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CHARACTERISTICS OF THE EXISTING ENVIRONMENT IN THE DUBLIN DOCKLANDS AREA - BASELINE DATA



This section of the Environmental Report describes the current state of the environment in the Dublin Docklands Area. The existing environment was characterised by way of a description of the Environmental Receptors listed in Annex 1(f) of the SEA Directive. Some related Environmental Receptors have been combined, such as biodiversity, flora and fauna, in order to provide a clear and complete review of aspects of the environment. Thus, the following environmental receptors were used to characterise the existing environment:

- Biodiversity, flora and fauna
- Population and human health
- Soil
- Water
- Air
- Climatic factors
- Material assets
- Cultural heritage and landscape

As required by the SEA Directive, commentary is also provided on the likely evolution of the various environmental receptors in the absence of the implementation of the Master Plan 2008.

4.1 BIODIVERSITY, FLORA AND FAUNA

The Docklands Area has significant areas of open space (Figure 2), in particular Irishtown Nature Reserve, Sean Moore Park and Ringsend Park. These parks together with lands in public ownership, private gardens and other green space all contribute significantly to the biodiversity resource in the Docklands Area. In addition, buildings, bridges and undeveloped sites provide important wildlife refuges in the Area. Together these areas support a wide variety of common flora and fauna typical of an urban environment.



FIGURE 2 DISTRIBUTION OF THE PRINCIPLE OPEN SPACES WITHIN THE DUBLIN DOCKLANDS AREA

There are 8 designated areas for wildlife conservation in or adjacent to the Dublin Docklands Area (Figure 3 and Table 1).

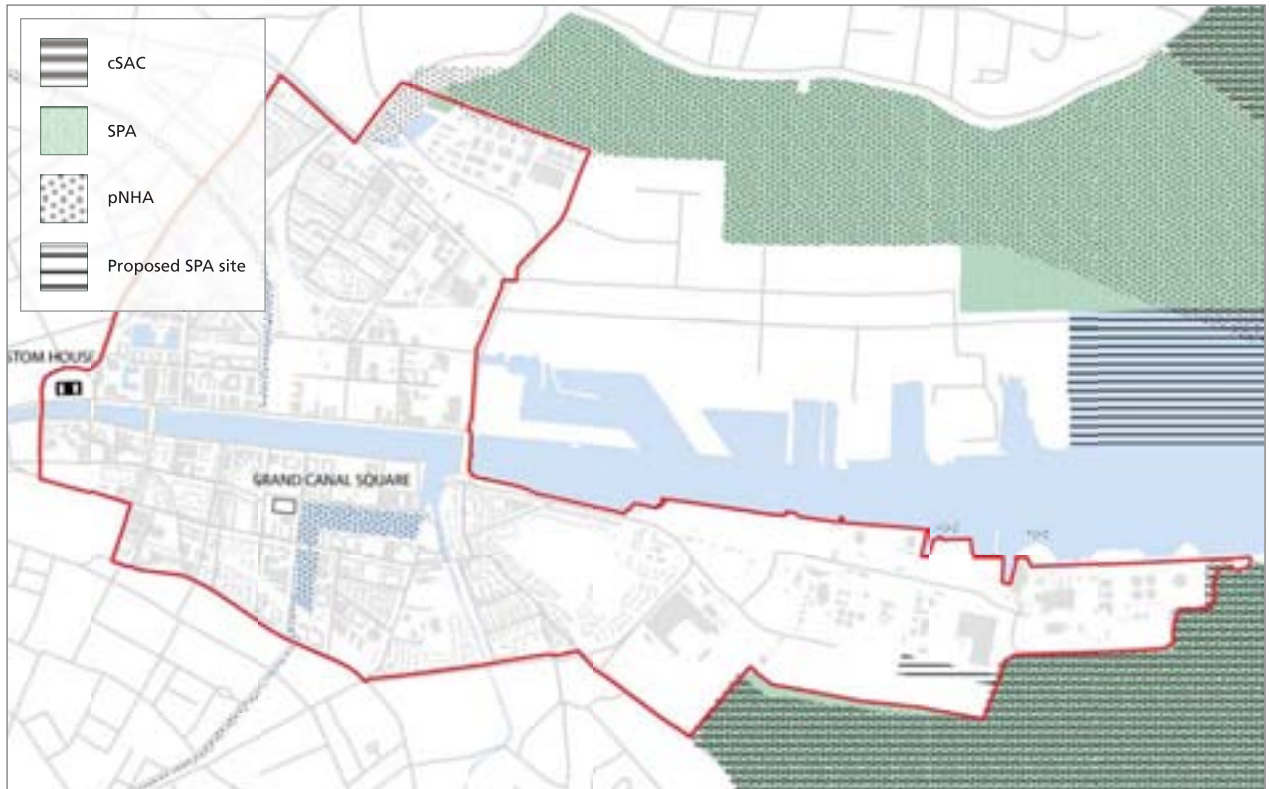


FIGURE 3 DISTRIBUTION OF THE EUROPEAN AND NATIONAL DESIGNATED NATURE CONSERVATION AREAS WITHIN AND ADJOINING THE DUBLIN DOCKLANDS AREA

cSAC: candidate Special Area Of Conservation SPA: Special Protection Areas pNHA: proposed Natural Heritage Area

Site code	Site Name	Designation
201	Dolphins, Dublin Docks	pNHA
206	North Dublin Bay	pNHA, cSAC, SPA
210	South Dublin Bay	pNHA, cSAC, SPA
2103	Royal Canal	pNHA
2104	Grand Canal	pNHA
4006	North Bull Island	SPA
4024	Sandymount Strand Tolka Estuary	SPA
	Dublin Bay	IBA

TABLE 1 DESIGNATED AREAS OF NATURE CONSERVATION WITHIN AND IN THE VICINITY OF THE DUBLIN DOCKLANDS AREA

NHA: The basic national designation for wildlife is the Natural Heritage Area (NHA) designated under the Wildlife Act (1976) and the Wildlife (Amendment) Act 2000. This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.

pNHA: There are 630 proposed NHAs (pNHAs) in Ireland, which were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats.

cSAC: candidate Special Area of Conservation. These are prime wildlife conservation areas in the country, considered to be important on a European as well as on a national level. The legal basis on which SACs are selected and designated is the EU Habitats Directive, transposed into Irish law in the European Union (Natural Habitats) Regulations 1997 as amended in 1998 and 2005. The Directive lists certain habitats and species that must be protected within SACs. cSACs are afforded the same protection as SACs.

SPA: Special Protection Areas. The EU Birds Directive provides for a network of sites in all Member States to protect birds at their breeding, feeding, roosting and wintering areas.

cSAC and SPA form part of the Natura 2000 network of European designated areas. These sites are afforded very strict protection under Irish and European law.

IBA Important Bird Area. This is a site listed by BirdLife International (of which BirdWatch Ireland is affiliated). This area consists of a shallow sandy bay with intertidal sand and mudflats situated between the Bailey Lighthouse at Howth and Sorrento Point at Dalkey.

The following site descriptions for the designated sites were taken from the Dublin City Biodiversity Action Plan 2008-2012

- **Dolphins Dublin Docks pNHA (201)** these form part of the Dublin Bay IBA and are protected under the Wildlife Act 1976 as amended in 2000. They are comprised of 2 mooring 'dolphins' in the River Liffey near Pigeon House Harbour. These 'dolphins' are used by nesting terns with approximately 350 pairs of common tern recorded in 2006. This pNHA is currently being considered for designation as an SPA for tern species and therefore would be treated as such by the NPWS.

- The **North Dublin Bay pNHA/cSAC/SPA** site covers the inner part of North Dublin Bay, the seaward boundary extending from the North Bullwall Lighthouse to the Martello Tower at Howth Head. Annex I Habitats include fixed dunes (2130), marram/shifting dunes (2120), embryonic shifting dunes (2110), dune slack (2190), annual vegetation of drift lines (1210), salicornia mud and sand flats (1310), Atlantic salt meadows (1330), Mediterranean salt meadows (1410), mud and sand flats (1140). Annex II species include Petalwort. The North Dublin Bay pNHA overlaps with the SPA and cSAC. The latter 2 include North Bull Island.
- The **South Dublin Bay pNHA/cSAC/SPA** site lies to the south of the River Liffey and extends from the South Wall to the West Pier at Dún Laoghaire. The largest stand of Eelgrass on the east coast occurs at Merrion Gates. New habitats are developing just south of Merrion Gates including embryonic dunes and a sand spit. This area is becoming increasingly important as a high tide roost site for waterfowl. EU Habitats Directive Annex I habitat: sand and mud flats (1140). The South Dublin Bay pNHA overlaps with the SPA and cSAC. The Department of the Environment, Heritage and Local Government has recently announced a proposed increase in the extent of the SPA designations from its current area of 1,700 ha to 2,190 ha. It is proposed to change the title and extend the existing Sandymount Strand/Tolka Estuary (4024) designation which will become the South Dublin Bay and River Tolka Estuary. The proposed SPA sites are now legally protected.
- The **Royal Canal pNHA** site includes the central channel and adjoining banks, hedgerows, tow-path grassland, open water, related scrub and related woodland. EU Habitats Directive Annex II species using the canal in the city limits include bats and otters. Opposite-leaved pondweed (*Groenlandia densa*) (Flora Protection Order, 1999) occurs in the canal. Green-winged orchid (*Orchis morio*) (Red Data Book) is found along tow-path grassland. Tassel stonewort (*Tolypella intricata*), a species of national importance is found along the Dublin stretches. Kingfisher (*Alcedo atthis*), an EU Birds Directive Annex I species feeds along the canal. However, none of these species are considered to occur within the limits of the Docklands Area. In addition, due to their location upstream from the Area, they would not be influenced by activity within the Docklands Area.
- The **Grand Canal pNHA** is an artificial waterway linking the River Liffey in Dublin with the River Shannon in the west. The areas designated include the main channel and banks. The Grand Canal regularly supports 11 different bird species over winter months, with on average 450 wildfowl including cormorant, little grebe, coote, moorhen, blackheaded gull, tufted duck, grey heron, mute swan, mallard and herring gull. Lesser opposite-leaved pondweed, a protected plant, is found in the Grand Canal, although not within the confines of the Docklands Area.
- The **North Bull Island SPA** is a sand spit that developed after the construction of the North Bull Wall. This island is covered in dune grassland. Other important ecosystems associated with the island are salt marsh and mud flats. The reserves are of international scientific importance for brent geese and also on botanical, ornithological, zoological and geomorphological grounds.
- The **Sandymount Strand/Tolka Estuary SPA** comprises a substantial part of Dublin Bay. It is of international importance for brent geese and of national importance for waterfowl species.

Whereas currently no management plans are in place for any of the above designations (Dr Rebecca Jeffrey, NPWS), there are draft plans for both cSACs and overlapping SPAs. However, they were compiled some time ago and require editing and updating before going through a period of public consultation. The SPA boundaries and qualifying interests are also undergoing review. Complete lists of flora and fauna existing at the various sites may be found in the EISs listed in the attached bibliography.

According to Dublin City Biodiversity Action Plan (2008) 33 different water bird species regularly occur in Dublin Bay, and frequently the bay supports in excess of 20,000 water birds over winter months. Internationally important concentrations of brent geese among other species also occur here. Other waterways such as the Rivers Liffey and Tolka support a significant wildlife resource

including otters, bats, Atlantic salmon (Habitats Directive, Annex II species), brown trout (Local Government (Water Pollution) Act 1999), sea trout (Fisheries Act 1959, 1999) and the kingfisher (Habitats Directive, Annex I species). Many waterways in the Docklands Area provide important feeding grounds and commuting corridors for a range of species.

According to an environmental study carried out for the North Lotts there are buildings within the study area which could potentially be suitable for roosting bats. Further bat surveys may need to be carried out before buildings are demolished as part of the redevelopment of the North Lotts. However, it is not considered likely that otters exist within the Docklands Area. In addition, studies carried out by the Authority for Poolbeg report that kestrels have been observed hunting on the peninsula.

4.1.1 EXISTING ENVIRONMENTAL PROBLEMS/ISSUES

The 1997 and 2003 Master Plans have led to the creation of more green space in which biodiversity can potentially flourish. However, the following are considered to be sources of concern regarding biodiversity, flora and fauna:

- Potential removal of habitats
- Potential reduction in size of habitats
- Potential risk to protected species from contaminated water

4.1.2 NON-IMPLEMENTATION OF THE MASTER PLAN

Were the Master Plan Review 2008 not implemented, the redevelopment of the Docklands Area would take place at a slower pace than that envisaged in the Master Plan 2008. Any proposed development adjacent to the South Dublin Bay Area would be required to reflect its significance in terms of nature conservation.

4.2 POPULATION AND HUMAN HEALTH

The Docklands Area has traditionally been made up of five residential communities, centred loosely in villages within the area, three on the north side and two on the south side. These are East Wall, North Strand, Sheriff Street/North Wall, City Quay/Westland Row and Ringsend/Irishtown. With the development of significant additional residential areas in International Financial Services Centre I and II, the Grand Canal Dock and North Lotts Areas, the residential profile of the Docklands Area has been strengthened considerably with the development of new residential communities. Population data from the Census of Population 2006 measures the changing population characteristics of the Area.

The socio-economic profile of the Area is outlined in Part 2 of the Master Plan 2008. Key indicators are as follows:

- The Docklands Area is continuing to exhibit population increase, with the overall population increasing from 17,414 persons in 1996, 19,705 in 2002 and 22,068 persons in 2006. Over the period 1996-2006, the population of the Area grew by c. 26.8%
- The most vibrant area of growth is evidenced in the 25-44 age cohort, which in 2006 represented 43.5% of the population with age-cohorts 0-14, 15-24 and 65+ experiencing decline. This has consequences in terms of the provision of services in the Area. It is also reflected in the characteristics of household units in the Area
- The increase in population has been reflected in the increase in households in the Area, with the overall number of households increasing from 8,387 in 1996 to 9,093 in 2002 and 11,069 in 2006. In the 10 year period from 1996 to 2006 an absolute growth of 2,682 households over the period occurred or 32%
- Reflecting the population profile of the Area, the type of housing differs from Dublin City and the State. Over half (51.6%) of the housing in the Docklands area in 2006 comprised flats/apartments/bedsits. This is significantly higher than that evidenced in Dublin City at 31.0%. Apartment building is the primary type of residential accommodation being constructed in the Docklands Area.
- The average household size in the Area in 2006 was 2.3, compared with 2.5 for Dublin City and 2.8 nationally
- The Docklands Area is characterised by a high labour force participation rate at 62.5%, and an unemployment rate of 5.1%. It is recognised however that pockets of unemployment still persist within the Area
- Since 1997, initiatives counteracting educational disadvantage in the Docklands Area have been successful. In the period 1997 to 2005, the percentage of children from the Docklands Area dropping out of school before the age of 12 has decreased from 35% to 13% and before the age of 15 from 65% to 30%. The percentage of those opting for higher education has increased from 1% to 10%. It is recognised that the level of early school leaving is still too high and requires concerted initiatives to be reduced further.
- Educational attainment in the Docklands Area has increased with current levels higher than those in Dublin City or the State. The percentage of residents with a primary or postgraduate degree or higher qualification in 2006 was 30.4% compared with 22.4% for Dublin City and 12.9% for the State. This is matched with a decline in the percentage of the population with primary or upper/lower secondary education
- Docklands residents have adopted sustainable travel patterns. In 2006, walking had the highest mode share for journey to work and education. At 46%, this is more than twice that of Dublin City (which includes the Docklands Area) of 22%
- At least 19% of the population of the Docklands Area walks more than 2km to work or education. A further 27% live within 2km of their destination. Reflecting this, most trips to work and education (69%) from the Docklands Area take less than half an hour

4.2.1 EXISTING ENVIRONMENTAL PROBLEMS / ISSUES

The environmental impact of the Master Plan 2003 has led to environmental improvements in the Area as evidenced by the annual Master Plan monitoring reports. In particular soil remediation, infrastructure improvement and development of open spaces and public realm have had positive environmental impacts.

Community consultation undertaken as part of the Master Plan 2008 indicates the following environmental issues of concern to the community living in the Docklands Area:

- Delivery of infrastructure simultaneously with development
- Delivery of public transport.
- Community greening.
- Development of open spaces and recreational amenities for a variety of users including children, the youth and senior citizens.
- Access to public waterways and full utilisation of water bodies
- Development of waste management measures.

4.2.2 NON-IMPLEMENTATION OF MASTER PLAN 2008

Were the Master Plan 2008 not implemented, the redevelopment and renewal of the Area would take place at a much reduced pace. The rate of growth of the residential population would not take place at the rate anticipated in the Master Plan. The delivery of infrastructure and services would be at a slower pace.

4.3 SOIL

The geology of the Docklands Area is comprised of a limestone bedrock overlain by a stiff to hard gravelly clay (Dublin Boulder Clay) which is in turn overlain by alluvial deposits of silty clay and sandy gravel. Much of the Docklands Area is built on reclaimed land from the River Liffey. The following table (Table 2) outlines the typical geo-technical characteristics of the geology in the Area.

Layer Description	Layer Characteristics	Estimated Depth of Layer
Filled Ground	Gravelly clay fill with fragments of glass, clay, brick, plastics, metal, timber, ash and ceramics.	0-5m
Soft Black Silty Clay	Alluvial deposits ranging from 1-2m thick and generally soft flow shear strength.	1-2m
Glacial Boulder Clay	Stiff to hard with occasional interbedded gravel layers.	3-10m
Limestone	Varies from weak to moderately strong and strong to very strong.	7-20m

TABLE 2 SUMMARY OF THE TYPICAL GEO-TECHNICAL CHARACTERISTICS OF THE GEOLOGY IN THE DUBLIN DOCKLANDS AREA

Source: Environmental Report, Dublin Docklands Master Plan 2003.

A desktop study of former land uses within the Docklands Area, together with site investigation data from development proposals within the Area, indicated that some sites have been contaminated by former industrial uses. This is consistent with Dockland areas throughout the world, reflecting the nature and character of such sites. One heavily contaminated site, the former gasworks on Sir John Rogerson's Quay, has been decontaminated by the Authority.

A Soil Deposition Strategy for the North Lotts Area was commissioned by the Authority in January 2008, from Mouchel Consultants. The main objective was to estimate the volume of each category of waste soil to be removed and to establish a strategy for its safe removal and disposal. The categories of waste soil ranged from 1-5 representing varying degrees of contamination. Category 1 was defined as inert i.e. not contaminated, whereas category 5 was defined as 'hazardous'. Estimated volumes for each category (for North Lotts only) are summarised in Table 3.

Assumed depth of made ground	Waste disposal route	Best case scenario (m3)	Worst case scenario (m3)
Made ground to 3m blg* with natural ground below	Category 1	150,210	125,175
	Category 2	229,853	107,925
	Category 3	67,218	181,350
	Category 4	19,692	48,136
	Category 5	2,188	6,564
Made ground to 4.5m blg* with natural ground below	Category 1	90,390	75,325
	Category 2	259,720	92,963
	Category 3	87,145	221,200
	Category 4	28,661	70,059
	Category 5	3,184	9,554
* Blg: below ground level			

TABLE 3 SUMMARY OF ESTIMATED VOLUMES OF SOIL WASTE TO BE REMOVED FROM THE NORTH LOTTS AREA

Source: Soil Deposition Strategy, Mouchel Consultants.

A number of Environmental Impact Statements were consulted during the course of this work and in general they all concur with regard to soil. Development in the Area results in the removal of previously contaminated soil to suitably licensed landfill facilities. Where hotspots of contamination exist arrangements have been put in place to remove the soil to appropriate disposal sites either within Ireland or abroad. In cases where large quantities of uncontaminated soil are required to be excavated for construction of building basements arrangements to reuse the excavated gravel for concrete aggregate are made where possible. In addition, both mud and dust generated during excavation require mitigation and control measures to be implemented.

4.3.1 EXISTING ENVIRONMENTAL PROBLEMS/ ISSUES

The removal of decontaminated soil from the Docklands Areas is on-going. The decontamination policy adopted by the Authority continues to lead to an improvement in soil quality in the Area.

4.3.2 NON-IMPLEMENTATION OF THE MASTER PLAN

Were the policies and objectives of the Master Plan 2008 not to be implemented, the likelihood is that, in the absence of redevelopment of the Area, existing contaminated sites would remain contaminated pending redevelopment.

4.4 WATER

The Docklands Area is dominated by waterbodies. According to the Water Framework Directive (WFD) water bodies can be classified as either surface, coastal or groundwater. Water quality monitoring is not carried out on a regular basis within the Docklands Area itself. However, data exists for EPA monitoring sites at Lucan (approximately 14km upstream from the Docklands), on the River Liffey and at Milltown (approximately 4km upstream of the Docklands) on the River Dodder. In addition, ground-water data are available through previous studies such as point sampling for environmental impact statements and a study on geology, hydrogeology, geochemistry and numerical modelling conducted by the Environmental Engineering Research Centre in Queens University Belfast. The current status of the water bodies for which data are available is as follows:

4.4.1 MAIN WATER BODIES IN THE AREA

4.4.1.1 RIVER LIFFEY

The dominant water body within the Docklands is the River Liffey, which flows from West to East bisecting the Area. It is typical of a large lowland river with a significant urban catchment. The water quality in the Liffey deteriorates as it becomes tidal as it receives increasing quantities of polluted surface water and effluent from the Ringsend wastewater treatment plant. The EPA water monitoring site located at Lucan was classified as having a Q value of 3 in 2002 and again in 2005 implying the water is moderately polluted at this point. The Q Value system describes the relationship between water quality and the macro-invertebrate community in numerical terms. Well documented changes occur in the macro-invertebrate community in the presence of organic pollution. Q5 waters have high diversity of macro-invertebrates and good water quality, while Q1 have little or no macro-invertebrate diversity and bad water quality.

A number of studies have been carried out in relation to sediment contamination and benthic fauna composition of the Liffey estuary, including the North Lotts section of the river. O'Higgins and Wilson (2005) investigated the physico-chemical status of a number of stations, including the North Lotts stretch. The sediments in the North Lotts Area have a silt-clay content of between 10% and 20% with levels of sediment contaminants above those defined by Jeffrey et al., (1985) as 'baseline' or indicative of unpolluted conditions. Wilson et al., (1986) reported no macro-faunal life at all from sediments in the North Lotts Area and only a few ciliate and nematode micro/meiofauna. More recent samples, taken in October 2007, off the North Lotts and landward of the East-link Bridge found only a single juvenile soft-shelled clam (*Mya arenaria*). The mud at those sites was extremely soft, with a very shallow RPD (redox potential discontinuity zone: in the sediment where oxidising conditions prevail) and smelt strongly of hydrogen sulphide. There was strong evidence of terrestrial inputs in the form of partially decomposed plant and leaf debris. As a result of these findings the North Lotts section of the estuary was classified as abiotic (Wilson, 2003).

4.4.1.2 RIVER DODDER

The Dodder was classified as having a Q value of 3 in 2002 and again in 2005 implying moderately polluted water at the sampling point (Milltown). The water was reported to be polluted at the Grand Canal Dock despite the tidal influence.

4.4.1.3 GRAND CANAL BASIN/GRAND CANAL

Water quality in the Grand Canal Basin has been adversely affected in recent years by an outfall discharging foul sewage into the southern end of the Inner Basin during periods of high rainfall episodes. Section 25 certification has issued to Dublin City Council to pipe the outfall through the Grand Canal Basin and the Authority's lands to the north, to discharge into the River Liffey, where its impact will not be significant.

The Grand Canal has been the most vulnerable of the water bodies to pollution within the Docklands Area. The relatively long retention time and low throughput of water makes it similar to a small lake and is particularly susceptible to pollution through leaching or direct discharge of both solid and liquid material from the catchment.

The Grand Canal is a freshwater body and is free from heavy metal contamination as it passes through the centre of the Basin. In addition, both Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) reach acceptable levels for fish survival. As the canal enters the basin suspended solid concentration decreases due to the enhanced settlement and flocculation in the large enclosed space. BOD was previously at a high level due to contamination from the former Dublin Gas site. However, this site has since been decontaminated by the Authority.

4.4.1.4 GEORGES DOCK/INNER DOCK

The water quality in both George's Dock and the Inner Dock has improved through the actions of the Authority. Aeration has been introduced to both Docks. The outer dock is aerated by use of the fountains. The water has been temporarily removed from George's Dock.

4.4.1.5 SPENCER DOCK/ROYAL CANAL

The relatively long retention time and low throughput of water makes these water bodies similar to a lake and are susceptible to pollution from leachate and discharge from the catchment. However, there is a reasonable flow through the dock, and in times of heavy rainfall it is substantial.

4.4.1.6 COASTAL WATER

The water quality of the Liffey estuary and Dublin Bay has significantly improved since the upgrade of the Ringsend wastewater treatment plant to include tertiary treatment. The discharge of untreated sewage to the Bay has ceased and this has subsequently led to a significant improvement in coastal water quality. According to the Environmental Protection Agency coastal water quality in Dublin Bay has been classified as unpolluted i.e. non-eutrophic for a continuous period from 1999 to 2005. In addition, the quality of the estuarine water of the Liffey has improved in recent years from being eutrophic (increase in nutrient loads especially phosphorous and/or nitrogen compounds) in the period 1995-1999 to being of intermediate (signs of some nutrient enrichment) quality in 1999 to 2005.

There are a number of public bathing amenities, including Sutton, Burrow Beach, Dollymount Strand, Merrion Strand and Sandymount Strand, within the vicinity of the Docklands Area which have the potential to be influenced by development. Bathing water quality at these locations has shown an improving trend over recent years (1998 to present). Under the EU bathing Water Directive (76/160/EEC) compliance with mandatory standards for micro-biological and physio-chemical parameters must be maintained. Furthermore, national limit values are set for a number of additional parameters (dissolved oxygen, total coliforms, faecal coliforms, and faecal streptococci). 'Blue Flag'

awards are given to beaches which meet certain very stringent water quality criteria. Dollymount Strand achieved this status in 2000. However, Blue Flag status is not an accurate guide for coastal water quality as not all beaches apply to be ranked and the selection criteria do not only relate to water quality. However, according to the GSDS (2005) the overall water quality of Dublin Bay, including off-shore waters is good.

4.4.1.7 GROUNDWATER

A relatively recent report on the geology, hydrogeology, geochemistry and numerical modelling conducted by the Environmental Engineering Research Centre in Queens University Belfast collected and collated all existing data relating to geology etc of the Dublin Region. The report highlighted the fact that there is currently very little information regarding the overall extent and nature of the Dublin aquifer system. In addition, little is known about the quality of groundwater in the Dublin aquifer and there is currently no groundwater monitoring being carried out in the Dublin Region. However, the report contained some information on the groundwater quality in the Docklands Area from borehole data collected by various consultants for development purposes.

The report suggested that groundwater in the Dublin Region including the Docklands Area could be considered as having high to extreme vulnerability as groundwater level was relatively close to the surface. In addition, the overlying strata were considered not to be thick enough to guarantee low travel times of pollutants. The report concluded that much more data were required to establish the true quality of the groundwater in the Dublin Region.

Contamination of groundwater by hydrocarbons, arsenic, heavy metals and volatile organic compounds, typical of industrial activity, has been reported in a number of environmental impact statements of development proposals in the Docklands Area.

4.4.2 EXISTING ENVIRONMENTAL PROBLEMS/ISSUES

Water quality in the Area is a result of complex interactions at both the local and regional levels. The upstream catchment areas of the various rivers in the Docklands contribute to the pollution load recorded in water quality in the Area. In addition, the natural vulnerability of the groundwater to contamination should be borne in mind.

4.4.3 NON-IMPLEMENTATION OF THE MASTER PLAN

In the event of non-implementation of the Master Plan Review 2008, the potential exists for a negative impact on water bodies in the Area arising from a lack of capacity for wastewater treatment at regional level.

4.5 AIR

Obtaining accurate air quality data for the Docklands Area has proved problematic due to the short and discontinuous nature of previous monitoring programmes which make it impossible to accurately describe the state of the environment regarding air. However, a number of sources have been identified but which may not accurately reflect the current situation due to the time lag since monitoring was conducted. The most recent data stems from the EIS for the Dublin Waste to Energy Project for which air monitoring was carried out on the Poolbeg peninsula. Main sources of air pollution were considered to be from existing industry in the area and traffic. A fixed monitoring station was setup at the Irish Glass Bottle site at which both NO₂, and PM₁₀ were monitored. Both pollutants exceeded recommended standards but it was considered this could be corrected through traffic management measures. Air quality monitoring was carried out using a mobile monitoring unit on Pearse St., by the Environmental Protection Agency over an 8-month discontinuous period between July 1999 and July 2000 (EPA, 2000). Monitoring of carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x), particulate matter (PM₁₀ and PM_{2.5}), benzene, lead and other metals was carried out. None of the EU Air Quality Directive (1999/30/EC) limit values were exceeded for PM₁₀, NO₂, NO_x, CO, SO₂, benzene, lead, arsenic or mercury during monitoring.

4.5.1 MONITORING RESULTS FROM EPA REPORT 2000

4.5.1.1 PARTICULATE MATTER

The average daily concentration over the 8-month monitoring period (1999-2000) was 29.7 µg m⁻³. The 24-hour limit value for the protection of human health (50 µg m⁻³ PM₁₀; 35 breaches permitted annually) was breached only 12 times during the 8-month monitoring period. This suggests that the annual PM₁₀ values were well within EU limits. More recent monitoring of PM₁₀ in 2003 by Arup Consulting Engineers for East Wall Traffic Management Scheme EIS over an eight-week period revealed eleven exceedences of the 24-hour limit value.

4.5.1.2 NITROGEN DIOXIDE (NO₂) AND OXIDES OF NITROGEN (NO_x)

The average hourly NO₂ and NO_x concentrations over the study period (1999-2000) were 52 and 122.6 µg m⁻³ NO₂. The hourly NO₂ limit value for the protection of human health (200 µg m⁻³ NO₂; 18 breaches permitted) was breached only 9 times during the 8 month monitoring period. All the breaches occurred during one pollution episode on the 28-29 July 1999. Therefore, it is considered that the annual NO₂ and NO_x concentrations were well within EU limits.

The use of the city centre by heavy goods vehicles (HGVs) has been restricted with the opening of the Dublin Port Tunnel and the introduction of the ban on 5+ axle vehicles, which has resulted in a reduction in HGVs of between 85% and 94% in the city. Before the Dublin Port Tunnel was opened Dublin experienced 9000 HGV journeys daily. The tunnel will have given rise to cleaner air although data is not yet available to quantify the improvement.

4.5.2 EXISTING ENVIRONMENTAL PROBLEMS/ ISSUES

It can be deduced that air quality in the Docklands Area is generally improving. Due to the lack of monitoring in the Area quantifying this statement is difficult.

4.5.3 NON-IMPLEMENTATION OF THE MASTER PLAN

At present, air pollution occurs in the vicinity of heavily trafficked routes arising from vehicle emissions. Decreases in air pollution are anticipated arising from emission controls and stringent traffic management in Dublin City Centre. In the event of non-implementation of the Master Plan 2008, the situation regarding air quality would remain unchanged.

4.6 CLIMATIC FACTORS

There is currently no data available on greenhouse gas (GHG) emissions in the Docklands Area. However, a number of strategies and initiatives are being developed as part of the National Climate Change Strategy 2007-2012 which will permit inventories of GHGs from different sectors and areas to be developed. One such initiative is the Draft Climate Change Strategy for Dublin City, 2008, which reports that CO₂ emissions in the city can be divided between three major sectors – commercial 37%, residential 37% and transport 26%. There are also some emissions from the waste management sector. In 2006 Dublin City released approximately 4.23 million tonnes of CO₂ (approximately 9% of total Irish emissions) into the atmosphere. On average a Dublin resident releases 8.4 tonnes of CO₂ per year, while the Irish average is 11.3 tonnes, reflecting the need to travel less in the city.

DCC together with Codema has initiated an Action Plan on Energy for Dublin, which is currently under development. This Action Plan will provide a framework for development in the three sectors that contribute most to climate change in Dublin; the residential, commercial and transport sectors.

4.6.1 MAIN CLIMATIC FACTOR CONCERN

4.6.1.1 FLOODING

The Greater Dublin Strategic Drainage Study (GSDSDS) was commissioned in 2001 and completed in 2005 with the objective of developing environmentally sustainable drainage policies and strategies for the Dublin Region for the 30 year period up to 2031. The study identified the infrastructure required to service existing and new developments in the context of dealing with storm water and foul effluent. Because of the predicted increase in intensity and frequency of rainfall events it is anticipated that it will not be possible in future to remove the predicted volume of storm water through the current drainage system. Accordingly new strategies involving attenuation of rainwater (limiting the maximum outflow of rainwater usually by infiltration or storage) at source to limit the maximum flow from any development during heavy rainfall have been implemented. In tidal areas, finished floor levels of new buildings are being raised to accommodate any further increases in water level. Recommended future high tide levels are 3.4m AOD or 4m AOD for strategic infrastructure. Freeboard should be applied above these levels.

According to Mott MacDonald Pettit the Dublin Coastal Flood Protection Project recommends flood protection walls or embankments for Poolbeg peninsula should be at an average level of 4.5m. Existing flood defences were breached in February 2002 at East Link Toll Bridge, ESB Poolbeg Power Station and Sean Moore Park. Subsequently, several houses in the Sandymount area were also flooded. Works have been implemented already to address the flooding at Sean Moore Park and further works may be carried out as part of the S2S cycleway.

The Dublin Coastal Flooding Protection Project addresses the risk posed from tidal flooding (RPS, 2008). Extreme water levels for Dublin Port tide gauge are reported as follows (Table 4):

Return period	Extreme high water level Dublin Port Lighthouse	
	Extreme high water level (mLAT)	Extreme high water level (mODM)
2	4.86	2.35
5	4.99	2.48
10	5.12	2.61
20	5.26	2.75
50	5.42	2.91
100	5.54	3.03
200	5.64	3.13
500	5.75	3.24
1000	5.82	3.31

TABLE 4 PROJECTED WATER LEVELS FOR DUBLIN PORT
Source: RPS, 2008

The recommendations made by DCC were that an average of 4.15mm/year be considered in all development. This includes an allowance of 0.3mm/year for subsidence.

RPS (2008) also suggested that finished floor levels of any new buildings should take climate change (CC) predictions into account. They recommend a finished floor level of 4.23m (3.13m (200 yr return period) + 0.8m CC + 0.3m FB). A lower level may be used for structures which can be altered at a later stage such as floodwalls or demountable defences i.e the 2031 design level of 3.55m ODM (3.25m + 0.3m FB). Any old/existing structures should be altered to provide flood protection to the 2031 level or alternatively be designed with sufficient resilience in terms of flooding. Structures facing the River Liffey might require a higher freeboard, depending on design of the quay wall and frontage. In addition, particular attention should be drawn to all elements of infrastructure and their influence on flooding in terms of flood paths (e.g. telecommunication ducting, sewer and drainage) and resilience (e.g. moving key electrical installations/ switchboards to first floor level).

Dublin City Council are partners in an EU initiative entitled SAFER (Strategies and Actions for Flood Emergency Risk Management) the aim of which is to develop innovative strategies and prevent and mitigate fluvial and coastal flood damage by working with organizations and agencies at different levels. Results will be presented in 2008.

As part of the work on the Greater Dublin Strategic Drainage Study (GSDSDS) and the SAFER project the issue of coastal zone flood risk management has also been identified and addressed in part. The new tidal early warning system to deal with coastal tidal surges has already been put in place. The annual rise of 1mm per year is not significant in the short to medium term but could be significant if tidal surges become more usual as a result of more intense storm activity. The City Council has commissioned a pre-feasibility study for a project called Project 2030 that will investigate the potential for tidal barrages to protect the city and region. The significant investment in coastal zone flood risk management has already been put in place and will be further developed through the coastal zone flood risk assessment study (DCFRAS). In the timeframe 2025-2035 it is likely that the city will require the construction of tidal barrages and possibly off-shore islands, to dissipate wave energy.

A comprehensive study of the River Dodder catchment flood risk assessment and management is underway by RPS Consulting Engineers. The aims of the study will be to provide a flood hazard and risk map and a catchment flood risk management plan for the river.

4.6.2 EXISTING ENVIRONMENTAL PROBLEMS/ ISSUES

The existing environmental issues in relation to climatic factors are the lack of data on which to make accurate projections. However, due to the initiation of the projects mentioned above, it appears that the vast task to collect suitable data and identify ways of addressing impacts from climatic factors is underway.

4.6.3 NON-IMPLEMENTATION OF THE MASTER PLAN

Decreases in greenhouse gas emissions in Dublin City are anticipated arising from new policies and strategies relating to the National Climate Strategy. In the event of non-implementation of the Master Plan 2008, the situation regarding GHG emissions would continue to deteriorate.

4.7 MATERIAL ASSETS

Material Assets are dealt with under the following categories:

- Wastewater and water supply Infrastructure
- Transport Infrastructure
- Seveso sites

4.7.1 WASTEWATER AND WATER SUPPLY INFRASTRUCTURE

The Docklands Area contains considerable existing water supply and wastewater infrastructure, much of which is critical not only to the city, but to the region and even the state. It includes recently developed areas where much of the infrastructure has only recently been provided or upgraded and older areas where infrastructure may date back to the 19th Century. The Area is served by the wastewater treatment plant at Ringsend, which caters for the Dublin Region.

4.7.1.1 WASTEWATER/ STORM WATER COLLECTION SYSTEM

The Docklands Area is a predominantly low lying area with sewerage infrastructure dating back to Victorian times in some instances. The system is almost all combined, although some separation has been achieved by Dublin City Council in recent years. The system is characterised by a number of very large culverts. These were originally sized to allow access for maintenance. They now have the advantage of providing storage during high tides when flows from low lying areas cannot discharge to the River Liffey.

There are three sewerage pumping stations in the North Docklands area at Casteleforbes Street, Mayor Street and East Road. The first two stations pump sewage to East Road from where it is pumped through a tunnel underneath the Liffey to the Main Lift Pumping Station in Ringsend.

There is limited capacity in the sewers in the northern part of the Docklands Area and a new pumping station is being built at Spencer Dock. This will pump flows, via a new rising main, through a new tunnel underneath the Liffey. Most of the flows in the southern part of the Docklands Area flow to the 2.4m diameter city centre sewer, which discharges to the Main Lift Pumping Station.

4.7.1.2 WATER SUPPLY DISTRIBUTION SYSTEM

There are 600mm trunk water mains on North Wall, East Wall and Pearse Street. These are approximately one hundred years old and are the main conduits for supplying drinking water to the Docklands Area. There are still old cast iron pipes in many parts of the Area. These are being replaced on an ongoing basis. This is an ongoing process in the city as a whole. An extensive network of new pipes has been laid in parallel with recent developments.

4.7.2 TRANSPORT INFRASTRUCTURE

4.7.2.1 CYCLE AND PEDESTRIAN

There is extensive cycle and pedestrian infrastructure in the Docklands Area. In particular the Campshires provide an important east-west link, connecting the Docklands Area with the city, while providing high quality pedestrian and cycling facilities. The Sean O' Casey Bridge has provided an important north-south pedestrian link.

4.7.2.2 RAIL

The eastern part of the Docklands area is well served by heavy rail, including DART. DART stations at Grand Canal Dock, Pearse Street, Tara Street and Connolly serve the Area. The Spencer Dock Station, a new suburban and outer-suburban station, opened in March 2007.

4.7.2.3 LUAS

The LUAS Red line began operation in 2004. The service at present terminates at Connolly station. LUAS Line C1 is currently under construction which will run from Connolly Station to the Point Depot along Mayor Street.

4.7.2.4 BUS

The Malahide, Howth and Clontarf QBCs operate along the western boundary of the North Docklands Area, providing access to the city centre and to areas to the north, east and south. New express commuter services access the Docklands Area via the Port Tunnel. Airport express services operate via the Port Tunnel and terminate at Bus Aras. The following bus routes currently service the Area: 1, 2, 3, 53, 53a, 74, 74a, 90 and 151. The Pearse Street Bus Priority Scheme provides bus priority from Ringsend Garage to the city centre.

4.7.2.5 ROAD INFRASTRUCTURE

The Docklands Area is well served with road infrastructure. New development areas are developed on the basis of a network of new streets and squares, creating permeability and allowing movement through the Area. The opening of the Dublin Port Tunnel has allowed the introduction of a 5-axle ban in Dublin City Centre, with positive impacts on traffic volumes in the North Docklands Area.

4.7.3 SEVESO SITES

There are two Seveso sites in the Docklands Area at present with further sites coming on-stream (Figure 4). The two existing sites are the Dublin Bay power plant and the ESB Poolbeg power plant. Two further potential Seveso sites are anticipated to come on-stream on the peninsula; the proposed Dublin City Council waste to energy plant and the proposal by the National Oil Reserves Agency to store diesel at the Dublin Bay power plant.

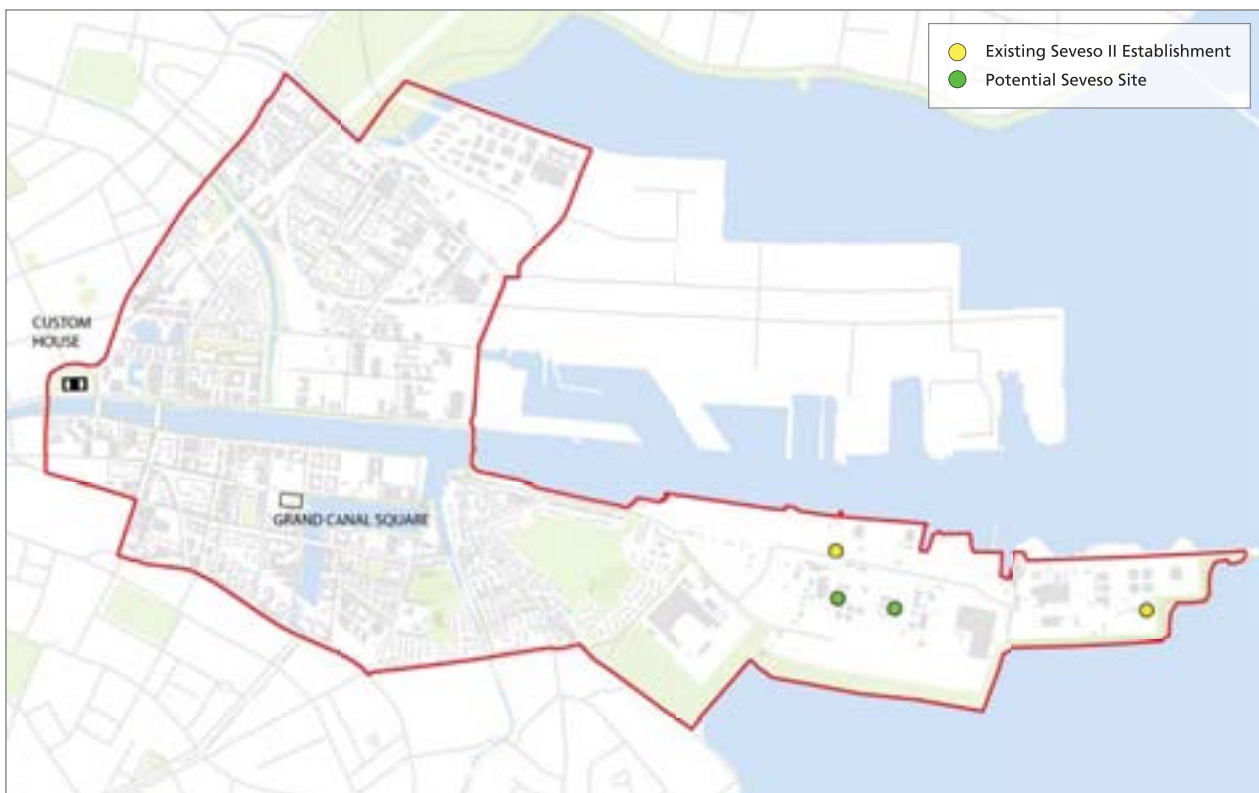


FIGURE 4 LOCATION OF EXISTING AND POTENTIAL SEVESO II SITES WITHIN THE DUBLIN DOCKLANDS AREA

4.7.4 EXISTING PROBLEMS/ ISSUES

4.7.4.1 WASTEWATER COLLECTION

Deficiencies exist in the capacity of the wastewater collection system in the Docklands Area. Dublin City Council Drainage Area Plan, 2002/ 2003, examined the drainage system then in place in the Docklands Area and made recommendations for upgrading of sewers based on the level of development then envisaged. The City Council are examining whether there might be scope to carry out some

of the works in the short term as development proceeds. Upsizing of the proposed network may be required to facilitate higher densities.

Spencer Dock Pumping Station was built for the Spencer Dock development and was based on the level of development envisaged in the original Planning Scheme. Another pumping station, rising main and new tunnel under the River Liffey may be required to facilitate new development.

4.7.4.2 WASTEWATER TREATMENT PLANT

The Ringsend wastewater treatment plant is considered to be operating at capacity. The expansion of the system is included in the DoEHLG capital investment programme 2004-2006. The operators are currently seeking a discharge licence from the Environmental Protection Agency. According to the Greater Dublin Strategic Drainage Study (GSDSDS) the capacity of the wastewater system (in the city centre and Docklands) is exceeded with excessive spills at combined sewer overflows causing pollution of the Liffey.

When the treatment plant at Ringsend is expanded, the increased capacity will not be sufficient for the future needs of the Dublin Region. Land constraints on the Poolbeg Peninsula mean that it cannot be expanded further and a second major treatment plant will be required in another location in the Region. There is also a proposal to build a new wastewater treatment plant in North County Dublin. Provision of the second plant will allow for areas in the city centre, including the Docklands Area, to convey their anticipated sewage loads to the expanded Ringsend waste water treatment plant. This has been identified in the GSDSDS where it was originally suggested that the second plant would need to be in place by 2011. It is now anticipated that it will be at least ten years before the second plant can be provided.

The Ringsend wastewater treatment plant is critical to sewerage treatment in the Dublin Region. All Dublin City Council's drainage infrastructure throughout the city converges on the Ringsend plant. Its operations are vital to maintaining the water quality in Dublin Bay.

4.7.4.3 WATER SUPPLY

The level of development now envisaged is at a much higher density than when the water network upgrades were designed. The trunk mains serving the Docklands Area are over a hundred years old. Even the most recently laid pipelines are considered to be inadequate for the level of development now being proposed.

Dublin City Council is to commission a formal study into large arterial mains but it will be several years before the results are available. All current indications are that the trunk main network is inadequate for the proposed new development in Ballsbridge/ Poolbeg/ Spencer Dock/ Point Village and other areas. It is likely that major new trunk mains will be required (for example, a large diameter trunk main may be required from Stillorgan Reservoir to Docklands).

The water supply infrastructure in the Docklands Area is considered to be close to capacity. Studies are currently underway on the two most feasible options for a new drinking water source for the region i.e. water from the Shannon River or desalination of seawater from the Irish Sea (Draft Climate Change Strategy for Dublin). A report on the outcome of these studies will be available in late 2008.

4.7.4.4 TRANSPORT

Connectivity and permeability within and outside the Docklands Area is affected by the presence of the River Liffey, the canals and existing rail infrastructure which create barriers to local movement.

Cycling infrastructure in the Docklands Area, although extensive, is disjointed and does not encourage cycling activity. The lack of cycling network in the surrounding area discourages cycling in general. The River Liffey acts as a barrier to north/south movement for pedestrians and cyclists. There are no crossing points for cyclists between the Eastlink Toll Bridge and Butt Bridge/ Talbot Memorial Bridge. Although walking has the highest mode for journey to work and education for residents in the Area at 46%, only 6% of residents cycled to work/education in 2006.

4.7.5 NON-IMPLEMENTATION OF MASTER PLAN

Were the Master Plan 2008 not implemented, the redevelopment of the Docklands Area would take place at a slower pace than that envisaged in the plan and delivery of infrastructure would be at a reduced level.

4.8 CULTURAL HERITAGE

The waterside location of the Docklands Area, in close proximity to Dublin City Centre provides an area of unique character and opportunity. The Area is not homogenous in nature and is characterised by a mix of high quality redeveloped areas, traditional village communities, major utility and amenity uses, industrial land, wildlife areas and underutilised/derelict sites. The cultural heritage and landscape of the Area are closely related and are dealt with together under the categories detailed below:

- Architectural Heritage
- Archaeological Heritage
- Waterbodies
- Open spaces
- Views

4.8.1 ARCHITECTURAL HERITAGE

The transport, maritime and industrial past of the Area has left a legacy of buildings and other features, many of which are Protected Structures, which contribute to the Area's unique character. Some of the Area's architectural heritage is of national/international significance as represented by the Custom House and the Custom House Quay (chq) building. A wide diversity exists in the range of architectural heritage in the Area. Protected Structures include a former gas holder, railway viaducts, a former power station, quay walls, bridges and warehouses. Parts of the Area however are not rich in architectural heritage, reflecting the fact that the Area comprises reclaimed land, a large proportion of which was subsequently used for port and industrial use.

The architectural heritage of the Docklands Area is protected under two mechanisms. These are

- The Record of Protected Structures (RPS)
- Conservation Areas under the Dublin City Development Plan 2005-2011.

There are no proposed Architectural Conservation Areas under the Dublin City Development Plan 2005-2011 in the Docklands Area. The identification of areas suitable for Architectural Conservation Area status is under review in consultation with the City Council.



FIGURE 5 LOCATION OF CONSERVATION AREAS AND PROTECTED STRUCTURES WITHIN THE DUBLIN DOCKLANDS AREA

4.8.1.1 THE RECORD OF PROTECTED STRUCTURES

Protected Structures identified in the Record of Protected Structures in the Docklands are provided in Appendix II and illustrated in Figure 5.

Protected Structures are unevenly dispersed throughout the Area with concentrations in the western and southern parts of the Docklands Area. In parts of the Area the number of Protected Structures is low. This is evidenced in the North Lotts Area, the Poolbeg Peninsula, and the north-eastern quadrant of the Area which contain relatively few Protected Structures. Studies carried out by the Authority as part of the Master Plan and SEA process indicate that some Protected Structures in the Area have been removed for a number of years, prior to the making of the Master Plan 2003 (Table 5).

RPS No	Description	Location	Comment
984	Hailing station	Britain Quay	Conserved by record. Removal permitted in Grand Canal Dock Planning Scheme Amendment No.1, 2006
2954	Pumping Station	Forbes Street	Removal permitted as part of DCC planning permission under the 1963 Act (as amended) to decontaminate the Bord Gais site. Not included in Master Plan Specific Objectives Map 2003
4924 4925 6626	Cluster of structures forming former gasworks	Pearse Street/Macken Street	Removal permitted as part of DCC planning permission under the 1963 Act (as amended) to decontaminate the Bord Gais site. Not included in Master Plan Specific Objectives Map 2003
4927	Former Gas Works power house	Macken Street	Removal permitted as part of DCC planning permission under the 1963 Act (as amended) to the Bord Gais site. Not included in Master Plan Specific Objectives Map 2003
5351	Former pressure station	Misery Hill	Removed as part of DCC planning permission under 1963 Act (as amended) to decontaminate Bord Gais site. Dismantled, recorded and scheduled for re-erection. Not included in Master Plan Specific Objectives Map 2003
5952	Campion's public house	North Wall Quay	Removed as part of Spencer Dock development. Removal initially permitted under An Bord Pleanala decision. Removal subsequently permitted in North Lotts Planning Scheme 2002
7713	Crane	Sir John Rogerson's Quay	Removed by Dublin Port prior to purchase of campshire by the Authority. Not included in Master Plan Specific Objectives Map 2003
7714	Former Marine School-side pavilion	Sir John Rogerson's Quay	Removal permitted as part of DCC planning permission under the 1963 Act (as amended). Not included in Master Plan Specific Objectives Map 2003

TABLE 5 PROTECTED STRUCTURES REMOVED IN THE DUBLIN DOCKLANDS AREA
Source: DDDA

The Authority has informed Dublin City Council of Protected Structures no longer in the Area with a view to updating the Record of Protected Structures.

4.8.1.2 CONSERVATION AREAS

The Dublin City Development Plan, 2005-2011, identifies a number of Conservation Areas in the Docklands Area at the following locations:

- The River Liffey from the city centre to Spencer Dock
- River Liffey quaysides
- Grand Canal Dock/Grand Canal
- George's Dock
- Spencer Dock/Royal Canal
- The Custom House
- The River Dodder
- The South Wall
- Pigeon House Dock
- Thorncastle Street, Ringsend (south end)
- Pearse Square
- Residential area located between Irishtown Road and Bath Avenue, Ringsend

The relatively high proportion of the Area covered by Conservation Area status reflects the unique character and environmental quality of parts of the Area (Figure 5).

4.8.2 ARCHAEOLOGICAL HERITAGE

Archaeological heritage in the Docklands Area is protected under two mechanisms:

- The Record of Monuments and Places
- Zones of Archaeological Interest under the Dublin City Development Plan 2005-2011

4.8.2.1 RECORD OF MONUMENTS AND PLACES

The Record of Monuments and Places establishes recorded monuments in the Docklands Area under Section 12 of the National Monuments (Amendment) Act, 1994. These are listed in Table 6.

Location	Description	Mon No.
North Wall/ Custom House	Quay	DU018-020564
City Quay	Quay	DU018-020479
Sir John Rogerson's Quay	Quay	DU018-020201
George's Quay	Quay	DU018-020458
York Road/ Pigeon House Road	Sea Wall	DU018-066
Great South Wall/Pigeon House Road	Sea Wall	DU019-02901
Pigeon House Road	Sea Wall site	DU019-02902
Pearse St	Glasshouse site	DU018-020325
Townsend St	Hospital site	DU018-0261
Pigeon House Road	Fort	DU019-027
Great South Wall Poolbeg	Battery	DU019-028
Poolbeg St	Church	DU018-020648
Custom House Quay	Glasshouse site	DU018-020152
Irishtown	Settlement	DU018-054
Irishtown	Church	DU018-054001
Pearse Street	Brickfield site	DU018-020439
Irishtown	Graveyard	DU018-05402
Central Dublin (part of)	Historic City	DU018-020
Ringsend	Settlement	DU018-053
Thorncastle St/ York Rd	Fort site	DU018-05301
Thorncastle St/ York Rd	Revenue House site	DU018-05305

TABLE 6 RECORD OF MONUMENTS AND PLACES IN THE DUBLIN DOCKLANDS AREA

4.8.2.2 ZONES OF ARCHAEOLOGICAL INTEREST

The Dublin City Development Plan, 2005-2011, includes Zones of Archaeological Interest in the Area as follows:

- Area centred on Thorncastle Street, Ringsend
- North Wall Quay, Custom House Quay, York Road, Pigeon House Road, Ringsend, Cardiff Lane (east side)
- Sir John Rogerson's Quay, City Quay including lands to south
- Area centred around the junction of Irishtown Road and Bath Street, Irishtown
- Area centred around Pearse Street/ Townsend Street area

Zones of Archaeological Interest are illustrated in Figure 6.

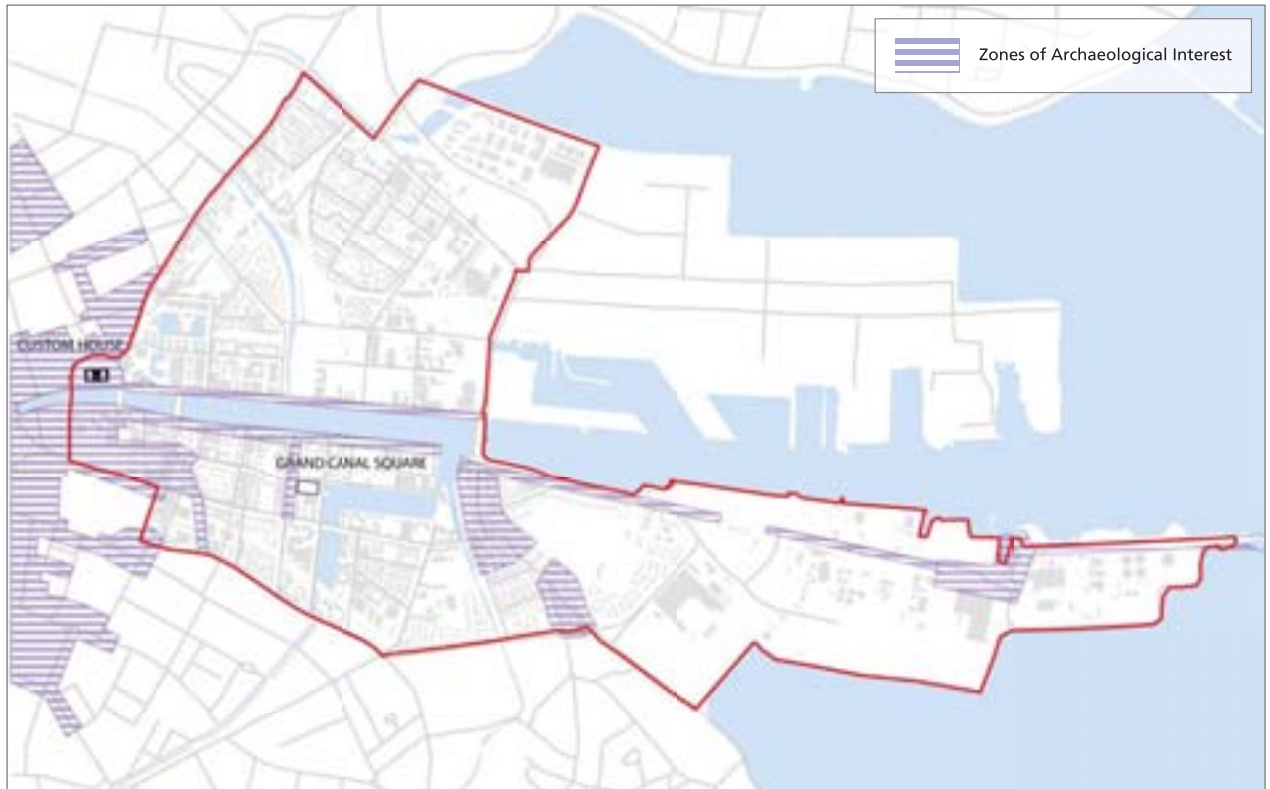


FIGURE 6 ZONES OF ARCHAEOLOGICAL INTEREST WITHIN THE DUBLIN DOCKLANDS AREA

4.8.2.3 UNDERWATER/ UNDERGROUND ARCHAEOLOGY

As yet, previously unrecorded archaeological sites such as submerged cultural landscapes or shipwrecks may lie undiscovered in the waters and lands of the Dublin Docklands Area. Other important archaeological maritime sites may survive in areas of reclaimed land, such as jetties, quay structures and fish traps etc. The DoEHLG notes the discovery of two unrecorded Mesolithic fish traps and a Neolithic structure during excavation works in 2005 in Spencer Dock demonstrates the high archaeological potential of the Area (K. Brady, DoEHLG).

The Shipwreck Inventory of Ireland has noted in excess of 10,000 possible wreck sites in Irish coastal waters but very many of these only have a general location. The inventory is largely based on documentary sources dating from after 1700AD, and there are therefore likely to be many wrecks from earlier periods of which no record survives. Wrecks over 100 years old and underwater archaeological objects are subject to statutory protection under Section 3 of the 1987 National Monuments Act.

The Shipwreck Inventory for Dublin lists hundreds of shipwrecks which may now lie submerged or buried within the River Liffey, Dublin Harbour and Dublin Bay. The Dublin Docklands Area is located on large tracts of reclaimed land that previously formed the entrance and anchorage to Dublin City and Port. Such areas of reclaimed land have the potential to retain buried shipwrecks, which may have been wrecked on earlier seabeds, river channels, sandbanks and shorelines. A list of recorded shipwrecks in the Area of the River Liffey, Poolbeg and the South Wall is included in Appendix III.

The DoEHLG considers the Dublin Docklands Area to be an area of high archaeological potential. Development in the Dublin Docklands Area may have the potential to negatively impact on known or potential submerged or buried archaeology. Proposed future developments in the Area will be required to take into consideration the archaeological potential of the Area and the likelihood that significant archaeological remains may be encountered during works that impact on the earlier riverbeds and sea-beds.

4.8.2.4 WATERBODIES

The water bodies in the Docklands Area play an important role in defining the character of the Area in addition to providing a valuable amenity and recreational resource. The River Liffey is the great 'form giver' of the city and the Docklands Area. The containment of the river to create a channel for shipping resulted in land reclamation on either bank, giving the Docklands Area the form it has today, deriving from the simple orthogonal grid pattern of streets and development blocks which were laid out in the early eighteenth century. The stretch of the River Liffey Quays from the Custom House to Spencer Dock is designated as a Conservation Area in the Dublin City Development Plan, 2005-2011.

In terms of recreational use, the river is used for cruise ship/visiting ship or boat berthage, canoeing and boat racing. The Maritime Festival, Liffey Swim and Liffey Descent are annual events. The Liffey Voyage operates on the river from March to November each year. The redevelopment of the campshires for public amenity use is ongoing and a project to 'green' the campshires has commenced.

The other key water bodies in the Area are Grand Canal Dock, George's Dock, the Inner Dock, Spencer Dock, the River Dodder and the Royal and Grand Canals. The former docks represent a unique architectural and engineering achievement and act as a reminder of the former port and industrial use of the Area. Water sports activities take place on Grand Canal Dock.

Public access is available to George's Dock, the Inner Dock and parts of Grand Canal Dock. The public will have access to Spencer Dock on redevelopment of the adjoining lands to the east. Public access is not currently available to Pigeon House Dock on the Poolbeg Peninsula.

Reflecting the contribution played by the water bodies in defining the character of the Docklands Area, Grand Canal Dock, George's Dock, Spencer Dock and those sections of the River Dodder and Royal and Grand Canals located within the Docklands Area are included as Conservation Areas in the Dublin City Development Plan, 2005-2011. Pigeon House Dock is also included as a Conservation Area. In conjunction with their Conservation Area status, George's Dock, the Inner Dock, Pigeon House Dock and Grand Canal Dock are designated as Protected Structures.

4.8.2.5 OPEN SPACES / PUBLIC REALM

The Docklands Area includes open space areas / public realm of diverse character and includes parks, squares, riverside/dockside walkways and coastal public amenity areas.

Open space provision is generous in the South Docklands Area and will be augmented by further development of the campshires along their full extent. In the course of the Master Plan 2008, public realm was enhanced by the development of amenity areas alongside Grand Canal Dock, the development of Grand Canal Square and smaller urban squares in the Grand Canal Dock Area. A total of over 30 hectares of public open space is available in Ringsend Park, Sean Moore Park, Irishtown Nature Reserve and smaller spaces such as Pearse Square.

The North Docklands Area is less well provided for in terms of open space/ public realm. Fairview Park adjoins the Area and is in easy proximity of the East Wall and North Strand communities. The development of the campshires and Mayor Square has enhanced public realm in the Area.

The Poolbeg Peninsula accommodates amenity areas of city-wide significance. These comprise the coastal walkway, the Irishtown Nature Reserve and the South Wall.

4.8.2.6 VIEWS

Extensive views are available of the city from the Docklands Area and of the Docklands Area from the city. The most significant view corridor in the Area is the River Liffey. A coherent urban form is emerging on the south side of the river. The redevelopment of the campshires, including the removal of former warehouse/ industrial buildings along the river frontage, is providing a unifying element to the view corridor.

Views from Dublin Bay and the south city are dominated by the Poolbeg Peninsula, which forms a significant landmark feature with its low rise land mass punctuated by high power generating chimneys, piled containers and a variety of utility and industrial buildings.

Other views of Docklands are available from a variety of vantage points and view corridors in the city. Of particular significance is the Fitzwilliam Street view corridor which runs in a northerly direction from Fitzwilliam Street and which has had implications for development in the western section of the North Lotts Area.

4.8.3 EXISTING PROBLEMS / ISSUES

The integration of Protected Structures into new development in a sensitive manner poses challenges for designers. For example, mitigation to prevent flooding requires raised floor level in new development and can make integration with existing Protected Structures difficult.

In addition, the Authority has experienced difficulties in convincing developers to find appropriate public (as distinct from private) uses for Protected Structures within their ownership.

Whereas the Liffey is the great 'form giver' of the city, it also acts as a divide between north and south river banks. North-south links in the Docklands Area are improving but are still less than adequate. The development of Sean O' Casey Bridge has provided an important pedestrian link between the Docklands Area and the south city centre. The Liffey Ferry has been introduced on Sir John Rogerson's Quay. The challenge exists to provide for improved pedestrian, cycling, public transport and private vehicular cross river linkages while also facilitating river regeneration.

Whereas the Area displays a wide variety of open space areas/ public realm, it is acknowledged that the full potential of such spaces is not always fully realised due to lack of public accessibility, poor layout or underutilisation. In addition some parts of the Docklands Area, in particular in the northern section of the Area, are not well provided with open space/public realm. Public access is not currently available to some potential amenity areas at Spencer Dock and Pigeon House Dock.

4.8.4 NON-IMPLEMENTATION OF MASTER PLAN

In the event that the Master Plan is not implemented, the status quo would be likely to prevail. Redevelopment and renewal would be likely to occur in a piecemeal fashion, rather than in the comprehensive manner envisaged.

Against this background, the opportunities for introducing new uses for Protected Structures would be more limited. Under-use or lack of use of the architectural heritage could mean that Protected Structures could have no viable future and their continued use could be threatened. The character of the existing Conservation Areas would remain largely unaltered in the shorter term. Sites/artefacts of archaeological interest would be largely unaffected.

The improvement of public access to the water bodies, the redevelopment of the campshires, the redevelopment of areas adjoining the water bodies and river regeneration would stall, as would the provision of additional amenity/open spaces/ public realm in the Area.

Views of the Area would undergo change at a slower pace than would arise on implementation of the Master Plan.

4.9 KEY ENVIRONMENTAL ISSUES ARISING FROM SCOPING EXERCISE AND BASELINE STUDY

A number of key environmental issues arise from the scoping exercise and the environmental baseline study which it is necessary for the Master Plan 2008 and SEA to address.

- The Master Plans 1997 and 2003 have led to the creation of more green space in which biodiversity, flora and fauna can potentially flourish. However, designated nature conservation areas within and adjoining the Area will require particular attention to avoid any negative impact on habitats or risk to protected species
- Water quality (surface, coastal and groundwater) in the Area is a result of complex interactions at both the local and regional levels. The upstream catchment areas of the various rivers in the Docklands contribute to the pollution load in water quality the Area. The natural vulnerability of the groundwater to contamination needs to be borne in mind
- Deficiencies exist at regional and local level in the capacity of the wastewater and water supply infrastructure. Deficiencies at regional level have implications, not only for the Docklands Area, but for development throughout the region and will necessitate local mitigation
- The roll out of Transport 21 will make the Docklands Area one of the most accessible parts of Dublin City. Despite this, some parts of the Area, in particular the Poolbeg peninsula are poorly served by public transport which will need to be addressed
- Connectivity and permeability within and outside the Docklands Area is affected by the presence of the River Liffey, the canals and existing rail infrastructure which create barriers to local movement and requires improvement. The challenge exists to provide for improved pedestrian, cycling, public transport and private vehicular cross-river linkages

- Climate change will continue to impact on the Docklands Area and will necessitate mitigation measures to deal with flood risk
- The Area is rich in architectural heritage which it will be necessary to integrate into new development in a sensitive manner. The rich architectural and archaeological heritage will require continued protection
- The Master Plans 1997 and 2003 have been successful in developing public open space, public realm and recreational amenities which it is important to continue to provide for a wide range of users.

4.10 DATA GAPS

A number of data gaps were identified while compiling the baseline data for the Docklands Area. Data gaps could be broken down into 2 main categories, as follows;

- a) data on the particular environmental receptor was not in existence,
- b) data on the particular environmental receptor was available but at an inappropriate scale.

Data on greenhouse gas emissions does not currently exist for the Docklands Area although there are a number of initiatives in place to address this gap. This type of data may become available in future through modelling and/or proxy information. Availability of data for water, soil, air, flooding and biodiversity existed but at the incorrect level of aggregation i.e. at an inappropriate scale both in temporal and spatial extent. For example, as regards water, data on water quality was available outside the Docklands Area and whereas the data was collected regularly it was not made available immediately thereby creating a long lag period. In addition, groundwater quality data was collected sporadically and from random boreholes in the Area thus not giving a spatially accurate coverage. It was considered that data on soil quality was available for isolated contaminated sites and nothing existed for the general condition of the soil throughout the Area. The major issues relating to data gaps for air pollution was the short and discontinuous nature of previous monitoring programmes thereby not providing an accurate analysis through space or time. As regards flooding, little information was available but mechanisms are in place to address this important gap. Finally, data on biodiversity was found to exist for some locations throughout the Area but there was little data available for the aquatic environment. Whereas many areas of nature conservation importance exist both within and adjacent to the Docklands Area which have been well documented there exists other areas within the Area where little information is available. In summary, data gaps exist within SEA due to the large spatial coverage of the assessment. Most of the monitoring has been conducted in isolation for once off objectives. The challenge for SEA is in getting good spatial coverage of information for all environmental receptors for the entire plan area.