage, already 56 years old.

In 1914, the Dublin Civics Institute organised a competition for a *Plan for Dublin* which attracted eight entries. The winning entry by Arthur Kelly, Patrick Abercrombie and Sidney A. Kelly was published in 1916.

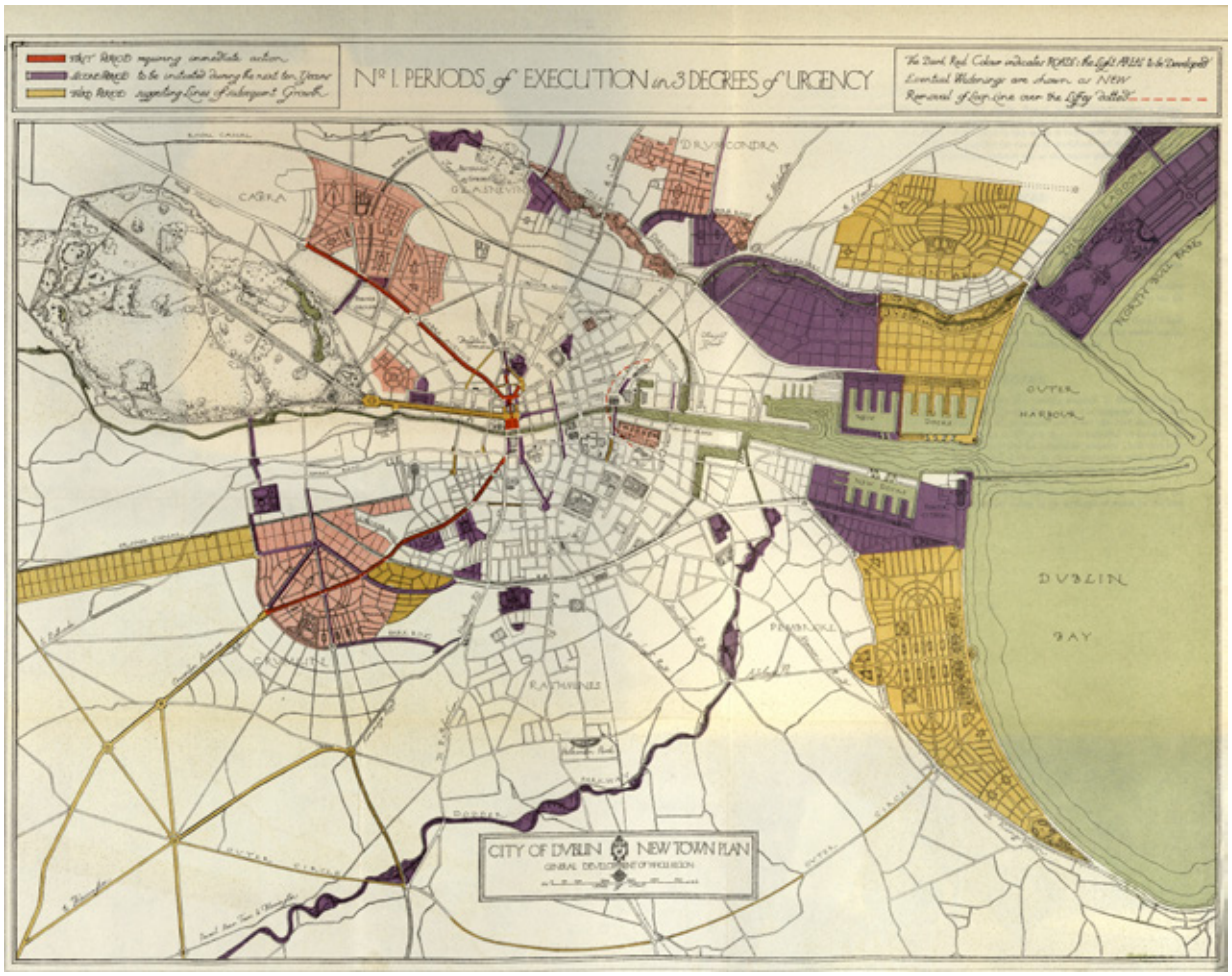
Abercrombie was an influential town planner in England and was one of the authors of London City Council's *County of London Plan* for the post-war reconstruction of London. Abercrombie's plans for London were very much in the vein of the garden city approach of Ebenezer Howard in the early decades of the twentieth century where industrial and residential areas would be separated rather than being mixed together in overcrowded towns and cities.

In the *New Town Plan* for Dublin, huge infill was envisaged both to the north of the port but, particularly, in the southern bay, almost as far as Dun Laoghaire, to provide 825 hectares for port and industrial activities and 400 hectares for housing. The 1,250 hectares in the *New Town Plan* of 1916 is almost the same as the 1,200 hectares suggested by Dublin Port and Docks Board in 1965. Whereas Abercrombie's suggestion to infill Dublin Bay to provide land for housing is still cited as an exemplar of what we should do today, less attention is given to the much larger provision the suggested infill made for port and industrial purposes.

Abercrombie's *New Town Plan* highlighted the need for planning legislation. This was eventually introduced in 1934 and, for its part, Dublin Corporation appointed a team of consultants (which included Abercrombie) to prepare plans for the layout and development of Dublin. The *Dublin Sketch Plan* of 1939 resulted and it again envisaged extensive infill into Dublin Bay.

Against this background, the infill suggested by Dublin Port and Docks Board in 1972 does not seem so misguided, however controversial it proved to be. Old ideas and orthodoxies have a tendency to prevail long past their sell by dates and sometimes old ideas reappear as solutions to contemporary challenges.

There was no shortage of plans and ideas in the early 1970s about how Dublin might be developed. This was the era of national economic planning inspired by T.K. Whittaker. The port board published its studies during the four year term of the *Third Economic Programme for Economic and Social Development* from 1969 to 1972 which set ambitious targets for industrial growth and for exports.



***New Town Plan* for Dublin suggested by Patrick Abercrombie, 1916**

In terms of spatial planning, there were new ideas about how Dublin City and Dublin Port should be developed. Most notably, Myles Wright, a planner from Liverpool, prepared a *Plan for the Dublin Region* in 1967 and, in this, he sought to limit expansion of the port by infill and called for a public inquiry into the future expansion of the port. At the same time, Wright suggested the development of four new towns to the west of Dublin with green belt separation following the garden city approach of Ebenezer Howard. Where Abercrombie had ignored greenfield lands to the west and suggested expanding the city into Dublin Bay in 1916, Myles Wright proposed the opposite in 1967.

In fairness to Dublin Port and Docks Board, the studies it published in 1972 sought, for the first time, to place port development projects into a coherent long-term framework:

> *Hitherto, Port development has taken place as it was required but without a concept of ultimate or overall development.*

Whereas the port board's plans ran into public opposition and influential planners opposed further infill, the idea of moving the port had not yet become current and, in the RIAI's 1975 publication, *Dublin – a city in crisis*, the architects even recognised that:

Having a port function one block away from the city's main street is a most unusual situation which lends a great deal of interest, with the colour and movement of shipping.

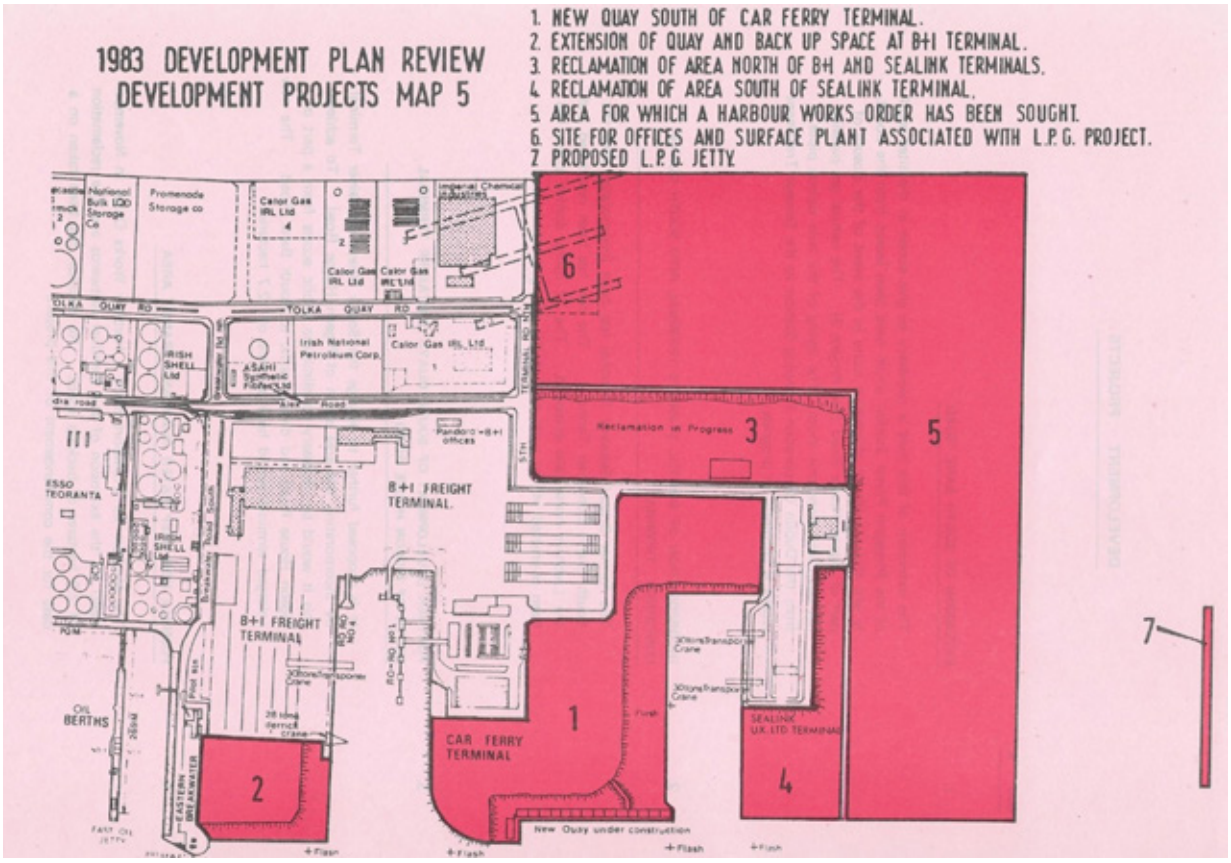
Having said this, the RIAI shared Wright's concern for Dublin Bay and, in one of its 19 recommendations, said:

The shoreline and the bay, part natural and part man-made, is a special and precious asset. It must be conserved and protected. First priorities here include the preservation and improvement of public access for recreation; the control of unsuitable, intrusive or incongruous development, particularly by industry; a total re-appraisal of the proposed coastal motorway; and the proper control and integration of port and harbour development with the city's traffic network and the overall planning and design of the bay as a whole.

Dublin Port and Docks Board's attempt to put long-term structure on the port's development plans was made at the same time as overarching plans for national economic development and for the spatial development of Dublin were being implemented. Given that the development options for Dublin Port were very much a continuation of past practice over decades, if not centuries, it is not surprising that the Dublin Port and Docks Board got it so badly wrong. Unfortunately, the port board compounded its own difficulties in the following years with at least three more controversial development proposals, none of which ever proceeded and all of which weakened the port's connection to the city it served.

Firstly, between 1972 and 1976, a developer applied for planning permission for an oil refinery on an 80 hectare infill extension to the Poolbeg Peninsula. The refinery was to have a similar capacity to Whitegate. The proposed development was very contentious and Dublin Port and Docks Board took what seems today to have been a jesuitically neutral stance on the issue. Permission for the development was ultimately refused by the Minister for Local Government.

Dublin Port and Docks Board Development Plan, 1983



Secondly, Dublin Port and Docks Board was more directly exposed to criticism for its support of a 1981 proposal to build underground gas caverns to store 100,000 tonnes of LPG. The project was included within the port's development plan for a number of years.

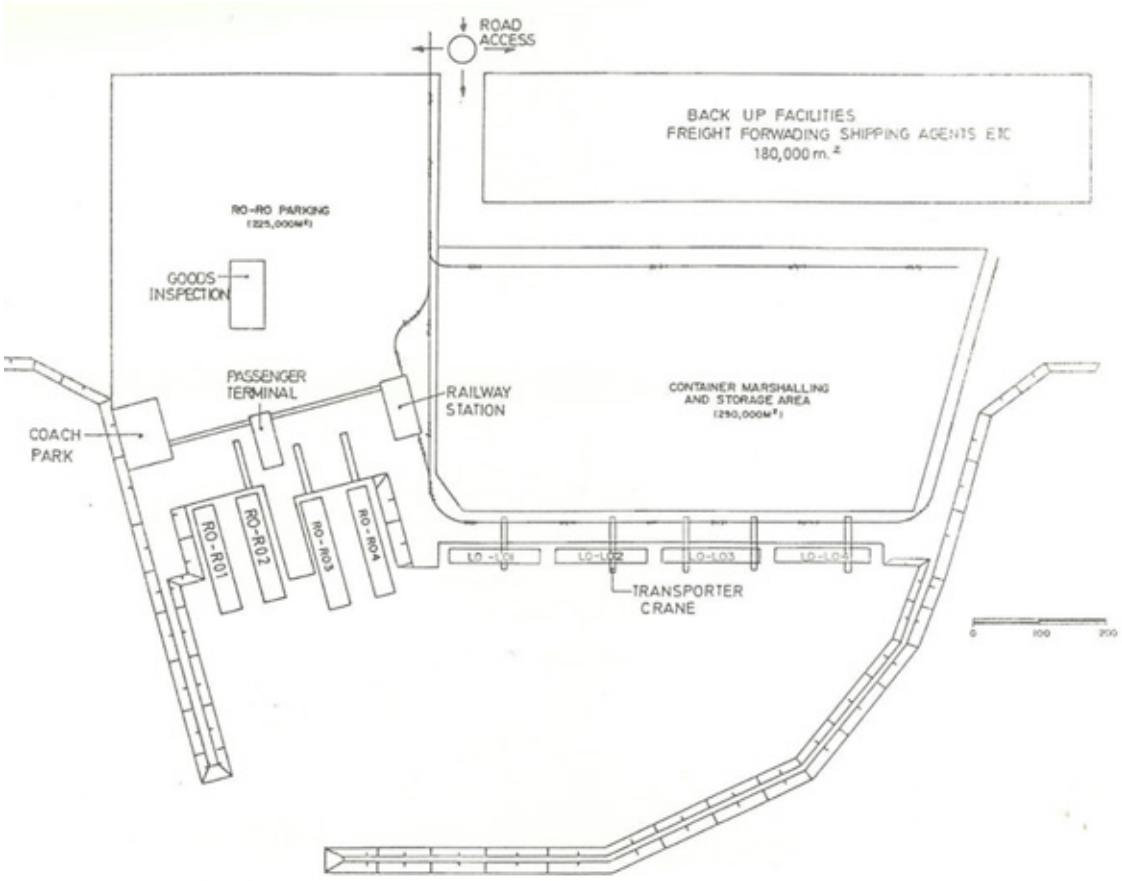
The proposed caverns are shown as Item 6 in the port development plan for 1983. They would have been partially beneath the existing Calor Gas facility in Dublin Port and partially beneath 38 hectares of new made ground which the port board proposed to create by infill (Item 5). The infill proposal was first made in 1979 when the port board applied for a Harbours Works Order. The caverns were to be filled by unloading tankers at a new jetty in a north-south orientation to the east of the port (Item 7). Dublin Corporation granted permission for the gas caverns development in 1982 but An Bord Pleanála overturned this on appeal in 1984.

The third failed and controversial development was a smaller version of the original 38 hectare infill proposal. This was the Dublin Gateway project and it proposed a 21 hectare infill to the east of the port with greater distance between it and Clontarf than the original 38 hectare proposal would have given. This smaller infill project was just as vigorously opposed and was ultimately refused planning permission by An Bord Pleanála in 2010.

At a time when the port board's development plans were so out of kilter with the development plans for the city and with public sentiment, the first proposal to move activities from Dublin Port to a new port to be built elsewhere on the east coast emerged in 1990 when ESB International published *Port Infrastructure in Ireland – Requirements and Proposals*.

In its report, ESBI concluded that *It was technically feasible to establish a single port capable of handling all present and projected needs for Ro-Ro and Lo-Lo shipping, on the Central Irish Sea Corridor, at a suitable North County Dublin location*. The location at which this new port could be built was limited to the section of coast between Malahide and Balbriggan, specifically at Loughshinney.

Layout of ESBI's suggested new port at Loughshinney, 1990



ESBI's new port would have been a harbour enclosed by approximately 2,000 metres of breakwaters. There would have been a container terminal (with a quay wall 650 metres long and 25 hectares of land) and a Ro-Ro ferry terminal (with four berths and 22.5 hectares of land).

Given the scale of ESBI's assertion that the new port at Loughshinney could have handled the *present and projected needs for Ro-Ro and Lo-Lo shipping*, the illustrative facility they proposed was unrealistically small. For example, the breakwaters would have been shorter than the piers in Dun Laoghaire Harbour (2,800 metres) and a small fraction of the size of Dublin Port's sea walls (7,500 metres). Moreover, the 650 metres of proposed quay wall for Lo-Lo operations compares to the almost 1,600 metres aggregate length of the quay walls in Dublin Port's three container terminals today. Finally, where ESBI's report suggested the need for four Ro-Ro berths at Loughshinney, there are eight Ro-Ro berths in Dublin Port today with more under construction.

The report suggested that the new port could have been constructed at a cost of €200m (at 1989 prices) and could have been completed within three to four years of approval, including planning approval.

The cost justification for proceeding with this proposed expenditure was that it was cheaper than the combined costs of Dublin Corporation's then proposed Port Relief Road - the Eastern Bypass by another name – of €317m and the cost of development proposals in Dublin Port and Dun Laoghaire Harbour of €50m.

Beyond cost, the report said that:

> *...the proposed new port would facilitate the redevelopment of complete areas of the city which are effectively derelict at present, due to the combination of port storage and port related traffic problems. In particular, it would facilitate mixed commercial, residential and light industrial development on the north and south docks area and the Liffey quays area, thus transforming the area.*

Quoting from Dublin Port and Docks Board's 1988 Development Plan (in which the port authority identified that development to provide capacity for growth to the turn of the century would require the continued eastward expansion of the port), ESBI, somewhat caustically, said:

> *But while Dublin Port and Docks Board recognise the problem, there is no indication that they appreciate the critical dimensions of the problem in an increasingly environmentally aware society.*

It is difficult to disagree with this assertion by ESBI. However, while saying this, ESBI did not itself show much awareness of the environmental and planning challenges a new port at Loughshinney would have had to overcome. At the time the ESBI report was published, Dublin Port and Docks Board's proposed eastern extension by infill had already been under consideration for 21 years and, yet, ESBI felt that it would be possible to complete construction of a new port at a greenfield site *within three to four years of approval, including planning approval*.

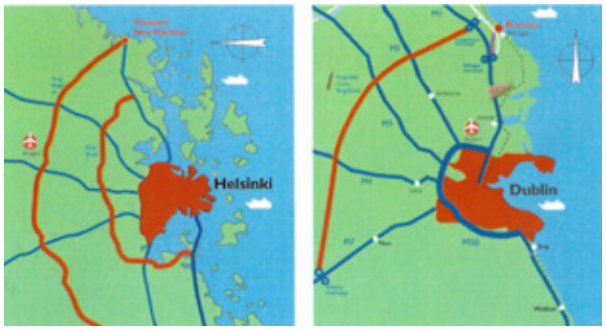
It is a common feature of all of the proposals to build alternative port facilities elsewhere on the east coast that the environmental and planning challenges which these megaprojects would have to overcome are ignored. Somehow, the constraints that apply to developments in Dublin Port wouldn't be as onerous for even larger developments elsewhere.

Sixteen years after ESBI published its study report, the Progressive Democrats produced an even more ambitious variant of the Loughshinney proposal in 2006. At the time, the PDs were a party of Government and their suggestion carried more weight than ESBI's had. Where ESBI had suggested moving Dublin Port's Ro-Ro and Lo-Lo business to Loughshinney, the PD's *A New Heart for Dublin* proposed moving Dublin Port to Bremore, near Balbriggan, and redeveloping the lands of Dublin Port to produce a Manhattenesque skyline not very different to that subsequently imagined in 2017 by Dublin Chamber of Commerce in its 2050 vision for the city.

Progressive Democrats' proposed development of Dublin Port, 2006

The need identified for moving *Dublin Port was that Dublin City is suffering from the modern malaise of the deterioration of its environment and of the quality of life of its one million plus citizens.* In addition, the port was restricted by the encroaching city and *citizens... are concerned with the ports eastward expansion plans into the 52 acres.*

In 2004, two years before the PD proposal, Drogheda Port Company had proposed to build a new port at Bremore, near Balbriggan. The PDs compared Bremore's location in relation to Dublin with that of Vuosaari in relation to Helsinki and concluded that what had been done in Helsinki by way of moving port activities away from the city should similarly be done in Dublin.



Progressive Democrats' comparison of Helsinki and Dublin, 2006

That the PD proposal cited Vuosaari as an exemplar for Dublin was not surprising as the Drogheda Port Company proposal for Bremore had itself cited Vuosaari and had similarly shown Bremore in relation to Dublin to make its point.

Drogheda Port Company's illustration of the proposed Bremore Port in relation to Dublin City, 2004

While the logic was superficially attractive, there were notable differences between the situations in Dublin and Helsinki. Most obviously, the PD's attractive imagery suggested that 34 hectares of tank farms in Dublin Port (through which almost one-third of the country's entire energy requirements are imported), three power stations (responsible for about one-fifth of all electricity generated on the island of Ireland) and the largest waste water treatment facility for County Dublin would all be relocated.

Drogheda Port Company's vision for the ultimate development of Bremore Port, 2004

However, Drogheda Port Company's plan for Bremore only envisaged the development of cargo handling facilities for Ro-Ro and Lo-Lo trade and made no mention of other cargo modes let alone of port-based critical national infrastructure.

Moreover, neither the PD proposal nor the earlier Drogheda Port Company proposal it was based on recognised that the challenge of a greenfield development at Bremore was not directly comparable to the brownfield development at the redundant shipyard at Vuosaari.

In addition to the planning and environmental challenges of building a new port, there was the issue of cost and the PD proposal provided no estimate on the level of cost to build the new replacement port at Bremore. However, the proposal did memorably state that *At up to €50m per acre, Dublin Port's land bank of 660 acres could release between €25 billion and €30 billion at 2005 prices*.

The lower estimate suggested an average value of land in Dublin Port of €38m per acre. By comparison, the ill-fated Irish Glass Bottle lands sold for €17m an acre in 2006. Even then, at the height of the property bubble, €17m an acre was an extraordinarily high price for development land not only by Dublin standards but by world standards. And yet, this price was less than half of what it was asserted port lands could be sold for if port activities were moved to Bremore.

The current value of the IGB lands is not much more than about €4m per acre, a small fraction of the suggested value of €38m 14 years ago.

Drogheda Port Company's proposed new port at Bremore was to be developed in three phases to ultimately create a harbour enclosed by two breakwaters with an aggregate length of 3,800 metres. The total land area of the new port was 200 hectares including 90 hectares of land made by infill. As in the case of ESBI's Loughshinney proposal,

there would be four Ro-Ro berths. However, Bremore was envisaged to have up to 3,800 metres of quay walls for Lo-Lo container handling.

The PD proposal was entirely unrealistic in many respects. At the most fundamental level, Bremore Port, as proposed, would have had nowhere near sufficient capacity to cater for Dublin Port's cargo volume and a far bigger port would have had to be built. Drogheda Port Company's plan at Bremore was to build a port with an estimated capacity of *20 million tonnes plus*.

It is now 16 years since Bremore was first suggested and it is nowhere nearer being built today than it was in 2004. In the intervening 16 years, the increase alone in Dublin Port's throughput has been 15 million gross tonnes equivalent to nearly three quarters of the ultimate capacity proposed by Drogheda Port Company at Bremore.

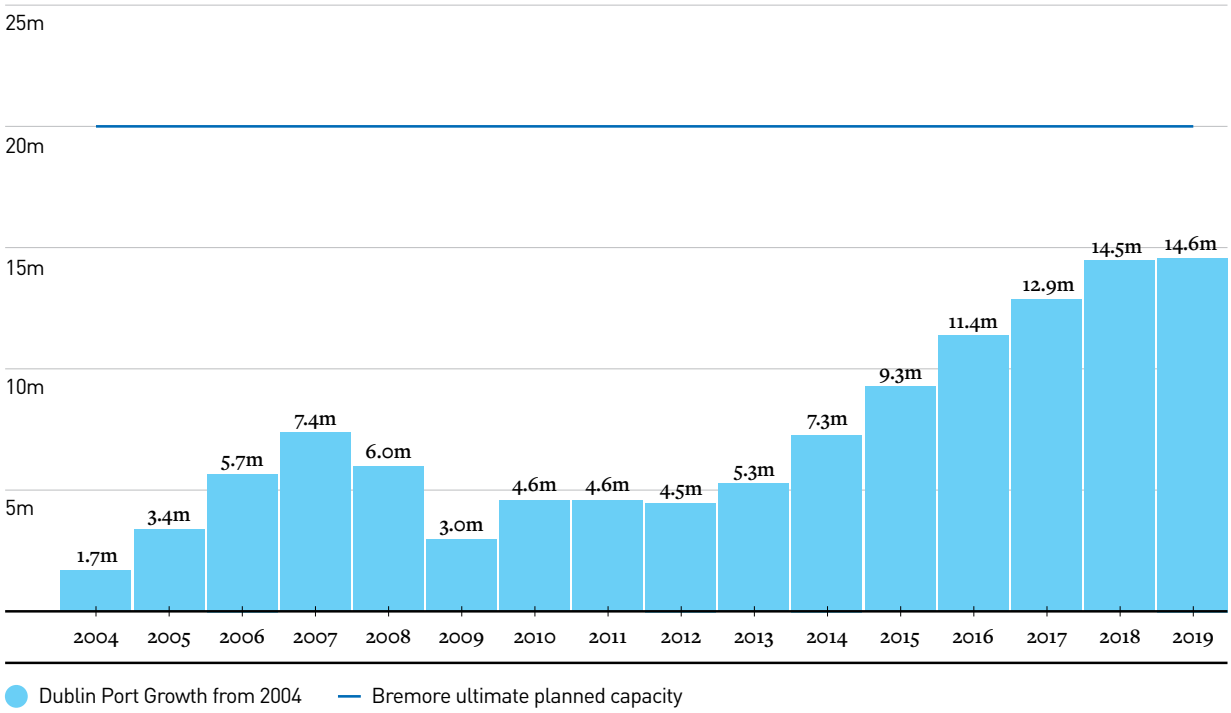
As in the case of Loughshinney, the shortcomings and perceived problems with Dublin Port in its current location did not give rise to an alternative approach which could have gone anywhere near addressing these shortcomings and problems. Where ESBI had at least attempted to put a cost estimate on their proposal, the PDs simply asserted that the value of Dublin Port's lands was so extravagantly large that selling them for redevelopment would yield vast sums greatly in excess of what would be needed to build a new alternative port, however much that might cost.

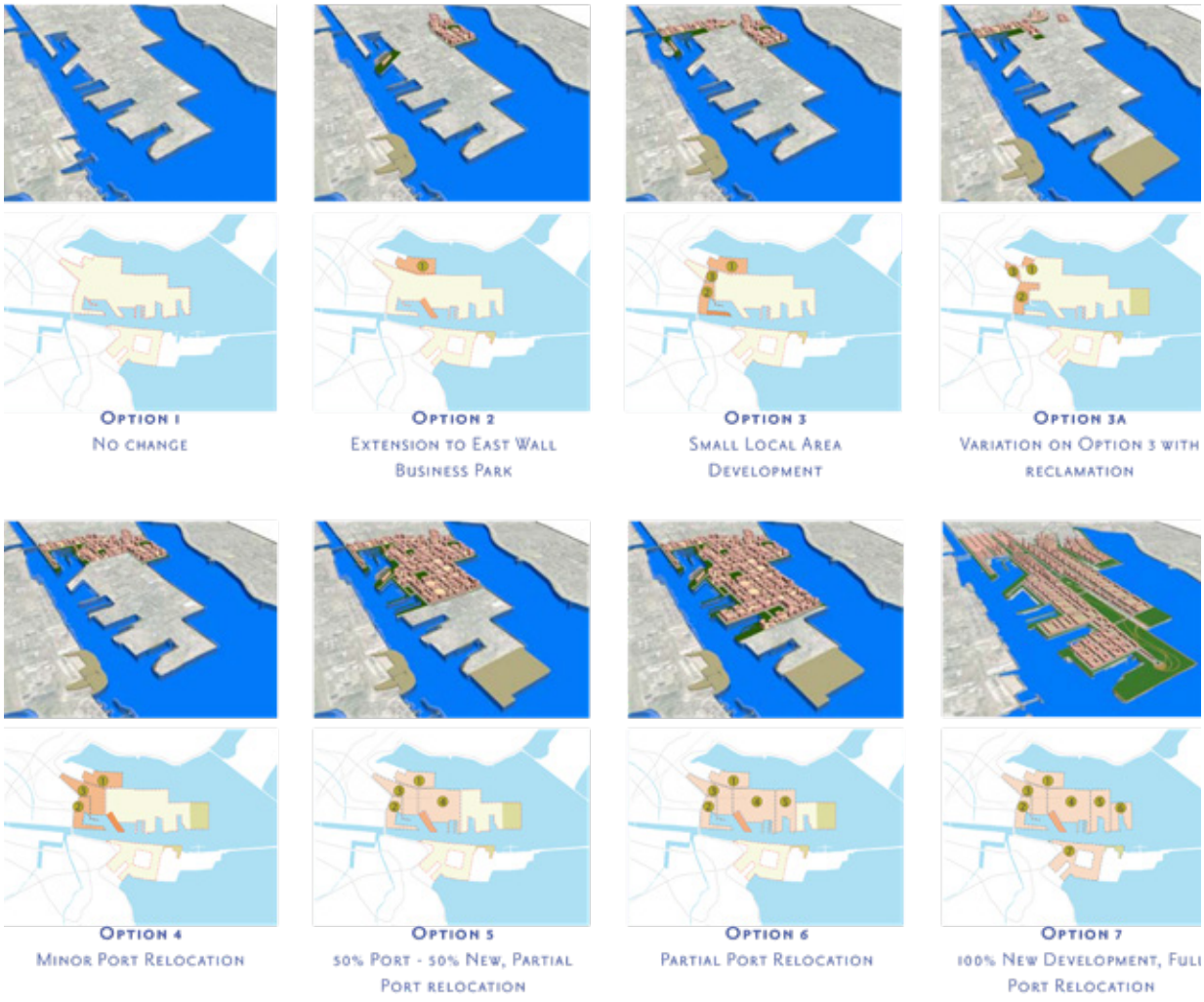
Notwithstanding how challenging the development of a new port at Bremore would have been for Drogheda Port Company, the project was facilitated at a policy level by ministerial approval for Drogheda Port Company to enter into a joint venture agreement. In addition, the port company's statutory limits were extended to include Bremore. This was an important consideration in terms of providing powers of compulsory purchase to the port company for its project, were it ever to get off the ground.

Whereas the PD proposal was to relocate Dublin Port to Bremore, the possible development at Bremore was, intended, in policy terms, to provide additional port capacity and, in the words of the Minister at that time,

Cumulative increase in Dublin Port's throughput since 2004

Gross tonnes





Options for Dublin Port considered in Dublin City Council's *A Vision for Dublin Bay*, 2007

> *... to promote competition while relieving congestion at Dublin Port. This proposal is being advanced as a standalone project and is not dependent on, or linked to, any relocation of capacity from Dublin Port.*

A joint venture development company was formed between Drogheda Port Company and a subsidiary of Treasury Holdings. However, to this day nothing of any substance has happened to progress with the Bremore project – for a host of very obvious reasons.

The idea of moving Dublin Port was given added currency during the boom period when, in 2007, Dublin City Council published *A Vision for Dublin Bay*. This report was the outcome of a study undertaken as part of the city council's earlier ten year strategy (2002 to 2012) *Dublin – A City of Possibilities*. By comparison with the earlier ESBI and PD suggestions, DCC's approach was not didactic and was designed to prompt discussion. It recognised the need for further analysis and detailed planning.

The 2002 strategy had stated that

> *Imagination is what is required if we want to be forward thinking and are to truly create new and exciting possibilities.*

Dublin City Council's *A Vision for Dublin Bay*, 2007

Dublin Port Company's illustration of the scale of Dublin Port if relocated to Bremore, 2007

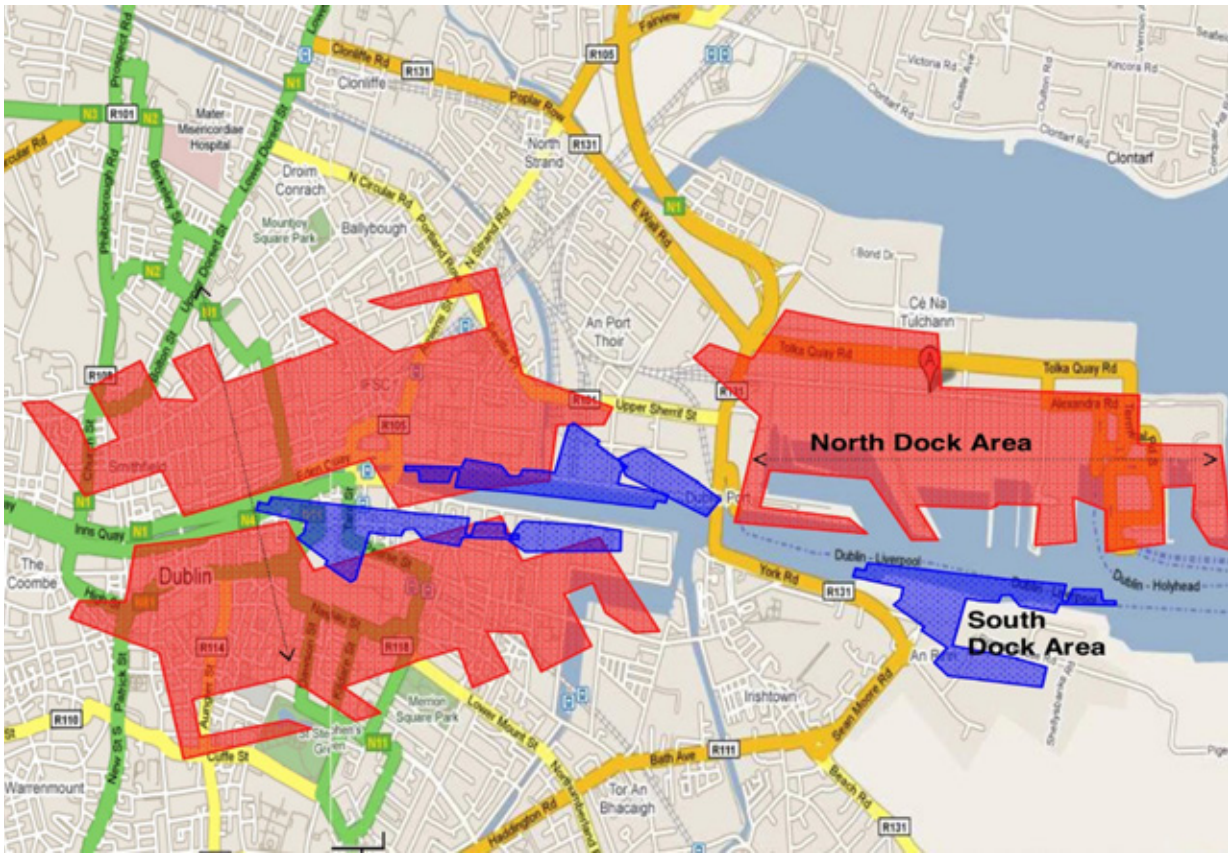


Illustration of the scale of the challenge to redevelop the lands of Dublin Port, Indecon Study, 2009

In this spirit, the 2007 report described itself in the following terms:

> *It is, simply, a blueprint for Dublin Bay, a first step towards a detailed master plan to protect its heritage, to enhance its vitality, and to assure its sustainable use.*
>
> *It is a reflection of dialogue with many stakeholders representing an array of public and private interests. It is the result of multidisciplinary analyses of possible "alternative futures".*

A Vision for Dublin Bay considered eight options based on removing different levels of cargo handling from Dublin Port to an unspecified alternative location. The study made no reference of Loughshinney, Bremore or any other location. Nor did it look at the cost, environmental constraints or planning challenges that might be required to realise any of the eight options.

Because it focussed on identifying the most attractive alternative future without considering how this might be achieved, it is unsurprising that the study favoured the full port relocation option and the visual representation of this option was certainly eye-catching.

For its part, Dublin Port Company had highlighted the huge challenge needed to realise the preferred option in *A Vision for Dublin Bay*, namely the construction of an alternative port on a similar scale to Dublin Port, and illustrated this by superimposing an outline of Dublin Port onto Bremore Head and contrasting this with the footprint of Balbriggan.

There were both differences and similarities between DCC's vision for Dublin Port and the PD's proposal. Where the PDs had shown the entire Poolbeg Peninsula being redeveloped, *A Vision for Dublin Bay* recognised the need to retain critical infrastructure on the Poolbeg Peninsula. On the other hand both DCC and the PDs envisaged the retention of cruise ship activities in Dublin Port. In DCC's case, a vestigial port facility would be retained for cruise ships with the balance of 260 hectares of port lands being redeveloped to provide 28,000 housing units, 1.2 million square metres of office space and 0.3 million square metres of retail space.

The DCC study did not stand alone and it was part of a wider consideration of national development plans at the time. In particular, the *National Development Plan (2007-2013)* identified the need:

> *...to undertake a comprehensive study of the role of Dublin Port, taking account of locational considerations, in the context of overall ports policy on the island of Ireland, wider transport policy, urban development policy, the National Spatial Strategy and national economic policy. This review will take account of the findings of the study on the role of Dublin Bay and the Dublin Port Area commissioned by Dublin City Council.*

In July 2009, the *Dublin Port National Development Plan Study Report* was published. It had been prepared for the Department of Transport by Indecon in association with MDS, Jones Lang LaSalle and Adams Hendry Consultants.

In the terms of reference, the consultants were asked to examine the costs and benefits of various scenarios relating to Dublin Port, including:

- Relocating all or part of Dublin Port's existing activities to an alternative location(s);
- Existing port activities continuing to expand with demand; and
- Port activities continuing at current levels with growth being catered for at alternative locations.

The suggestion of moving Dublin Port to Bremore was at the core of the study's considerations and is reflected in the study report's conclusion:

> *The key findings of this study indicate that additional port capacity will be required in Ireland and it is likely that this would require the expansion of Dublin Port or the proposed development of Bremore or an equivalent alternative. Given the uncertainty concerning both these projects, nothing should be done at a policy level to block these projects at this stage, as there is a significant cost for Ireland if neither of these projects develop. Our analysis also indicates that the closure of Dublin Port is not justified on economic grounds as the benefits of alternative land use is less than envisaged and that these and other benefits would not justify the costs involved.*

In its report, the consultants gave a useful visual representation of the scale of the challenge to redevelop the vacated lands of Dublin Port by superimposing outlines of the land areas of Dublin Port on the north side and on the south side of the Liffey onto a plan of the city. This was done to support the study's statement that:

> *To fully develop these lands at an urban scale through many upward and downward property cycles, would in our view be a project of centuries. This is based on our assessment of the annual incremental demand in Dublin for residential and commercial property and our view of how long it would take for the market to absorb different parcels of land based on these factors.*

The Indecon study was decisive and clear in its conclusions. While not ruling out the development of new additional port facilities at Bremore, the study firmly identified that there was no economic rationale to consider moving Dublin Port to another location.

From Dublin Port Company's perspective, this seemed to be an entirely logical conclusion in line with the port company's understanding of and appreciation for the huge challenges and enormous expense to build a replacement port.

However, where there was some possibility that the State might undertake just such a challenge, there was no shortage of support from sectors that would benefit from it. This is particularly well illustrated by a breathless opinion piece written by an executive in one of Dublin's leading property agencies and published in the Irish Times in March 2008 as the country was sliding into a deep recession.

Opinion piece by a property agency executive, Irish Times, 21st March 2008

The 650 acres of prime development land that makes up Dublin Port is significantly undervalued in its current use and the Government can no longer ignore its potential.

DUBLIN PORT IS undoubtedly one of Ireland's most valuable pieces of real estate, involving approximately 263 hectares (650 acres) of prime development land that is significantly undervalued in its current use. The potential of the port cannot be overstated and can no longer be ignored.

It is anticipated that Dublin Port will have reached operational capacity by 2008. This leaves the Government with mainly two possible options: reclamation of some 21 hectares (52 acres) amounting to 0.04 per cent of Dublin Bay; or relocate the port.

Reclaiming the land may give rise to a number of damaging issues, such as increasing the risk of flooding in city centre areas and ecological threats. Furthermore, this option can only be seen as a short term solution to a long term problem.

Should the Government choose to relocate the port, they would be freeing up one of its high net value assets. Relocating the port and releasing up to 650 acres of city centre lands may enable rezoning to mixed uses. Under the Dublin City Development Plan 2005-2011 the majority of the port lands are zoned "Objective Z7", providing for mainly industrial use.
On appraising the potential relocation of the port, you would have to take into account the significant potential that Bremore Port has to offer. Located just north of Balbriggan, Bremore is a deep water port with room for expansion as it has an existing land bank of up to 1,000 acres.

Castle Market Holdings, a subsidiary of Treasury Holdings, was successfully selected by Drogheda Port as partners for a joint venture that will see Bremore transformed into a modern state-of-the-art deepwater facility. Drogheda Port will control a 51 per cent stake in the development while Castle Market Holdings will hold the remaining 49 per cent.

Bremore appears to tick all the boxes as a suitable relocation for facilities at Dublin Port with the process of preparing a port masterplan for Bremore already underway with Bremore expected to be fully operational by 2012.

In September 2007, Dublin City Council carried out a study - Dublin Bay - An Integrated Economic Cultural and Social Vision for Sustainable Development - which is seen as the initial step in preparing a strategic framework plan for the Dublin Bay area, including Dublin Port.

The study identifies seven options for Dublin Port which can be narrowed down to four and sorted into three realistic scenarios.

The first scenario is to re-develop about 51 hectares (126 acres) of the port lands, to accommodate at least 12,000 residents.

The second is to re-develop about 50 per cent of port lands, to accommodate about 32,000 residents. The final option is to re-develop and relocate the entire port to create accommodation for about 55,000 people.

Opting to relocate the port would undoubtedly be met with stiff opposition as about 10,000 people work in and around the port, and relocating the port would require significant capital expenditure on the upgrade of infrastructure in the new location. Further difficulties may also be faced in securing planning permission in the chosen location.

Having said that, relocating port facilities would allow for strategic and proactive planning, to enable the successful development of modern purpose-built facilities to cater for future needs.

Also, the direct effects that accompany construction work is somewhat lower when choosing to relocate rather than upgrade existing facilities.

Upgrading existing facilities would have considerable impact on the day-to-day lives of locals and workers in the area, with a problem of increased traffic.

Under the National Development Plan 2007-2013, around €481 million of investment in transport is to be allocated for ports facilities.

In Budget 2008, the Minister for Finance Brian Cowen announced significant expenditure in the upgrade of transport facilities.

A budget of €3,837 million was allocated with a number of key improvements which are to be delivered in 2008 and over subsequent years. However, investment in ports did not figure on the list which could lead to the conclusion that Dublin Port is not high on the Government's list of transport priorities.

The relocation of a significant port facility is not unheard of. In Finland they have opted to relocate the north and west harbours of the Port of Helsinki to Vuasaari Harbour.

Vuasaari is north-east of Helsinki's port. Initial construction works began in 2003 with the new port due to start operating at the end of 2008. In order to facilitate the successful and efficient operation of the new harbour there has been significant capital expenditure to improve the infrastructure in the area surrounding Vuasaari, include the construction of a new motorway and the upgrade of rail services.

"While the Dublin Port Authority may choose to disregard this potential, the Government can no longer overlook the high value alternative use that Dublin Port can offer

Closer to home, there are plans to relocate trading activities from Cork's City Quays to alternative facilities in the Ringaskiddy area of Cork Harbour.

The relocation of the facilities will allow for the significant re-development of Cork's docklands.

Through a joint venture between the Cork Port Company and Howard Holdings, an application was lodged to Cork City Council for a €1 billion development of Cork's docklands to include two hotels, office accommodation and residential units and a landmark building.

A new metro system is also planned to service the area and Cork City Council is seeking tax incentives from the Government for designated areas within the docklands.

Preparations for the development of Ringaskiddy appear to be taking shape as in November 2007 the Port of Cork Company lodged a planning application for the development of a new container terminal at Oyster Bank in Ringaskiddy

In light of the recent media coverage surrounding the purchase of shares in ICG, the Dublin Port Authority has come strongly to the fore playing down the development potential and value of the 33-acre ICG site. The ICG site and port lands have undoubtedly got development potential and, while the Dublin Port Authority may choose to disregard this potential, the Government can no longer overlook the high value alternative use that Dublin Port can offer.

Surely it's a contradiction to underutilise such a strategically placed asset when strong emphasis is placed on energy efficiency and sustainability.

The common characteristic of all of the suggestions that Dublin Port should be moved is that cost is no obstacle and this viewpoint is still evident today. The statement that Dublin Port's lands are significantly undervalued is repeatedly made without reference to the huge cost of replicating these port lands elsewhere. The reality is that building port infrastructure is phenomenally expensive and comparatively small port projects can be far more costly to deliver than headline grabbing property developments.

In more recent times, the challenge of Brexit has spawned a new line of argument about Dublin Port and, in 2018, the Irish Academy of Engineering (IAE) published *Brexit: Implications for Transport Infrastructure Investment*. In this study, the IAE said that Ireland needs to plan for a hard Brexit. The engineers identified that Ireland has an excessive dependence on Dublin Port (which handles 85% of the country's unitised trade) by making a comparison with UK ports (where none has a share of more than 20%). The IAE said that this dependence on Dublin Port increases traffic congestion on the M50, adds to unbalanced regional development and raises significant issues as to supply security. The proposed solution to these perceived problems was to divert 500,000 unitised freight movements to South Coast ports by 2020 or soon thereafter. This diversion would be supported by unspecified levels of capital investment which might attract EU or EIB funding.

There is a shared lack of specifics in the proposals of ESBI in 1990, the PDs in 2006 and the IAE in 2018. This is best seen, in the case of the IAE, in one of its conclusions:

> *The required re-routing of traffic could potentially be achieved at capital investment levels less than previously envisaged, provided alternative solutions are adopted for the provision of a motorway route connecting Galway-Limerick-Cork.*

The idea that 500,000 unitised freight movements (one-third of Dublin Port's unitised volume in 2019) could be diverted to South Coast ports within two years is redolent of ESBI's naïve optimism in 1990 that a new port could be built at Loughshinney *within three to four years of approval, including planning approval*. All of the ferry companies and virtually all of the container lines which provide services in and out of Dublin Port also provide services in and out of other Irish ports. This includes South Coast ports such as Rosslare and Waterford where there is, today, spare capacity available. Quite how 500,000 units might be diverted from Dublin Port to such ports within two years is, to put it mildly, unclear.

When the IAE says that Dublin Port's 85% share of unitised volumes is excessive by comparison to port market shares in the UK, it overlooks basic realities of geography. For example, if 500,000 unit loads could be diverted to south coast ports, they would still find their way to the M50 and to the Dublin region because that is where the demand for goods is concentrated. All that a diversion of 500,000 unit loads to ports between 170 kilometres and 260 kilometres from Dublin would accomplish is to increase national HGV tonne-kilometres and, by extension, national HGV carbon emissions by about 10%.

As a by-product of its suggestion that 500,000 unit loads be diverted from Dublin Port to South Coast ports, the IAE also said that 20 hectares of land could be made available for residential and commercial development on the Poolbeg Peninsula.

Just as the challenges of Brexit motivated the IAE's thinking that there should be a wholesale diversion of trade from Dublin Port, so also Dublin's housing challenges have prompted calls for Dublin Port's lands to be redeveloped for housing. In some cases, the movement of Dublin Port is, again, seen as an inevitability.

Where the RIAI in 1975 had extolled the attraction of a working port so close to the city centre, its president in 2018[3] said:

> *At some stage, the Port of Dublin will have to move. The relocation of the port is a golden opportunity to create a modern high density city within the city. If this is to occur, it is of great importance to start the relocation process now if relocation is to be completed by 2050. This is also a golden opportunity for the [Land Development Agency] to start making a real difference at scale. If we choose not to use the port for the sustainable growth of Dublin, we need a really viable alternative – where will this be?*

The rhetorical question as to where the sustainable growth of Dublin will be accommodated is posed. The interrogative question as to where the port will be relocated is ignored.

3 RIAI conference, 5th October 2018

In subsequent media coverage[4], Patrick Abercrombie's *New Town Plan* of 1916 was referenced:

> *However, while elements of Dublin of the Future, the New Town Plan, by Patrick Abercrombie did go ahead, such as the development of Cabra and Crumlin, the Sandymount Strand and Tolka Estuary projects were abandoned in favour of the westward expansion of the city, Mr Browne said:*
>
> *"The approach of successive Irish governments to the Abercrombie plan was to cherry pick bits of it. The attitude was, 'We have loads of land so let's just keep going,' and look at what we've ended up with."*

Irish Times graphic, August 2019

Abercrombie's plan had envisaged 825 hectares of the bay being infilled for port and industrial purposes and a further 400 hectares for housing. In extolling Abercrombie's vision to provide housing in Dublin Bay as an earlier visionary solution to today's housing problems, the unhelpful problems of where to put Dublin's port facilities (which Abercrombie had addressed) were conveniently overlooked.

Where the RIAI suggested the relocation of Dublin Port as a long-term objective, others have suggested it as a short-term solution to Dublin's housing problems.

Of all of the challenges to provide much-needed additional housing in Dublin, a lack of land is not one of them. The Poolbeg Peninsula SDZ planning scheme envisages development at a density of up to 238 units per hectare to provide homes for 8,000 people. Since the time of Myles Wright, Dublin has sprawled westwards with housing densities in some outer suburbs of 27 units per hectare. If the whole land area of County Dublin could be developed at the density planned for the Poolbeg Peninsula SDZ, the county could house fifty million people. Even at the sprawl levels of the outer suburbs, County Dublin could accommodate almost six million people. The challenges of building new houses in Dublin are manifold and include, but are not limited to, land use planning and transportation. The idea that moving Dublin Port is necessary or essential to meeting Dublin's housing needs is simplistic and ignores three basic points.

Firstly, could a new port for Dublin get the planning and other consents necessary to construct it on a greenfield site on the east coast?

Secondly, the cost of the megaproject to build a new port would fall on the exchequer – it is incapable of being financed as a private sector project. Ireland started 2020 with a national debt of €200 billion and will finish the year with national debt approaching €230 billion. How conceivable is it that Government could commit to an unnecessary multi-billion euro megaproject any time soon?

Finally, even if it were accepted that Dublin Port should be moved to make way for housing and if the major challenges of planning and finance could be overcome, no new houses on former port lands would be available for at least 20 years. Would it not make more sense to spend the billions of euro that would be needed to have a new port available in 20 years time on new houses which could be available much sooner?

The same planning, environmental and financing challenges that would apply to the megaproject to build a new port for Dublin and to redevelop the vacated port lands for houses apply to Dublin Port Company's plans to develop Dublin Port to its ultimate capacity by 2040 in accordance with Masterplan 2040. In the latter case, these challenges are being overcome; in the former they are not even mentioned.

4 Irish Times 6th August, 2019

It has been suggested[5] that the attitude of Dublin Port Company (its management and Board) is an obstacle to moving Dublin Port. This is not the case - we simply believe that it is not a good idea.

Our approach is to maximise the utilisation of the port facilities in Dublin Port between now and 2040. While we do this, we will plan for the development of new but additional (as opposed to replacement) port facilities on the east coast to be available by 2040. Over the next 20 years, we hope that a combination of factors will obviate the need to construct even these additional port facilities. These factors include the decoupling of port volume growth from economic growth, the provision of additional port capacity in other east coast ports and the generation of demand to use these other ports as a result of more balanced regional development in the country.

Over the past 30 years, there have been many calls to relocate Dublin Port and none has addressed the basic issues of the viability and cost of the megaproject to build alternative port facilities. The absence of focus on these underlying issues has allowed the attractive options that would emerge, once the existing port had been moved, to become the focus of attention.

Dublin Port Company has carried out initial detailed studies to design, cost and identify the planning and environmental challenges of the megaproject to build a replacement port for Dublin. We refer to this megaproject as DP2.0. The DP2.0 studies are intended to fill the information and fact vacuum which has allowed so many unfeasible ideas about moving Dublin Port to persist for 30 years.

In addition, we have completed similar studies for the alternative smaller project to build additional port facilities. We refer to this smaller megaproject as DP1.5.

The most fundamental challenge for both DP1.5 and DP2.0 is to decide what volume of throughput the proposed new port should be designed for. It is clear that neither ESBI's Loughshinney nor the PD's Bremore would have been anywhere near big enough to cater for the demand that emerged not long after they might have been built. Sizing the port to be built requires projections of port volumes long into the future.

Unfortunately, projecting future port volumes with any level of accuracy is not easy. This was notably demonstrated in the *Dublin Transport Initiative* report of 1995. This report projected that Dublin Port's volumes would reach 10.7 million gross tonnes by 2011. However, volumes through the port had already reached 21.0 million gross tonnes by 2000, just five years after the report was published.

This difficulty in 1995 of projecting future port volumes with any degree of accuracy was not new and, in 1972, *Studies in long term development of the Port of Dublin* recognised the same reality:

> *The fact is that the growth that has taken place in recent years has exceeded any forecast which might have been made even 10 years ago. This emphasises the timing difficulties with which we are faced in planning the orderly development of the Port area.*

The very same problem remains today except now, if anything, future uncertainties are even greater as we try to reconcile our views on future long-term economic growth with the impacts of energy transition and digital technologies. It seems inevitable that port volume growth will plateau and, as a result, the need to build additional port infrastructure will diminish. However, we cannot predict when and to what extent this will happen.

The best megaproject is the one that can be avoided and we in Dublin Port Company hope that the need to build new additional greenfield port facilities does not arise. However, we have to ready ourselves to build them should they be needed and this requires us to look at what the level of demand for port infrastructure might be many years from now. Projecting port volumes long into the future presents us with a formidable conundrum.

"The best megaproject is the one that can be avoided and we in Dublin Port Company hope that the need to build new additional greenfield port facilities does not arise.

5 Senator Michael McDowell: *"We need a broad-ranging debate on whether former Senator Morrissey's visionary plan for Dublin is the way forward or whether vested interests in the form of the Dublin Port Company and its desire to remain located at its current position should win out."* Seanad debates, 19th June 2019.

Ronan Lyons: *"There are lots of options, not least Dublin Port, which is over 600 acres of prime land that could house as many as 60,000 of the homes needed. ...it would come with a fight, as Dublin Port has long resisted any attempts to move again."* Sunday Independent, 10th June 2018.

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 5

THE CONUNDRUM OF PLANNING FOR LONG-TERM GROWTH

28th September 2020

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 5

THE CONUNDRUM OF PLANNING FOR LONG-TERM GROWTH

28th September 2020

If a new port is to be built on the east coast of Ireland, there needs to be a good reason to do it.

Some argue that a new port should be built in order to allow the lands of the existing Dublin Port to be redeveloped for other purposes, notably for housing.

Dublin Port Company does not accept this argument and believes that a new port should only be built if there is a demonstrable demand for port infrastructure that cannot otherwise be met.

Whether a larger or a smaller new port might be built by 2040, one of the key things to be determined is its size in relation to the demand for port infrastructure many years from now. Given the length of time it will take to build a new port and given its operating lifetime of many decades, if not centuries, it is necessary to form a view of demand very far into the future to at least 2080 and possibly as far out as 2100.

This very long time horizon is required because a decision needs to be taken in the coming years on the size of breakwaters required to enclose the new harbour. Breakwaters such as those in Dublin Port, Dun Laoghaire Harbour, Howth Harbour and Rosslare Harbour last for centuries.

Dublin Port Company's approach to date in dealing with the unavoidable uncertainties of projecting future volumes in Dublin Port has been to make what appears to be a reasonable assumption for the foreseeable growth to 2040 (now only 20 years away) based on what has happened over past decades.

In doing this, we have looked at average annual growth rates over periods of 30 years since 1950 and, in each year, we considered the average volume over the previous five years in the same way Isaac John Mann did when, in 1881, he analysed the impact of the completion of the North Bull Wall on Dublin Port's volumes over the 70 years to 1875.

The basic assumption in Masterplan 2040 is that growth rates similar to those seen over the 60 years from 1950 to 2010 will continue for 30 more years to 2040. Where the average annual growth rate from 1950 to 1980 was 3.2% and from 1980 to 2010 was 4.7%, Masterplan 2040 is premised on a growth rate of 3.3% to 2040.

1950	2.9m	
1980	7.3m	3.2%
2010	28.9m	4.7%
2040	77.7	3.3%

If this growth rate of 3.3% materialises, then the overall growth rate over the 90 years from 1950 to 2040 will have been 3.7%.

We are now one third of the way into the 30 year period from 2010 to 2040 and, by end 2019, the average annual growth rate over the nine years since 2010 has been 2.5%. Given that these nine years included the five years of recession after 2008, this is a high rate of growth. At an average annual rate of growth of 2.5%, volumes would double in 28 years; at 3.3%, a doubling would take just 21 years.

The country has now rapidly fallen into recession in a matter of months, and without knowing how long the recovery period might be, the 3.3% growth rate may turn out to be on the high side. However, as a figure for planning the capacity required 20 years from now, it is undoubtedly better to plan on the high side and to be ready to construct projects as and when they are required even if this turns out to be later than assumed at the outset.

Whereas the 3.3% growth rate seems to be a reasonable figure for planning purposes over the remaining 20 years to 2040, it is entirely implausible that compounding growth at such a high level can continue indefinitely.

For example, if the level of growth we have seen in the 69 years from 1950 to 2019 continued for another 69 years to 2088, then Dublin Port would need to have the capacity to handle 456m tonnes. This is almost equal to the 469m tonnes handled by Europe's largest port, Rotterdam, in 2019.

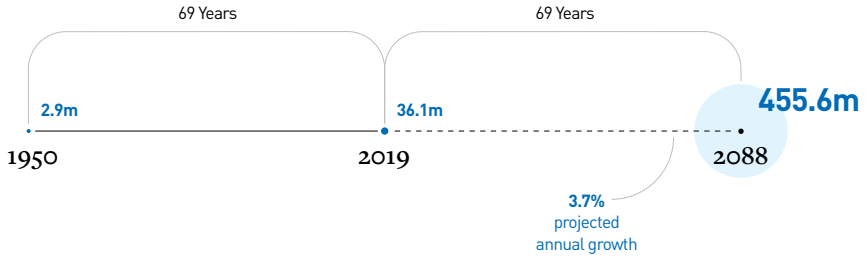
Even more implausibly, if the projected growth over the 90 years to 2040 continued for another 90 years beyond that out to 2130, then volumes would rise to 2,076m tonnes, more than four times Rotterdam's 2019 volumes.

Considering growth rates over very long periods is an academic exercise until decisions have to be made on the scale of port projects to be built. There comes a point in any large infrastructure project where the decision has to be made to build it, or not.

Dublin Port Company believes that the longer we can put off the decision to build a new port, the better. The implausibility of the continuation of historically high levels of growth long into the future suggests that there will come a time when there will be a decoupling of growth in port volumes from economic growth. At this point, port volumes will plateau or grow only very slowly over time.

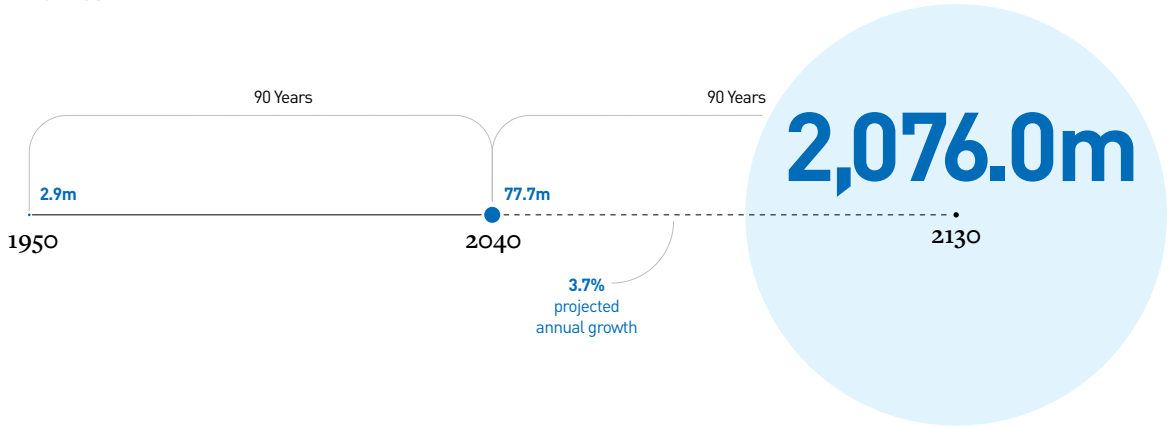
If historic growth from 1950 to 2019 were to continue for the next 69 years ...

Growth tonnes



If the Masterplan projections over the 90 years from 1950 were to continue for another 90 years into the future

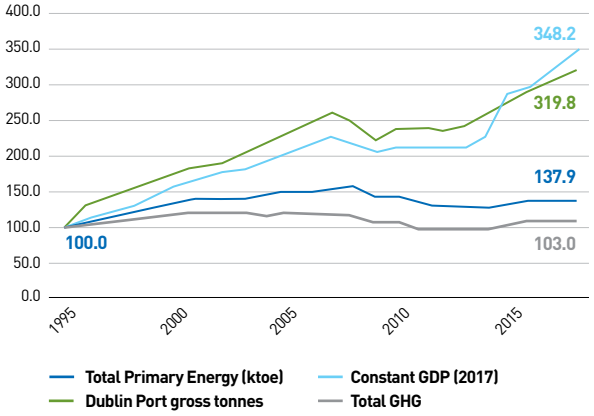
Growth tonnes



Where in decades past, there was an inexorable link between growth in energy consumption and economic growth, this link has very considerably weakened in recent years. For example, the size of the economy as measured by real GDP (however unreliable GDP has become as a measure in recent years) increased by 248% between 1995 and 2018, while energy consumption increased by only 38%. Over the same period greenhouse gas emissions were almost flat, increasing by just 3% in 23 years.

In stark contrast to energy and greenhouse gases, the volume of cargo through Dublin Port grew by 220% between 1995 and 2018 equivalent to an average annual growth rate of 3.5%.

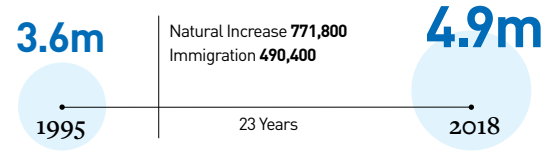
Comparison of trends in Dublin Port with selected national trends, 1995 to 2018



There is a plausible argument that cargo volume growth will slow down because future economic growth will be driven far more by trade in services than by trade in goods. However, we have had a high value and low volume pharma sector, a burgeoning ICT sector and a large aviation leasing sector for many years already, all contributing significantly to economic growth, and yet cargo volumes through Dublin Port have continued to grow at a high rate. This is because Ireland produces little of what it consumes and domestic demand drives large volumes of imports. Domestic demand is itself driven by population and Ireland's population has increased substantially in recent decades.

For example, over the 23 years from 1995 to 2018, the population of the country grew by 35% from 3.6m in 1995 to 4.9m in 2018. This growth came both from natural increase (61%) and net immigration (39%).

Population growth in Ireland (1995 to 2018)



With population growth projected to continue to at least 2040, it is entirely possible that the level of volume growth projected in Masterplan 2040 may yet materialise, notwithstanding the 2008 and 2020 recessions.

This points to the conundrum at the core of planning long lead time projects to deliver port infrastructure. How can you reliably forecast demand levels far into the future to allow you to determine the scale of what is to be built? It is all too easy to get it wrong.

This conundrum is faced not only by Dublin Port Company but also by those who propose that a new port should be built in order to make Dublin Port's 260 hectares of land available for redevelopment.

Dublin Port Company's approach to long-term planning is to be prepared to build the infrastructure required for projected future volumes but only to commit to major construction projects closer to the time of need when there is less uncertainty about the level of future demand. The longer major projects can be deferred, the better.

If a new port is to be built by 2040, what size should it be?

We have termed the suggested replacement port DP2.0 and have estimated its required scale as follows.

The throughput projected in 2040, which Masterplan 2040 seeks to provide capacity for, is 77m gross tonnes. This target capacity is driven by the assumed annual average growth rate of 3.3% over 30 years.

Based on the belief that volume cannot grow indefinitely at such a rate, we have assumed that the unitised modes of Ro-Ro and Lo-Lo continue to increase at the lower rate of 1.5% per annum for the 40 years from 2040 to 2080 and that non-unitised modes plateau with zero growth from 2040 to 2080. This would suggest that DP2.0 should have a capacity to handle 134m gross tonnes.

Long term projections by cargo mode: 2040, 2080 and 2100

	2010 '000 gross tonnes	Growth rate 30 years	2040 '000 gross tonnes	Growth rate 40 years	2080 '000 gross tonnes	Growth rate 20 years	2100 '000 gross tonnes
Ro-Ro	16,403	4.1%	54,287	1.5%	98,478	0.75%	114,351
Lo-Lo	6,317	3.0%	15,270	1.5%	27,700	0.75%	32,165
Bulk liquid	4,009	0.0%	4,000	0.0%	4,000	0.0%	4,000
Bulk solid	2,054	0.0%	3,500	0.0%	3,500	0.0%	3,500
Break bulk	96	0.1%	100	0.0%	100	0.0%	100
Total	**28,879**	**3.3%**	**77,157**	**1.4%**	**133,778**	**0.71%**	**154,116**

We have designed a port with this capacity at each of two locations – Arklow and Bremore – and have estimated the construction costs at 2020 prices. The costs are eye watering.

Because we believe that there is no case to undertake a megaproject such as DP2.0, we have also looked at the possibility of building a smaller port at these same locations. This smaller port is referred to as DP1.5.

DP1.5 has been sized with a lesser capacity of 60m gross tonnes based on the following logic:

- Total demand by 2080 will be 134m gross tonnes.
- 77m gross tonnes will continue to be handled at Dublin Port leaving 57m gross tonnes to be handled elsewhere.
- 40m gross tonnes would be handled at DP1.5 with the additional 17m gross tonnes being handled at other east coast ports such as Greenore, Rosslare and Waterford[1].
- DP1.5 would be designed with capacity sufficient to accommodate additional annual growth from 2080 to 2100 of 0.75% in the unitised modes.
- By 2100, total demand would be 154m gross tonnes with 77m continuing to be handled at Dublin Port, 17m being handled at other east coast ports and 60m gross tonnes at DP1.5.

DP2.0 or DP1.5 would take 20 years to build and planning for either option needs to start in 2020 if a new port is to be available in 2040.

Although less than half the size of DP2.0, the project to build DP1.5 would still be a megaproject and its costs, although lower, would also be eye wateringly large.

Whichever port project is considered, there is enormous uncertainty underpinning the projection of what capacity might be needed in 20 years time to handle volume growth for many decades after that. In particular, it seems inevitable that the decoupling of growth in port volumes from economic growth must occur at some point. However, it is impossible to predict when this might happen.

Dublin Port Company's preferred approach is to plan for the construction of the much smaller DP1.5 (with an annual throughput capacity of 60m gross tonnes) and hope that, in the intervening years, before construction would have to commence, a combination of factors would obviate (or at least defer) the need to build the new port. These factors include:

- Completion of all of the development options for Dublin Port envisaged in Masterplan 2040
- The decoupling of growth in port volumes from economic growth
- Provision of additional capacity at other east coast ports (such as Greenore, Rosslare and Waterford)
- The generation of demand to use other ports (such as Cork and Shannon Foynes) as a result of more balanced regional development in the country.

From the perspective of proper planning and sustainable development, Dublin Port Company believes that the best future outcome is that DP1.5 ends up not having to be built at all and that future volumes of cargo can be handled at a combination of Dublin Port and other existing east coast ports for many decades past 2040.

However, such is the conundrum of planning for long-term growth, it is prudent to plan to build DP1.5. Or, put differently, it would be negligent not to plan for this possible eventuality.

1 17m gross tonnes is equivalent to 700,000 Ro-Ro units or 1.75m TEU of Lo-Lo. To put these figures into context, the 2018 throughput of Rosslare Harbour was 128,414 Ro-Ro units and the throughput of the Port of Waterford was 43,943 TEU.

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 6

WHAT WOULD MOVING DUBLIN PORT INVOLVE?

12th October 2020

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 6

WHAT WOULD MOVING DUBLIN PORT INVOLVE?

12th October 2020

It has been suggested that Dublin Port should be moved so that 260 hectares of port lands could be redeveloped, primarily to provide much needed housing. An obvious question, though surprisingly seldom asked, is how much would it cost to free up the lands of the port for development?

Before the 260 hectares of Dublin Port lands could be developed, a new port would have to be built on the east coast to accommodate the cargo and passenger traffic that currently pass through Dublin Port. There is no alternative option:

- All of the other ports in the range from Greenore to Waterford are far too small individually or in aggregate to handle Dublin Port's throughput – in 2019, their total throughput was just over one quarter that of Dublin Port.
- The Port of Cork is a small port in a large harbour and is both too small and too far away from Dublin Port's hinterland – in 2019 its throughput was one third of Dublin's.
- Ports on the west coast, such as Shannon Foynes, could not serve as replacement ports for Dublin Port primarily because of their geographical location far away, in nautical terms, from Ireland's markets.

We have termed the new port that would need to be built DP2.0.

This paper seeks to answer the question as to how much it would cost to free up the lands of Dublin Port including, but not limited to, the cost of constructing DP2.0. In doing this, important environmental issues have been identified and project timelines for both the permitting phase and for the construction phase have been estimated.

More often than not, a simple question which seeks a simple answer requires a complex response and so it is with the question of how much it would cost to free up the 260 hectares of Dublin Port land for development.

However, if a simple answer is demanded, then the best estimate which we in Dublin Port Company (DPC) can give is that it would cost, at 2020 prices, €8.3 billion. In addition, we believe that it would take not less than 20 years from today to achieve this objective. However, we also believe that it would be extraordinarily difficult to secure planning permission because of environmental impacts. Furthermore, it would take at least ten years just to resolve this planning challenge.

The cost estimate of €8.3 billion comprises the cost of constructing the new port, replicating port buildings and equipment and a variety of land costs, including the remediation of port lands to make them ready for development.

The estimates we have made (which include contingencies on top of costs derived from detailed bills of quantities) are first estimates and are the subject of many qualifications and much explanation.

For example, the cost of €8.3 billion is stated at 2020 prices. If construction cost inflation ran at 2% per annum over the next 20 years, and if all of the expenditure took place between 2031 and 2040, then the actual cost could be €11.2 billion.

It is a universal feature of megaprojects that the best early days cost estimates are undermined by a range of factors and the passage of time is but one of these factors. This happens because megaprojects are inextricably laden with risks at all stages. There are project scope risks – will the envisaged project provide too much or too little capacity for future demand?

There are consenting risks – can the project get all of the necessary planning and environmental consents to allow it to be constructed? There are design risks – can the detailed design capture all of the cost elements so that when the project goes to tender a contract emerges which can deliver the project at an agreed price?

These are the *known unknowns* of all megaprojects and they are a recurring feature of megaprojects everywhere which incur large cost overruns[1].

The inability to provide firm and reliable estimates for the cost of megaprojects long before a decision to proceed with the project might be made is not due to incompetence or laziness. It is a simple reality which has to be accepted because of the nature of megaprojects.

It is far more likely than not that the cost estimates in this paper are on the low side.

Examples of cost overruns on megaprojects

Project	Cost overrun (%)
Boston's artery/tunnel project	196
Humber bridge, UK	175
Boston–Washington–New York rail, USA	130
Great Belt rail tunnel, Denmark	110
A6 Motorway Chapel-en-le-Frith/Whaley bypass, UK	100
Shinkansen Joetsu rail line, Japan	100
Washington metro, USA	85
Channel tunnel, UK, France	80
Karlsruhe-Brcttcn light rail, Germany	80
Øresund access links, Denmark	70
Mexico City metro line	60
Paris–Auber–Nanterre rail line	60
Tyne and Wear metro, UK	55
Great Belt link, Denmark	54
Øresund coast-to-coast link	26

1 Table taken from *Megaprojects and Risk*, Bent Flyvberg, Nils Bruzelius and Werner Rothengatter, 2003. The overruns are based on constant prices and do not, therefore, include the impact of construction cost inflation. The baseline cost against which the overruns are calculated is the cost estimate at the date the final decision to proceed with the project was made.

The cost estimates which this paper presents underpin the opinion of those of us in DPC who believe that the idea of moving Dublin Port makes no sense. The estimates have been prepared by staff of and consultants to DPC who have succeeded in getting planning consents for major port projects from An Bord Pleanála in 2015[2] and again in 2020[3] and who have constructed major works within Dublin Port of a similar nature to the works that would be required to construct DP2.0.

We accept that there are those who believe that the benefits of moving Dublin Port are worth the trouble and expense.

Similarly, in 1800, when experts of the day were asked for their opinions on solving the problems of Dublin Port at that time, solutions far more costly than ultimately proved necessary were proposed by eminent people. One of these was Thomas Hyde Page, a military engineer. In 1800, he suggested a series of works in Dublin Bay to solve the problems of Dublin Port at a cost, he estimated, of £1,784,885. Another expert, John Rennie, proposed works to a cost of £1,802,763.

The solution to the problems of Dublin Port was ultimately provided by the Ballast Board (the port authority of the time) at a far lower cost of £103,055 when the North Bull Wall was constructed between 1819 and 1824. The solutions proposed by Page and Rennie were seventeen times the cost of the solution delivered by the Ballast Board.

In our opinion, it is very likely that it would not be possible to secure the necessary planning and other consents to build a new port to which all of the cargo handling activities in Dublin Port could be moved. Given this, the question of cost is moot. Notwithstanding this, we have provided a detailed basis for our estimated costs to facilitate an initial cost benefit analysis (CBA) by anyone who thinks it worth doing even after having considered the planning hurdles and the likely magnitude of the costs.

And just as project costs have associated risks, so also any estimates of the benefits which the megaproject to make the lands of Dublin Port available for development have their own associated risks.

The analysis in this paper is confined to the cost side and we leave it to others to provide financial estimates for the benefit side of the CBA equation.

The starting point for our analysis of costs is the determination of the size of DP2.0 in terms of its throughput capacity.

Masterplan 2040 envisages Dublin Port being developed in its present location to provide capacity for up to 77 million gross tonnes by 2040. This is based on an average annual growth rate of 3.3% per annum over the 30 years from 2010. It is possible that this growth might not be achieved but historical trends suggest it could be. Moreover, we know that the long term historical trends we have seen in past decades cannot continue indefinitely and that port volume growth must slow down or even plateau at some point. It is even possible that a new trend of long term port volume reduction could emerge. The future is, inevitably, very uncertain.

Against this uncertain background, we have estimated what the capacity **DP2.0 Phase 1** would have to be as follows.

It seems reasonable to plan that the new port that would be available in 2040 to facilitate a relocation of existing cargo handling activities from Dublin Port would have to have a capacity at least equal to the level Masterplan 2040 seeks to provide by 2040.

If the rate of growth assumed in the Masterplan from 2010 to 2040 turns out to be less than 3.3% per annum, then the new port would have surplus capacity for some years after 2040. This would not necessarily be a bad thing; on the other hand, too little capacity would be a bad outcome.

DP2.0 would have a very long lifetime after 2040 and there is likely to continue to be some level of growth once the new port would open for business in 2040. DP2.0 must, therefore, be constructed in such a way as to be capable of being expanded as and when required.

	2010 '000 gross tonnes	**Growth rate** 30 years	**2040** '000 gross tonnes	**Growth rate** 40 years	**2080** '000 gross tonnes
Ro-Ro	16,403	4.1%	54,287	1.5%	98,478
Lo-Lo	6,317	3.0%	15,270	1.5%	27,700
Bulk liquid	4,009	0.0%	4,000	0.0%	4,000
Bulk solid	2,054	1.8%	3,500	0.0%	3,500
Break bulk	96	0.1%	100	0.0%	100
Total	**28,879**	**3.3%**	**77,157**	**1.4%**	**133,778**

2 ABR Project, PL29N.PA0034, grant dated 8th July 2015
3 MP2 Project, PL29N.304888, grant dated 11th July 2020

To cater for this eventuality, we have assumed that the unitised modes of Ro-Ro and Lo-Lo continue to increase at a rate of 1.5% per annum for the 40 years from 2040 to 2080 and we have designed DP2.0 to be capable of being expanded to an ultimate capacity of 134 million gross tonnes. The additional port capacity required to cater for growth from 77 million gross tonnes to 134 million gross tonnes is **DP2.0 Phase 2**.

Thinking about what volumes might be as long into the future as 2080 is necessary in order to determine the size of the breakwaters that should be built in Phase 1 – they need to be long enough to allow additional port capacity to be built in future years as and when required. The approach we have taken here is similar to the approach in other European ports including Rotterdam, Barcelona, Copenhagen and Bilbao.

Having determined the capacity of the new port, the next challenge is to decide where it might be constructed.

RPS Group has completed a *High Level Environmental Appraisal* on DPC's behalf for the DP2.0 project and, within this appraisal, RPS concluded that the two most suitable (or perhaps, more accurately, least unsuitable) locations are Arklow and Bremore. The *High Level Environmental Appraisal* was informed by *Hydraulic Model Studies* also carried out by RPS.

RPS has previously completed a number of environmental studies for DPC - most notably the environmental impact assessment reports and the studies of the impacts on Natura 2000 sites - included in the two successful applications for planning permissions to An Bord Pleanála. Given that DPC paid for the RPS study, the RPS study might be considered not to be independent. However, it has been prepared by experts with a proven track record whose analysis and judgement has been accepted in environmental impact assessments and appropriate assessments completed by An Bord Pleanála on two occasions.

The main challenge in selecting sites for DP2.0 is the need to avoid sites which are protected by EU environmental law. These sites are termed Natura 2000 sites and are of two types: Special Areas of Conservation (SACs) and Special Protection Areas for birds (SPAs).

EU environmental protection laws are sometimes cited by frustrated developers as being excessively burdensome. One developer, who suggested that the Tolka Estuary should be infilled at a cost of €200 million in a period of just 18 months so that houses for 65,000 people could be built, commented that *You have bird populations but there will have to be a compromise found at some time between birds and people*[4].

The reality is that there are strong legal protections for the environment and any large infrastructure project has to have regard to these. In DPC's case, we not only have regard to these legal protections of the environment, we welcome them. If the protections in law were to be diminished or removed to facilitate development, it would require a change in EU law. There is no prospect of this happening. As recently as 2016, the European Commission completed a fitness check on the EU Birds and Habitats Directives and concluded that *...within the framework of broader EU biodiversity policy, they remain highly relevant and are fit for purpose*[5].

Whereas there are SACs and SPAs all along the east coast, including some at sea, and whereas the selected sites at Arklow and Bremore avoid these to the greatest extent possible, a port project at either location would have to be assessed by An Bord Pleanála for its specific impact on nearby Natura 2000 sites in a process known as *Appropriate Assessment*. It is clear from our analysis that there would be such impacts because the huge footprint of DP2.0 at either Arklow or Bremore would alter coastal processes in such a way as to cause a loss to or degradation of protected habitats in Natura 2000 sites.

The extent of the projected impacts is such that an application for planning permission for DP2.0 at either Arklow or Bremore would almost certainly have to invoke a provision of EU environmental law known as IROPI.

IROPI is an abbreviation for Imperative Reasons of Over-riding Public Interest and the concept behind it is that where a proposed project would have negative impacts on a Natura 2000 site, it can only be granted planning permission if two conditions are satisfied.

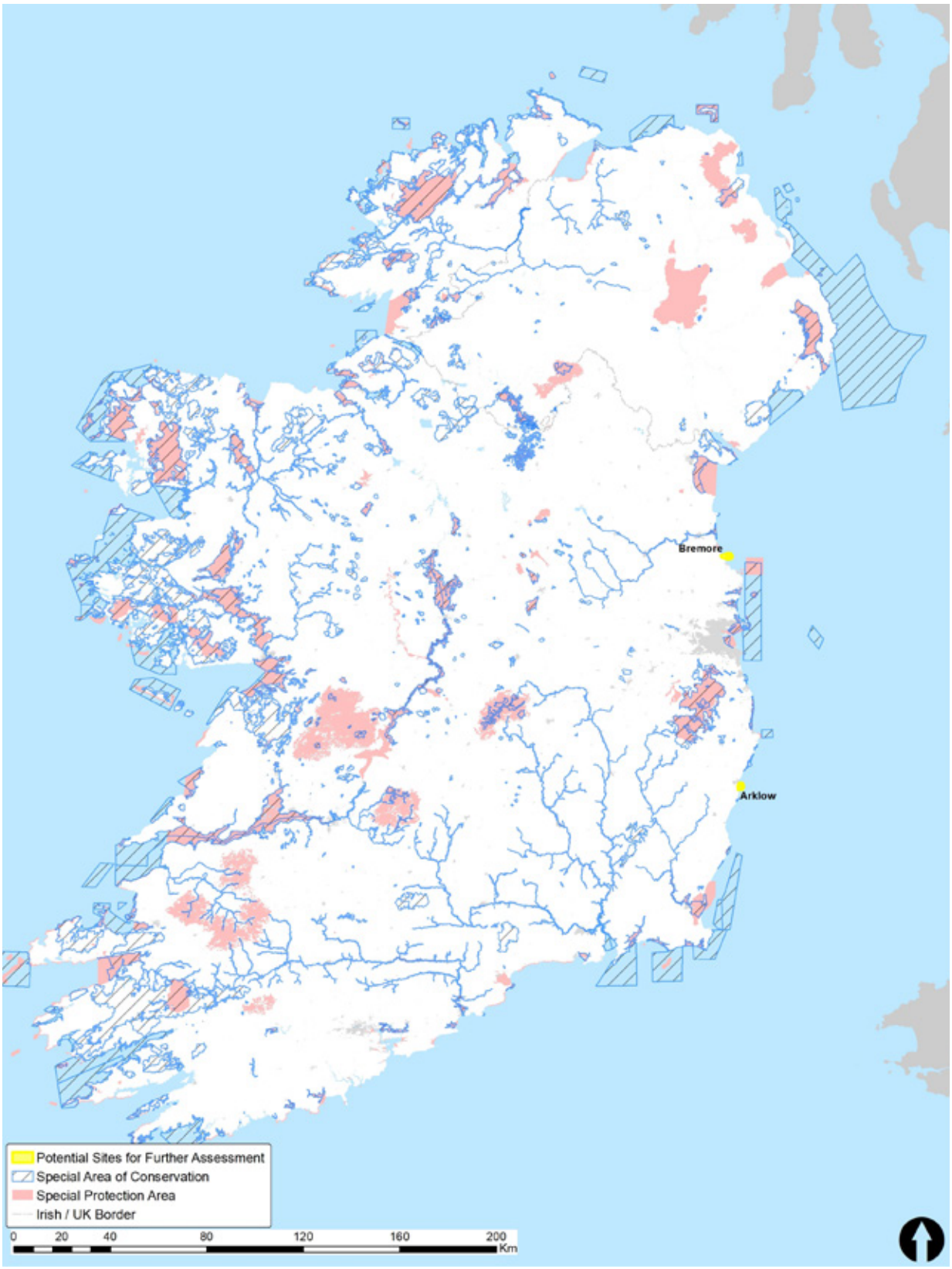
Firstly, it must be shown that there is no alternative to the proposed project - in this case DP2.0 - and that it is in the public interest for it to proceed. Sustaining such an argument where there is a large and established working port in Dublin would be, to say the least, challenging.

Secondly, compensatory habitats which would at least offset the environmental loss which the project would cause would have to be created and the State would have to secure the agreement of the European Commission that the compensatory measures proposed to accomplish this were adequate.

No large IROPI project has ever been completed in Ireland. In 2014, Galway Harbour Company applied to An Bord Pleanála for planning permission for an IROPI project[6]. It is six years since the planning application was lodged and a decision has yet to be made.

4 Irish Times, 17th August 2019
5 https://ec.europa.eu/environment/nature/legislation/fitness_check/index_en.htm
6 Galway Harbour Extension, An Bord Pleanála reference PL61.PA0033

Natura 2000 sites



Having selected the two locations of Arklow and Bremore, the layout and orientation of a workable port with the required capacity was determined for each location.

The main factors considered in doing this were the need to have a safe access channel which could be maintained over time and the need to protect and shelter ships at berth from wave action. These are the most basic requirements for any port. In the case of Arklow, there is deep water close to Arklow Head and the port could be built with sufficient adjacent depth of water to obviate the need to create a long entrance channel.

Each design yielded a very large harbour protruding far into the Irish Sea and the impacts of such a large construction on the coastal areas north and south of each harbour were then assessed in terms of their environmental impacts.

The above issues were considered iteratively to arrive at the final layouts of the new port that would be built at either Arklow or at Bremore. In both cases, the port would constitute an enormous coastal excrescence.

Because Dublin Port is nestled into Dublin Bay and along the banks of the Liffey, it can be difficult to appreciate its scale. For example, the distance from the Tom Clarke Bridge to the end of the easternmost berth in Dublin Port is almost three kilometres. It is a further two kilometres from this point to the entrance to the port at the Poolbeg Lighthouse. Dublin Port is concave; DP2.0 would be convex. DP2.0 would extend 3.2 kilometres into the Irish Sea if built at Arklow and 4.5 kilometres if constructed at Bremore.

The huge size of DP2.0, at either Arklow or Bremore, is because the channel inside the breakwaters has to be long enough to allow ships to slow down once they have entered the shelter of the harbour. This distance, combined with the impact of the new harbour on coastal processes and the extent of the land that needs to be made by infill, dictates how far the outer breakwaters need to project from the coast.

DP2.0 at Bremore projects farther into the sea than at Arklow because the surrounding waters at Bremore are relatively shallow. Because of this, the entrance channel needs to be farther out to sea so as to reduce the risk of the movement of sands blocking the channel during major storm events. This is a known and recurring feature at existing ports on the east coast.

By comparison, DP2.0 at Arklow would lie in much deeper water and this problem would not arise.

Based on the layouts identified for Arklow and for Bremore, conceptual schemes for each site were designed to a sufficient level of detail to allow bills of quantities to be produced. These bills of quantities were then costed.

The project to build Phase 1 of DP2.0 at either Arklow or Bremore would be enormous by any standard and would be of the same magnitude as the Maasvlakte 2 expansion of the Port of Rotterdam in 2012.

	Arklow Phase 1	Bremore Phase 1
Total port area (land plus water)	893 hectares	963 hectares
Land area (including land made by marine infill)	340 hectares	416 hectares
Area of land made by marine infill	186 hectares	416 hectares
Length of external breakwaters	9,150 metres	9,200 metres
Length of berths (including Ro-Ro berths on jetties)	5,675 metres	5,675 metres
Land area for port operations	311 hectares	309 hectares
Road system (including connection to national road network)	12.8 kilometres	17.8 kilometres
Rail system (including connection to national rail network)	11.4 kilometres	9.7 kilometres
Bulk fill materials	29m cubic metres	45m cubic metres
Dredging quantities	5m cubic metres	23m cubic metres
Access channel	Not required	4.1km
River diversion	Not required	1.8km[7]
Overall cost estimate at 2020 prices	**€7.6 to €8.9 billion**	**€7.7 to €8.9 billion**

7 Delvin River

Location and scale of DP2.0 at Arklow or Bremore

"Because Dublin Port is nestled into Dublin Bay and along the banks of the Liffey, it can be difficult to appreciate its size.

In addition, the project to build DP2.0 at Bremore would have similarities with the 2013 project to expand the port of Barcelona. In Barcelona, the Llobregat river had to diverted by two kilometres. In Bremore, the Delvin would have to be diverted by almost the same distance.

Finally, in both locations there would have to be a considerable development to provide road and rail access to national networks.

However, it is important to emphasise that in addition to these connections, there would likely be a requirement for major investment to increase the capacity of either the M1 or the M11 motorways in order to cater for a large volume of port-related HGV traffic. Our costings take no account of this.

The overall cost estimates for the project to build DP2.0 and to free up the lands at Dublin Port for development comprise four elements:

- The cost to construct DP2.0
- The cost of replicating in Arklow or Bremore all of the buildings and equipment which allow Dublin Port to function
- Three categories of land costs:
  - The costs to acquire lands at the site where DP2.0 would be built
  - The cost to buy out the property rights and compensate for the loss of the operating assets of leaseholders in Dublin Port
  - The cost of remediating the lands of Dublin Port to bring them to the point where they could be developed
- The capitalised costs of long-term continuing environmental mitigating measures at either location.

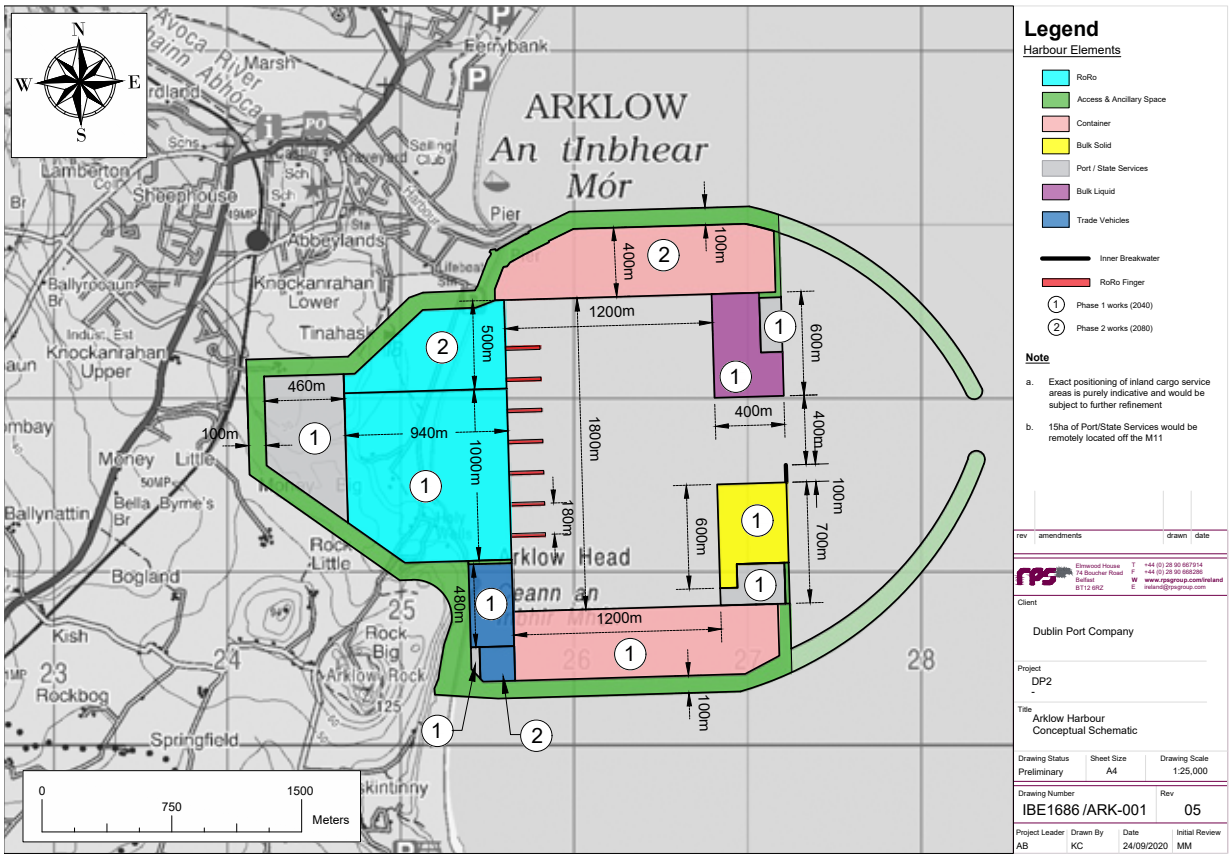
The costs to relocate an existing port business can be very substantial as evidenced by the project to construct the Waste to Energy plant on the Poolbeg Peninsula where a new molasses storage and distribution facility had to constructed at a cost of €31m on a 0.7 hectare site to clear the site for the Covanta plant.

Moreover, property rights in Ireland are strongly protected in law and there would be substantial costs to acquire land for DP2.0 and to buy out the property rights of leaseholders in Dublin Port.

Because of the inherent uncertainties in estimating quantities and in applying estimated pricing rates to these quantities, (long in advance of detailed designs being prepared) contingency allowances were added to each of the four elements at a lower level and at a higher level.

Cost category	Lower contingency levels	Higher contingency levels
New port infrastructure	25%	45%
Buildings and equipment	25%	45%
Land Acquisition	25%	45%
Remediation of existing port land	25%	50%
On-going liabilities (capitalised)	25%	45%

DP2.0 at Arklow

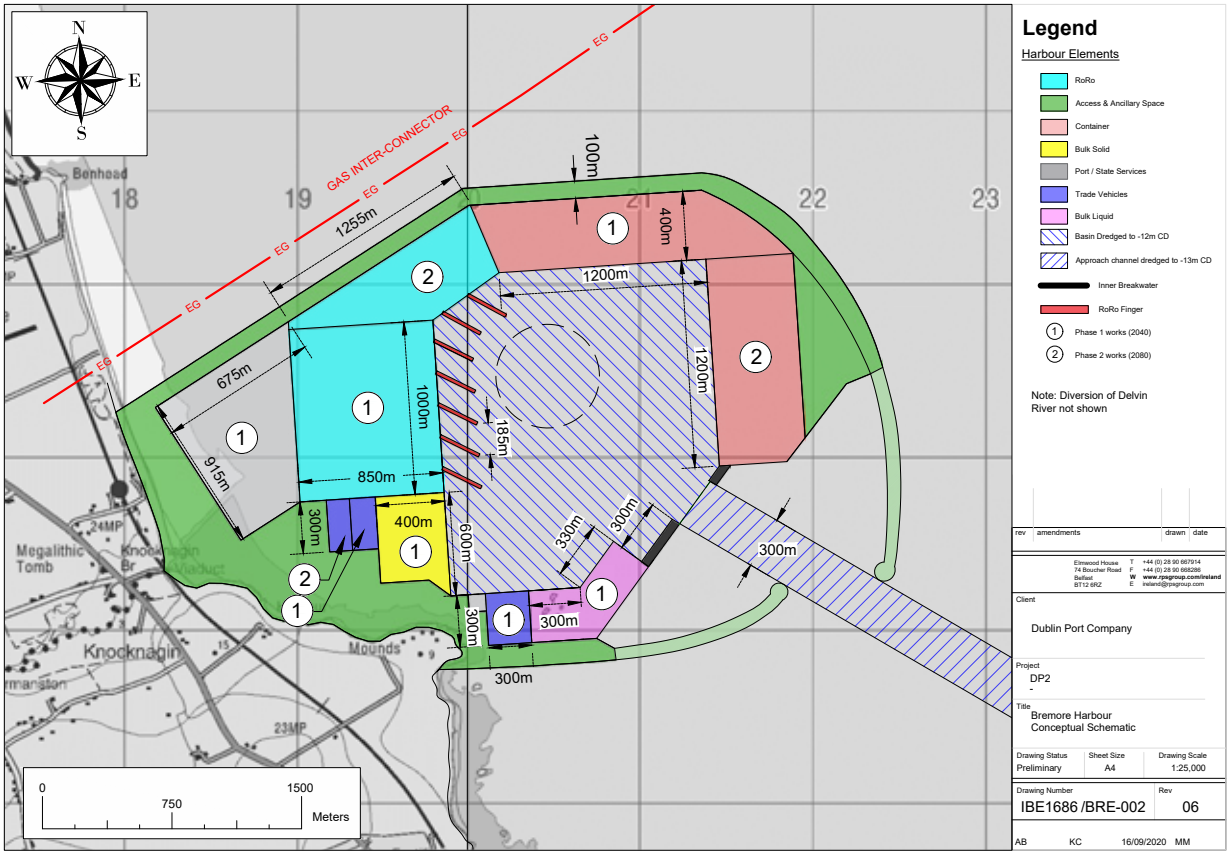


Based on the above, the cost to make the lands at Dublin Port available for development by building DP2.0 Phase 1 at Arklow was estimated to be between €7.6 billion and €8.9 billion at 2020 cost levels.

Arklow (€ millions)	Phase 1	Phase 2	Total
New port infrastructure	3,551	758	4,309
Buildings and equipment	926	98	1,024
Land Acquisition	866	-	866
Remediation of existing port land	703	-	703
On-going liabilities (capitalised)	73	-	73
Total (excluding contingency)	*6,119*	*856*	*6,975*
Contingency Lower Range	1,530	214	1,744
Total cost (low)	*7,649*	*1,070*	*8,719*
Contingency Upper Range	2,789	385	3,174
Total cost (high)	*8,908*	*1,241*	*10,149*
Total cost (average of high and low)	**8,279**	**1,155**	**9,434**

Estimated cost to make the lands at Dublin Port available for development by building DP2.0 Phase 1 at Arklow (at 2020 cost levels).

DP2.0 at Bremore



The cost range based on building DP2.0 Phase 1 at Bremore was estimated to be between €7.7 billion and €8.9 billion at 2020 cost levels.

Bremore (€ millions)	**Phase 1**	**Phase 2**	**Total**
New port infrastructure	3,668	903	4,571
Buildings and equipment	926	98	1,024
Land Acquisition	686	-	686
Remediation of existing port land	703	-	703
On-going liabilities (capitalised)	147	-	147
Total (excluding contingency)	*6,130*	*1,001*	*7,131*
Contingency Lower Range	1,533	250	1,783
Total cost (low)	*7,663*	*1,251*	*8,914*
Contingency Upper Range	2,794	450	3,244
Total cost (high)	*8,924*	*1,451*	*10,375*
Total cost (average of high and low)	**8,293**	**1,351**	**9,644**

Estimated cost to make the lands at Dublin Port available for development by building DP2.0 Phase 1 at Bremore (at 2020 cost levels).

Detailed cost estimation and the application of contingency sums can give the illusion of high side cost certainty. Having completed a detailed analysis under several hundred cost headings and having applied high levels of contingencies, how could the cost of building DP2.0 Phase 1 at Arklow or Bremore combined with the cost of bringing the vacated lands of Dublin Port to the point where they could be developed possibly exceed €8.3 billion?

One answer we know of is construction cost inflation and the experience of many other megaprojects suggests that, if the DP2.0 project were to go ahead, other issues would emerge which would lead to cost escalations which we cannot meaningfully identify or estimate today.

The cost of land used in our analysis has assumed an acquisition price for existing long leaseholds at Dublin Port based on the current guide price for the Irish Glass Bottle Site of €4.2m per acre less site remediation costs. The reality is that existing leaseholds would need to be acquired at the open market value current at the time of acquisition, whether through CPO or by negotiation. Land prices in Ireland can increase rapidly, particularly where the State is a purchaser in need because a large project has to be delivered. The cost of replacing the molasses facility on the Poolbeg Peninsula referred to above is a salutary precedent.

The Phase 1 cost estimate of €8.3 billion for each of the Arklow and Bremore options is equivalent to a cost, at 2020 prices, of €12.9m per acre of land made available for development at Dublin Port. If this were to be developed for housing at the rate envisaged in the Poolbeg Peninsula SDZ planning scheme of up to 238 units per hectare, the land cost per housing unit would be €134,000, again at 2020 prices.

This assumes, of course, that planning permission for the new port could be secured and that the cost of the megaproject to build this new port did not escalate beyond the estimate we have made today 10 years before construction might commence and 20 years before it would be completed.

These timing estimates of 10 years and 20 years have been arrived at by considering three sets of challenges:

- Planning policy would have to be amended at a range of levels from national to local to support the proposed development of DP2.0
- Once planning policies had been aligned, there would be a lengthy consent process due not only to the scale of the project but also to the near certainty of it having to rely on an IROPI argument
- Construction of what would be a huge marine construction project unprecedented in scale in Ireland

Importantly, so great is the environmental challenge of building DP2.0 at either Arklow or Bremore, there is a clear and obvious risk that, after ten years of effort, planning permission to proceed with the project to build DP2.0 at either location could be denied.

Based on DPC's experience of developing Masterplan 2040, having it recognised at multiple policy levels (including: Project Ireland 2040; Regional Spatial and Economic Strategies; Dublin City Development Plan) and taking large port projects through consent processes and into construction, we have prepared project schedules for developing DP2.0. If a decision in principle was taken during 2020 that DP2.0 should be built at Bremore, we estimate that the new port could be available for operation in mid-2041 as summarised below. A development of DP2.0 at Arklow would be no quicker.

Task	Duration in months	Start date	Finish date
Gaining policy support	70	Jan–2021	Jan–2027
Securing planning permission	70	Jul–2024	Jun–2030
Getting other consents	24	Jun–2030	Jun–2032
Mobilisation	6	Jan–2033	Jun–2033
Northern breakwater	68	Jul–2033	Mar–2039
Southern breakwater	17	Nov–2033	Apr–2035
Internal breakwater	34	Aug–2034	Jun–2037
Quay walls	45	Dec–2035	Sep–2039
Yards	48	Jun–2036	Jul–2040
Contingency	12	Jul–2040	Jun–2041

Large infrastructure projects everywhere have a lengthy gestation period and given the scale of what would be involved to vacate the lands at Dublin Port to make them available for development, the estimate of 70 months to get all necessary policies aligned is not unreasonable.

However, once there might be a Government decision in principle to undertake the project, work on preparing planning applications could commence and, in our project plan, we have suggested that this could start in mid-2024. Gaining planning and other consents would itself be a large and expensive undertaking particularly where the consent would depend on the making and acceptance of an IROPI case.

Only after consents had been secured could detailed design work, incorporating the requirements of environmental conditions in planning permissions, be completed and works tendered and procured. We have suggested that this could be done in about two years to allow site mobilisation in the first half of 2033.

Thereafter, the construction times and sequencing are based on recent experience of actual large marine civil works in Dublin Port and using benchmarks from large international marine projects.

Behind the 20 year programme shown there is a host of challenges to secure contractual agreements with all of the stakeholders who would be displaced from Dublin Port.

When the jewel of redeveloping 260 hectares of Dublin Port lands is so dazzling, it can be difficult to appreciate and accept the magnitude of the challenge to make this happen. However, if this vision were to be realised then all of the challenges we have described above would have to be taken on in what would be the largest megaproject ever undertaken in the State. Given the worldwide experience of megaprojects, it is likely to the point of near certainty that the project to develop a new port for Dublin at either Arklow or Bremore in order to make the lands of Dublin Port available for development would take far longer and be more costly than we have estimated in this paper. And only at that point could work commence to build out the new vision for the lands of Dublin Port.

Undermining all of this, of course, is what we believe to be a high probability that it would not even be possible to secure planning permission for DP2.0.

All of the analysis behind this paper is available to be critiqued by anyone who believes it worthwhile to move to the next stage of completing a cost benefit analysis of the megaproject to redevelop the lands at Dublin Port. It is clear to us in Dublin Port Company that this would be an unnecessary and wasted effort.

However, there still remains the challenge of providing additional port capacity to cater for growth after 2040 by which stage Dublin Port is planned to be operating at full capacity. One option to provide this additional capacity is to build a new port at either Arklow or Bremore smaller than the DP2.0 port considered in this paper. We have termed this project DP1.5 and have carried out a similar detailed analysis to test its feasibility.

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 7

OPTIONS FOR THE GREENFIELD DEVELOPMENT OF ADDITIONAL EAST COAST PORT CAPACITY

30th November 2020

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

Dublin Port Post 2040 Dialogue – Paper 7

OPTIONS FOR THE GREENFIELD DEVELOPMENT OF ADDITIONAL EAST COAST PORT CAPACITY

30th November 2020

If Dublin Port's cargo volumes continue to grow in the future as they have in the past, then a new port will have to be built at a greenfield site on the east coast of Ireland. If our growth projections in Dublin Port Company (DPC) come to pass, then this new port will need to be ready for operation in just 20 years' time by 2040. We refer to this new port as **DP1.5**.

DP1.5 would be very costly to build. We estimate it would cost €3.9 billion (at 2020 prices) to construct DP1.5 at Arklow and €4.2 billion at Bremore. A project this size would be beyond DPC's financial means.

DP1.5 would be very impactful on the environment and it would be extremely challenging to secure the necessary consents to build it. To do so would require acceptance by An Bord Pleanála of a planning application based on an IROPI[1] argument that the project should proceed notwithstanding negative impacts on designated sites protected by European environmental law. No significant project has ever been permitted in Ireland on this basis.

If DP1.5 is to be ready for operation by 2040, DPC needs to start preliminary investigation and design work during 2021 so that construction could commence by about 2033 if required.

Even while this preparatory work is being done, DPC (and other ports) need to complete a range of smaller projects both in Dublin Port and elsewhere on the east coast over the next 10 to 15 years to achieve two objectives:

- Firstly, to cater for growth in the period 2020 to 2040
- Secondly, to maximise the capacity which can be provided at existing brownfield port sites so as to minimise the scale of DP1.5

Given the long lead time of 20 years to complete large port projects and given the uncertainty in projecting port volumes over long periods (or anything else for that matter), it is just as likely that growth will be less than we are projecting - in which case DP1.5 may be needed later than 2040 - as it is that DP1.5 will be needed by 2040.

The simple fact is that we do not and cannot know with any level of certainty but we need to be prepared for either eventuality.

A project of the scale of DP1.5 would be a *megaproject* as defined by the Danish academic, Bent Flyvbjerg[2]. Megaprojects tend to be one-off projects with unique characteristics and, because of this, have to be designed and constructed without the benefit of experience from comparable and reasonably recent projects elsewhere. Megaprojects frequently have large cost over-runs, take far longer to complete than planned and, often, deliver lower benefits than originally projected. DPC believes that the megaproject to construct DP1.5 should be avoided if at all possible or, at the very least, should be deferred for as long as possible.

1 IROPI is an abbreviation for Imperative Reasons of Over-riding Public Interest and the concept behind it is that where a project will have negative impacts on a Natura 2000 site – either a Special Area of Conservation (SAC) or a Special Protection Area (SPA) - it can only be granted planning permission if it can be established that the project is in the public interest and if compensatory measures are implemented which, at least, compensate for the environmental loss the project would cause.

2 *The Oxford Handbook of Megaproject Management*, edited by Bent Flyvbjerg, 2017, defines megaprojects as large-scale, complex ventures that typically cost $1 billion or more, take many years to develop and build, involve multiple public and private stakeholders, are transformational and impact millions of people.

We have identified possible sites for DP1.5 at Arklow and Bremore based on analysis by RPS Group in their *High Level Environmental Appraisal* of the project to build a replacement port for Dublin Port[3]. The *High Level Environmental Appraisal* was informed by *Hydraulic Model Studies* also carried out by RPS.

The design of DP1.5 has been based on projections of demand in 20 years' time in 2040 and growth thereafter over a further period of sixty years to 2100. This very long-term view is needed to determine the size the breakwaters need to be to allow the capacity of DP1.5 to be increased in stages in the decades after it might open.

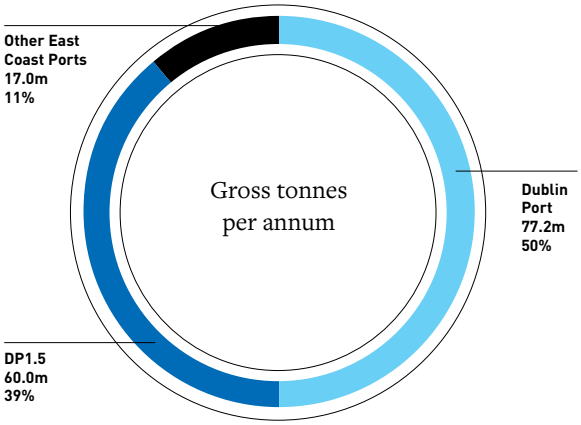
Where we previously designed and costed **DP2.0** as a replacement port for Dublin (with an ultimate capacity of 134 million gross tonnes per annum based on projections to 2080), DP1.5 would be very much smaller because Dublin Port would continue to provide an annual capacity of 77 million gross tonnes.

Because we believe that DP1.5 might actually have to be built, we have looked as far out as 2100 to ensure that the capacity of what would be constructed by 2040 could be increased thereafter if necessary. This is a similar approach to developments in other European ports such as Barcelona, Rotterdam and Bilbao.

DP1.5 has been designed to have an annual throughput capacity of 60 million gross tonnes. The same projections of future growth were used for both DP1.5 and DP2.0[4] and, from these projections, we have used the total annual demand in 2100 of 154 million gross tonnes to determine the size of DP1.5.

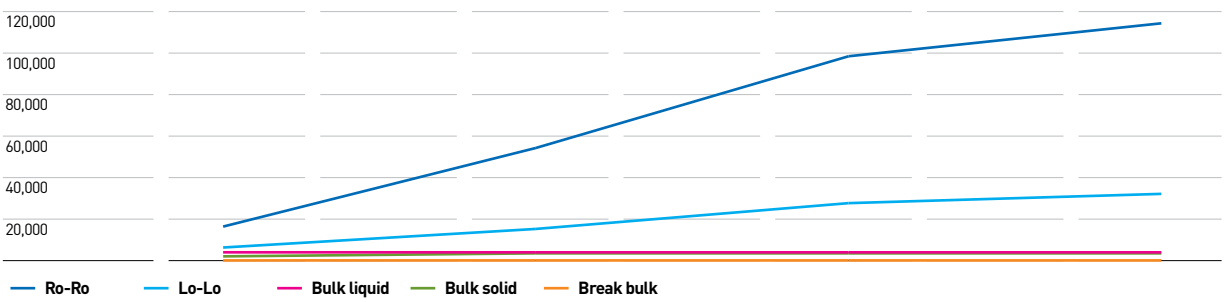
If 77 million gross tonnes were to be handled in Dublin Port and if DP1.5 were to provide capacity for up to 60 million gross tonnes, then the balance of 17 million gross tonnes per annum would need to handled at other east coast ports.

Long-term distribution of port capacity on the east coast of Ireland



Projected Capacity Requirement 2010 - 2100

	2010 '000 gross tonnes	Growth rate 30 years	2040 '000 gross tonnes	Growth rate 40 years	2080 '000 gross tonnes	Growth rate 20 years	2100 '000 gross tonnes
Ro-Ro	16,403	4.1%	54,287	1.5%	98,478	0.75%	114,351
Lo-Lo	6,317	3.0%	15,270	1.5%	27,700	0.75%	32,165
Bulk liquid	4,009	0.0%	4,000	0.0%	4,000	0.0%	4,000
Bulk solid	2,054	1.8%	3,500	0.0%	3,500	0.0%	3,500
Break bulk	96	0.1%	100	0.0%	100	0.0%	100
Total	**28,879**	**3.3%**	**77,157**	**1.4%**	**133,778**	**0.71%**	**154,116**



3 Paper 6 – What Would Moving Dublin Port Involve

4 Paper 5 – The Conundrum of Planning for Long-Term Growth

A conceptual design was prepared for DP1.5 at Arklow and at Bremore, the main quantities and dimensions were estimated and bills of quantities were prepared. Construction costs for these quantities were evaluated at 2020 prices based on the knowledge and experience of large marine infrastructure projects currently under construction in Dublin Port.

Finally, given the preliminary nature of the design and the lack of any site investigations at this early stage, contingencies were applied at lower (25%) and higher (45%) levels to provide a range of construction cost estimates.

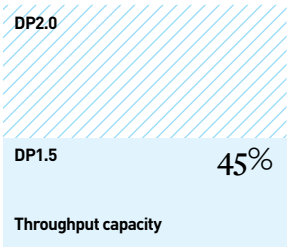
Trying to estimate the construction costs of a project based on high level assumptions, and doing so many years before it would have to be built, inevitably leads to cost estimates very different from the actual out-turn cost at completion. In the case of a megaproject such as DP1.5, it seldom, if ever, happens that the costs estimated when the decision to proceed with the project is made are lower than the final project cost. Almost invariably, the opposite is the case.

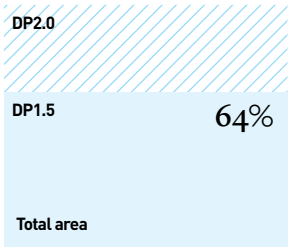
The main quantities and dimensions for DP1.5 at both Arklow and Bremore are summarised below.

The total area of Dublin Port (land plus water) is 443 hectares. DP1.5 would be larger – 574 hectares at Arklow or 617 hectares at Bremore. By comparison, the total area of DP2.0 would be 893 hectares at Arklow and 963 hectares at Bremore.

Dublin Port is shaped by the Great South Wall and the North Bull Wall and their combined length is 7,500 metres. DP1.5 would require similarly large breakwaters. At Arklow, the external breakwaters would be 7,950 metres long and, at Bremore, 7,650 metres long. The equivalent figures for DP2.0 are 9,150 metres at Arklow and 9,200 metres at Bremore.

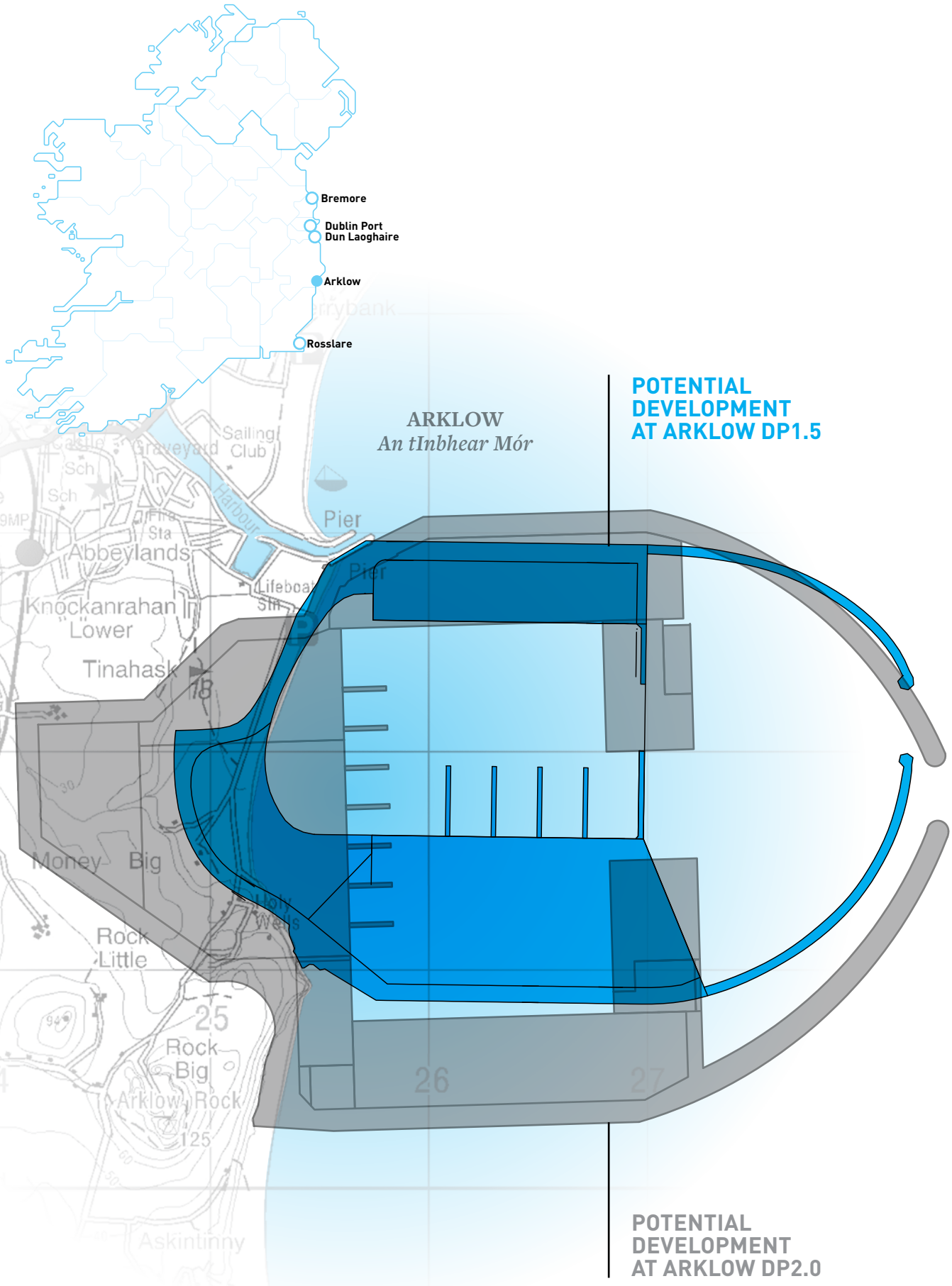
DP1.5 and DP2.0 Total Area and Capacity Comparison



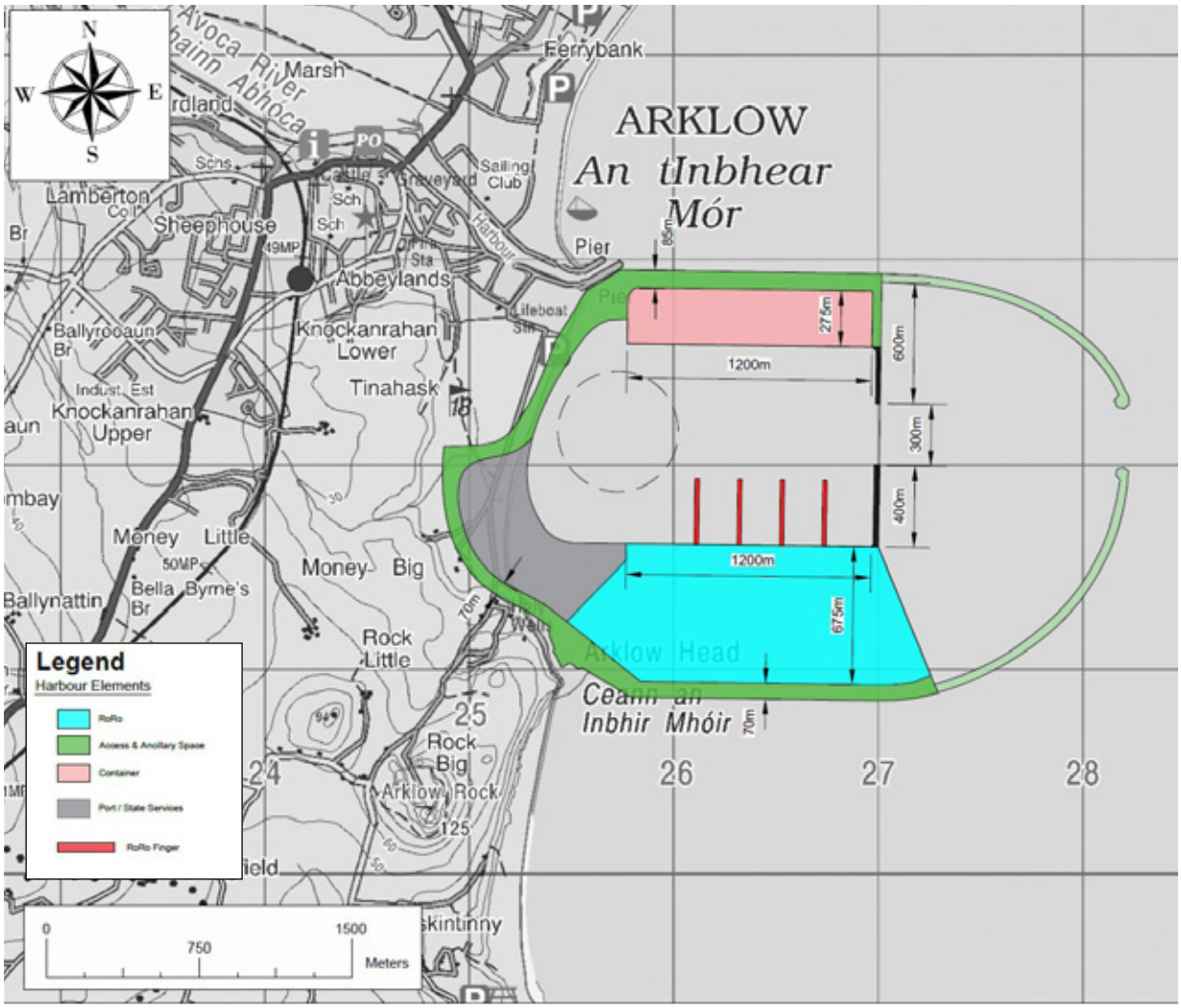


	Arklow	Bremore
Total port area (land plus water)	574 hectares	617 hectares
Land area (including land made by infill)	217 hectares	265 hectares
Area of land made by marine infill	192 hectares	265 hectares
Length of external breakwaters	7,950 metres	7,650 metres
Length of berths (including Ro-Ro berths on jetties)	4,225 metres	4,225 metres
Land area for port operations	191 hectares	195 hectares
Road system (including connection to national road network)	11.5 kilometres	14.2 kilometres
Rail system (including connection to national rail network)	5.8 kilometres	5.5 kilometres
Bulk fill materials	31m cubic metres	28m cubic metres
Dredging quantities	4m cubic metres	21m cubic metres
Access channel	Not required	4.5km
River diversion	Not required	1.3km
Overall cost estimate at 2020 prices	**€3.6 to €4.1 billion**	**€3.9 to €4.5 billion**

At both Arklow and Bremore, the total area of DP1.5 would be 64% of the area of DP2.0.

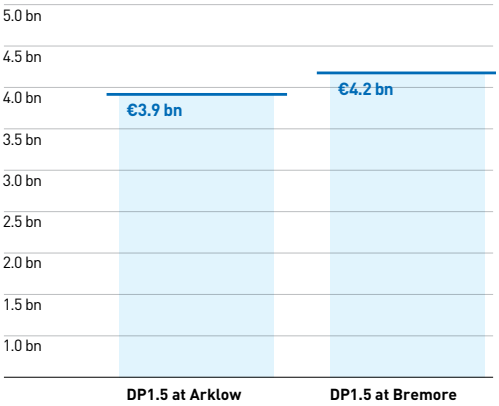

Bremore
Dublin Port
Dun Laoghaire
Arklow
Rosslare
ARKLOW
An tInbhear Mór
POTENTIAL DEVELOPMENT AT ARKLOW DP1.5
POTENTIAL DEVELOPMENT AT ARKLOW DP2.0
Sailing Club
Harbour
Pier
Abbeylands
Knockanrahan Lower
Tinahask
Little Money Big
Rock Little
Rock Big
Arklow Rock
Askintinny
25
26
27

DP1.5 at Arklow

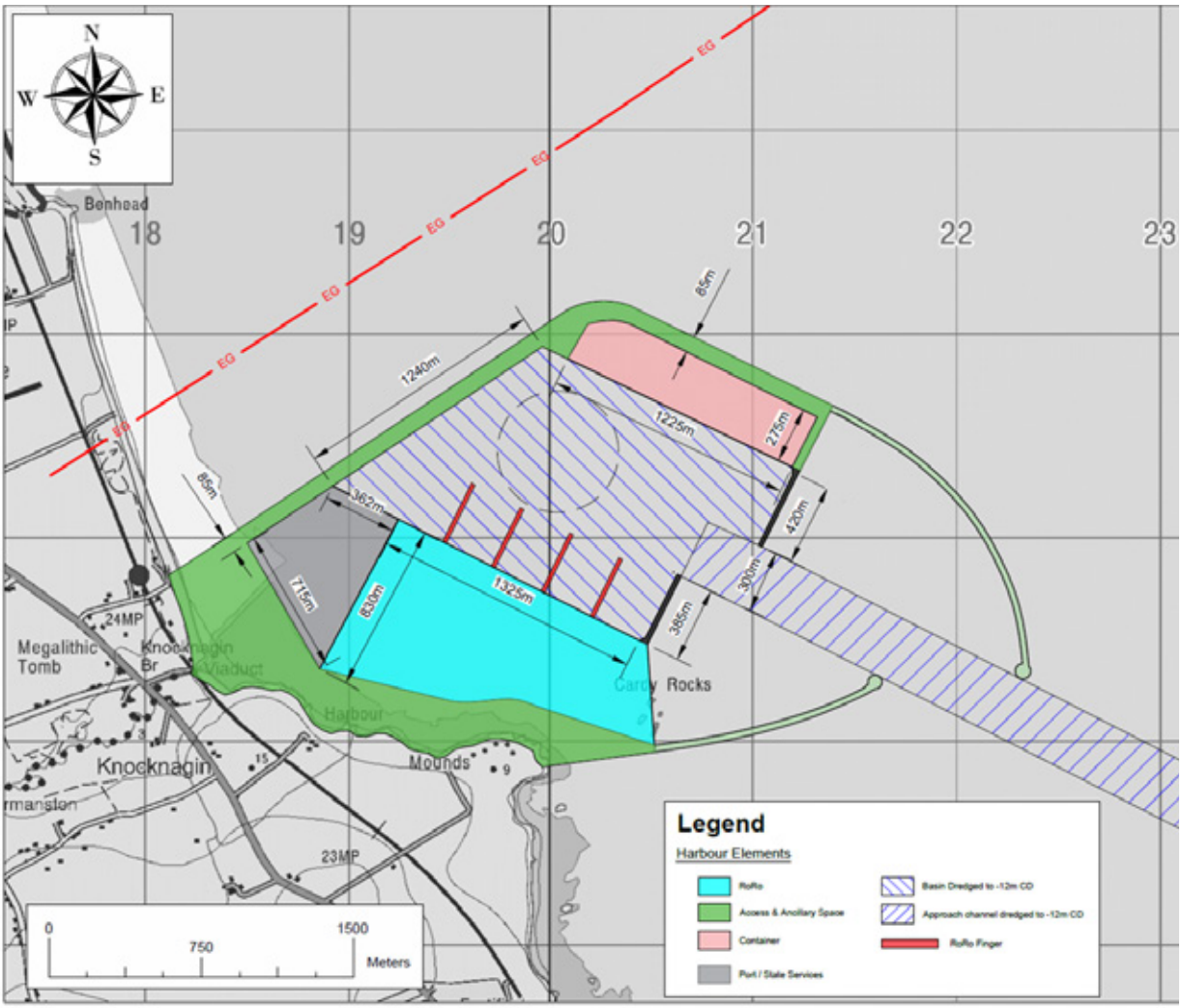


Arklow (€ millions)	Total
New port infrastructure	2,483
Buildings and equipment	240
Land Acquisition	61
On-going liabilities (capitalised)	73
Total (excluding contingency)	*2,857*
Contingency Lower Range (25%)	714
Total cost (low)	*3,571*
Contingency Upper Range (45%)	1,286
Total cost (high)	*4,143*
Total cost (average of high and low)	**3,857**

DP1.5 Total Cost Comparison (average of high and low) at Arklow and Bremore



DP1.5 at Bremore



Bremore (€ millions)	Total
New port infrastructure	2,675
Buildings and equipment	240
Land Acquisition	42
On-going liabilities (capitalised)	147
Total (excluding contingency)	*3,104*
Contingency Lower Range (25%)	776
Total cost (low)	*3,880*
Contingency Upper Range (45%)	1,397
Total cost (high)	*4,501*
Total cost (average of high and low)	**4,190**

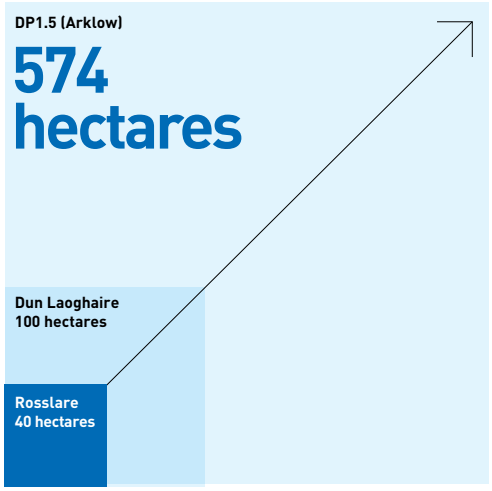
It is difficult to convey the scale of the DP1.5 project or its complexity because the need to build a new port on a greenfield site arises only very infrequently. We, therefore, have no familiar comparator to rely on. This lack of a ready perspective has led to unrealistic and naïve suggestions over the past 30 years to greatly reduce the scale of operations at Dublin Port or even to move them entirely to a new port[5].

Likewise it is difficult to convey the project's urgency when its possible need will not arise for 20 years. Ports such as Dublin and Waterford developed over centuries as Viking era settlements became centres of trade and grew into cities. More recently, railway companies built harbours at Rosslare and Greenore in the late nineteenth and early twentieth centuries as nodes for ferry services to ports in Britain. These were small harbours and are not at all comparable in scale to the new greenfield harbour that might be required at Arklow or Bremore.

5 Paper 4 – An Overview of the Calls to Move Dublin Port

Some sense of the scale of DP1.5 can be gained by comparing its key dimensions with those of Rosslare Harbour and Dun Laoghaire Harbour.

	Port area (land + water)	Length of external breakwaters
DP1.5 (Arklow)	574 hectares	7,950 metres
Rosslare	40 hectares	470 metres
Dun Laoghaire Harbour	100 hectares	2,800 metres



Rosslare Harbour is the next largest unitised port on the east coast of Ireland after Dublin Port. It is also the second largest Ro-Ro port in the country and, in 2019, handled 122,000 units compared to Dublin Port's 1,059,000 units. DP1.5 would be more than fourteen times larger than Rosslare Harbour.

In Ireland, the only manmade harbour that is any way comparable to DP1.5 - and, at that, it is less than one fifth the size of DP1.5 - is Dun Laoghaire Harbour, built more than two hundred years ago.

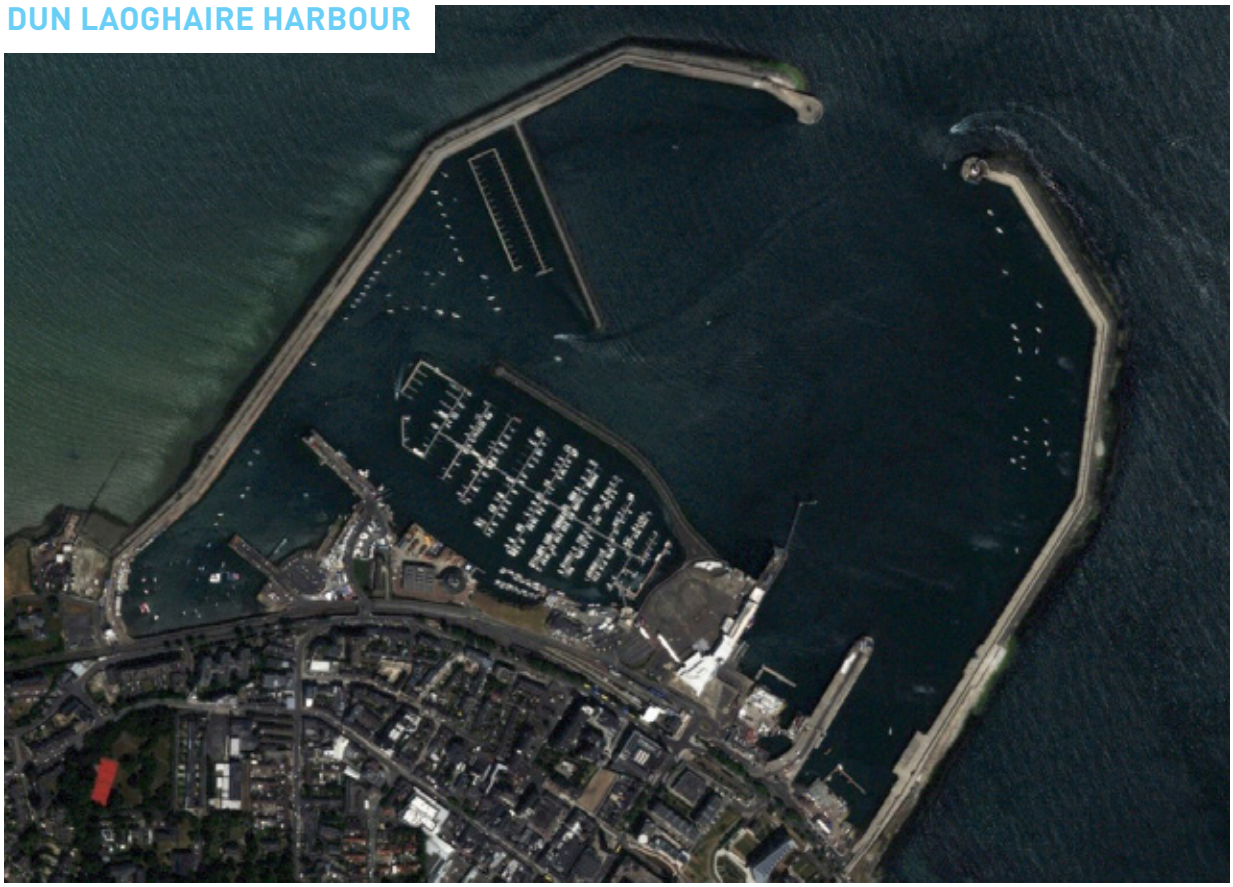
The construction of Dun Laoghaire Harbour was a major undertaking for Government at the time and required three acts of parliament (1815, 1816 and 1820) to enable and finance the project. Dun Laoghaire Harbour was built as a harbour of refuge and the case to build it was championed by Richard Toutcher - a Norwegian *master mariner and minor shipowner* - following the death of almost 400 people when, in 1807, the *Prince of Wales* and *Rochdale* were driven ashore in Blackrock and Seapoint by extreme weather. The harbour was constructed over a 25 year period from 1817 to 1842 at a cost of £690,717 [6].

ROSSLARE HARBOUR

© Google Earth

6 *History of Dun Laoghaire Harbour*, John de Courcy Ireland, 2001.

DUN LAOGHAIRE HARBOUR



© Google Earth

The need for a harbour of refuge at Dun Laoghaire arose because the entrance to Dublin Port was perilous and this problem was not addressed as quickly as it should have been following the completion of the Great South Wall in 1784. The ultimate resolution came 40 years later when construction of the North Bull Wall was completed in 1824 at a cost of £103,055. The solving of Dublin Port's problems had been interminably discussed and debated for many years before construction commenced. Had the known problems been addressed more expeditiously, it is likely many lives would have been saved and it is arguable that the need to construct Dun Laoghaire Harbour would not have arisen.

The lesson of history from the late eighteenth and early nineteenth centuries is that when long-term infrastructure challenges are recognised and understood, it is important to act decisively and plan to deliver essential construction projects without undue delay. After 45 years of poor planning in Dublin Port from 1965 to 2010, a similar situation exists today as existed over 200 years ago. Future infrastructure deficits are foreseeable and plans to address these deficits by way of large infrastructural projects need to be progressed. Moreover, given the scale and importance of Dublin Port, the need for these projects is of national significance.

We are in the unusual situation of having to plan for DP1.5 while, simultaneously, doing everything we can to obviate the need to build it or, at least, to defer its construction for as long as possible. This situation comes about from DPC's commitment to the principles of proper planning and sustainable development. We believe that the capacity of existing brownfield port sites should be maximised before any greenfield development is progressed.

"We believe that the capacity of existing brownfield port sites should be maximised before any greenfield development is progressed.

The means to obviate or defer the DP1.5 project come in three ways.

Firstly, there is the hope that the long-term link between national economic growth and growth in Dublin Port's volumes will weaken to the point where year on year increases become very small. It seems inevitable that future long-term growth cannot continue at historical rates. If it did, port volumes would reach unfeasibly high levels. However, we cannot predict when the link might break. Hope is not much of a strategy to address a foreseeable problem and we need to plan on the basis that there will be continued growth of Dublin Port's volumes over, at least, the next 20 years.

Secondly, there is the possibility of large infrastructure projects being completed in other east coast ports to provide additional capacity to cater for demand which Dublin will not be able to accommodate as it reaches its ultimate throughput capacity. In this paper, we have assumed that an additional throughput capacity of 17 million gross tonnes per annum could be provided elsewhere over the next 20 years. The scale of this challenge can be appreciated by comparing this assumed level of additional capacity to the existing capacity in the larger east coast ports outside of Dublin.

An annual throughput capacity of 17 million gross tonnes is equivalent to 700,000 Ro-Ro units or 1.75 million TEU of Lo-Lo.

In 2019, the throughput of Rosslare Harbour was 122,000 Ro-Ro units and the port's capacity is in the order of 340,000 units per annum. A development at Rosslare to cater for 17 million gross tonnes of Ro-Ro cargo would more than double the capacity of the existing port.

The Lo-Lo throughput of the Port of Waterford in 2019 was 49,000 TEU and its existing capacity is in the order of 200,000 TEU per annum. A development at Waterford to cater for 17 million gross tonnes of Lo-Lo cargo would require more than an eightfold increase in the capacity of the existing port.

The size of port infrastructure projects required at other east coast ports is enormous by comparison to their current scales. Moreover, there is a clear obstacle to completing such projects given the combination of the small financial scale of other port companies and provisions in National Ports Policy that port projects have to be financed from within the port company's own means possibly with private sector involvement but with no exchequer support. Large port infrastructure projects are so expensive and the revenue generating capacity so low that there is no possibility of private sector financing or partnership without exchequer support of some type.

Thirdly, and finally, the need to build DP1.5 can be deferred by the completion of all projects in Masterplan 2040. In 2019, Dublin Port's throughput was 38 million gross tonnes. By 2040, it is planned that three Strategic Infrastructure Development projects will have been completed to provide capacity for 77 million gross tonnes:

- One project has been consented and is under construction – the Alexandra Basin Redevelopment Project or **ABR Project**[7].
- The second Masterplan project (the **MP2 Project**[8]) has been consented, works are currently being planned and construction will commence in 2022.
- The scope of the third and final Masterplan project (the **3FM Project**) is set out in Masterplan 2040 and involves development of port lands on the Poolbeg Peninsula and the construction of a new bridge to provide a Southern Port Access Route which would take port traffic off existing public roads including East Wall Road and Pigeon House Road.

Completing all three of these Strategic Infrastructure Development projects will be necessary if an annual throughput capacity of 77 million gross tonnes is to be achieved by 2040. However, it will not be sufficient. The utilisation of Dublin Port's capacity by the operators of unitised terminals (both Ro-Ro and Lo-Lo) will also have to be greatly intensified.

The throughput in Dublin Port in 2019 was equivalent to 146,000 tonnes per hectare. By comparison, the land utilisation in the Port of Rotterdam was 58,000 tonnes per hectare. In Barcelona, it was 62,000 tonnes per hectare.

7 ABR Project, PL29N.PA0034, grant dated 8th July 2015
8 MP2 Project, PL29N.304888, grant dated 11th July 2020

By 2040, assuming all three Strategic Infrastructure Development projects have been completed, Dublin Port's cargo throughput will need to increase to 296,000 tonnes per hectare per annum. For this to happen, two fundamental changes in supply chain behaviour are required:

- Firstly, the landside movement of goods by HGV will have to become truly 24 / 7 and current demand peaks will have to be flattened. Over the 168 hours in a week, virtually all cargo movements are concentrated into a 12 hour period on weekdays and, even within this 12 hour period, there are early morning and late afternoon peaks. There are almost no deliveries of cargo to or collections of cargo from Dublin Port after 19:00 on weekdays and virtually none at all at weekends. The 108 hours of low or no demand coincide with port tunnel, M50 and general motorway traffic volumes being at their lowest levels. Supply chains will have to change if utilisation of the combined capacities of Dublin Port, the Dublin Port Tunnel and the national motorway network is to be maximised.
- Secondly, the land area of Dublin Port is fixed and the faster cargo moves through the Port, the greater its capacity. Dwell times of trailers and containers need to be greatly reduced. Terminals in Dublin Port provide too much free or low cost storage of trailers and containers. Again, supply chains will have to change to eliminate these systemic inefficiencies.

If the targets of Masterplan 2040 are not attained and if additional capacity is not provided in other east coast ports, then DP1.5 will have to be constructed, possibly even before 2040.

To further appreciate the scale of the project beyond its financial cost, it is beneficial to compare DP1.5 with existing large ports in Europe.

If all of the 60 million gross tonnes per annum were accounted for by Ro-Ro, DP1.5 would need to have the capacity for 2.5 million units per annum. The Port of Dover is Europe's busiest Ro-Ro freight port and its throughput in 2019 was 2.6 million units. At a demand level of 2.5 million units per annum, DP1.5 would need to have a throughput capacity almost equal to the throughput of Europe's largest Ro-Ro port in 2019. However, virtually all of Dover's Ro-Ro trade is accompanied and this huge throughput is achieved through a small land area of only 40 hectares. We are planning on the basis that all Ro-Ro would be unaccompanied and, as a consequence, DP1.5 would have a much larger land area than Dover.

If, on the other hand, all of the 60 million gross tonnes was Lo-Lo, then DP1.5 would have to have the capacity for 6.2 million TEU per annum. Compared to 2019 throughput volumes, DP1.5 would be similar in size to the fourth largest Lo-Lo port in Europe, Piraeus, and about two thirds the size of Europe's third largest Lo-Lo port, Hamburg.

1	Rotterdam	14.8m TEU
2	Antwerp	11.9m TEU
3	Hamburg	9.3m TEU
4	Piraeus	5.7m TEU
5	Valencia	5.4m TEU
6	Algeciras	5.1m TEU
7	Bremerhaven	4.9m TEU
8	Felixstowe	3.8m TEU
9	Barcelona	3.3m TEU
10	Le Havre	2.8m TEU

However, DP1.5 would not be exclusively a Ro-Ro port or a Lo-Lo port but would, instead, handle both of the unitised cargo modes.

Based on the current and evolving patterns of unitised trade, DPC believes that the gross tonnes capacity of DP1.5 would need to be split 78 / 22 between unaccompanied Ro-Ro and Lo-Lo.

	Dublin Port 2019	Dublin Port 2040	DP1.5
Ro-Ro units	1,059,103	2,249,000	1,942,000
Lo-Lo units	432,510	926,000	800,000
Total units	**1,491,613**	**3,174,000**	**2,742,000**
Lo-Lo TEU	774,056	1,574,000	1,361,000

The challenge for DPC to double the capacity of Dublin Port by, firstly, completing the three major projects envisaged under Masterplan 2040 and, secondly, by changing longstanding supply chain practices, is formidable. However, it is a challenge that can be undertaken in stages.

Because a new harbour would need the upfront construction of enormous breakwaters and a lot of other basic infrastructure, the first phase of the development of DP1.5 could not be broken into a series of individually small projects capable of being delivered over an extended period (as is possible in Dublin Port with Masterplan 2040).

As a consequence, the unit cost of greenfield port capacity is high compared to the cost of adding port capacity in an existing port.

For DP1.5 the cost for each tonne of throughput capacity is estimated, at 2020 prices, to be €64. In our previous analysis of DP2.0, there would be scale economies and the cost would be €45. However, within this, the Phase 1 cost would be €63 with a lower Phase 2 cost of €19.

By comparison, DPC will complete the development of the new T4 Ro-Ro terminal in Alexandra Basin during 2021 as part of the ABR Project at a cost of €15 per gross tonne of annual throughput capacity. Likewise during 2021, Port of Cork will complete construction of the new Ringaskiddy Container Terminal at an estimated cost per gross tonne of annual throughput capacity of €25.

Not only are there good environmental and planning reasons to avoid building a new port, there are large financial benefits.

Through this series of seven papers, we have sought to explain and contextualise the challenges DPC faces in planning the long-term delivery of port capacity to meet future demand on the east coast of Ireland.

We are at a pivotal moment now where answers are needed to three important questions:

- What level of port capacity will have to be provided to meet future demand on the east coast of Ireland over the next 20 years?
- Where will this additional capacity be provided?
- How will the projects needed to deliver this additional capacity be financed?

In answering these important questions, environmental challenges, planning challenges, financing challenges and national port policy challenges have to be considered.

Project	Capacity in gross tonnes per annum	Estimated cost for basic infrastructure	Capital cost per tonne of annual throughput capacity
DP 1.5 (Arklow)	60 million	€ 3,857m	€ 64
DP 2.0 Phase 1	*77 million*	*€ 4,873m*	*€ 63*
DP 2.0 Phase 2	*57 million*	*€ 1,121m*	*€ 19*
DP 2.0	134 million	€ 5,994m	€ 45
ABR Project T4	6.6 million[9]	€ 99m[10]	€ 15
Ringaskiddy Container Terminal	2.7 million[11]	€ 68m[12]	€ 25

“Not only are there good environmental and planning reasons to avoid building a new port, there are large financial benefits.

9 Based on 274,000 unaccompanied Ro-Ro units per annum at 24.1 gross tonnes per unit
10 DPC estimate of cost to completion
11 Based on 279,000 TEU per annum at 9.7 gross tonnes per TEU
12 Based on reported project expenditure of €80m less an assumed cost of €12m for cranes

Our analysis of these issues in the seven papers of the Dublin Port Post 2040 Dialogue leads to the following conclusions:

Conclusion 1

Dublin Port Company must complete all of the projects outlined in Masterplan 2040 to deliver infrastructure with an annual throughput capacity of 77 million gross tonnes by 2040.

Conclusion 2

Critically, this will require planning permission to be secured for the 3FM Project.

Conclusion 3

The achievement of a throughput of 77 million gross tonnes per annum by 2040 will require not only the completion of all of the infrastructure projects in Masterplan 2040; it will also require that the efficiency of port operations greatly increases so that port infrastructure is utilised to its maximum. This will require the elimination of systemic inefficiencies in existing supply chain operations.

Conclusion 4

Over the next 20 years, additional capacity at other existing east coast ports will be required so that, as Dublin Port approaches its ultimate capacity, volumes which Dublin cannot handle can be accommodated elsewhere.

Conclusion 5

During these 20 years, DPC will need to work on the DP1.5 project so that it can be brought through the planning process and construction started by about 2033 should that become necessary.

Conclusion 6

The projects to provide additional capacity in other ports and the project to construct DP1.5 can only be realised with State support – none of the projects and none of the port companies (including DPC) are capable of raising the project finance that would be required.

These six conclusions will inform DPC's contribution during 2021, firstly, to the preparation of the next Dublin City Development Plan and, secondly, to Government's review of the National Development Plan.

In publishing the seven papers, we have invited others to critique our thinking and to prepare detailed responses including, possibly, alternative analysis which yields different conclusions to ours. The long-term planning challenges faced by DPC are national challenges and it is important that future port capacity plans are formulated on the basis of as detailed a consideration of the issues as is possible.

www.dublinportpost2040dialogue.ie

COMHLACHT CHALAFORT ÁTHA CLIATH
DUBLIN PORT COMPANY

www.dublinport.ie