Dublin South Bank

Strategic Development Framework

final report

for

Dublin City Council

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DEGW

PROJECT HISTORY

Document History

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A	June 2001	Current Tenancy Issues / Stakeholder Consultation
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C	Nov 14 2002	Final report submitted to City Council

Presentation History

Presentation No.	Date	Summary
1	22.08.01	First Client Steering Group presentation
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3	17.10.01	Presentation to City Managers and Client Group
4	08.07.02	Presentation material to D Gleeson for Councillor mtg

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1.0

executive summary

The Case for the Poolbeg Peninsula
In March 2001 the Dublin City Council (formerly Dublin Corporation) issued briefs calling for Urban Design and Land Use Studies for three specific areas in Dublin City; Heuston Station and Environs, City Markets Area and the South Bank Road Environs. All three areas either responded to pressure from current planning applications, or had a particular potential for regeneration. A comprehensive detail framework opens the option for a comparative review of proposals as well as providing the criteria for the assessment of individual applications.

All three areas were identified within the Dublin building Heights strategy - 'Managing Intensification and Change' (DEGW, 2000) as areas with high potential for change and in need of consolidation of character, intensification and amenity base.

A significant diversion from the original brief for the South Bank is the extension to the given site boundary that included development land to the south-eastern corner of the peninsular and currently identified as 'development' sites. At the outset of the project the case was made for the need to review those sites in the context of the Poolbeg Peninsula. Such arguments relate to:

- The significance of the geographic location of the South Bank site in the context of the overall peninsular as a gateway location with potential for establishing a new image and charac ter;
- The relationship of development sites to the large scale topographical features running across the peninsular;
- The wider scale impact of the future of the utilities and harbour, and
- The lack of strong character of the immediate physical built context.

The study boundary has been extended to include the entire Poolbeg peninsular.

From the very early stages of initial area evaluations the study recognised three major challenges. Our recommendations have taken a position towards these challenges.

1. The Poolbeg Peninsula - a unique character
The Poolbeg Peninsula is quite clearly a unique site in the context of Dublin in almost every way - physical / topographical, ecological character, existing land use and land ownership, cultural context and connotation and relationships to the city. Uniqueness relies equally on the 'opportunities' as well as the short and long term imposed 'constraints'. Furthermore in the context of the City of Dublin, the peninsular (other than potentially the operational harbour area to the north of the Liffey in the long run) is the only large undevelopable tract of land open to unique concepts for large scale city wide amenity close the city centre, which Dublin lacks in relation to other European cities. The relatively large scale and semi-institutional land ownership pattern of the area renders such an opportunity more 'realistic' in the long term than other parts of the city.

The key challenge here is how a development framework can capitalise on the unique character of the site by fulfilling short-term development objectives while in parallel preserving the long-term opportunities for 'a unique place' for Dublin city. This study suggests:

- Full development of the peninsular will considerably compromise both asset and social cultural value of the area and therefore proposes a 3- zone character concept;
- Allowance for a significant level of city wide amenity and preservation of sites for future facilities including a large reserve for public open space;
- Further review of ecological character and concept design of existing assets;
- Statutory designation at this point as a tool for moderating speculation on sites.

2. Role of the 'Plan' within a context of uncertainties
The second major challenge for the proposal for an overall plan deals with the level and number of uncertainties for the future development of large parts of the site. On the peninsula these primarily relate to the future of the utilities and associated infrastructure plans as well as the city wide transport plans currently under review.

Whilst the long term view (based on international practice and technological development of city services provision) suggests the retraction or relocation of most of the current uses, the short-term plans suggest the expansion of some of the current utilities. The danger of such unpredictability is the tendency toward piecemeal intervention without the clear understanding of implications for the overall future of the peninsular. In parallel, infrastructure plans (such as those relating to potential road infrastructure) are assessed within criteria relating to the needs of particular land-ownerships, again without consideration of the implications for future options for the wider area. The key challenge here is to identify the

remit and role of a 'development framework plan' considering the uncertainties and long term potential opportunities. Central to this is the ability of the plan to consider and incorporate at an early stage implementation parameters, which are necessary to safeguard the incredible opportunities of the site. The response on this issue involved:

- The level of flexibility of the plan. The plan fixes only primary infrastructure and zoning of develop ment capacities. Flexibility is maintained on all other fronts including different plans and designs within areas defined by the primary infrastructure;
- The proposed structure plan to allow for implementation of potential changes to utilities and other proposed infrastructure without compro mising the integrity of the overall intention (assumes 'clean' utilities);
- (This in itself opens up the possibility for housing on the site);
- The allowance for large scale facilities - flexibility for land use development over time in relation to demand, contribution to the city centre and to local amenities, liveliness and charac ter;
- Taking a position towards road plans;
- The role of short term uses for repositioning of the site;
- The need to Inform the South Bank planning application;
- The review of infrastructure servicing on basis of capacity need that takes into consideration overall levels of development not only individual sites.

3. A definition of capacity and character outside of an existing context and service plan.

Regeneration or redevelopment area plans within cities are informed by the potential of the existing context. 'Contextual drivers' may include the existing character and historic context, existing and potential infrastructure capacity, market demand, aspirations and need for new amenities to service a wider context and potentially, a new image. In the current case all these factors as the 'drivers' for new character are either non-existent or loosely defined, or characterised by uncertainties rendering them unsuitable as starting points. The challenge here is to identifiy and constructively justify key drivers that will inform capacity and character. This approach led to the following.

- A preliminary evaluation that tested a full capacity scheme within a reason able time frame found that it could not be supported on the existing road network and could not self-finance rail related public transport development. Therefore identified the clear need to establish alternative benchmarking standards with traffic management to give priority to brown field sites close to the city centre;
- Capacity to be based on good practice, sustainable development principles and area character;
- Favour low traffic generating types of development and land use (eg. housing, leisure, recreational amenity etc), including actively encouraging; experimental car-free development.
- Establishing the principle for residential development on the site- on the basis of inherently insufficient service capacity;
- Very high quality design particularly of initial developments;
- Emphasis on restructuring the site to include additional public space and adding high value outdoor active amenities. Suggests the need for a detailed landscape plan, and distribu tion of existing open space;
- Need for an overall plan open to piecemeal implementation.

2.0

introduction

2.1 BACKGROUND TO THE PROJECT

The brief for the South Bank Road Environs study (fig 1), hereon called the South Bank, called for consultants to review the area's potential as a significant employment location and to develop an urban design and use framework. Such frameworks that seek to define new areas through design guidance necessarily require in the first instance clarity of the context on which to draw character. Where clarity is not present, or adjacent development character is inappropriate for the site, new character definition should be based upon a city-wide design context, the 'demand' side of the development potential and urban design good practice. The subject area must then be of sufficeint scale to generate contiguous character of environment. Any arbitrary definition of new character is neither desirable nor sustainable in the city context.

The common characteristic of the 3 areas identified within the report 'Managing Intensification and Change - A Strategy for Dublin Building Height' (DEGW, 2000) is that they are areas with high potential for change (fig 2) and in need of consolidation of their character and amenity bases. All exhibit a parallel relationship to the city centre and city centre edge sites and therefore can potentially attract a similar cleintele. Significant differences however across the 3 locations are exhibited on:

- Local accessibility;
- Character and content of existing physical form;
- Levels of potential infill (physical and economic).

The potential of parallel commissions allows the development of a comprehensive understanding of 'city potential' as well as positioning ot specific areas on the 'supply/demand' map of Dublin as a whole. Although the brief does not call for a comparative evaluation, our study takes into consideration the overall city centre development context on the basis of previous research.

The broader aim of the study has been to develop a number of 'strategic scenarios' for future change.

That aim is met by a number of more detailed objectives:

- To review the aspirations and physical requirements of all stakeholders including the current land occupiers and owners;
- To understand the present role of the South Bank as principle public utility location for Dublin city and identify the

fig 1: The three Area Framework studies (Dublin City Council brief)

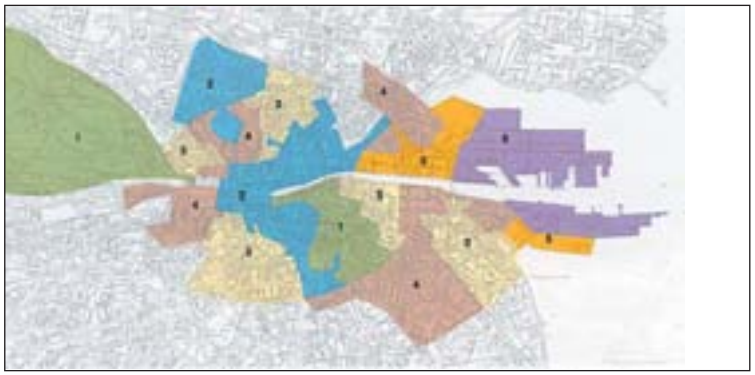

fig 2: Zones for change, DEGW 2000

future needs and potential retraction of those activities;

- To explore the opportunities afforded by this waterfront location to enhance the City and define a framework for development;
- To explore the potential capacity of the study area and set out a structure for development in coordination with public utility demands;
- To provisionally assess the transport infrastructure required; and,
- To set out time-scales and phasing for development based on public utility growth and change, design scenarios and undetermined transport parameters.

2.2 STUDY INTEGRATION

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2.2.1 Relationship to other studies

This study is one of a number of similar studies progressing in parallel, however depending upon the nature of the built context and city-wide positioning and timing, differences in study levels can be noted. Urban Design and Use Frameworks for the City Markets area and Heuston Station are in locations of clear and significant built context and known systems of public transport and road access. As a consequence these studies can contribute to more detailed guidance in the respective areas for short term development guidance.

In contrast the South Bank calls for longer term scenario identification and includes a higher degree of uncertainty affecting the potential timing of bringing this area of the city 'on stream'. The economic positioning of the South Bank will be influenced by other significant developments in the city and must be mutually supportive in this regard. Potential markets will need to be evaluated in light of the suggestions of other studies.

2.2.2 Relationship to the DDDA

A study initially undertaken in 2001 by Urban Projects, Dublin and continued by the Dublin Docklands Development Authority (DDDA) reviewed the future of the South Bank in terms of land use and transportation. Discussion with the DDDA has identified the need for co-ordination with the current study (to avoid overlap in baseline analysis) and to present a commonly agreed series of development scenarios. Future public display and consultation on both studies is anticipated.

The DDDA, as secondary authority, were included in the key stakeholder consultations for the South Bank. Their work supported many of the initial ideas on what the Poolbeg peninsula could potentially become.

2.2.3 Project ouputs – timing & scale

The most useful contributions of the study for the Dublin City Council at this stage in the lifecycle of the Poolbeg peninsula are threefold:

- definition of the roles of the area;
- identification of its future potential in a Dublin wide context and;
- setting out of a number of 'design' scenarios based on clear assump tions towards retention/retraction of current tenancies.

In this sense it is important to recognise the role of this study in relation to the timing of any development on the South Bank. The primary issue in this regard is the continued presence of both Port and public utility facilities in the medium to long term. New waste treatment plant, power generation plant and pontential refurbishment of the older Poolbeg Power station set clear parameters on future development and the possibility for change of use.

Balanced against this is the future potential of key city centre brownfield sites with waterfront locational characteristics such as the Poolbeg Peninsula and the rapid growth of the Dublin economy in the last 10-15 years. Though the take up of office space has slowed in the last 2 years (office vacancy rates now at 20% cf. 2% in 1999/2000) the strength of city centre / waterfront / high amentiy locations such as East Point and Spencer Dock is clear. Further development in these locations however must have regard to other business locations, particularly those to the west of Dublin (Park West, City West) that are experiencing higher than average vacancy levels.

Given the need to balance the above positions, a repositioning of the project was necessary (described in section 2.3). This shifted the levels of enquiry of the study from those of detailed design guidance to that of a strategic framework for the entire peninsula. This opens up the potential for the current study to feed into the Development Plan review study papers for 2003/2004.

2.3 REPOSITIONING THE PROJECT

Early enquiry into the study raised a number of important issues in relation to the original brief. Of these the most critical being the need to reposition the study to best equip Dublin City Council with the broad parameters for evaluating individual site developments on the South Bank.

The need for a repositioning of the study was driven by four key issues:

- Size of the study area considered in relation to the peninsula context;
- Lack of built context of character and type appropriate to set future design guidelines;
- High degree of uncertainty over key strategic issues (infrastructure, port, public utilities) and;
- Absence of a clear vision over what the South Bank could become.

2.3.1 Size of the Study Area

The ability to develop detailed design/ townscape guidance and site specific briefing is dependent upon three key factors:

- the size of the site;
- the amount and type of built space;
- its physical character.

In relation to the size of the site and immediate area, the current site, shown in fig 3, is too small to generate contiguous character and therefore a neighbourhood plan. It is also too small to add any significant content of built space and therefore drive change in its own right. Such change would include contributions to major infrastructural improvements and a much larger quantum of development would be required to drive extensions to the light or suburban rail system.

2.3.2 Extent of Built Context – Character Definition

In principle the site is too isolated to draw from its context. The lack of any immediate or significant character context on the site and wider peninsula predetermines the extent to which it is appropriate to evolve a definition of new character if wider sustainability objectives are to be met. Such objectives include mutually supportive local and regional economic strategies, flexible building types and range of tenure and appropriate area character that reflects a broader vision.

The site area does not exhibit a traditional city block structure. The adjacent residential layouts of Ringsend and Irish Town terminate on the boundary of Sean Moore Road and do not extend into the site. Similarly the definition of a public realm network is weak and the site is poorly connected into the wider area.

No immediate provision of amenity exists on the South Bank (except for open space) to support or direct particular development types and functions. Within the adjacent communties of Ringsend and Irish Town however there is a level of provision of amenity and 'soft' infrastructure. The question over amenity is central as it is this which facilitates the diversity of community. Encouraging a mix of use and tenure suggests that people who live on the South Bank may also work there.

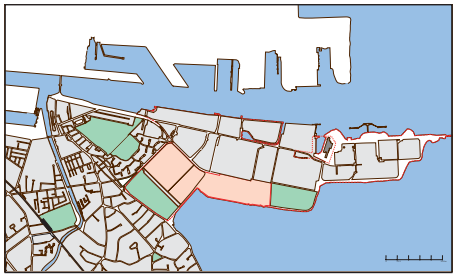

fig 3: Initial study area

fig 4: Minimal character of existing utilities

Local amenity - Sandmount

2.3.3 Key Strategic Issues Uncertainty

The relationship between land use and movement/access is complex. The character of an area will be influenced by the nature of its connection into both local, regional and European movement networks.

The future character of the South Bank as part of the city structure should be diverse and draw from as wide an area as possible. As a consequence current uncertainty over the East Link's at grade junction on the subject lands and connection into the local network and Dublin Port Tunnel project is of major significance.

The question over a future junction on the site could be viewed both in terms of its ability to offer direct access to the city wide network and a future international business market (airport connection), or simply as a means to enable greater HGV access to the port, public utilities.

Current servicing capacity to the South Bank (public transport and road) is insufficient to enable large scale change and growth across the whole peninsula. The ability of a long term bus focused public transport strategy will only support a limited quantum of development as evidenced by capacity studies of recent planning applications.

2.3.4 Defining a Clear Vision

A clear strategy for the future of the South Bank needs to be established on the basis of:

- the identification of the aspirations of all stakeholders and their physical/ spatial expectations;
- the particular site and local area characteristics;
- a confirmation of certain key strategic issues and;
- the aim to contribute positively to the city design context of Dublin.

This study deals with the majority of these issues but cannot address issues outside of its control. Whilst as much information as possible on the baseline position has been obtained through discussion with key stakeholders (NRA, City Council, Port Authority, Land owners and occupiers) resolution on certain issues has not been possible. Prime amongst those include:

- long term future of the Port;
- potential Thermal Treatment plant;
- alignment and at-grade junction connections of the East Link and;
- extensions to the light/suburban rail networks.

fig 5: Access network will drive land use and character

South Bank area bus connection with the DART a 15min walk

2.3.5 Key Implications

A redefinition of the project has implications for two main areas within the study:

1. The need for a more strategic view of the role of the peninsula in the wider Dublin context and;
2. The expansion of the project boundary to include the overall southern peninsula necessarily takes into account the current public utilities.

These two redefinitions immediately raise a number of different issues that where therefore included in our brief.

- the role of the public utilities, port and their future development;
- the future role of the peninsula in regard to its open space, ecological and historic value and the balance with potential development;
- the relationship of individual planning applications to a comprehensive framework for the peninsula;
- the connection of the peninsula into the wider movement and access networks and the capacity of these;
- direction on the phasing of develop ment in relation to other key city sites;

1. The Role of the peninsula

Development pressure within Dublin centre remains high despite the aforementioned vacancy levels of city fringe office employment locations. As such any available brownfield land in close proximity to the city center is a focus of attention for development. Further, any expansion within the docklands area calls into question the role of this whole eastern city edge as a new waterfront location that could be expressed equally as civic gateway or open space amenity. The site identified by Dublin City Council for the consultants' examination lies within the south docklands peninsula and critically at the junction point with adjacent communities. Implicit in the brief, therefore, is a review of the docklands, in terms of its waterfront value, its functions and its relationship to the city.

2. Expansion of the boundary

An expansion of the project boundary to include the entire peninsula not only takes in the majority of Dublin's utility operations but simialry expands the discussion on the growth of the city eastwards to its sea border. Expansion of the size implied by the south bank peninsula (108ha) will inevitably redefine the city as it is today and this study therefore explores possible future scenarios for the waterfront character of the city of Dublin.

The market implications of the type of change suggested through the development of three key areas in the city of Dublin are significant. Understanding of the role of each area and recognition of the need for mutually supportive employment locations has opened up the discussion on the need to evaluate at the level of the city region the performance of characteristics of market sectors. This is broadly evaluated within the study but calls for more detailed evaluation.

Summary of physical potential

Based on the boundary expansion position a comparative analysis was made on the potential for change (table 1). This table suggests that if the potential is determined within the boundary of the initial site area then only moderate change is possible over the key elements noted. If however the entire peninsula is considered then there exists far greater potential, especially for improvement to public transport, car movement, scale and image of future development.

fig 6: Area of recent planning enquiry

South Bank	Public Transport	Mobility	Proximity to Centre		Size	Image	Historic Importance
contribution to Dublin's position			Actual	perceptual			
Existing	-	+	-		- small	-	memory views chimney
Potential to change	+ (+++)	+ +++			+++ medium	+++	+

-	Weak / negative impact
+	Good
+++	High Potential to improve

table 1: Comparative site audit

3.0

Evaluation of a Unique Site

3.1 PHYSICAL CHARACTERISTICS - OPPORTUNITIES & CONSTRAINTS

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3.1.1 Strategic Position of the SIte

The significance of this site and its potential relies on a number of factors. These factors relate to the location of the site in a city-wide context, to Dublin within a European growth corridor and to the regeneration initiatives of adjacent areas.The importance of placing Dublin in a Global context, in relation to other world cities, is to understand the effect of this position on the success of recent developments such as Eastpoint and potentially those on the subject lands. Dublin has, and still is in the process of maximising this opportunity.

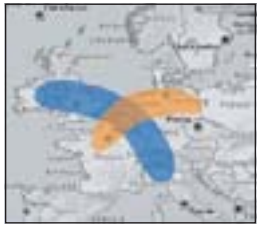


fig 7: Dublin sits within the European 'Blue Banana'

Part of the regional strategy (SPG, 1999)

Part of the uniqueness of the South Bank lies in its relative isolation, which though being largely perceptual is never-the-less reinforced by the 'cul-de-sac' structure of the peninsula, (ie not a through location). Characteristic of this type of location is a limited infrastructure capacity (poorly connected to access networks, road congestion already high and a purely local amenity base) coupled with a strong and ongoing public utility and port presence. These are key factors affecting the area's capacity for change. SIte specific issues relating to capacity potential are delt with in section 3.3.

In locational terms the site occupies a strategic position within the broader city context, lying within the eastern linear edge development of Dublin city (fig 8). This position is influened further by the locational characteristics of current development as mapped below (fig 9), which indicates three broad locational types:

- City core;
- City periphery and;
- Satellite (eg. Swords township).

Central here is the positioning of the site in relation to the current city centre boundary definition. Given the previous extension of the boundary east to the Grand Canal Dock the site could be

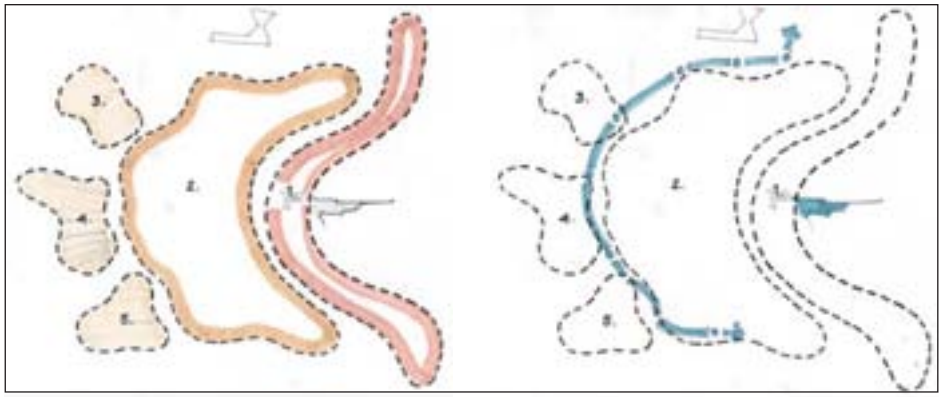


fig 8: The South Bank as part of an eastern edge growth corridor

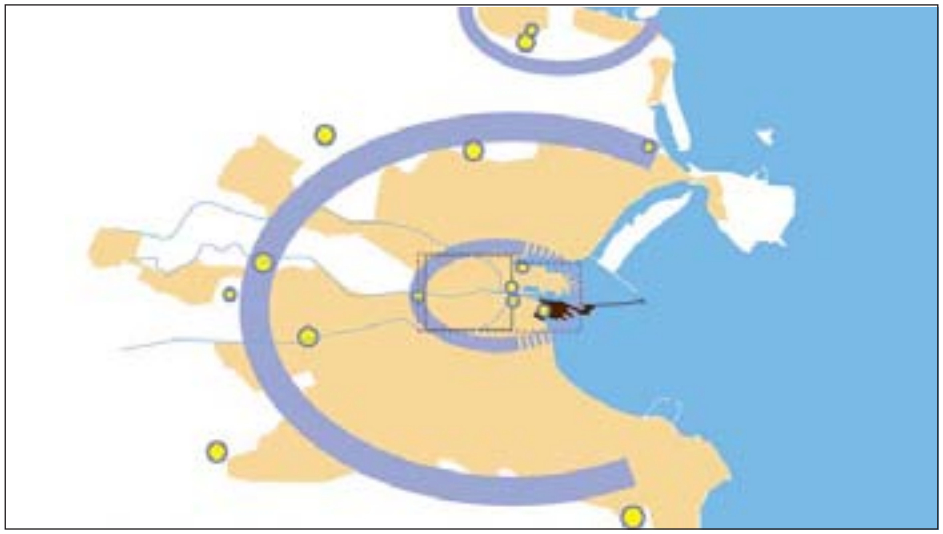


fig 9: New development locations in the Greater Dublin Area

viewed as a further extension to this core area. This has implications for connection into the existing public transport network and in spatial design terms suggests a redefinition of the city's relationship to the Bay.

The great opportunity presented by the South Bank is driven by:

- **The proximity of the site to the city centre** (areas of which are currently undergoing significant change). The consolidation of the financial services sector along the north quay and supporting space developments (Eastpoint) suggest the area is in a stage of positive growth and expansion.
- **Significant environmental character of the 'waterfront'**. In reference to the worldwide waterfront agenda (see section 4.2), the current study area adjacent to the Liffey and Dublin Bay holds significant potential due to its location. European and North Ameri can examples have indicated that such locations that were traditionally working ports are transformed into centres for sophisticated recreational amenity, leisure, specialist residential and employment.
- **Potential to improve key infrastruc ture**. Poor public transport isolates the peninsula and restrains the future potential quantity and type of develop ment. Enabling the site to be accessed from a much wider catch ment, including direct airport access will open up employment and other opportunities;
- **Adjacency of other regeneration initiatives**. East Pont, Grand Canal Dock and Spencer Dock schemes have established a particular built and market context and initiated discus sion on the future of the eastern docklands as a whole. The potential now exists to completely change the image and perception of this location.

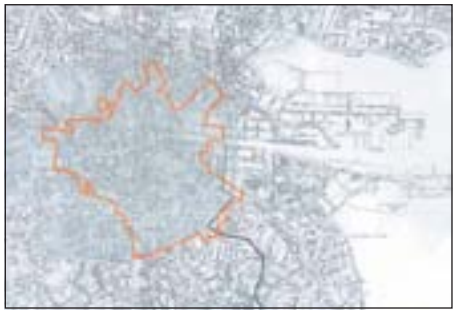


fig 10: Current commercial core boundary

fig 11: Potential new character area

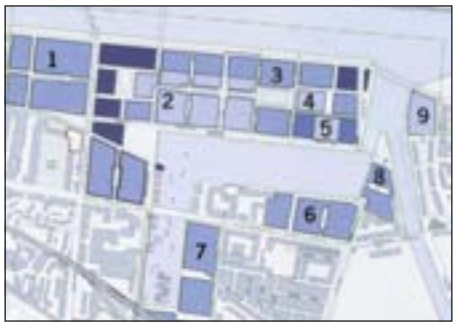


fig 12: Grand Canal Dock Planning Scheme, 2000

3.1.2 Movement and Access

Discussions with the Roads Department and Environmental Traffic Planning within Dublin City Council, the National Roads Authority (NRA) and the Dublin Transport Office (DTO) identified the current initiatives (proposed and under construction) and other transport/traffic considerations salient to the subject lands.

The DTO's *'A Platform for Change - strategy 2000-2016' (Sept 2000) sets out an integrated transportation strategy for the Greater Dublin Area. The public transport network is targeted for considerable expansion along with new road construction.*

The South Bank peninsula is at present effectively by-passed by all rail transport systems (fig 13). There are no proposals within the DTO's strategy to extend light rail / suburban rail systems onto the South Bank peninsula at least for the next 15 years and therefore no public money available for such projects. Any transport programme would have to be funded, at least in part by private development.

Bus routes into Sandymount / Ringsend (nearest bus connections) currently suffer from road congestion though bus priority measures and extension of the QBC are indicated within the DTO strategy to upgrade the network.

Road proposals include:

1. Eastern Bypass motorway link and junction.

The Eastern Bypass Strategic Study, (NRA, 1999) recommended that a potential link between the southern end of the Dublin Port Tunnel and the M50 in the south be taken forward for detailed feasibility. This link is a key unresolved determinant, which could potentially affect the South Bank area depending on two factors:

- its alignment and vertical location (viaduct, tunnel, cut);
- the potential to connect at grade or in cut to the study area.

Motorway Alignment

As shown in fig 13 three potential alignments have been identified.

A1 - Overland option on elevated structure from Dublin Port Tunnel on alignment of East Wall Road, dropping down to low level crossing of East Link Bridge. Motorway adjacent to East Link Road then in cut/cover section under South Port entrance to interchange adjacent to Irish Glass factory.

A2 - Underground option from Dublin Port Tunnel under the Liffey with no at grade interchange on the South Bank area.

A3 – Elevated motorway option with no interchange on the South Bank area.

fig 13: Existing rail networks by-pass the peninsula

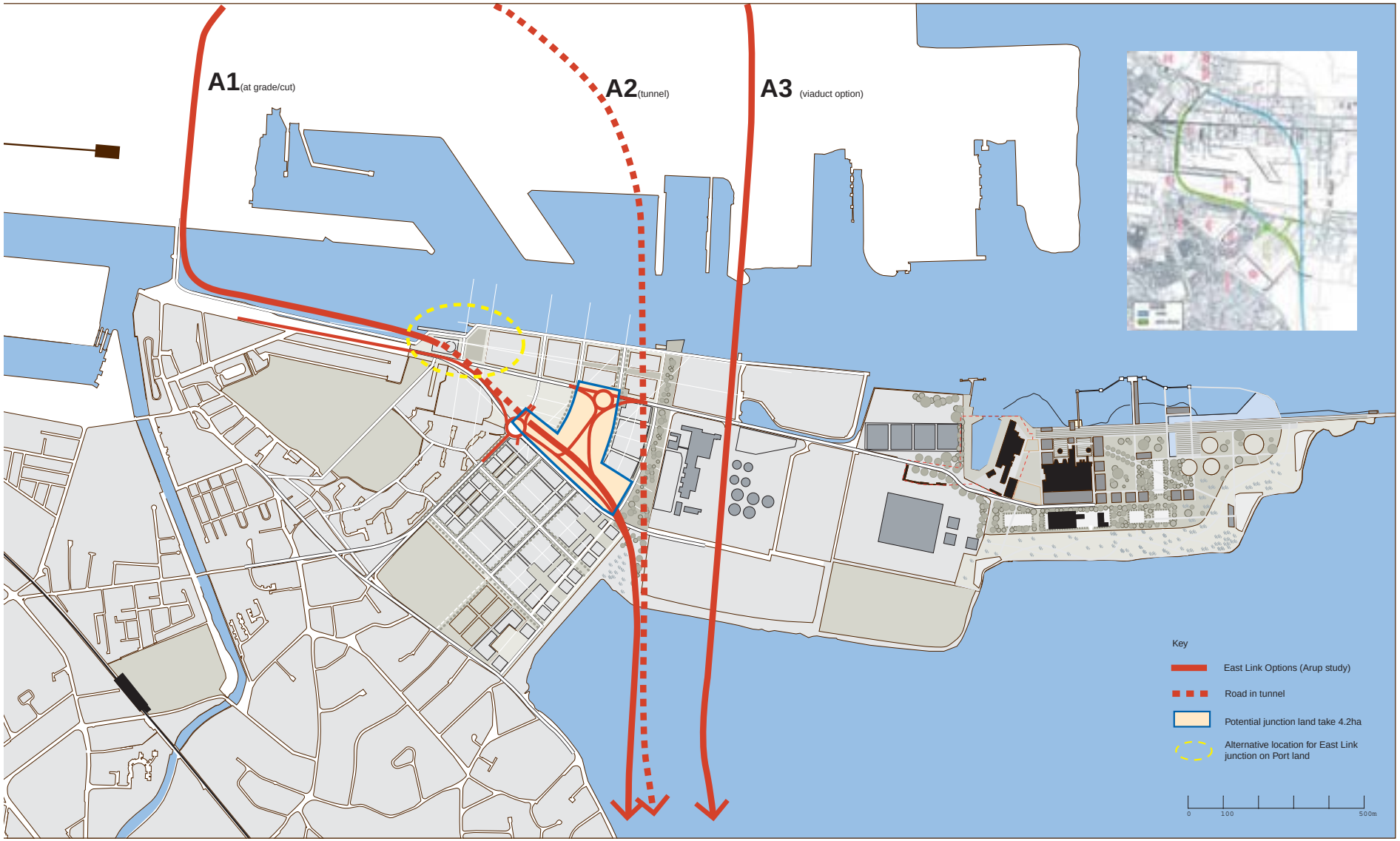


fig 14: Motorway link proposals

Junction Interchange
The question over interchange access on the South Bank area from the proposed Eastern Bypass fundamentally affects future development potential in the following ways:

- Interchange at present to serve truck access only for Dublin Port. Would not offer wider accessibility to the national road network;
- Interchange would not alleviate local traffic congestion as it deposits cars too far south – people still would want to get to and from the city centre from the South Bank area;
- Large land take (5.5ha) required by junction / road infrastructure;
- Junction in key central location that would affect development on all boundaries;
- Phasing of junction / motorway would require large 'hole' to be set aside in overall development strategy.

The rationale behind providing an interchange on the subject lands from the Eastern Bypass therefore needs careful consideration. Alleviating traffic congestion due to truck Port access is a real concern though given the non truck dependent utilities (Ringsend and Poolbeg CCGT, waste water treatment plan) a junction solely for the relatively small Port Lo-Lo use would seem irrational.

An alternative scenario could consider the location for an interchange on Dublin Port lands to the southern edge of the Liffey (see fig 13). This would negate the need for the cut and cover section of alignment A1 and consolidate Port related truck access on Port lands.

2. Dublin Port Tunnel
Discussions with the Dublin Port Tunnel Project Team identified that construction of the Port Tunnel to link into the M1 to the north (Coolock interchange) and south onto the northern peninsula (East Wall Road) has begun and will run through to September 2004. Connection into the proposed eastern by-pass is undefined though a full orbital system is envisaged.

3. Bridge link
Construction of a new bridge linking Guild Street across the Liffey to Macken Street to combine public transport / vehicular access. Currently proposed to accommodate a bus corridor though discussions with the Light Rail Project Office indicated that consideration is being given to a LUAS corridor.

4. Peninsula and local roads.
The DDDA Master Plan (1997) indicates an extension of South Bank Road (off Sean More Road) east to provide greater access along the peninsula adjacent to Irishtown Nature Park.

Other current proposals over next 6 months include the calming of Sean More Road to traffic, reducing lanes and surface treatment as well as other traffic calming measures in the local traffic cell.

Suburban Rail / Light Rail proposals include:
5. LUAS
Construction of an extension to the LUAS network from Abbey Street / O'Connell Street east to The Point Depot (identified within the DTO Strategy and the DDDA Draft Planning Scheme 2001 for the Extended Custom House Docks Area).

The DDDA planning Scheme 2000 for the Grand Canal Dock proposes an extension to the LUAS corridor east along Sir John Rogerson's Quay to the Toll Road via a new bridge across the entrance to the Grand Canal Dock.

Different ways of accommodating a light rail system were explored by the Light Rail Project Team (on street / separate corridor) through examining Strasbourg and Grenoble as case studies.

Extension of the LUAS line into the South Bank peninsula could potentially be accommodated along the Toll Road, swinging southeast into South Bank Road.

6. Suburban rail
Construction of an extension to the suburban rail line through Spencer Dock connecting into Pearse Station and further west to the Heuston Station interchange.

fig 15: Port Tunnel

3.1.3 Land Ownership and Occupation

The South Bank currently accommodates a large proportion of Dublin city's public utility activities and is zoned for industrial and employment use. Major land owners and occupiers in the area include:

- Dublin City Council (sewage treat ment plant, parks and Strand);
- Dublin Port Company (container storage, LOLO terminal);
- ESB – Electricity suppliers and Networks, part of Irish Electricity;
- The Irish Glass Bottle Company Ltd. (now relocated off site);
- ZOE Developments;
- Scrap metal trader and cement works.

A number of other activities take place on land leased from Dublin City Council and the Dublin Port Company including: cement works; scrap metal yard; molasses storage tanks and a rowing club. Part of ESB's land is also used as a golf course though this is temporarily used as a construction site for their new gas turbine plant. Through current consideration of the South Bank's potential for a thermal waste treatment plant it may be viewed as an appropriate location for consolidation of existing activities.

On the South Bank the Port shares majority ownership with the City Council. Some £60m have been spent by the Port in then last 10years on capital infrastructure.

The historic Pigeon House electricity works is a protected structure and consideration needs to be given to its future use. It is located on a small harbour, adjacent to public utility structures and includes an old hotel. The old station falls within the ownership of ESB and may be put on the market. ESB is also aware of the commercial value of its property and this may affect the long term options for its current location.

The existing sewage treatment plant run by Dublin City Council is a modern, enclosed system with strict control over odour emissions. Along with several other locations, a site adjacent to the existing sewage treatment plant has been identified as a potential location for a new thermal treatment plant and is presently under review. A report published in November 1999 considers options for the thermal treatment of waste and builds on the 1997 'Waste Management- A Strategy for Dublin'. That study identified targets for waste management (59% recycle, 25% thermal, 16% landfill) given that Dublin city's current landfill sites are rapidly nearing capacity.

Industrial activity – leased land

A number of 'dirty' industrial type activities currently take place on the South Bank.

The Irish Glass Bottle Company - Long term lease from Dublin Port (now decommissioned).

Scrap metal yard - renewable lease from Dublin Port. Operate on the northern edge of the South Bank, heavy contamination of the site with truck access.

Cement Works - renewable lease. Large amount of infrastructure, high truck access and generator of dust pollution for the South Bank.

Molasses storage tanks - lease from Dublin Port. Truck access required but relatively 'clean' non-emitting activity.

Cement works

Container store

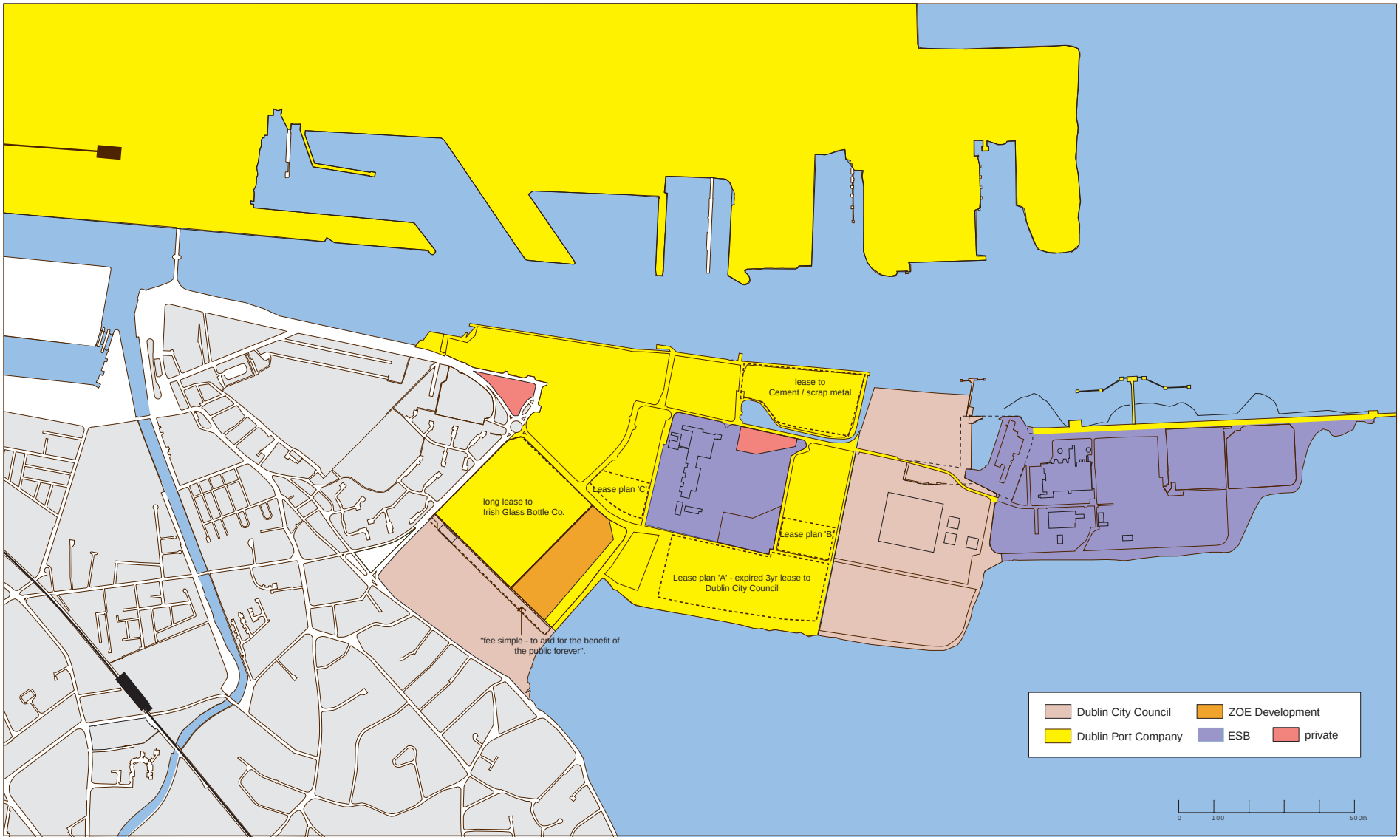


fig16: Existing ownership

3.2 STAKEHOLDER CURRENT NEEDS AND EXPECTATIONS

The following section presents the range of tenancies currently operating on the subject lands. These include both land owners and those operating under lease. Issues particularly to do with growth, space needs and change are described. This review is based on face to face interviews held in May and June 2001 with each of the tenants.

3.2.1 Dublin Port Company

The Dublin Port Company, formerly known as the Dublin Port and Docks Board, has operated since the late 1700's and changed over to its current structure in 1997. The Port's main activity takes place on the northern peninsula, which includes the majority of its land holding.

The Dublin Port Company operates under remit from the Dublin City Council to transfer sea cargo to land. Approximately 95% of goods arrive in Ireland by sea and the Port's throughput has increased from 7m to 21m tons in the past 8 years. With growth expected to continue at around 5-7% annually, tonnage will rise to 29.4m by 2005.

The Port Company has 5 key areas of activity, including:

- RORO - roll on / roll off;
- LOLO - load on / load off;
- Break bulk – mixed goods (timber/ steel/paper);
- Bulk liquid – oil/petroleum/molasses, and;
- Bulk solid – grain/animal feed/coal.

Two key problems faced by the Port are:

1. Access and;
2. Capacity

Access

The majority of cargo is now transferred by road with the proportion of rail cargo reducing. The railroad holdings on the northern Port lands are underutilised.

Access by HGV is problematic, with Port traffic passing through city centre routes to get out to the west. This is slow and has negative effects on the city centre environment. Alleviating this problem has been a long standing concern for the city and the new Port Tunnel (due for completion in 42 months) along with the potential Eastern By-pass will tackle this issue.

Capacity

Current land holding of around 160 acres of which approx 8% is leased for non-Port activity (Irish Glass Bottle Co., concrete, scrap metal works and some sold for the relatively recent (late 80's) East Point Business Park.

Rapid growth in the 90's and continued, though reduced, growth today has led to a shortage of hard standing space adjacent to deep water. To respond the Port Company has made an application for reclaimation of land to the north of the Liffey while a smaller area to the southern side (10 acres) is being infilled. The recent Government position on bay reclaimation has referred the application to DCC for planning permission, leading to a focus on the MLT Terminal for relocation of LOLO activity, allowing expansion of the RORO to the north.

3.2.2 ESB

A semi-state organisation with a significant land holding on the subject lands. Ownership includes the historic Pigeon House, now a listed structure, the existing Poolbeg power station and a new combined cycle gas turbine plant at Ringsend, currently under construction. They feed into the national grid 'networks' who are on site adjacent to the new CCGT plant. ESB will seek to maximise the value of their lands and consolidate existing operational space (already relocating from their centre city office location further out beyond the city core).

Port activity on the north docks

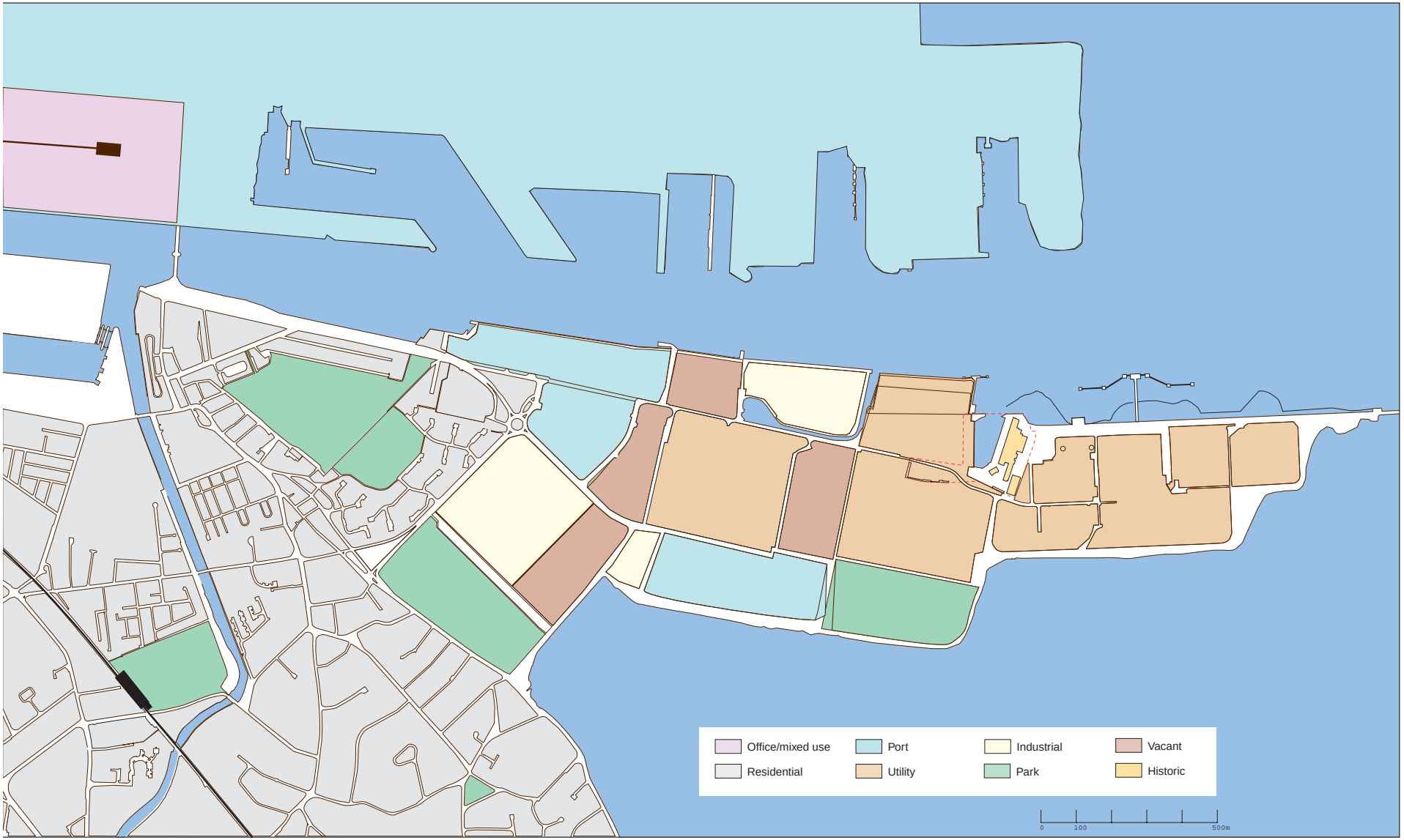


fig17: Current landuse

Current holdings on the South Bank lands will continue for the medium term given the 25yr life span of the new CCGT plant, though with developments in technology, deregulation of the sector and increasing development pressure raising land values the future requirements in the present location are undefined.

Main constraints include costs associated with cabling infrastructure (three levels 1 – Air Grid, 2 – Networks, 3 – Supply). Further requirements include:

- Fuel supply (natural gas)
- Cooling water (closed system – free cooling)
- Cabling

The Poolbeg power station chimneys form an important historical landmark in the wider city structure and traditionally marked the 'end' of the city. These elements are listed structures and will need to be protected.

3.2.3 ZOE Developments
Acquired the land located between the Irish Glass Bottle Company and Sandymount Strand. Submitted an application for the construction of primarily office space (120,495 sqm) with ancilliary retail, leisure and hotel making a total of 140,000 sq.m gross in July 2000 (#1777/00). Development to allow for 7,000 population and 2,200 car parking spaces. This application has not been decided on.

The development seeks to include a residential element where such use is 'permissable' in the statutory zoning policy.

3.2.4 Irish Glass and Bottle Company (main activity relocated off the subject lands)
The following description pre-dates the current objectives of this organisation that are to develop the site as a commercial / mixed-use scheme. The Company are keen to initiate discussion with the City Council to identify acceptable parameters for future development.

The former factory operated on land leased from the Dublin Port Company and has traded in the current location since 1966. Majority of suppliers and customers are located to the west of the city and access is a clear problem. Operate 40ft articulated lorries.
Primarily constrained by their furnace infrastructure (run 2 furnaces with life spans of 7-10 years with a further 3-5 years to run). Also require a large power source and use gas and heavy fuel oil.

3.2.5 Dublin City Council
The Council's holding includes:

- Ringsend Sewage Treatment Works located between the two ESB generating stations;
- Irish Town Nature Park, Sean Moore Park, Rinsgend Park, Irish Town Stadium;
- Mobility, access and services Infra structure;
- Sandymount Strand, foreshore and beaches along the southern edge of the South Bank lands;
- Pigeon House western harbour border and Liffey edge.

The DCC faces the challenge to see the Docklands area as a whole regenerated and meet the demands of a burgeoning tertiary employment sector whilst retaining and consolidating the public utility activities of the city in the same location. The issue of Port activity is one under consideration by the Minister for the Marine and Natural Resources, though support appears forthcoming from the Council for extension and growth of the same with the Port Tunnel construction and land reclaimation.

The DCC have a clear objective to 'clean up' Dublin Bay through the Dublin Bay

Poolberg power station

Glass factory

Project to meet European clean water guidelines. This £200m project is due for completion in 2002 and will:

- Upgrade existing sewage treatment at Ringsend to secondary and tertiary levels of treatment;
- Construct Sutton pumping station to collect all North Dublin flows presently dumped untreated of Howth point;
- Construct a submarine pipeline to connect Ringsend to Sutton and;
- Establishe a Sludge Disposal Management Plan.

New tertiary waste treatment plant

Sandymount Strand

3.3 OPEN SPACE - DUBLIN WIDE AND LOCAL CHARACTER

Strategic Value of Dublin's Open Space
The character of Dublin's open space can be defined across a number of distinct types that include:

- Small structured urban parks;
- Public / Georgian squares;
- Linear open space routes;
- Phoenix park;
- Rural large scale green belt and;
- Eastern sea board 'Strand'.

Of these, Phoenix Park to the west with its elevated topography and the Poolbeg peninsula to the east contribute to the feeling of generous large open space within the city and visibility from the 'outside in'. In terms of 'urban memory' and historic reference the Poolbeg has allowed city inhabitants and visitors to experience Dublin as a background setting from a position of open space.

Importance of large open spaces to experience the city

Local Spaces
The South Bank and its immediate environs include a number of significant public open spaces. These include:

- Sean Moore Park;
- Ringsend Park;
- Irishtown Stadium;
- Irishtown Nature park;
- Sandymount Strand;
- Poolbeg - South Wall;
- Beaches (3 No.) and;
- Foreshore.

These spaces are managed by Dublin City Council Parks Department and fall under the remit of the Parks Superintendent.

The Poolbeg peninsula forms an important and final element in the continuity of open space running west to east through the city and connecting with Dublin Bay. The perception of this publicly accessible area is reinforced by the extension that is the Great South Wall.

Sean Moore Park is used primarily as a recreation ground for various sports activities. The Clannagael Fontenoy Gaelic Club is the local club enjoying the use of the park as its home ground. The club has current plans to expand and improve its club house facilities. The park is also a feeding ground for Brent geese and other wintering wildfowl. Grants of around £0.5m have been made available from the DDDA to upgrade the pitches.

Ringsend Park and the adjacent running track has recently received a £2.5m upgrade. The park suffers from its relatively enclosed location with poor entrance visibility. Safety on the park after dark is a concern for local residents. This is currently the subject of improvement schemes under the remit of the DDDA along with other local road surface treatments.

Irishtown Nature Park is a well used amenity, frequented by walkers and bird watchers. It developed on the site of a landfill and has evolved into an ecologically diverse landscape with a good range of flora. It forms the only high point on the South Bank (apart from the embankments) and along with the 'two chimneys' is an important element in the overall landscape of the peninsula. Car access to the park is limited.

The Great South Wall is an important amenity for a range of users and enables people to distance themselves from the enclosure of the urban city condition and obtain views back into the city.

The foreshore as the point of interaction with Dublin Bay and as a link from Beach Road to the Great South Wall fullfils an important function. Parts of the foreshore are in need of cleaning up within the broader Dublin Bay project. Two beaches have formed along the southern stretch of the South Bank and are unique elements offering a different kind of recreational use other than the tidal Strand flats.

Local improvement scheme at Ringsend

Local Parks: Sean Moore & Ringsend

Increasing amenity of Irishtown Park

Foreshore offers access and recreation

Evolving an Approach to Open Space

In principle there is a strong argument for holding development back from the water edge that can be defined as:

- Increasing public access (visual and physical) to the waterfront;
- Maintaining continuity of current users experience and;
- Allowing joint experience of peninsula and water (often an edge walkway will only allow appreciation of the water body itself).

In the broader city-wide context the role of the South Bank and its contribution to Dublin's open space network can therefore be defined across two broad possibilities (figs 18a & b). The first indicates the South Bank as a fully developed (in yellow) extension of the city of Dublin, effectively forming a 'plug between the two tidal strands. The second (fig 18b) indicates the possibility for the peninsula to form part of a contiguous eastern open space structure with reinforced green links along the Liffey to Phoenix Park. As a currently accessible part of Dublin's open space amenity this role should be reinforced drawing the South Bank closer to the city in perceptual terms.

fig 18a: South Bank as built extension to the city

fig 18b: South Bank as open space element in tidal edge

3.5 STATUTORY CONSTRAINTS AND ENVIRONMENT

DEGW

3.5.1 Planning Context

(Refer to Appendix 1 for detailed list of documents appraised).

Reviewed Planning Policy affecting the South Bank lands highlighted the following:

- High degree of policy flexibility for the area suggested by the notion of enterprise/ B1 type use and the technopol proposal and also potential for some residential;
- The current zoning for Industrial use may have been Influenced by the former Irish Glass Bottle Company and to protect existing public utility activities. With relocation of the Glass factory there is the potential to rezone the area for enterprise/B1 use;
- As the site sits adjacent to residential and local residential amenity there is an argument to be made for including a mix with housing – which is of course in high demand;
- Although the technopol is not indi cated for this site specifically (see page 152 DDDA) there is scope for is inclusion;
- Area has the potential for a mix of education/knowledge based busi nesses and industry (particularly industry incubated companies knowledge based and R+D parts of industry), Type B offices (definition see page 59) ie administration, research and dispatch uses in flexible office type buildings and some residential and;
- Residential density guidelines are fluid at the moment and to be driven by local character/site specific issues. Appropriate locations for Increased densities should be identified. City Centre/Brownfield sites plot ratio 1.0 – 2.5 suggested.

3.5.2 Planning applications

A number of planing applications are active on the subject lands, including:

- Extension to Gaelic Fontenoy football club builidngs;
- Reclaimation for extension to waste treatment ponds;
- Works to the existing sewage pump ing station (MLPS) on Pigeon House Road;
- Extension to boating club facilities;
- Upgrade to Ringsend stadium
- Improvements to access points for Ringsend park;
- Feasibility for Thermal waste treat ment plant

3.5.3 Ecological

The value in the South Bank as a natural environment is described within the DDDA study[1]. This covers its role to both flora and fauna and identifies key designated parks and beaches.

The Strand (700ha) is covered by four key environmental designations that include:

- Special Protection Area (SPA);
- Special Area Conservation (pcSAC) proposed candidate;
- Areas of Scientific Interest (ASI's) and;
- Proposed Natural Heritage Area (pNHA).

These designations are described further in the DDDA study.

Arguments for underlying principles of city design in sustainable terms that move towards zero environmental impact and which recognise non commercial forces for shaping growth are becoming increasingly salient. The current Dublin Bay project recognises the importance of creating a healthy environment for city users with emphasis on minimising the destructive impact of city by-products with a view to increasing the recreational amenity of the bay and shore. Key brown field sites (Grand Canal Dock, North Lotts, Heuston station environs, South Bank etc.) are seen as development alternatives to greenfield fringe sprawl, and which seek to maintain the compactness and character of the city. Improved living and working environments will draw those seeking healthier lifestyles back into the centre and influence the demand for local amenity and services.

The South Bank benefits from direct access to open space and a range of recreational activities made possible from shore, bay, park and beach landscapes. This key quality differentiates it from any other location in the city and should be held as a priority for influencing change.

3.5.4 Heritage

The peninsula is one of Dublin's distinct places in as much as its land formation and former uses epitomises the city's historic development. In particular the South Bull wall and lighthouse testify to a maritime trade dependency while the interesting roles of the Pigeon House Harbour area tell their own story. The highly visible twin chimneys of the Poolbeg power station form an important mnemonic device for residents and landmark the site from local and strategic vantage points. In general preserving the experience of history in the area is a key driver in any future development.

1 Unpublished study - Poolbeg Peninsula, Land Use and Transportation, DDDA.

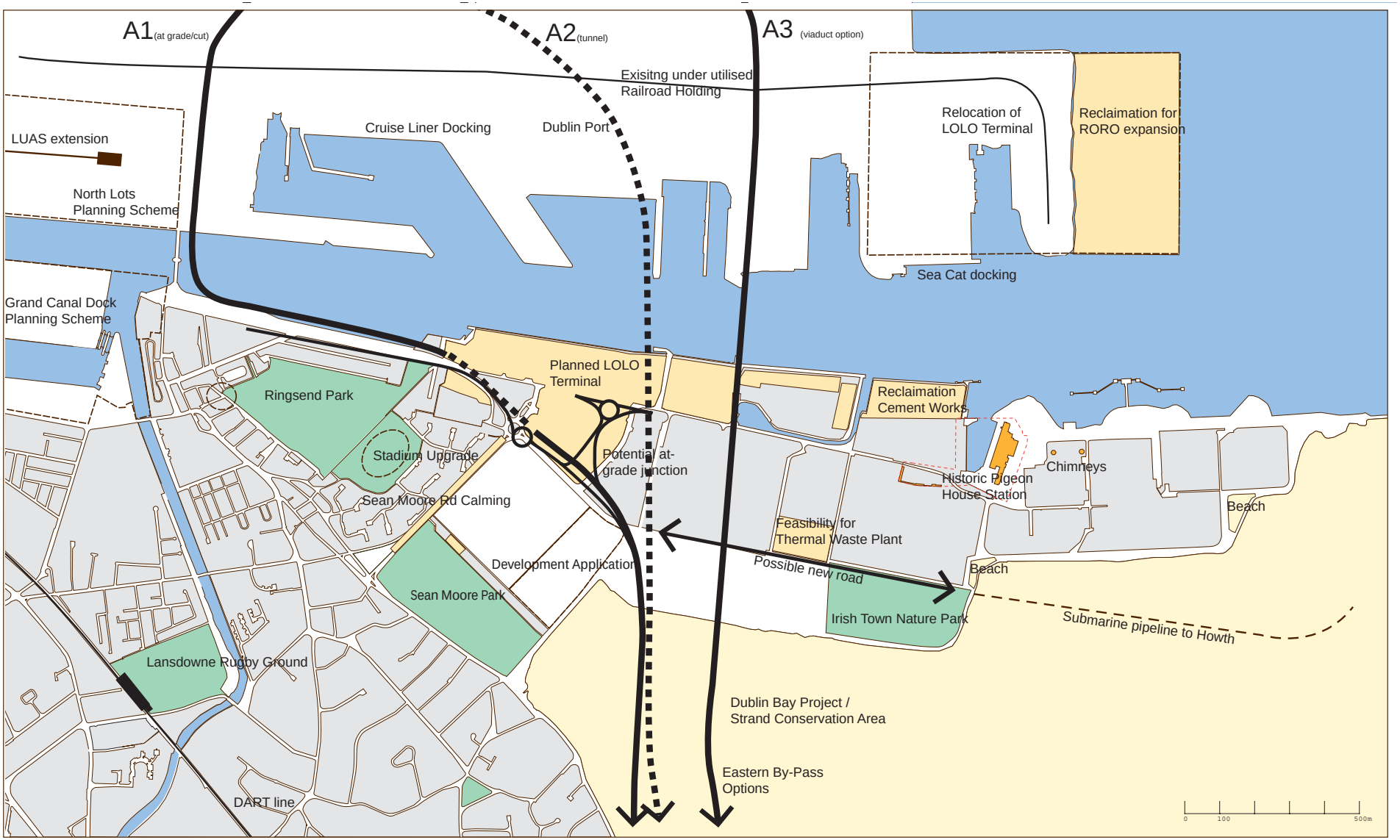


fig19: Infrastructure condition

3.4 Utilities & Infrastructure

A number of current initiatives, planning applications, designations and site conditions are active on the subject lands. At the time of this study the following have been identified.

Sewer Drainage -
New waste treatment & pipeline
As part of the overall Dublin Bay project two major pieces of infrastructure are under construction. A new tertiary waste treatment plant (enclosed building and ponds) will be fed by a new 1422mm submarine pipeline from a pumping station on the Howth peninsula to the north of the Bay.

Two main 2290mm siphons (MS1) carry sewage from the Main Lift Pumping Station on Pigeon House Road to the waste treatment plant. The sewers run under South Bank Road and to the southern boundary of the new CCGT Ringsend power station. A second main sewer trunk MS2 (1800mm) runs from Rathmines and Pembroke Road sewer. This sewer is located under Pigeon House Road and runs to an outfall on the South Bull Wall.

Transmission/Distribution networks (Add Diagram)
Construction of a new CCGT power station (Ringsend) is complete along with the necessary connections into the transmission and distribution systems. Large amounts of buried ESB cable exist along three primary corridors (EL1, EL2, EL3), each with a 16m wayleave. (EL1 – 2 No 38kV cables carry power to DART, 2No 110kV cables, 2 No 220kV cables; EL2 – 2 No 220kV cables, 1 No 110kV cable; EL3 – 3 No 220kV, 1 No 110kV).

Road infrastructure
Described in section 4.0 are the potential alignments of the eastern by-pass (A1,A2,A3) and the possible location of an at grade junction. The DDDA Master Plan (1997) identifies a potential new road running east west along the edge of Irish Town Nature Park.

Some calming measures are already underway (Sean Moore Road) and others planned for particular traffic cells in the adjacent area.

Reclaimation and contamination
As shown in fig 20 - a geological survey map of 1912, much of the current peninsula was reclaimed during the twentieth century. Ringsend park, Grand Canal Dock and the north docklands area is classified as ‘intake’ as opposed to river gravel terraces and raised beach. Due to the infill for reclaimation a range of possible contaminants are present from builders rubble to ash, organic waste and other more hazardous material. Current industry such as scrap metal, oil storage, cement works will have contaminated the area further.

Remediation is likely to be extensive due to EPA assessments and the necessary Environmental Impact assessments and risk assessments. Measures could include excavating material, capping infill, remediating ground water though these measures will be dependent upon the intended end use and level of stringency.

Water, Gas and Oil lines (Add Diagram)
The Irish Glass Bottle Company has a direct feed 250mm oil pipe from the north shore line. The status of this will be reviewed due to the relocation of the glass factory off the subject lands.

Two natural gas piplelines, each with 8m wayleaves connect into the Poolbeg power station and new CCGT plant south of the older station. G1 runs from Sandyford to Poolbeg and G2 from Dublin City.

A 300mm water main runs along Sean Moore Road to serve the Ringsend power station. Two smaller mains (2 No 225mm and 1 No 150mm) run under Pigeon House Road.

fig 20: Geological map 1912

fig 21: Services infrastructure, DDDA study unpublished, 2001

4.0

drivers for change

4.1 IDENTIFYING DRIVERS FOR CHANGE

The strategic significance of the site can be realised through repositiong the peninsula in the wider Dublin context. This chapter reviews the following parameters that can potentially drive change:

1. Physical characteristics;
2. Development needs in current market condition;
3. Future of utilities and port and;
4. Accessibility and transport capacity vs development maximising.

In theoretical terms the capacity of the site can vary enormously. The three initial options developed in the early stages of the study (fig 22) highlighted the scale and potential range of intervention possible from a design concept-led approach. The need for a parallel approach to site potential that emcompasses both existing physical constraints and design is an important methodological process that is iterative and avoids the danger of highly involved analysis with little design response.

With the three broad design scenarios (minimum to maximum) in mind the following defintion of drivers sets the context for review. Section 4.5.2 presents the arguments and preconditions associated with each level of intervention.

Scenario 1
Minimum intervention
Ecological Park

Scenario 2
Medium intervention
Development node &

Scenario 3
Maximum intervention
Full development

fig 22: Strategic design scenarios

4.2 LOCATION AND SITE CHARACTER SIGNIFICANCE

The major opportunity for the South Bank lies in recognising the future potential of the area as a significant waterfront location. Precedent for this type of regeneration and fundamental change of function and perception abound across the globe. The significance of the site's location in a city wide context includes:

- Proximity to the city-centre;
- Adjacency to Dublin Bay and the Liffey
- Large 'brownfiled' tracts of land and new character potential and;
- Local regeneration intiatives (Grand Canal, North Lotts)

These characteristics are typical of the conditions within which other waterfront sites have been redeveloped and thus place Dublin's South Bank in an opportunistic position. A recent focus on Dublin's Port[1] has reinforced the need to identify strategic issues facing the functioning of ports in relation to their host city.

1 Established Dec 2000 by Minister for Marine and Natural resources in which two new groups will examine the effect of the successful Irish economy on its Ports.

4.2.1 Development of the Site in the Docklands Context

Dublin, and specifically its waterfront has, unlike many of the port cities of the world lagged behind the general regeneration trend (described this section). Only recently is the city experiencing the tertiarisation of its economy that would apply development pressure to city-centre harbour sites on the north and south banks. Placing Dublin within a general model of change in the relationship between city and port we find that it locates itself within 'stage c' as shown below (Fig. 23c)

The pre-modern beginnings of the city of Dublin indicate a port that was very much part of the settlement core where the harbour was the final destination. Growth of the port as a center for distribution required a redefinition of the relationship between the port's infrastructure, open rural landscape and city. That same relationship is salient in the context of the current project, which calls into question

16th century: Port part of the enclosed city
(Dublin A Celebration, Pat Liddy, 2000)

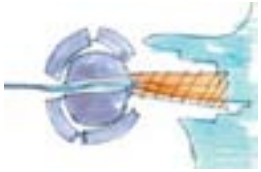
the role of the South Bank in terms of its function, open space contribution to the city and spatial structure.

As can be seen in Fig 23, the development of Dublin city is one which has progressively engaged with the shoreline, though the nature of that engagement has been as a separate industrial and port related activity. Very little change to this scenario has occurred today and indeed consolidation of this relationship has taken place recently through development of public utility infrastructure (waste treatment and proposed thermal treatment plants).

This situation has increasingly created a state of tension as harbour areas have grown (in particular the North Bank and now expansion of LOLO activity onto the South Bank), more noticeably in the latter half of the nineteenth century and early twentieth century. The traditional quay, which used to form a link between the international port and local city scales has disappeared, with the result a permanent tension between the two very different spatial systems. In comparison, Dutch quays were very much part of the city street network, lined with housing and also part of the ocean going world-wide trade network.

a. Port as part of city core

b. Port spreads along the quays, flow of goods past



c. Separation of the specific functions - city & port

d. port become part of a network of functions

fig 23: models of city-port relationship

1685-1783

1824-1897

1897-1956

1958-1975

fig 24: Dublin City growth
(Dublin A Celebration, Pat Liddy, 2000)

Compounding this is the disparity in scales of function that have increased as distribution systems and their technologies have simply enabled greater unit sizes, requiring ever larger infrastructure. Dublin's road network has struggled to cope with this growth and has prompted the construction of the new Port Tunnel, though with Port growth at 5-7% per year, predicted tonnage of 29.4m by 2005 (21m today) and a current shortage of deepwater hard standing space the future of this location must be called into question.

The beginnings of functional change have begun to take place with the IFSC and Planning Schemes for Grand Canal Dock and Spencer Dock (North Lotts), proposed as mixed use and employment focused developments.

Dublin docks in the C18th and the port today

4.2.2 The 'Urban Waterfront' Agenda – World Context

Waterfront development has grown into a speciality over the last 20 to 30 years, reflecting the colossal scale of waterfront regeneration internationally. The shift from Industrial to Post-Industrial activities and their implications on the spatial structure of the city (transport and industry moving out of city-centre locations) has generated a surplus of unused harbour sites. In particular, changes in technology and decreased railroad holdings have caused ports to relocate out of their traditional city-centre sites, as shown in London and Amsterdam.

In addition worldwide pressure to 'clean-up' waterways, harbours and bays prompted regeneration and public investment on environmental grounds. Dublin's docklands is undergoing major investment in new waste treatment plant as part of the move to establish a clean and usable public bay.

Many of the more 'interesting' cities (Barcelona, Helsinki, Rotterdam, New York, Rio de Janiro, Hong Kong to name but a few) are known for their waterfront character. These have demonstrated that the waterfront aspects of cities have been able to adapt to changes in technologies and create new opportunities for city wide character, open space, primary and secondary economies and character neighbourhoods.

The context of the waterfront agenda has also been driven by changes in both social and environmental conditions. Lifestyles of those living in cities demand greater sophistication in levels and types of amenity and recreation. Places that include water/shoreline have a fundamental attraction and also form historical connections with the earliest reasons for settlement. Specialist forms of retail and recreation have utilised waterfront sites (Cosmo Square, Osaka) contributing to the overall 'offer' of the city.

4.2.3 Waterfront Warning Signs

Not all waterfront regeneration schemes have met with success. Many of the large scale transformation projects went through stages of modification or trimming down or simply remained on the drawing board (as is the case of development of the IJ Shore in Amsterdam), some were economically flawed or undermined by the local politics of their environments.

London's Docklands and in particular the Canary Wharf 'heart' to the area (1985/6) was affected by a number of factors. The then new London Docklands authority (LDDA) developed a strategy that focused on:

1. Enterprise Zones
2. Transportation Links
3. Housing Projects

Barcelona waterfront - open space network

Pacifico Yokohama, Japan

Enterprise zones gave a high degree of freedom to private investment to encourage and promote the area as a future office location for the primary and high technology economies. Such development resulted in the privatisation of the historic Docklands area. Housing projects doubled the amount of new dwellings from 1981 to 1991 (17,000 units, only 2,000 of which were local authority owned) but these were exclusive enclaves around the most characterful parts of the area (basins, Thames banks etc.). Money was then spent from 1981 to 1985 on the DLR system without any parallel development or contribution to significant public open space. This system had a limited capacity of ~6,000 passengers an hour and was not designed for the scale of Canary Wharf. Along with its relative isolation from the City and inadequate public transportation system, uncertainty in the market led to real-estate developers Olympia and York going bankrupt in 1992. Despite this tentative start the development today has grown with the recent construction of two new high rise towers.

4.2.4 Changing the 'Backyard' activity

Due to the nature of port activity during the latter half of the twentieth century that tended towards poles for specialised distribution and transhipment, huge industrial areas relocated from traditional city centre sites to fringe land. Examples of port relocation include:

- Liverpool: port moved to Birkenhead;
- Bordeaux: port moved to Verdon and;
- New York: port moved to Port Eliza beth.

To enable regeneration of these industrial areas required significant changes in public perception, initiated through relocation of the former activity. Not all ports however followed this trend and some remained in their original locations.Where this is the case such ports and cities either improved there infrastructure; experienced mobility and access tensions (Dublin) or; evolved their port/city relationships into a hybrid of integrated functions (Marseille).

Integrated port functions – Marseille Euromediteranée La Joliette

Euromediteranee was initiated by the municipality of Marseille, and aimed to establish a prestige tertiary sector to act as an economic motor in the heart of the port city. A key concern was to safeguard port activity. Major infrastructure developments included the Marseille railway station (addition of TGV) and placing existing motorways that crossed the site underground. Infrastructure was developed prior to private residential / commercial development.

Area: 300ha
Phasing: Planning in progress
Functional programme: 100ha port activity, 100ha existing industry and new commercial, 100ha new housing.

Canary Wharf, London Docklands

IJ shore, Amsterdam

Port development of Marseille seen in strategic context

Relevant issues
Most Docklands regeneration projects rely on the relocation of the port's industrial activity. The Marseille port project demonstrated an alternative approach where port activities remain but are mixed and integrated with other urban functions. For the municipality, the synergy between the port and the built up area is key to the launching of new tertiary facilities.

Due to the peripheral character and location of such sites they may include public utility type functions. This activity often stigmatises an area and in perceptual terms turns it into the city's 'backyard'. Once 'backyard character' has been established, public acceptability of further consolidation in these locations becomes easier (likely to draw fewer objections to expansion of utilities for example). Re-visiting of the area as an opportunity for high value amenity or inclusion in the city's open space structure requires significant changes in perception.

The Poolbeg peninsula functions both as the waste processing/power generation 'engine' of the city and operates an industrial transhipment port with the spin off activites one would expect to find (scrap metal, cement works, manufacturing and the like). Servicing of these requires heavy truck usage that compounds the negative perception of the area.

'Dirty' activities constrain development

Habitat, Herbert Giradet, 1998

4.2.5 Designing the Utility - Copenhagen
The experience of cities like Copenhagen has shown the potential and opportunity for dealing with the necessary city functions described above in a positive way. Two principle points are worth describing in relation to their approach:

- Use of open space – greening the city;
- The city 'engine' and ports.

Greening the city
Three types of open green space have been allowed for in Copenhagen's city structure. The larger of these, the Nature Park (2,500ha) was set aside to regenerate after former military uses moved out. Other reclaimed land has been designated as Beach Park (7km length) and both contribute to a memorable system of large open spaces. The value in this type of space has been recovered through allowing residential development along the edges, now seen has high value locations and through a significant open space public amenity that is part of the 'townscape'. Historic reference has also been made to the former city defences through the creation of a linear 'urban' green structure, again contributing to the value of adjacent development.

The city engine and ports
Copenhagen contains a number of port facilities, old and new and leading edge public utility infrastructure. Of the ports (inner, southern and northern) the northern port, Faergehavn Nord, has plans for extension while the older inner city ports (Vesterbro and Kongens Enghave) are subject to urban redevelopment. Each has been identified wihtin the District Planning Schemes with a strategic overview for development.

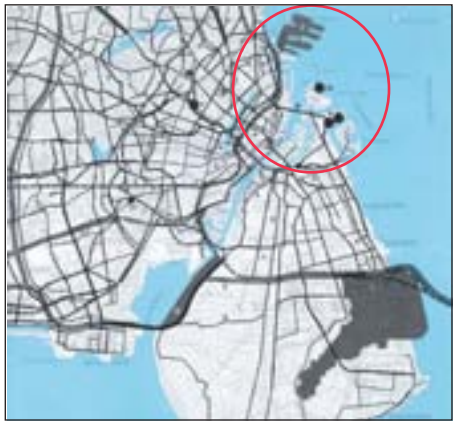
A programme of sustainable and renewable energy has been developed with four combined heat and power plants distributed across the city districts. District heating (steam and hot water) began in the 1930's and now covers the whole municipality. Amager is a combined power and incineration plant of high quality industrial design that sits promonently on the eastern sea board for visitors to Sweden to glimpse when arriving by ferry and cruise liner, along with the well designed Lynetten sewage treatment plant. Windfarm and biogas locations have also been considered.

Reclaimed land set aside as open space

Nature Park, 1950

Beach Park, 1975

Preservation of historic elements



Amager incineration and power plant

Northen port and power station

4.2.6 The potential of port/industrial sites – Scenario development

A general review of the current water-front regeneration agenda has identified seven generic development types (fig 25), which can be broadly categorised as ranging from full civic scale development of city gateway (type 1) to specialist employment/retail locations (types 3-6) to minimum intervention/ecological park (type 2). These types are described further in Appendix 2.

A review of the potential for each of the seven scenarios was carried out against the specific physical constraints of the South Bank location. This review tested the degree of potential of the respective scenarios in the current situation and against the future redevelopment of the entire peninsula. It showed that certain types of development would be more suitable (likely to succeed) than others for the South Bank.

Preconditions for each scenario were identified based on review of the case study parameters. That review is summarised in table 2 and indicates that, for example, a significant new gateway development must have sufficient land size, a motorway connection and public transport access. Similarly for new primary employment however in this case the possibility for such a development is unlikely due to the city-wide demand profile and existing IFSC location.

Other key preconditions relate to the revenue potential of particular forms of development and indicate that though an ecological park would be of significant national value it never-the-less would not pay for itself and would require funding.

South Bank	Gateway	Eco Park	Primary Industry	Service Industry	City wide Amenity	Specialist Residential	Specialist Use	Transport
	Type 1	**Type 2**	**Type 3a**	**Type 3b**	**Type 4**	**Type 5**	**Type 6**	**Type 7**
Existing	○	◒	○	○	○	●	○	○
Potential	●	●+	○	●	●	●+	●	●
Preconditions	Size m'way	No land value	Size demand public transport	Public transport	Size public invest public transport		Size demand mobility	Deep water public transport mobility

table 2: Viablility of the seven scenarios for the South Bank

○	Minimal possibility / none
◒	Some potential
●	Good potential use
●+	High Success

1. GATEWAY
Site specific/high mixed-use

2. ECOLOGICAL PARK
Walkway / recreation

3. EMPLOYMENT
Primary &/or service industry

4. CITY WIDE AMENITY
leisure / entertainement

5. SPECIALIST RESIDENTIAL
Waterfront housing

6. SPECIALIST USE
Wholesale / retail / market

7. TRANSPORT
Passenger terminal, interchange

fig 25: Seven waterfront development types

4.3 DEMAND CONTEXT

This section establishes market parameters for the development strategy with a view to the future outlook of the city. The review was carried out in June 2001. Key principles include:

- maximise success by setting the framework;
- maximise potential value;
- lead and influence Dublin future redevelopment and;
- benefit from creation of high profile opportunity for Dublin.

Main business sectors –initial findings

SECTORS	CURRENT LEADING	FASTEST GROWING	CLUSTER LOCATION
Software/teleservices	●		
Electronics/ engineering	●		GUINNESS CENTRE (MULTI MEDIA)
Financial services	●	●	
Tourism	●	●+	
Business & commercial services		●	
Construction industry		●	
Food	◗		
Drink	◗		
Tobacco	◗		
Paper	◗		
Printing	◗		
Banking	◗		
Telecoms	◗		
Public administration	◗		

table 3

***+** under tourism but not in other sections of same document*

Service vs manufacturing
Total businesses in Dublin area total 40,000 (excl. self employed) of which:

Service companies: **37,000 (92.5%)**
Manufacturing companies:1,300 (3.25%)

Company size
89.8% of companies employ < 10 people
9.6% of companies employ < 50 people
0.5% of companies employ > 200 people
0.1% of companies employ > 1,000 people

Population growth and housing
In the past 5 years the population in the Greater Dublin Area (GDA) has increased by approximately 9%. (128,000 people bringing the population to its current level of ~1.5m).

In the next 10 years the population is forecast to increase by 15% (bringing population to an estimated ~1.7m). 184,000 more houses or apartments will be needed to accommodate them.

Trends recently registered:

- population spread in adjoining towns along transport arteries;
- population returning to live in the city centre;
- spread of office and industrial space in the suburbs has given response to the reverse commute phenomenon – whereby people prefer to live in the city centre and are prepared to commute outwards.

Strategic Planning Guidelines
Concentrate development on areas with developed infrastructure therefore:

- Consolidation of development within the city centre;
- Naas-Newbridge-Kilkullen recommended as primary development centre;
- Balbriggan, Drogheda, Navan and Wiclow should become development centres;
- Swords and Bray-Greystones-Delgany should *be* further developed;
- 'dormitories' not ideal but recognition of function as 'commuter belts'.

Current situation
- Demand for property higher than supply
- Pressure for higher densities

Office accommodation
At the end of 2000 Dublin office stock was approximately 1.85m sqm, vacancy levels at 2%. A very significant increase in 2001 lead to a vacancy rate of 8% and this has continued to current levels of around 20%. The slow down in new office construction is likely to cause this to fall. In early 2001 286,000 sqm of new space was under construction, the majority of which is in suburbs such as Park West, City West, Sandyford, and Blanchardstown. By the end of 2002 111,480 sqm of space will come on stream, 60% of which will be City Centre.

The majority of demand (52%) is in the city centre, 38% of demand is for suburban locations to the south of the city while the north and west attract only 7% and 3% respectively. Development on the South Bank could offer rentals at two-thirds the cost of city centre;

Demand in city centre has increased rental prices. City centre rental levels £390 per sq.m. Higher quality suburban development £200 per sq.m.

Forecast Office Absorption 1999-2005	
	FORECAST NET OFFICE ABSORPTION (BASED ON NEW JOB CREATION) SQ.FT
1999	1,593,000
2000	705,257
2001	749,000
2002	612,000
2003	432,000
2004	370,000
2005	348,000

table 4: Dunloe Ewart Plc, Sept 1999

Industrial
Shortage of incubator type space for small and start-up companies, although the Guinness Enterprise Centre has provided much needed space.

Development of a multi-media district adjacent to the Guinness Centre is likely to bring more space in this part of city into play (MIT Multi Media Lab already moved into Guinness Hop Store). Conversion of existing buildings in light industrial space.

Conference centre
Plans still current for the construction of a 2000 seater National Conference Centre in Spencer Dock.

Multi sports stadium
Plans still current for a new combined all weather sports stadium. Potential locations to be assessed

Major infrastructure projects
(Overall cost estimated at £14bn)

- the Dublin Port Tunnel
- completion of the M50 Ring Motorway
- an Eastern Relief Route to complete ring road around the city
- a city centre metro system, including a circular line linking central rail stations
- extended DART and suburban rail services
- upgrade light rail to metro system
- rail link to airport
- network of Quality Bus Corridors (QBCs)

Commuting
Commuting flows are substantial / congestion common. Consequences are:

- pressure on transport infrastructure;
- higher transport costs caused by congestion;
- environmental costs and;
- social costs as individuals leisure time is reduced by commuting time. Commuting stress likely to impact on work productivity.

4.4 CONSOLIDATION OF UTILITIES

The South Bank area is the principle location for the majority of Dublin city's public utilities. In particular the ESB power generation plants at Poolbeg and Ringsend, and the new waste water treatment plant are the largest and most 'fixed'. The previous need to discharge primary treated sewage into the Liffey Estuary with the raw sludge waste dumped at sea outside Dublin Bay made sense for the location of this activity on the eastern edge of the city. Dramatic changes in technology, however, now afford greater opportunities for location and proximities for these activities. The current expansion and consolidation of utilities (new CCGT plant at Ringsend & Poolbeg, feasibility for thermal waste treatment plant, tertiary waster water treatment plant, Sutton submarine pipeline) and the relocation of Dublin Port's Lo-Lo activity to the south side of the Liffey (fig 27 Area 1) establishes a constraints picture for the site. This is described in terms of:

- Short (yellow) & long (blue) term potential for change based on the lifespan and likelihood for relocation of utilities;
- Implications on land take – realistic development area available taking into account consolidation of utilities;
- Restrictions on land use – due to proximity to activities whose impact and emissions on the environment are considered or perceived as harmful.

Figure 27 indicates the future development of the proposed thermal waste treatment plant and compared to a development picture without the TWTP, indicates a significantly reduced area of flexible (yellow). Figure 26 shows the development potential if no thermal plant were constructed.

Development areas *with* proposed thermal treatment plant
Eight specific areas are identified below:

Area 1 – 16.1ha
Currently in Dublin Port ownership and operating as container store for Lo-Lo activity and expanding eastwards along the Liffey edge. This area occupies prime location on the southern edge of the Liffey and as gateway into the South Bank area as a whole. Classified as blue (hard) due to the growing shortage of hard-standing space for the Port's activity. Future depends upon Port strategy.

Area 2 – 4.2ha
This central area of land is in Dublin Port ownership and is vacant except for a local rowing club.

Area 3 – 14.5ha
In dual ownership and tenancy (Dublin Port / ZOE development / Irish Glass Bottle Company – long lease from Port). This area holds the most immediate potential for development with the relocation of the glass factory, current planning applications on the ZOE lands and large size. It is edge conditions vary from low density residential to park to coast to utility plant.

Area 4 – 2.5ha
An area in Port ownership currently occupied by cement works and scrap metal merchants. A 'soft' area with potential for change, high value due to adjacency of the Liffey though bounded to the south by Ringsend power plant.

Area 5– 18.9ha
This area includes the new ESB Ringsend power plant and allows for the possibility of a new thermal waste treatment plant (on Port lands). It forms part of a relatively 'hard' core of utilities that include Areas 5 and 7. A small part of the area adjacent to Pigeon House Road is in private ownership

Area 6 – 2.8ha
This small area has been identified separately due to its adjacency to the waste treatment ponds in Area 7. It is likely that such an area will be necessary to form a buffer to development in Area 3.

Area 7 – 8.4ha
Currently owned and occupied by the Port for container storage with a small amount of industry. This is a prime high value location overlooking The Strand and Dublin bay with good views towards the Wicklow mountains. Bounded to the north by the ESB plant and potentially constrained further by the possible future thermal treatment plant.

Area 8 – 17.2ha
Solely owned and occupied by Dublin City Council's tertiary waste water treatment plant. The plant is a new fixed facility, integrating with Sutton pumping station and north Dublin sewers thus classified a 'hard' area not expected to change in the near future. Contains some small historic elements linked to the former Pigeonhouse precinct.

Area 9 – 28.5ha
A large area in ESB ownership with good potential for change though contains the smaller and relatively new CCGT plant south of the older Poolbeg power station. This latter station contains two generating furnaces with limited lifespans (5yrs), currently under review for a major refit. The future of the station will depend upon ESB strategy and power demand from Dublin city. The 19th Century Pigeonhouse Harbour, Hotel and former electricity

station transferring to DCC ownership are listed structures along with the twin Poolbeg station chimneys. As an area adjacent to the southern coastal edge that includes two beaches giving access to the South Bull Wall and Poolbeg Lighthouse it has the potential to contribute to a wider amenity/recreation offer for the city.

Development areas *without* a thermal treatment plant

The proposed TWTP has significant impact on the development potential of the study area. Figure 26 indicates the greater amount of 'soft' land available for new non-utility type development. In particular when the constraints engendered through proximity to a perceived pollutant emitting thermal plant are removed, Area 10 (10.3ha) becomes a large development site linking both Areas 4 and 7.

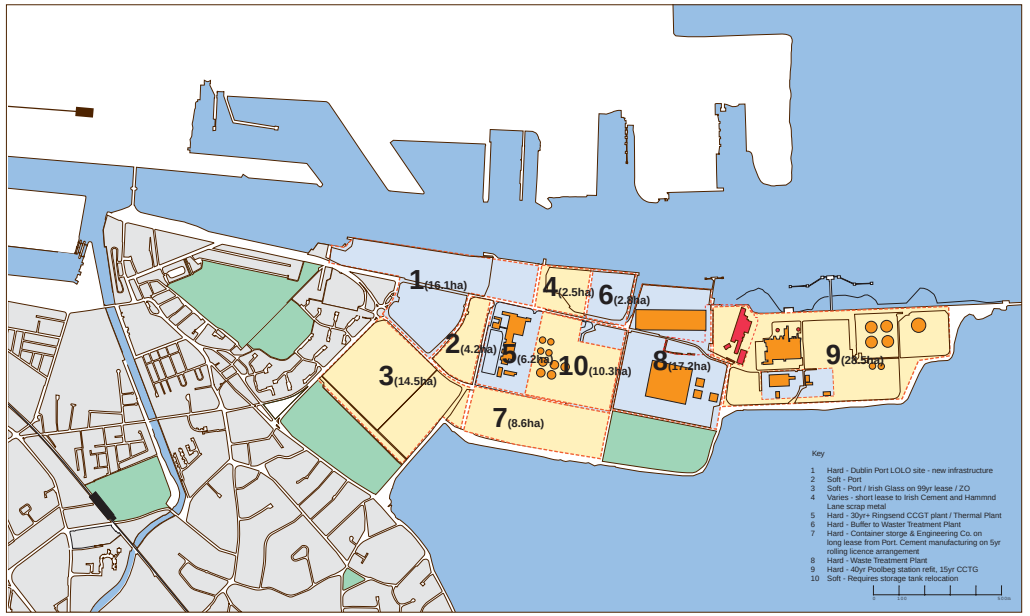


fig 26: Development areas without a thermal plant

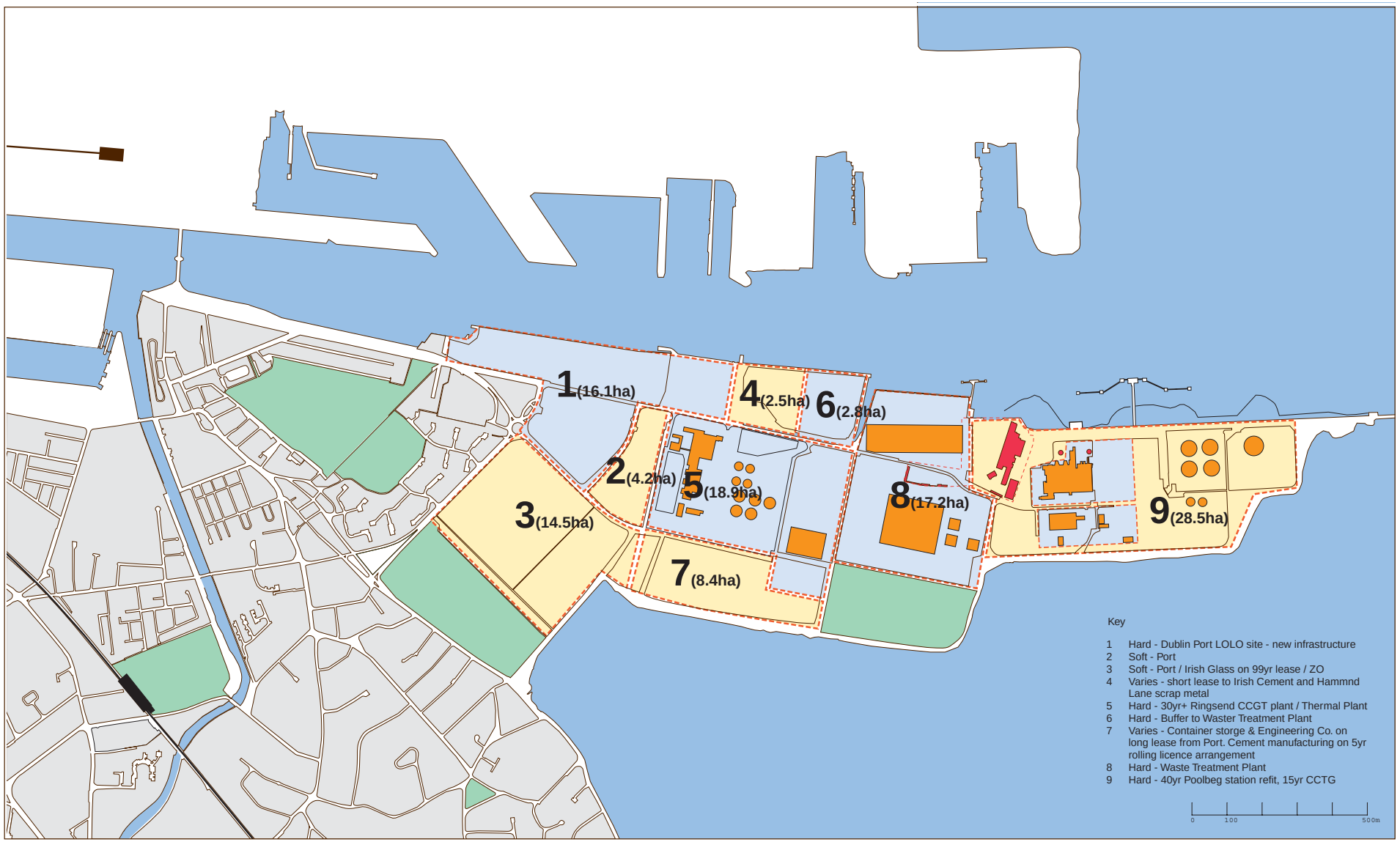


fig 27: Development areas with thermal treatment plant

4.5 SERVICE CAPACITY OF THE SITE

The South Bank is characterised by its cul-de-sac configuration in overall structural terms, with a similarly 'non-through' access condition (fig 28). A minimal road netwrok does exist through simple site subdivision on the basis of land take from current industry and public utilities, though this is of a coarse block grain. Adjoining residential communities to the south west demonstrate a more permeable block structure, while those to the west (Ringsend) fail to connect well.

In built form terms these adjacent areas exhibit building types and densities of around (plot ratio) 0.3, which are inappropriate for the site's future potential and contribution to Dublin's housing stock needs.

The question of the 'starting point' for new physical configuration therefore becomes critical and should be considered on two fronts:

- Transport capacity as key driver and constraint;
- City Design and tenancy types as criteria for definition of new character and amenity networks.

4.5.1 Infrastructure Provision - transportation limitations on development potential

The current accessibility/mobility conditions and potential for expansion of these as a driver for the nature and extent of new development paints a very clear picture of what is possible on the subject lands. Understanding this transport capacity-led potential revolves around two key issues:

- How can car dependency for the proposed development be reduced to a level compatible with the limited spare capacity on the existing (or even potentially improved) road network?
- Can a viable public transport proposal be developed to meet the demand for public transport from the proposed development?

To answer these questions five more specific enquiries need to be made that include:

1. What is the available spare capacity on the existing (or on the realistically achievable) road network?

2. What is the potential capacity of viable public transport solutions?

3. What quantum of development is needed to fund/sustain such public transport solutions?

4. What are the "car trip"; "public transport trip" and "parking deficit" implications of a range of potential development scenario?

5. What implications has the above for development potential/capacity?

To answer these questions a basic set of assumptions have been made, which relate to the South Bank area and local market condition. These include:

- A 70:30 public transport : private car modal split is the best that can conceivably be assumed (DTO target);
- Approximately 50% of all parking spaces empty or full in peak hour;
- Office occupancy rates are 14sq.m/person and;
- Parking deficits are deemed to be met in adjacent areas (figures quoted are deficit in peak-hour and are approxi mately 40% of total parking deficit).

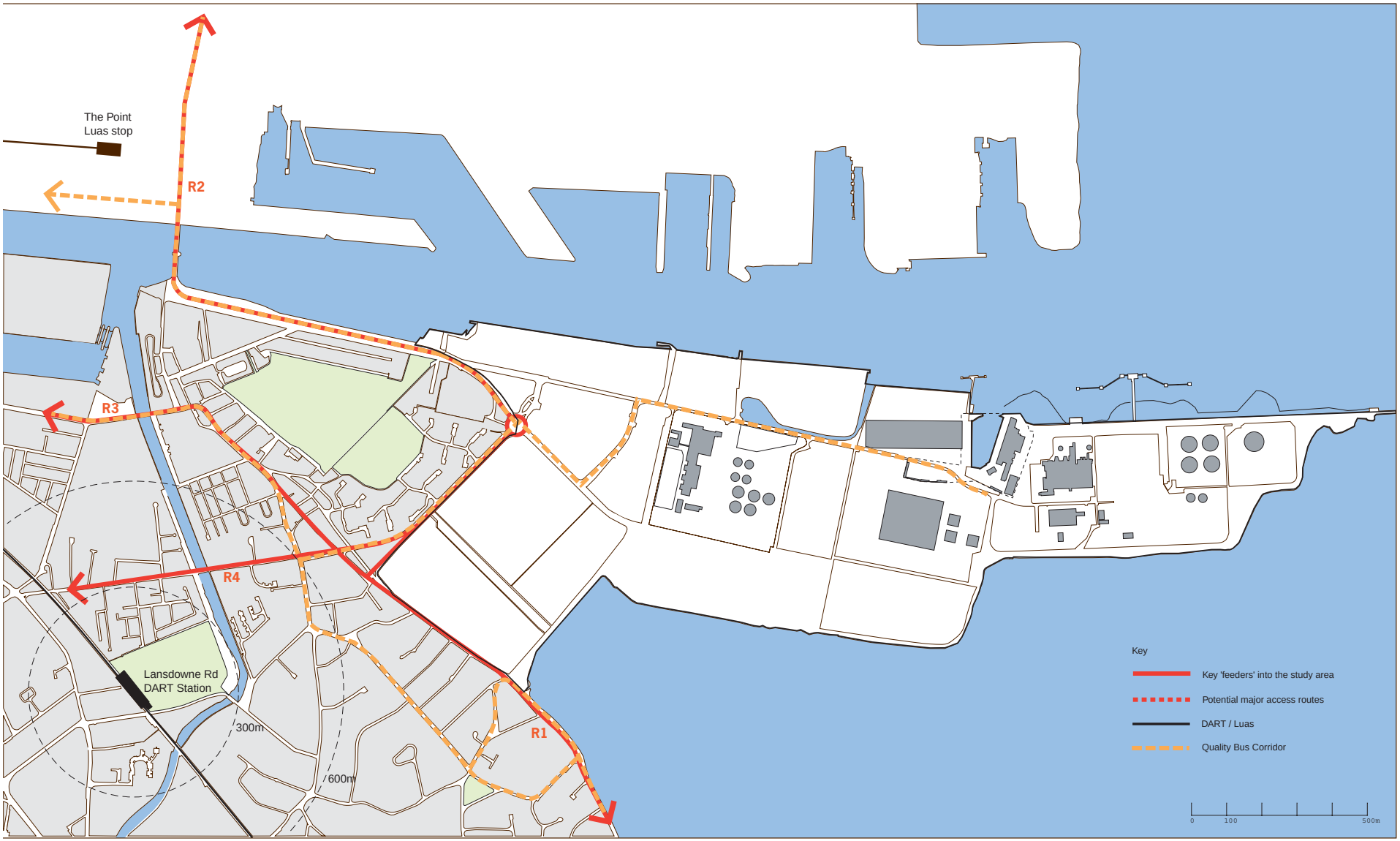


fig 28: Existing access condition

1. Available spare capacity on the road network.
The key constrained "feeders" to the South Bank area are (see fig 26):

- Strand Road to South; (ref. R1)
- East Link to North; (ref. R2)
- Ringsend Bridge to City; (ref. R3)
- Church Ave. to South City; (ref. R4)

The current 2-way use/capacity of these links at peak hour are of the following order:
(Based on brief traffic counts – require confirmation against official DCC/NRA data).

	Capacity (pcu's)	Use (pcu's)	Spare Capacity
R1	2400	2400	Nil
R2	2650	2550	100
R3	1800	1650	150
R4	800	800	Nil

table 5: Exisring & potential road capacity.

This suggests 250 spare 2-way capacity with little obvious improvement potential (other than a future motorway linkage). An upgrade of R4 capacity would require demolition of a row of houses.

2/3. Public transport capacity funding.
A QBC towards the City Centre would clearly provide significant linkage to other public transport facilities. It could be provided at minor cost but would need to displace other traffic. If buses serving the South Bank area were to travel at 5 minute intervals in both directions, approximately 1500 trips per peak hour could be accommodated. However it is difficult at this time to see precisely what routing is feasible.

A LUAS link on the surface could accommodate around 4000 trips at a cost of about 40m euro which would need about 500,000sq.m of development for funding. Once again the routing is problematic and an underground routing is inevitably non-feasible.

LUAS funding calculations are based on levy rates for LUAS extensions elsewhere and are of the following order:

- 6,000 - 8,000euro/residential unit;
- 60 - 80euro/sq.m of office/commercial development.

The likely cost of the LUAS extension (including stops) @ 20m euro/km on surface would be of order 40m euro, which therefore would need the following order of magnitude of development to totally fund the Luas Extension:

- 250,000sq.m of housing + 250,000sq.m of offices;
- 450,000sq.m of housing and;
- 550,000sq.m of offices.

However this quantum of development presents effectively "unsolvable" road network problems and indicates that shuttle buses are the only likely viable option. The above figures would obviously reduce if Government were to provide part funding.

4/5. Trip generation/parking implications.
(The following data was compiled on the basis of trip generation assumptions by use type and is illustrative only. Tabular presentation of figures are given in Appendix X based on an eclectic range of data drawn from previous experience and EIS's). A **"low" density scenario** (of 100,000sq.m) will produce anywhere from 220 to 1680 car trips depending on use mix. Only one scenario is compatible with the capacities quoted in 1 above. The associated public transport demand could vary from 440 to 2080 trips. Only two of the options considered could be accommodated by a single QBC and the higher figures will need Luas but cannot fund it. However a range of other public transport facilities will come into play.

A **"high" density scenario** (of 500,000sq.m) produces very much greater figures (by a multiple of 5) and the associated car parking deficits are potentially huge (up to 12,000 spaces).

Thus the high density scenario is entirely incompatible with any transportation improvements particularly of the roads network. The implication therefore is that the only justifiable possibility (from a transportation viewpoint) is to propose a low density solution with the maximum possible housing content (though this presents real public transport difficulties).

4.5.2 City Design as generator
The second approach to defining new site character and development potential ignores transport limitations and takes a design led and future tenancy profile approach .

Described below is such an approach for the subject lands based on recognition of the following:

- the unique character of the location;
- the city-wide need for particular amenity/recreation facilities
- preserving the historic and ecological value of the peninsula;
- phasing utilities within a clean green framework and;
- support through expansion of accessi bility conditions.

Based on the scenario development in section 4.2.6 several preferred development options were identified. The three options described below represent in-

creasing levels of built intervention on the South Bank, from the designation of the majority of the area for large scale ecological regeneration (ie. a 'minimum' option) to medium and full built development options relating to retraction of existing industry and increased accessibility.

Table 6 sets out the basic preconditions and parameters for the varying levels of intervention of each option. A key precondition relates to the accessibility criteria of each option. Described in figure 29 is the city-wide implication of an East Link / motorway connection on the South Bank, a requirement of the full development (civic gateway) option.

Parameter	Option 1 - min	Option 2 - med	Option 3 - max
Access / Infrastructure	Transport line diversion	Wider transport diversion	Transport extension Rail lines / motorway
Population	~3,000 + say 20,000 visitors p.wk.	~7,000 + visitors	~15,000
Ownership	Consolidation of ownership / Comp	Negotiation for land swap	Negotiation of land release over time
Funding of Infrastructure	International funding, min private contrib'n	Public contribution to open space	Private contribution thru joint venture
Policy Framework	International compt'n, Design & Briefing	Spatial structure, open space dgn, Dev plan.	Action Plan & Detailed Development Frmwk

table 6: Review of three development options

fig 29: Significant infrastructural change will drive the development scenarios

1. Minimum intervention

International Ecological Park

Option 1
Dublin Bay and its environs are already internationally important nature conservation sites. The South Bank Peninsula would becomes a key part of this resource. Its main role would be to provide valuable new urban habitats on the edge of the Bay and to provide an educational and interpretative facility for the whole city.

Key objectives

- to provide a major contribution to wildlife and nature conservation resources and increase biodiversity in the city;
- to provide educational and interpreta tive facilities, thus raising awareness of the importance of Dublin Bay to residents and visitors alike;
- to elevate Dublin's international standing on environmental issues.

Development requirements/ considerations

- requires large tracts of land;
- could still be achieved with utilities in place – but public access in key areas would need to be restricted;
- relatively low development costs – high opportunity costs;
- limited opportunity for revenue;
- likely to attract grant aid.

fig 30: minimum intervention

2. Medium intervention

Coastal Amenity Park

Option 2
A coastal amenity park with a very strong emphasis on sustainability. It would share many of the characteristics of the previous option. However, the nature conservation aims would be much more modest. The park would base its attraction on ecology, water and energy and would have a strong educational theme.

Key objectives
- to provide the city with a major new park;
- fine grain commercial / residential;
- cultural value.
- to raise awareness on sustainability issues and to provide educational facilities;
- to provide a major visitor attraction – Irish Eden?
- to elevate Dublin's international standing on environmental issues.

Development requirements/ considerations
- requires large tracts of land, but could be developed incrementally;
- could still be achieved with utilities in place – but new public access would be required into areas currently restricted;
- public access onto key areas would need to be restricted;
- relatively high development costs;
- major visitor attraction with revenue opportunities;
- likely to attract grant aid.

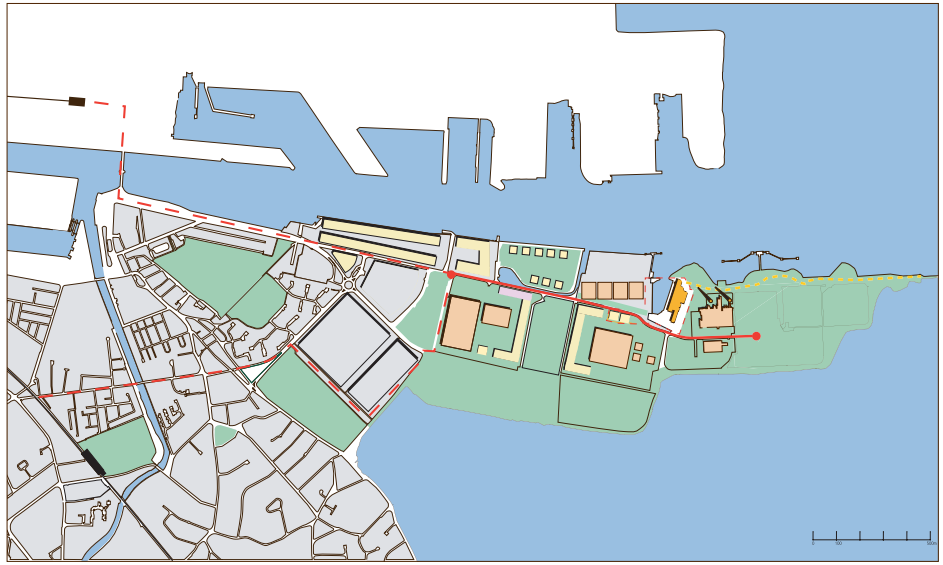


fig 31: medium level intervention

3. Maximum intervention

Full Development- civic gateway

Option 3
A high density, fully urban extension to the city of Dublin. This would contain a primary development zone to enhance value, create new activity and new population. The vision would seek to establish a new image and gateway into the city and redefine its built relationship to the shore.

Key Objectives
- to provide for a high density mixed use development supporting and driving Dublins economic needs;
- to provide a primary employment function with amenity;
- To significantlly reposition thw SOuth Bank area in image and perceptual terms;
- to extend motorway mobility with at grade junction.
- To extend public transport rail access into the area;

Development requirements/ considerations
- requires high public transport and mobility access;
- requires a phased development programme to bring sites on-stream as the city needs demand;
- good public acces must be main tained to waterfront and views/links established;
- likely to be funded largely by private investment with subsidy for special 'new typology' areas (eg car free housing);

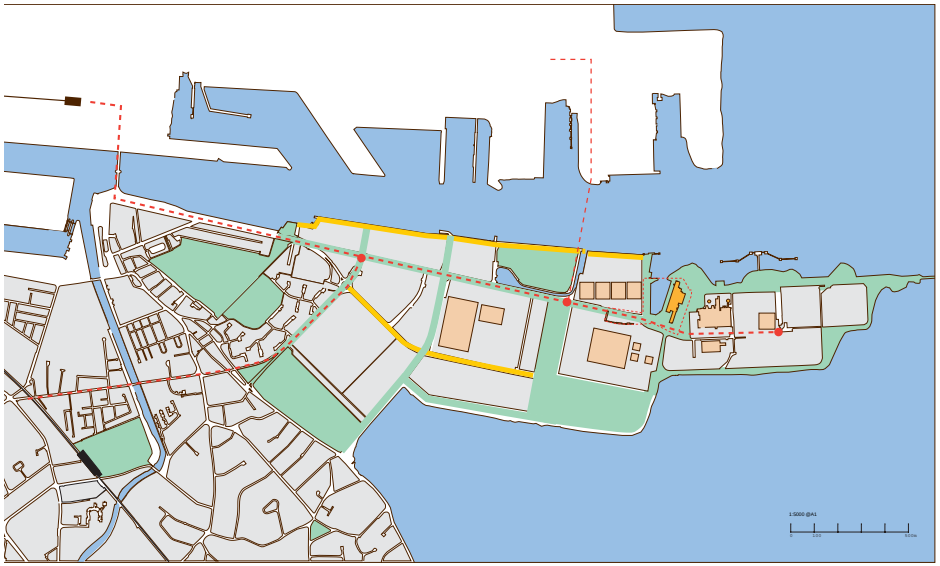


fig 32: full development

Preferred Option
Identification of a preferred option took place over the course of a number of reviews with the client Steering Group. The key concerns revolved around the following issues:

- the need to balance the various needs on the site while maximising its future potential;
- the need for a longer term view recognising that other areas of the city are more suited for immediate development (and therefore the nature and level of the study);
- transportation limitations requiring a phased and limited quantum of development under current access conditions;
- the need for sufficient private develop ment to fund/ enable other environ ment improvements.

This requirement led to a focus on a medium scale level of intervention (option 2) and forms the basis of the design framework in section 5. Option 2 allows for a continued public utility and Port presence through explicit definition of zones of character and further, a shift in character for other areas to accommodate new residential and employment uses. Definition within these new character areas is driven by understanding the 'demand side' or future tenancies and accepted good urban design practice.

5.5.3 Potential Tenancy Profile
A review of the current market and trends for space types and needs was presented in Section 4.3. Key findings relevant to the development potential of the South Bank include:

- Population forecast to increase by 15% in the next 10 years (bringing population to an estimated ~1.7m);
- 184,000 houses/apartments required;
- Population returning to live in the city centres;
- 80% of companies employ fewer than 10 people;
- 52% of office space demand is in city centre;
- Net office absorption for 2002 61,000sq.m;
- Shortage of incubator type space for small and start-up companies;
- Need for specific city-wide amenity - current plans for 2,000 seater confer ence centre and multi-sports stadium.

Housing

- There is a clear demand for city centre housing, - do we have any indication of what type – if not we can suggest that there is a need for a more detail review of proportions of size of apartments needed;
- Reference to affordable housing;
- Safe assumptions will be that housing needs to be ruled out on basis of appropriate density levels, sustainability etc. Considering the proximity to city centre and the relatively fringe character of the area and also the site character (waterfront etc) a primarily residential character to most of the site is appropriate. Furthermore because of the relatively limited land availability and the need of a certain level of population to support local amenities (we have population figures for the overall zone 1 of the site which we can refer to.

Employment

- At present discrepancy between supply /demand of office space in Dublin between city centre and city fringe. Extensive supply of business park type space will increase the discrepancy.
- Business park environments not appropriate for city centre locations – recommendation for city centre type office space in mix areas (i.e. east point model not appropriate – too low density, mono-functional, and requires large sites which will compromise the opportunity for a 'prevailing character')
- The location character of the site is appropriate for 'secondary' start up employment sectors – does not require bulk of space but very high value and constructive in terms of supporting activity, facilitating the growth of new economic activity in the city and compatible to a primarily residential character.
- Business services sectors have the same characteristics and will be potentially attracted by location character (fringe centre);
- Provide range of development types to accommodate different stages in organisation growth (table 7). Allow for start-ups, serviced space to HQ; locations for mature companies.
- Other appropriate sectors which can be reviewed – private health and educational sectors (growing interna tionally).

Amenity
City wide and local amenities inlcude:
All weather stadium; Conference centre; Sports/recreational facility; Cultural centre / art gallery; Passenger terminal; eco / sustainable energy centre.

	Entrepreneurial / High Tech	Craft / Low Tech
Established	Own building Single function	
Mature	Own building Mixed function	Own building
Youthful	Multi-tenanted Shared service	Design centre
Infant	Business centre	Incubator units
Embryo	Innovation centre	Homework

table 7: Organisation stages profile

4.5.4 Urban Design Principles
Current best practice in urban design is more recently established in England and reflected in the newly adopted government guides that include the Department of the Environment Transport and Regions By Design: Urban Design in the Planing System: Towards Better Practice documemt and the Urban Design Compendium. (Other relevant documents include the Urban White Paper, 2000 - Our Towns and Cities: The Future, along with the Companion Guides to PPG3 and Design Bulletin 32). These promote urban design objectives to be considered at a range of levels from setting up development projects to designing schemes to evaluating proposals. The urban design framework for the South Bank peninsula builds on those objectives.

While every place has a specific physical, cultural, social and economic context (as described earlier in this study) there are general principles that can help guide the development of concepts. Those principles are described below in regard to the South Bank condition.

1. City to Shore - A Civic Role
First point of city conatct with the sea. Unique and special character. Major waterfront opportunities and location for city-wide amenity.

2. Zones of ContiguousCharacter
Broad distinction of areas of contiguous character to support and consolidate particular development forms. Allows for comprehensive vew and a diverse environment.

3. Spatial Structure -a flexible urban grid.
Adequate servicing capacity, permeability and safety of the street system. Market robustness and ability to accommodate different uses. Creating a hierarchy of routes and spaces.

4. Greening and the Public Realm
The peninsula is largely a wasted natural asset. Opportunity for major lansdscape contribution to harmonise the range and scale of built form.

Range of types of public space. Overlooked streets and lively publicy oriented ground floor uses, Micro-climatic design issues. Natural materials and rich detail. Public art and street furniture to contribute to local identity.

5. Network of amenity - linking to the context
Mutually supportive condition with existing local ‘soft’ infrastructure. Supporting both city-wide and local needs. Recognise cultual and ecological function in parallel with recreational and employment needs. New connections into the area and quality links to waterfront areas.

6. Movement and Integrating the Transport
Providing pedestrian, cycle and vehicular networks. Make connections between places. New development should take account of the needs of the elderly, mobility impaired and small children. Supporting the site through QBC extensions and links to rail (DART). Shuttle bus connections to and from the city and other transort point. Accommodating the car - parking provision on site and regard to capacity on exiting routes.

7. Uses and Types
Complexity of environment to support long term sustainability. Active, working and living neighbourhood. Commercial, retail as well as community facilities (lesiure,sport, creche etc.) and local facilities (pub, corner shops and the like). Mix of uses focused on main distributor routes and squares.

Flexibility of form - storey and a half ground floors to allow conversion to retail/office in areas of future change and typology variety in residential units (apartment-duplex combinations, terraced houses etc.). Large plot sizesfor flexibility in commercial tenant type.

8. Continuing the Built Edge
Compliance to a common building line to enclose spaces and streets.
Location of main entrances on streets or to reinforce legibility of corners.
Private building-public space definition to be clear.
Design guidance for building fronatage to be developed to control fenestration, soild to void proporions, skyline, canopy structures, signage and the like to ensure visually rich and ordered appearance.

9. Sustainable objectives
Environmental issues that are bassed on high accessibilty but low resource use (walking, cycling, PT). Use mix and compactness with sufficient residential to support local amenity.
Micro-climatic design issues - yearly irradiance levelson building faces and streets to create pleasnt environments. Building design and building relationships - combined effects on street space.
Master plan layout and servicing - maximise site positioningin design of spaces.
Socio-economic issues to create well used and cared for places. Local economies to support city-wide economic strategy. Employment and living opportunities for alldependent upon range in type and tenure of built for.

5.0
design framework

5.1 INTRODUCTION

This chapter describes the design framework for the peninsula and, as discussed in the preceding section, sets out a solution that seeks to respond across two principle conditions:

1. **Balancing the current and future interests and;**
2. **Maximising the potential of the site.**

On this basis the framework addresses the following issues:

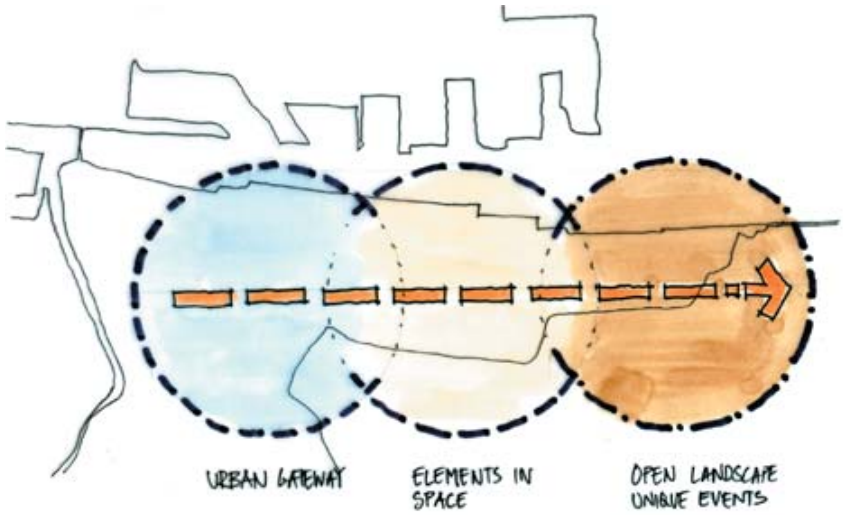
- The present character of the site and its value in the setting of a Dubin wide context;
- Insuring future flexibility for develop ment and functioning of public utilities;
- Allowing sufficient development to enhance or generate urban character/ activity;
- Allowing sufficient development to act as integrator (gateway) of peninsula to city;
- Minimising the impact on insufficient transport capacity.

Figure 30 overleaf identifies three distinct zones of character and development phasing (see section 5.9) while the diagram this page suugests that an important principle is to establish common connections across all three through a landscape strategy (fig 34). The rationale for each zone is described below.

Zone1
Primary development zone to enhance value. New activity and population. Creation of a new image and gateway

Zone 2
Sufficient development to establish waterfront related development character.

Zone 3
Area of different activity based on open character, ecological and cultural value. Strong role to establish historic value and memory.



Continuity in character change

5.2 CHARACTER AREA APPROACH

A broad definition of areas of different character have been established based on:

- The consolidation of utilities;
- The land take of Dublin Port and;
- The physical characteristics and access conditions of the respective parts of the South Bank area.

The classification into three distinct zones allows for a phased strategy that preserves the functioning of critical public utilities and their potential expansion in the immediate future.

This approach also recognises the need to consider the peninsula in its entirety such that the individual development of sites contributes to a coherent vision for the South Bank. A landscape structure, described later, cross links the three zones ensuring continuity of access and environment that redresses the juxtaposition of the man made and natural landscapes at present.

The three character zones shown in fig 30 are described below.

Zone 1
Adjacent to Sean Moore Road and the Ringsend residential community to the west, this area establishes connection with the existing built context. With plot ratios of around 0.3, average quality and low scale, the Ringsend residential development does not establish appropriate precedent on which to draw character. Other existing development includes the decommissioned Irish Glass Bottle buildings.
Site specific drivers for character include:

- Potentially large development area (Irish Glass, Port and ZOE sites);
- Flexibility through deep plot subdivision;
- Possibility to allow for future Eastern Bypass interchange
- Waterfront opportunity to southern edge of the Liffey;
- Building massing response to Sean Moore Road context and opposite housing;
- Waterfront opportunity and promenade extension along south east edge;
- Environmental improvements to Sean Moore Park and better development frontage on north east edge;
- Need for commercial type development adjacency to Ringsend power station (CCGT) and greater building height in this area;
- Gateway opportunity at South Port entrance off East Link Road.

Figure 30 also indicates the potential to extend Zone 1 along the northern and southern edges of the peninsula. These extensions would occur as a later phase, maximising their waterfront position and serving to improve the environment around the Ringsend power station.

Zone 2
A core area retained for public utility functions that would allow for limited further expansion of the same (potential thermal waste treatment plant).
Primary potential for intervention includes environmental improvement measures through landscape strategy to increase accessibility of coastal routes, Irish Town Nature Park and through access to South Bull Wall.

Longer term potential to accommodate development extension zones to northern and southern edges.

Zone 3
Strong sense of remoteness due to relationship with Dublin Bay, distance from city centre (Poolbeg Lighhouse is 7km from O'Connell bridge), surrounding wildlife, beaches, strand and particular geographical condition that allows views to Dublin city as if from the 'outside in'.

Site specific drivers for character include:

- Natural and man-made landscape juxtaposition;
- Large industrial type structures, active and decommissioned;
- interesting supporting infrastructure including the former passenger dock (late 18th Century) at Pigeonhouse Harbour;
- The historic South Bull Wall, constructed by the Ballast office in the early 18th Century as channel protection and access way;
- Dublin-wide recreation area – walking, fishing, beach;
- Potential re-use of decommissioned utility structures for cultural / recreation activities;
- Historic and highly visible twin Poolbeg chimneys.

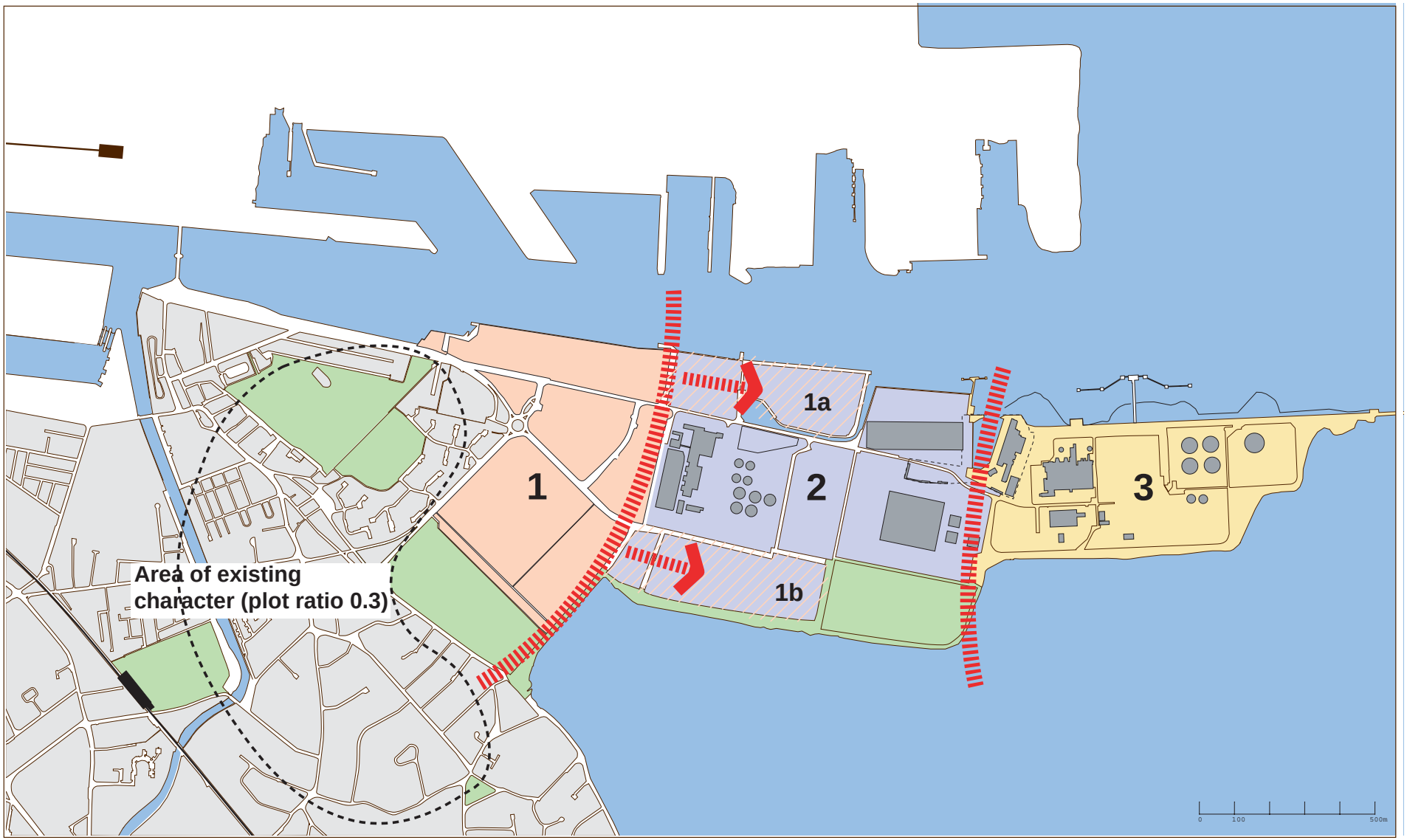


fig 33: Character zones

5.3 LANDSCAPE AND VIEW STRUCTURE

DEGW

5.3.1 Rationale

- The need to provide an overall connected landscape structure that integrates large scale utility functions with finer grain commercial/residential development;
- Using the landscape structure to accommodate a possible future Eastern Bypass interchange;
- Need to phase development within the three character zones described in 6.1;
- Recognition of the existing adjacent block structure with respect to con nections into the street network;
- Creation of a hierarchy of routes and spaces to introduce inherent legibility into the area and to allow for a range of uses requiring different quality conditions;
- Allowance for future flexibility and change in tenancy & building type through large block structure;
- Maintaining appropriate walk distances through block subdivision and recognising a finer grain for residen tial blocks adjoining the Ringsend community;
- Responding to the different edge conditions of waterfront: 1) the need to create a highly permeable structure along the south eastern bay edge; and 2) a more urban edge to the south bank of the Liffey;

The characteristics of the landscape environment at present can be classified as follows:

- The man-made environment that includes the hilly landfill site known as Irish Town Nature Park and other industrial type settings. Of particular quality is the granite stone walkway that continues along the southern edge of the Liffey from South Bull Wall to Pigeonhouse Harbour and;
- The natural environment, which is represented by the broad sweep of Dublin Bay, accentuated at low tide by some 800ha of uncovered sand in this shallow estuarine area. The ‘natural’ southern edge is characterised by a continuous coastal walkway that includes a variety of edge conditions from open Bay views to the south of Dublin to small beaches to the Nature Park’s elevated position giving 360 degree views back to the city.

The development of a detailed landscape plan needs to be the subject of a first stage in the early development on the peninsula. The principles set out above and illustrated in figure 34 will ensure that any site development takes into account the future development of the landscape.

fig 34: landscape and site structure

5.3.2 View parameters

The South Bank's peninsula structure is clearly visible from many locations as a strategic and background view, of which the Poolbeg chimneys form a major landmark. From the south, main view points include Sandymount to Dun Laoghaire and Kiltiernan, from the north (Howth) and west to the city (Liffey quays, Matt Talbot to East Link bridges) the view is largely industrial. Locally the view from Ringsend/Irishtown is less industrial and one of shore edge and landscape.

The use of views to structure the site is important and in this regard views exist across three levels.

1. Local view corridors

Includes views along streets, to local landmarks, emphasising site legibility and connection between spaces. Very much the subject of detail master plan and design guidance.

2. View space

Includes the design of sufficient space around key elements for their appreciation (eg around the Poolbeg/Pigeon house). Alos critical to establish 'breathing space' within development or in the specific case as shown in fig 35 to connect north and south sides of the peninsula.

3. Strategic views

Views from the peninsula back to the city can be experienced along the shore to the south and the Liffey edge to the north. Also strong 360 degree views from Irishtown Nature Park. Such views allow the city to be experience form the 'outdide in' and are unique in this regard.

Views to the peninsula can be experience from as far away as Dun Laoghaire's west pier to the south and as far north as Howth Hill. Important views also exist along the Liffey river space, in which the Poolbeg chimneys establish the eastern 'end' to the city.

Recognising these characteristics informs the site layout and oreintation of blocks and generally sets massing parameters for the peninsula. Key amongst those are:

- Maintaining the open aspect of the eastern sections of the peninsula;
- Focusing the bulk of development within the area identified as character zone 1;
- Holding development back from the shore edge allows dual appreciation of shore and water at the same time, and increases public access;
- Preserving identified key views;
- Allow a combination of local street vistas and longer bay views

Local views from Sandymount

Background setting of the peninsula

Connecting views from the city

Visible position at the eastern edge

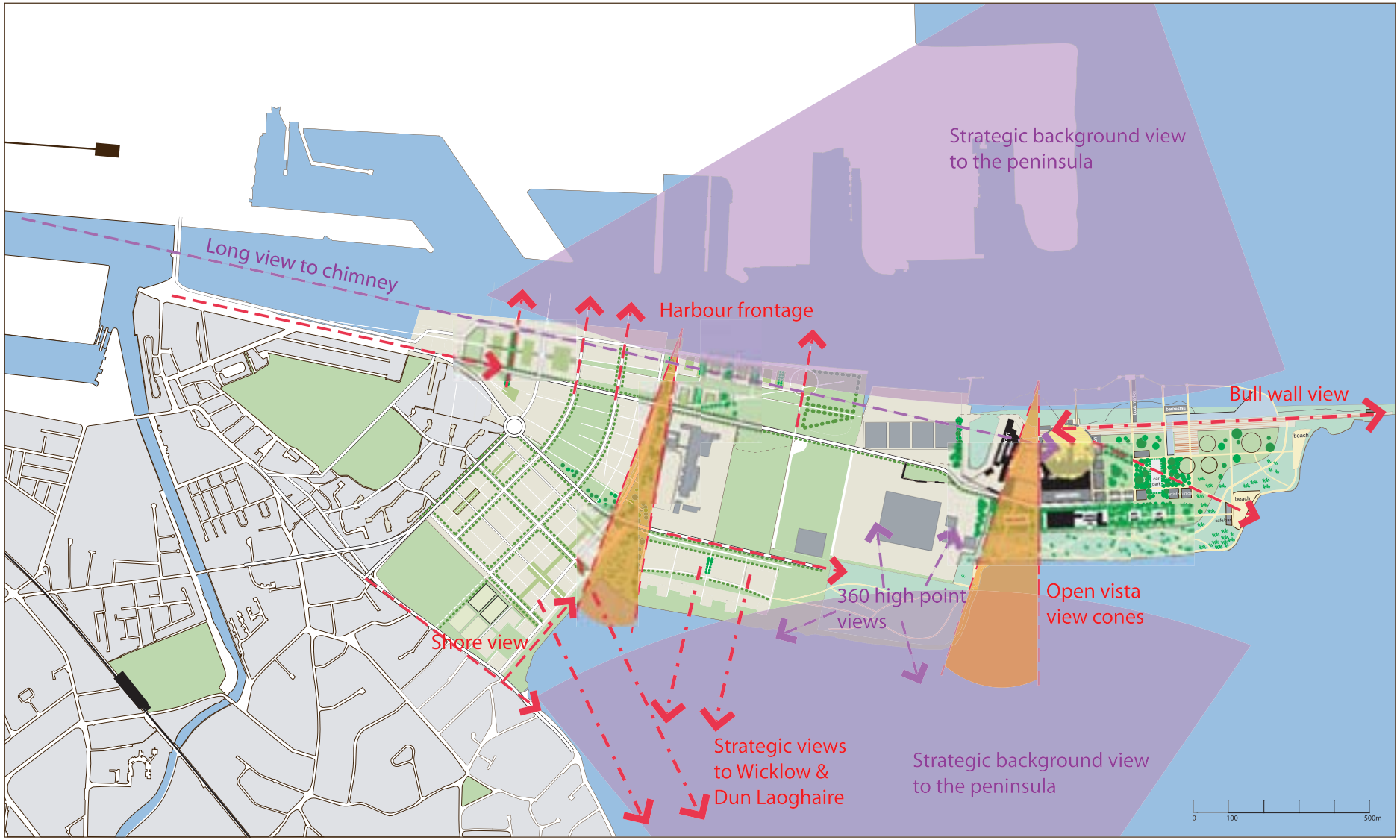


fig 35: Key views and vistas

5.4 MOVEMENT AND ACCESS

This section describes an overall movement strategy that includes a potential road network to service the site, pedestrian and cycle movement and public transport access connecting the peninsula into the city-wide transport system. The strategy ensures that:

- the site maximises opportunities to connect into the existing network;
- the movement system supports a range of potential uses;
- the potential for an Eastern Bypass interchange is catered for;
- DTI Strategy is supported;
- Public transport, cycle and pedestrian modes are prioritised; and,
- Informal recreation routes are de signed into the plan.

6.4.1 Road Hierarchy

The road network builds on the adjacent traffic cell structure and identifies a hierarchy of movement routes. This hierarchy is shown in fig 36 opposite and includes:

1. Major access connections – (red) primary roads within the site, extensions off existing major feeders connecting into the local area;

2. Local access routes - (blue) roads forming the principle block structure division and connecting into adjacent local roads;

3. Site access routes – (white) and indicative access points. These routes subdivide the primary block structure into service lanes and dedicated access roads.

4. Pedestrian and cycle ways – (yellow) should be direct and safe to encourage use and given controlled crossings wherever they meet primary and local access roads.

Connections into the site from existing Highways are described in section 4.3, in which the four primary 'feeders' are identified:

- Strand Road to South;
- East Link to North;
- Ringsend Bridge to City; and,
- Church Ave. to South City.

These feeders have limited scope to accommodate further capacity and should receive the focus of attention for improvement schemes. Particularly improvements at key junctions are required for pedestrians and cyclists. Through traffic is high due to the limited access roads to the south city, though with the construction of Macken Street bridge congestion levels may change.

Bridge traffic will be drawn off the narrow East Link Bridge. The toll gates on East Wall Road bottle neck traffic and constrain access from the north.

The proposed primary access roads, in particular Sean Moore Road and the extension into the site of East Wall Road should minimise the use by heavy through traffic (H.G.V's). Independent primary access, specifically into the south port and current industrial activities should be provided.

fig 36: Movement network

5.4.2 Public Transport

Public Transport access to the site is poor, relying principally on the QBC which runs along Sean Moore Road. Suburban rail DART accessibility is borderline (Lansdowne Road Station is approximately 1.5km to the heart of the site) with no clear direct route. Other nearest stations include the new DART Grand Canal Dock Station at Barrow Street and the proposed LUAS stop at The Point, both beyond a walkable distance.

Arguments based on the economics for development of new public transport light rail services and increase of bus services on existing near capacity roads have been made in section 5.4 and it is clear that this is problematic. Not-with-standing issues of subsidy and quantum of development to fund new infrastructure, discussion with the Light Rail Project Office was held on a purely 'design' basis. This discussion identified a potential extension alignment of the LUAS line from The Point, across the Liffey adjacent to the East Link Bridge, along East Wall Road and into the site, containing at least two new stops. This would ensure that the entire Zone 1 development area would be within 300m / 5min walking distance of a tram service.

In addition to the potential LUAS extension it is crucial that new bus routes are introduced into the South Bank area. These would share local and primary access roads, laid out in such a way again that all of the development area is within a 5min walk of a bus service.

5.4.3 Car Parking

Current parking provision for the South Bank area is of an order comparable to an outer suburban location such as Ballymun. This generous ratio will need to be reviewed in light of potential public transport access, road capacities, trip generations based on use mix and proximity of the site to the city centre.

The majority of parking will be provided in undercroft or building garages. On street parking should be allowed on major and local access routes. Entry points to garage / underground parking should be off lower order service lanes, minimising visual impact and not interrupting pedestrian/cycle routes.

In general parking provision will be dependent upon:

- Use mix
- Car trip generation
- Modal spilt
- Public transport provision
- Parking deficits and ability of off-site locations to absorb deficit

Parking ratios will be dependent upon degree of acceptable congestion of surrounding road network.

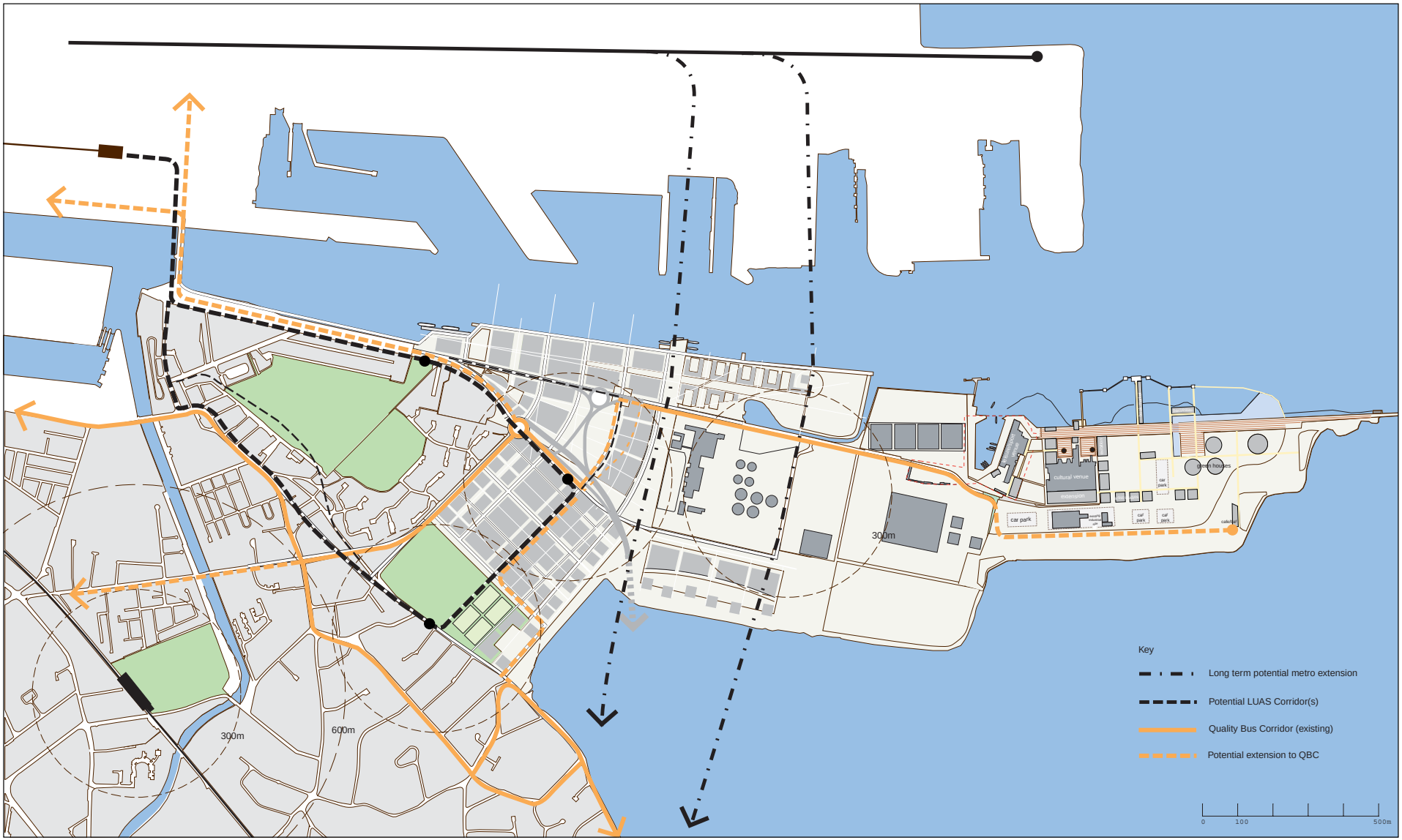


fig 37: Access network

5.5 LAND USE PATTERN

The pattern of distribution and location of uses for the South Bank area shown in Fig 38 is described in terms of the following:

- Residential;
- Commercial retail;
- Employment;
- Leisure and recreation;
- Specialist amenity (sports center, conference center etc.); and
- Public utility.

For the purposes of area calculations a broad residential / commercial classification is used (see 5.8), which suggests a 30% commercial, 70% residential mix.

The land use pattern is driven by:

- The specific locational characteristics of the South Bank area;
- Proximity to similar uses and adja cency of existing residential areas;
- Accessibility, aspect and environmen tal quality conditions of particular locations;
- Market profile characteristics (identi fied in 4.3 and 5.5.3) and city-wide need for specific amenity (stadium / conference center option Appendix 3).

5.5.1 Residential

Traffic and transportation constraints on development type and quantum suggest that a low density residential option for the site is the only viable alternative. From the point of view of mixed development creating a lively, vibrant and naturally surveilled area however traffic driven parameters do not achieve the broader goals.

Residential development on the site should be distributed across a range of building types from low density two storey terraced to duplex, low and mid-rise. This ensures that a range of residential units will be provided to cater for young professional single people to families and older retired people. The proximity of the site to the city centre suggests that 20% to 30% of each development type should be made affordable for key workers and include a social housing content.

Section 4.3 identified the demand profile for residential space, based on the predicted growth of Dublin's population over the next 10 years of 15% to 1.7m. This generates an estimated need for 184,000 more apartments or houses. Current demand for housing is higher than supply and there is pressure for greater densities and inner city living.

The particular locational characteristics of the site suggest appropriate typologies for the following areas:

- Liffey edge – apartment accommoda tion, one and two bed units;
- Sean Moore Road edge – terraced and duplex units with own front door;
- South eastern site edge – low to mid rise apartment mix with maisonette;
- Southern site edge – mid to high rise apartment blocks.

5.5.2 Retail Provision

Local shopping areas include the well established Irish Town neighbourhood and Sandymount Green. These cater for existing local populations and cafés and restaurants in Sandymount Green of high quality. The potential new populations on the South Bank area would be substantial (say 300,000sq.m of residential space would generate 3,750 units and a population of around 9,750 and 100,000sq.m of commercial space would support around 7,150 workers) and require aditional amenity. Demand for restaurants, shops and pubs would need to be met on site and would contribute to a lively and vibrant setting.

Potential locations for such amenity would include the south easterly facing bay frontage that forms major pedestrian link and potential new boulevard route off Beach Road. Good sunlight penetration, views and access make this area suitable for shops, restaurants and pubs and would add to the vitality of the waterfront.

5.5.3 Commercial employment space

At the end of 2000 office vacancy levels were around 2% and though these have risen significantly to their current level of around 20% the slow down in new office construction will bring the vacancy level down. The fastest growing sectors are Financial services, Business services and Information technology, tourism and construction, with the majority of firms employing under 10 staff. This indicates good potential for growth and a strong number of new businesses. A focus for the area should be on serviced start-up office space and the like.

Of the demand in office space the greatest take-up by size is for 50 – 100,000 sq.ft space type, with the 10 – 20,000 and 20 – 50,000sq.ft space in second place. The demand for larger floor plates suggests that these should be located within blocks central to the area defined as zone 1 that have short walking distances to LUAS and bus services and are adjacent to major access roads.
As a potential office location the area offers a high quality waterfront character in close proximity to the centre and other employment locations (East Point, IFSC, Grand Canal Dock). Local amenity is of high quality (Sandymount Green) and large middle class residential areas adjoin the site.

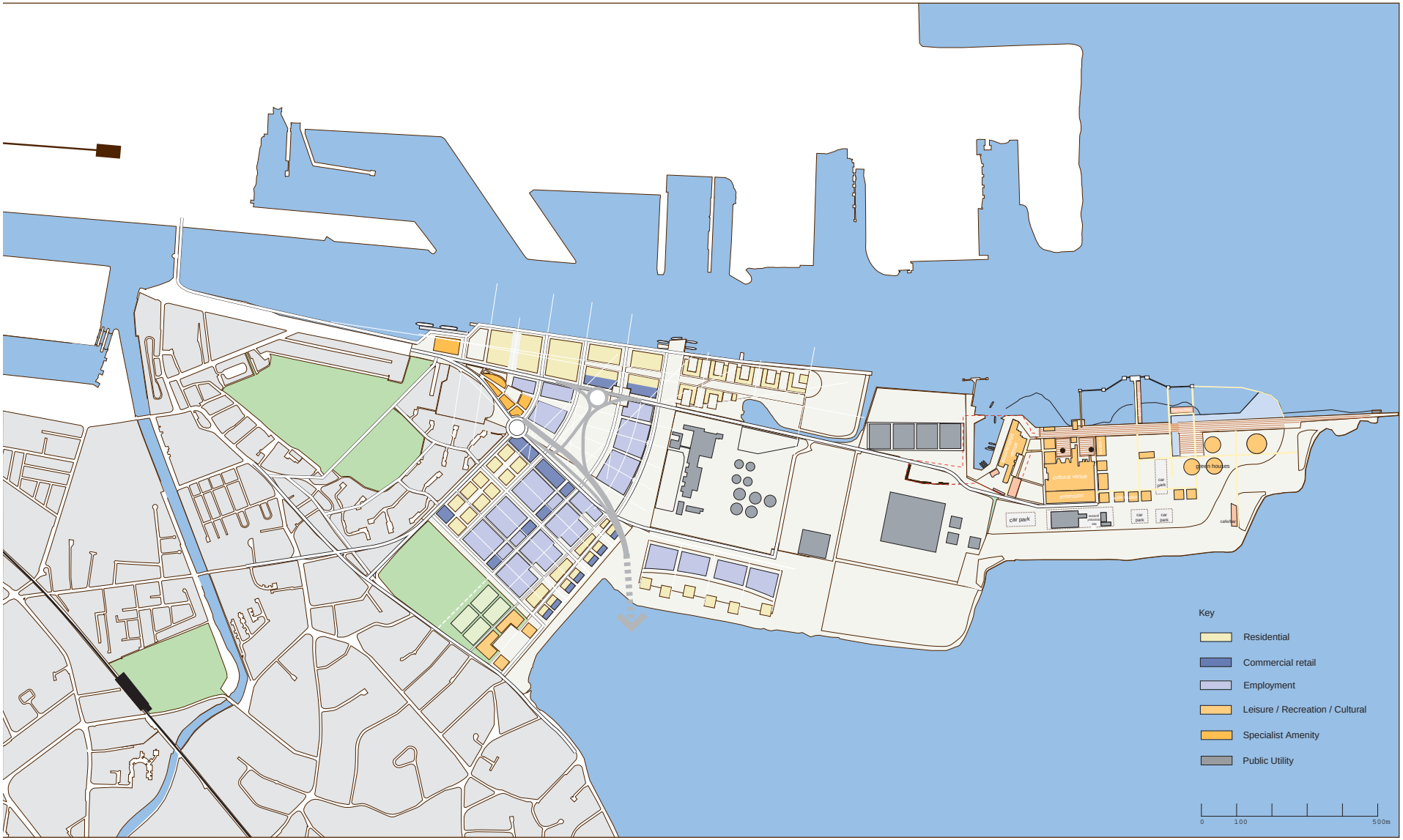


fig 38: Land use pattern

5.6 AMENITY PROVISION

The development of a network of amenity for the future working and living populations on the South Bank will integrate with the existing adjacent neighbourhood shops, services and restaurants (fig 39).

The Liffey river and Bay are major city-wide public amenities whose accessibility and quality should be reinforced. The South Bull Wall and Strand area contribute major character to the area and the beaches constitute the only immediate seaside recreation for Dubliners. The historic granite pavers that run west from the South Bull Wall to Pigeonhouse Harbour are of high quality and should be retained if public access is opened up to this area.

Within the site the distribution of amenity will depend upon the type and level of provision which will vary according to the larger corporate organisations and their internal structure of provision. In general business services (printing, brokering, banking etc.) should have an on site presence and be combined with other local amenity (pub, restaurant, corner shop etc.) along main distributor roads or at nodes and public spaces (fig 40).

Specialist amenity
Development of the Pigeonhouse Harbour and associated utility buildings including the Pigeonhouse Hotel. Potential uses include recreational / leisure facility, rowing / boating club, cultural centre / art gallery.

Potential development for a new sporting facility adjacent to the bay on Beach Road.

Longer term potential development of the Poolbeg power station into multi events centre (rock climbing / diving / ecological education centre / arts and crafts studios) depending on ESB strategy for future power generation requirements (fig 41).

Potential development of a new multi-sports all weather stadium (unresolved) along with development of a new 2,000 seater conference center and associated facilities.

Potential development of new passenger ferry terminal.

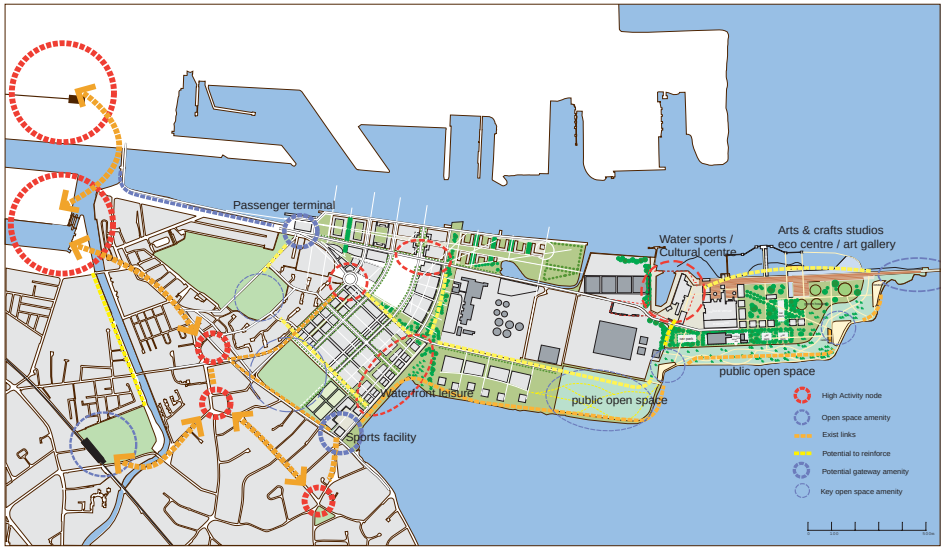
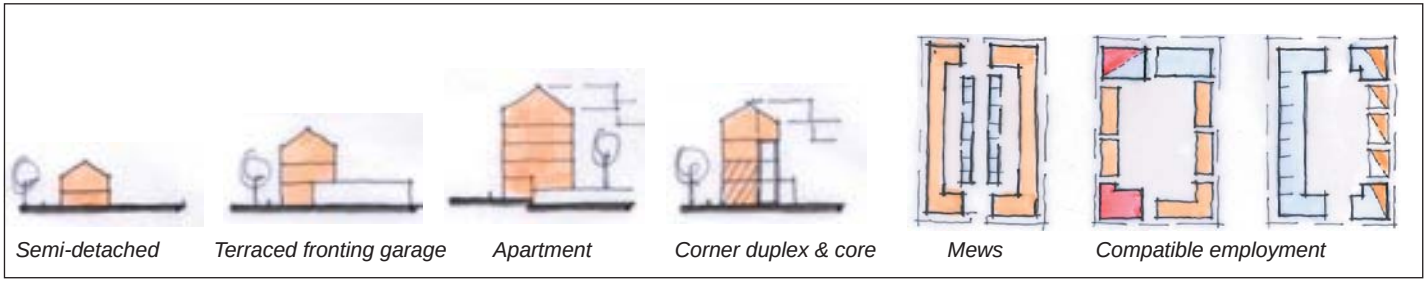


fig 39: Network of amenity



Building type and layout affect residential/commercial utilisation levels, key to mixed use environments

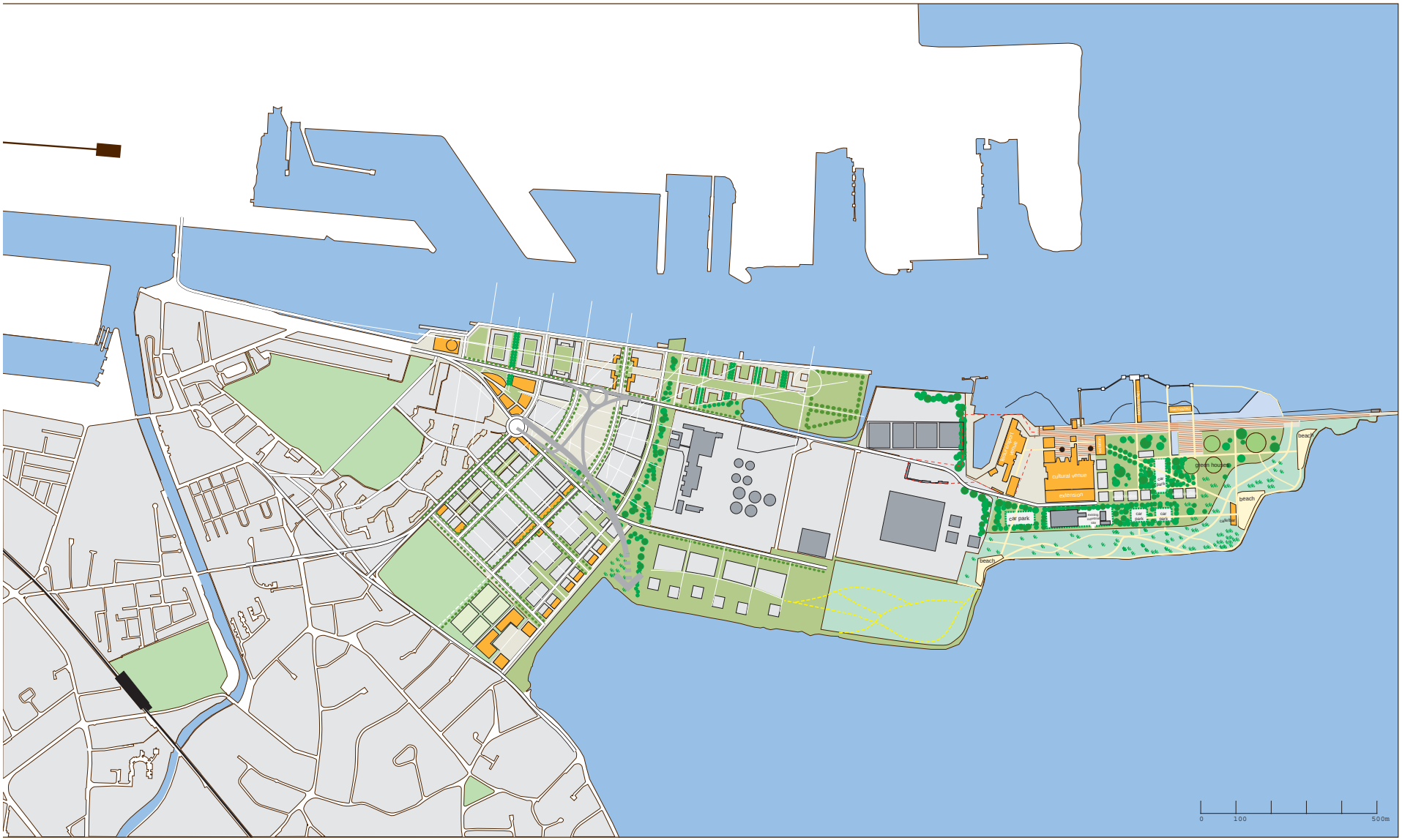


fig 40: Amenity provision

Amenity Park
Zone 3 to the eastern end of the peninsula is proposed to include a range of city-wide amenity based activities that aim to re-use many of the exsiting historic buildings and infrastructural elements. The plan in figure 41 suggests a possible re-development of this area along the lines of several cultural regeneration schemes that have proved successful elsewhere.

The plan indicates large scale landscape intervention to create a range of sculptured outdoor spaces and natural shore line habitat, connected by a network of pedestrian and cycle paths. New built intervention is proposed to include small studio type artist spaces, cafes and restaurant and specialist market spaces (eg book venue).

Existing historic buildings are proposed for refurbishment and conversion into cultural or recreational watersport facilities, while the harbour area is to be redeveloped into major waterfront attraction.

Learning from other places:
1. Emscher Park: Duisberg-Nord
A seminal project for dealing with an abandoned industrial site and attempt to create a new formula for an urban park out of what was otherwise 'lost space'.

Background
A decommissioned steel works covering a 200ha site on the edge of town in the heart of the industrial Ruhr region. A landscape that has changed in the last 150 years from agricultural to the largest indutrial enclave in Europe. The original flat landscape was transformed by abandoned pits and slag heaps.

The Strategy for Change
Emsher Park IBA set up by North-Rhine Westphalia Government to promote economic and environmental growth. A 10 year programme financed by public and private sources to establish a scheme that would give coherence to the vast industrial site.

Proposals
- Using existing structural networks of rail tracks and bridges to link inner park with surrounding fabric;
- Nature walks at ground level;
- Water park;
- Use of ruins as vertical structures for climbing walls and viewing tower;
- Use of gas cyclinder as diving tanks;
- Existence of some 240 plant species, brought in a seeds in coal trucks creates totally new landscape;
- Water purification - use of old ditches and pipes to create water courses throughout.

2. MOCA - museum of contemporary art, Massachusetts, USA
An extraordinary project to convert a 27-building historic mill complex into a multi-disciplinary center for visual, performing and media arts.

Background
Set in North Adams the 12 acre mill complex was built in 1872, with the 27 buildings listed on the National Historic Register. The site is linked to the history of New England and went through changes of use from cloth to electronics manufacturing. In 1985 the complex was closed.

Strategy for Change
Investigations by the Williams College Museum of Art into new locations for contemporary ary venues led them to develop a plan for the Sprague Mill in 1993. Also to meet a community need to develop economic/cultural links, prestigous architects Frank Gehry and Robert Venturi prepared a study which secured a 35m USD matching grant from Massachusetts legislature.

Proposals
- Use of authentic industrial mill character to create space for art gallleries, performing arts, artists-in-residence, video and film production, restaurants, cafes and shops;
- Use of covered bridges and elevated walkways to connect the complex elements;
- Fiber optic network to connect the complex to the world;
- Permanent work in progress with the mission to maintain s position as the premier platform for creating and presenting the best 'art of our time'.

Understanding the type of change possible, how that change has been implmented and the relative success or failure indicates the potential for such schemes on the South Bank. In both of the above case studies the redevelopment has proven to be successful though in both cases change took place over relatively long times scale (10 years) and funding was required from external public bodies.

fig 41: Amenity Park

5.7 VOLUMETRIC EXPRESSION

DEGW

5.7.1 General Approach

The overall massing of built form on the peninsula is driven by a number of factors including:

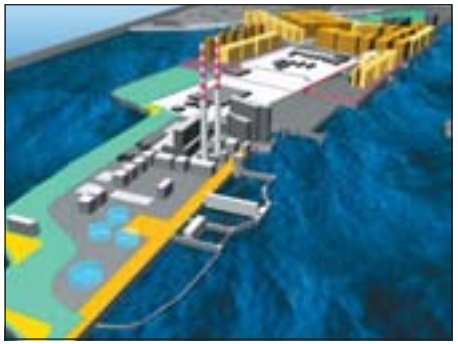
- the adjacency of existing areas of specific height and use;
- the specific character of openspace and waterfront adjoining development sites;
- achieving overall density commen surate with an urban scheme of plot ratios ranging from 1:1.5 to 1:2.5 (see tables section 5.8);
- the need to create the character of an urban setting through appropriate enclosure of streets and spaces;
- the need to establish landmark features (buildings) in particular locations to reinforce identity and area legibility;
- the demand for particular types of development and office space according to current trends and market demand.

These broad criteria inform the volumetric expression of built form indicated in figures 42 & 43.

The focus of building mass within zone 1allows the open character of the eastern end of the peninsula to be maintained (fig 43b), including the experience of standing outside the city looking in. Increasing development to the west creating a strong southern edge to the Liffey creates a strong sense of arrival (fig 42d) and definite edge to the city centre whilst preserving the presence of the two chimneys.

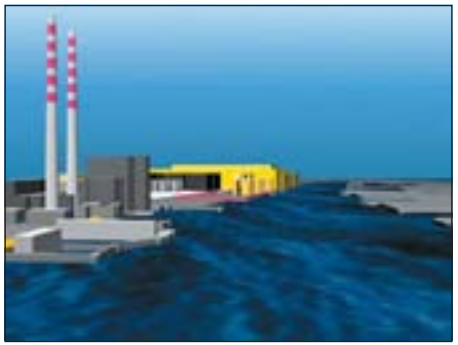
Building relationship to the waterfront is explored in more detail in figure 44 and begins to describe an aspirational urban quality. In principle the massing of development along the south western bay edge attempts to create a human scale in building footprint and height with direct relationship to the shore. The built edge is broken into smaller sub-blocks (fig 42a&b) allowing set-back and articulation of the edge for small puclic spaces and to create both physical and visual connection back into the ZOE and Glass Bottle Factory sites.

a: Distribution of development allows for utility presence



b: Maintaining the open aspect to the east

c: Urban zone 1 development & conference centre



d: Approach from the Liffey

fig 42: Illustrative views into the site

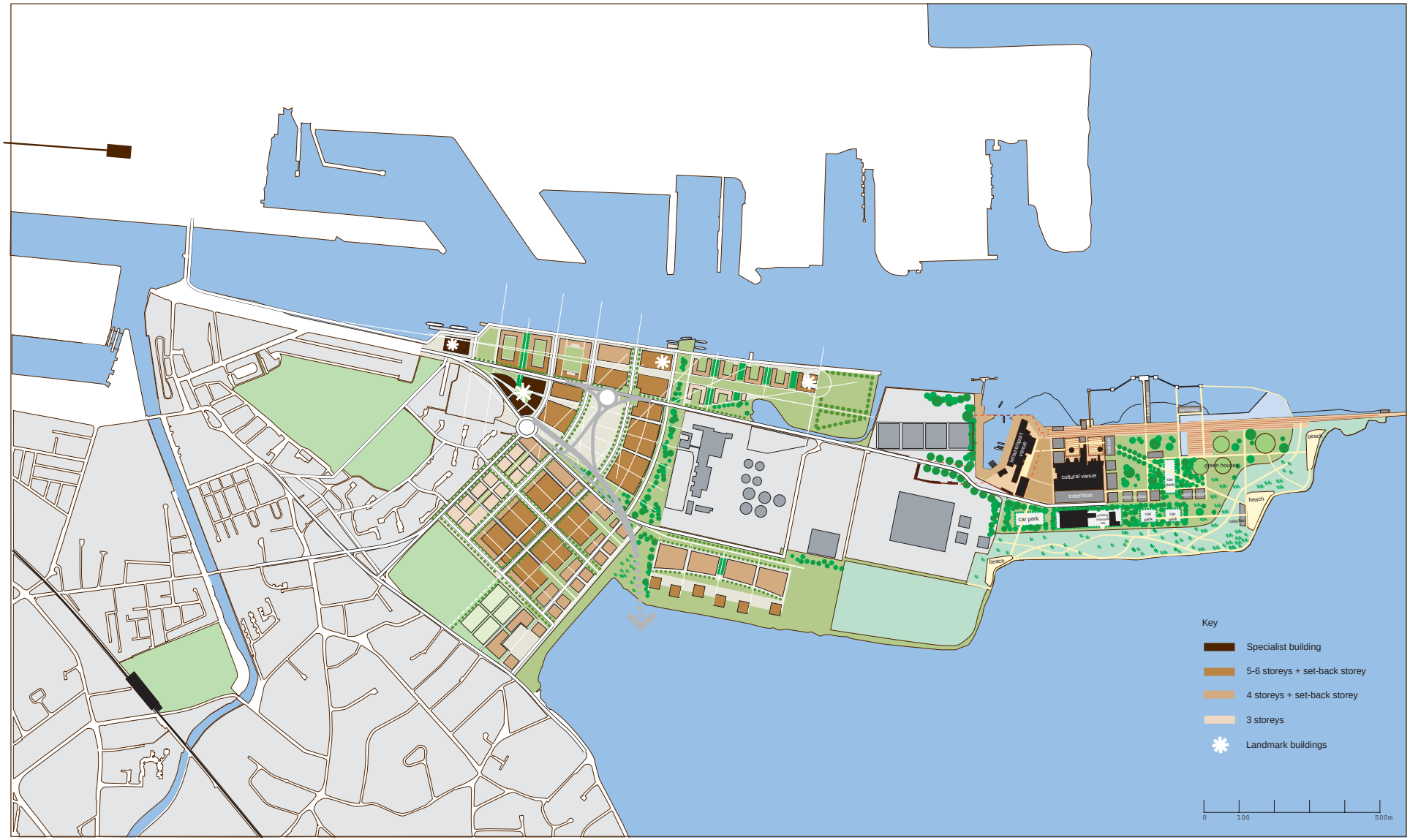


fig 43: Building height

5.7.2 Urban Ream Quality

Described in section 4.5.4 were key urban design objectives to guide the character and quality of future development on the South Bank. In order to understand these further a number of illustrations (fig 44) suggest the way in which a new place could be created, with particular reference to the specific waterfront condition.

The general principles illustrated here describe:

- Waterfront building height of up to 4 storeys with possible set back 5th storey;
- Building blocks broken into smaller sub blocks to achieve open space connections to the north-west;
- Active ground floor uses (cafe, restaurant, shops with facade fenestrationa nd canopy structures to relate to the human scale;
- Varied us of planting - open natural landscape and sea front dunes combined with more structured boulevard tree lines;
- Generous public space (approx 40m) between building edge and shore. Resolved into layers of space type from cafe seating space to paved shared surface to natural sea front paths.

fig 44: Illustrative views into the site *Looking north-east towards the Ringsend power station*

Aerial perspective

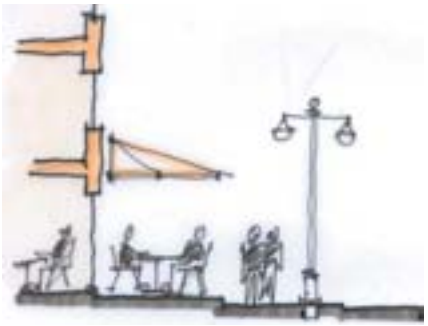


fig 45: Active building edges vital at the ground floor

Looking sout-west towards Beach Road

5.8 POTENTIAL CAPACITY

To test the capacity of the site a 'building type led' approach has been applied to the different site areas identified in figure 46. This approach identifies the range of potential building types, from semi-detached to apartment, duplex, mid-rise and high-rise with the corresponding plot rations relevant for each type. Both the commercial/residential utilisation possible within each type and predicted populations are shown in full in Appendix 5.

The tables below identify the net development areas of the respective sites and calculates gross floor areas on the basis of preferred development types for those locations. An example calculation is given for Area A1 (table 9), indicating a mid-rise block option of plot ratio 1:2, giving gross residential area of 29,484 sq.m and gross commercial of 12,636 sq.m, with combined populations of 1,860.

Site Areas	Area ha	Area net
Area A1	3.24	2.11
Area A2	3.05	1.98
Area B1	1.38	0.90
Area B2	2.97	1.93
Area C1	3.16	2.05
Area C2	6.69	4.35
Area C3 (ZOE)	4.79	3.11
Area d1 (extension 1)	5.29	3.44
Area d2 (extension 2)	6.59	4.28
Area d3 (extension 3)	2.09	1.36
Area a3	1.24	0.81
Area b3	1.55	1.01
Area b4	4.2	2.73
Area b5	2.73	1.77

table 8: Net development areas

Site Area 1 example calc.	3.24
Servicing Infrastructure (%15)	0.486
Amenitiy (%20)	0.648
Nett Site Area	2.106

* Assumes 80 sqm per unit
* Assumes occupancy of 2.6
* Assumes 14sqm pp commercial

Overall development capacity by area
The figures below indicate the potential capacity of Zone 1, calculated on the basis of assumptions made regarding builiding height and type as described in the preceeding section.

Area A
A1: Gross residential 29,484sq.m Gross commercial: 12,636 Population: 1,860
A2: Gross residential 27,755 Gross commercial: 11,895 Population: 1,752
a3: Specialist amenity building

Area B
B1: Gross residential 12,558sq.m Gross commercial: 5,382 Population: 793
B2: Gross residential 27,027sq.m Gross commercial: 11,583 Population: 1,706
B3: Specialist conference centre facility
b4: Set aside land for potential infrastructure
b5: Green open space

Area C
C1: Gross residential 28,756sq.m Gross commercial: 12,324 Population: 1,815
C2: Gross residential 60,879sq.m Gross commercial: 26,091 Population: 3,842
C3: Gross residential 43,589sq.m Gross commercial: 18,681 Population: 2,751

Area D
d1: Gross residential 48,139sq.m Gross commercial: 20,631 Population: 3,038
d2: Gross residential 59,969sq.m Gross commercial: 25,701 Population: 3,785
d3: Specialist recreational amenity

Total indicative gross development area approx **500,000sq.m**
Total residential **370,000sq.m** (approx 74%)
Total commercial **130,000sq.m** (approx 26%)
Total population **21,342**

Note: the development area of specialist sites a3, b3, d3 is not included.

Area A1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	2.106	0.35	7,371.00	1	7,371.00	92	240	43	0	0.00	0	240	
Terraced	2.106	0.5	10,530.00	0.95	10,003.50	125	325	59	0.05	526.50	38	363	
Duplex	2.106	1	21,060.00	0.9	18,954.00	237	616	112	0.1	2,106.00	150	766	
Low-rise block	2.106	1.5	31,590.00	0.8	25,272.00	316	821	150	0.2	6,318.00	451	1,273	
Mid-rise block	2.106	2.0	42,120.00	0.7	**29,484.00**	369	958	150	0.3	**12,636.00**	903	1,861	**42,120.00**
High-rise block	2.106	2.5	52,650.00	0.6	31,590.00	394.875	1,027	187	0.4	21,060.00	1,504	2,531	

table 9: Example calculation for Area A1

fig 46: Development sites

5.9 PHASING

DEGW

5.9.1 Zone 1 development phasing

The diagram in figure 47 indicates a potential phasing of sites within the character area defined as zone 1.

Phasing flexibility

The phasing plan includes an inherent flexibilty due to the nature of road infrastructure on the site and the reserve for a future potential East Link junction. This allows relative independence between development sites and thus alternative site ordering to be established.

Reflecting the current condition

The suggested plan takes into account a number of existing conditions:

- The immediate development planing application on the ZOE lands;
- The continued growth of the Port on lands to the southern edge of the Liffey;
- The need to set aside reserve land as open space for future infrastructure;

Phases 1&2

Waterfront edge lands including the ZOE site (current application). Stand alone recreational amenity (1b) could be developed independently. Second stage would include the lands on long lease to the Glass Bottle Factory from Dublin Port.

Phase 3

Peninsula gateway sites that include specialist amenity developments (conference center, pasenger terminal and some office related use). relatively independent site development and servicing issues.

Phase 4

Large linear open green space link to the Liffey edge would be established as part of the office related development of this phase. Would establish relationship of development to Ringsend power station.

Phase 5

Two independent residential and office waterfront sites to the southern and norther edges of the peninsula. Phase 5a may need to be developed later due to the uncertain ongoing Port expansion plans.

Phase 6

Development dependent upon long term Dubin Port Company strategy. An important and highly visible development location on the baks of the Liffey that would help to create a strong sense of new city edge and arrival to Dublin.

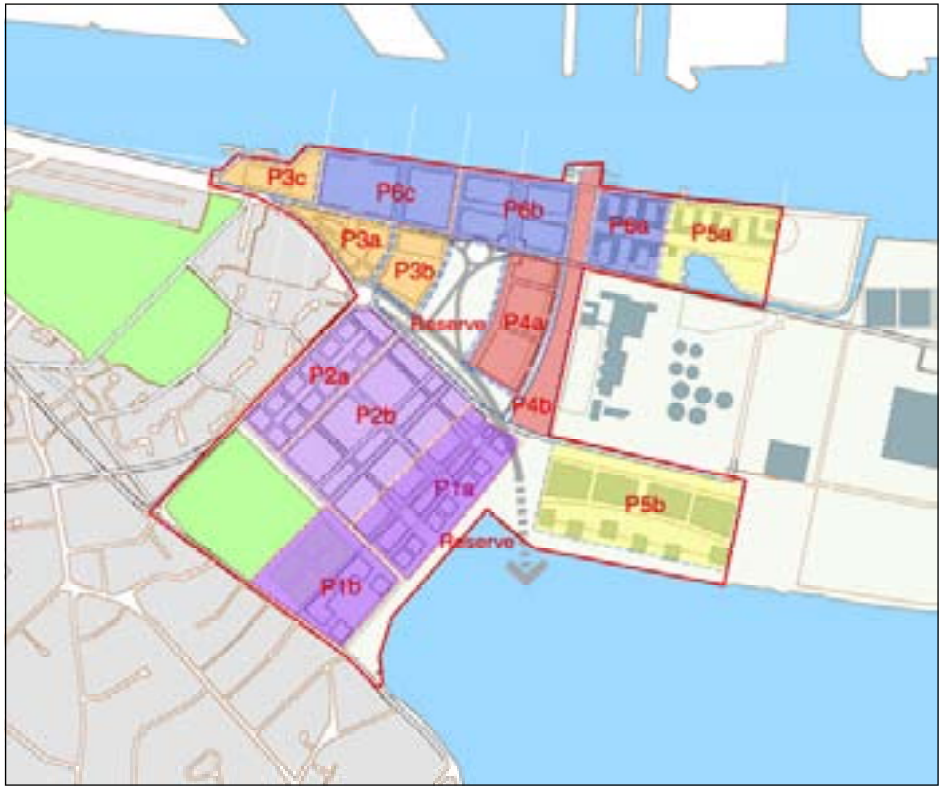


fig 47: Development Phasing - Zone 1

6.0

appendices

6.1 APPENDIX 1 - STATUTORY PLANNING CONTEXT

Reviewed Planning Policy affecting the South Bank lands included the following:

Dublin Docklands Area Master Plan, 1997

- Specific Objectives
- Development of Dublin Technopole (enterprise/research/training)
- Development of continuous public amenity zone, natural park / walks
- Develop new local access road
- Develop ecopark concept to south east
- Develop linear & pocket parks – open up access to water
- Proposed local shopping node
- No conservation Area / Archaeological or listed building issues
- Adjacent to conservation area and archaeological zone of interest
- Proposed Natural Heritage Area – Sandymount
- Change perceptions of the area as 'backyard' utility area of the city
- Improve public transport access to the peninsula

Dublin City Development Plan, 1999

- Promote Intensification around transport nodes;
- Zone 6, 7 for enterprise and industrial use and 9 for recreation;
- Area identified as Section 25 for Planning Scheme;
- Transport – DTI proposes extension of QBC's, light rail, cycle routes, new roads (by-pass) under DTO. Reduce car emphasis – modal change.

Parking standards

Refer to Dublin Corporation Plan.

South Bank Peninsula

- In the DC Plan the South Bank is zoned only for Industrial (general Industry). In the DDDA plan it is zoned Industrial (General) - Zone 7 and Enterprise Zone 6 (English B1 type classification) to reflect the nature of the contemporary workplace'). The DDDA zoning supercedes the DC Plan
- The eastern fringe is zoned for enterprise and is linked to an enter prise corridor eastwards along the peninsular. The enterprise corridor could include e g 'administration, research and dispatch' uses in flexible building types.
- Policy objective for local centre– retail - east edge of site
- Policy objective for only light industry close to residential
- Policy objective in favour of redevel opment underutilized sites.

A Platform for Change - strategy 2000-2016' (Sept 2000)

Strategic vision and potential transport strategies, DART LUAS, QBC and Heavy Rail, Port Tunnel.

'Land use development must be consistent with Strategic Planning Guidelines in relation to location, land use type and density.....to ensure a land use pattern that maximises accessibility to the public transport infrastructure and minimises continuity between the hinterland and Metropolitan Areas'

Transport proposals relevant to South Bank:

- Proposed QBC to Ringsend;
- South Quay on fringe of Public transport corridors ie where develop ment should occur;
- Target to limit 'trip induced' develop ment;
- Development sites may have tempo rary parking areas until infrastructure built. This is under the control of Dublin Corporation.

Strategic Guidelines for Dublin Region

Residential Density Guidelines for Planning Authorities, 1999

- General objectives not much detail
- Appropriate locations for Increased densities:
- City/Town Centre/Brownfiled sites plot ratio 1.0 – 2.5
- Inner suburban plot ratio 0.5 – 1.0
- All development on sites in excess of 1.0 ha required to have a variety of dwelling types
- Recommends residential standards:

Grand Canal Dock Planning Scheme, 2000.

1 Civic Gateway

- high mix of use
- extension of city center
- high bulk and massing
- public transport access
- hotel, office, apartments, dock, underground parking
- continuous perimeter walkway
- size varies 3-180ha
- public open space
- former wharf
- new railway station investment

Rowe's Wharf Boston 1987

Pacifico Yokohama 1991-4

2 Ecological Park

- regenerate neglected land
- reinforce original landscapes
- world heritage site
- size varies 15-260ha
- international ecological value
- smaller character giving
- open space amenity
- recreational installations (exhibitions, butterfly house


Xochimilco Park Mexico 1993


Brisbane River 1992

3a Employment - Primary

- finance and business services
- demand in key sectors
- new character
- size 2,225ha
- public transport investment
- American style office park
- bankrupt ‘92, refinanced ‘95
- 115,000 pop
- LDDC minimal planning constraints
- market led

Canary Wharf, London 1970 -

3b Employment - Services

- 10ha site area
- telecommunications
- call center services
- close to CBD
- former docks
- majority office content
- courthouse, hotel
- public transport (cable guided bus)
- shuttle bus to rail station

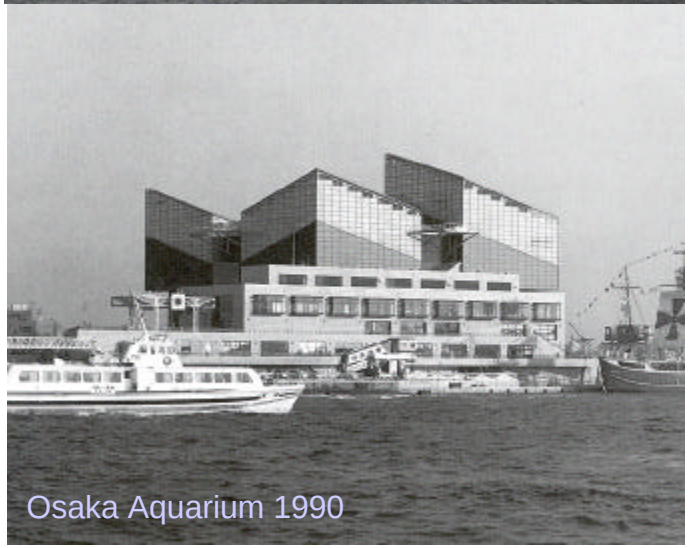
East Point, Dublin 1996 -

Quayside Newcastle 1990 -

4 City Wide Amenity

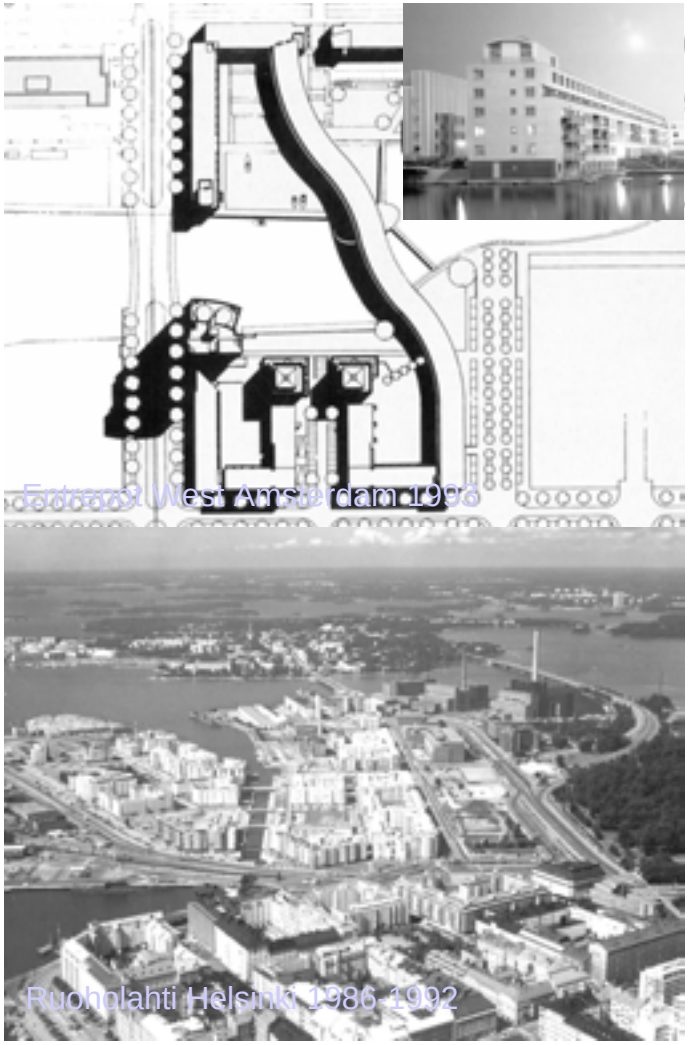
- prominent location
- the ‘wow’ factor
- adjacent uses (retail, water-bus)
- public space
- new city identity
- large site (bldg alone 2ha)
- public transport
- former working docks


Sydney Opera House 1973


Osaka Aquarium 1990

5 Specialist Residential

- waterfront housing
- range of sizes 2-65ha
- 524 units (Entrepot) 4-8 storeys
- underground parking
- former docks / cargo port
- road put on tunnel
- extended public transport
- amenity provision - library, kindergarten, resource center
- began with new metro line
- office component - 3500 workers
- high public space detailing



6 Specialist Use

- wholesale trade center
- part of 768ha ‘Technoport Osaka’
- 8ha plus .5k long promenade
- appliances / furnishings
- amenity zone
- part of working port
- huge amount of public space
- ferry dock

- Antwerp port relocated out of center
- marine sheds reused


Cosmo Square Osaka 1994


Zuiderterras Antwerp 1991

7 Leisure / working transport

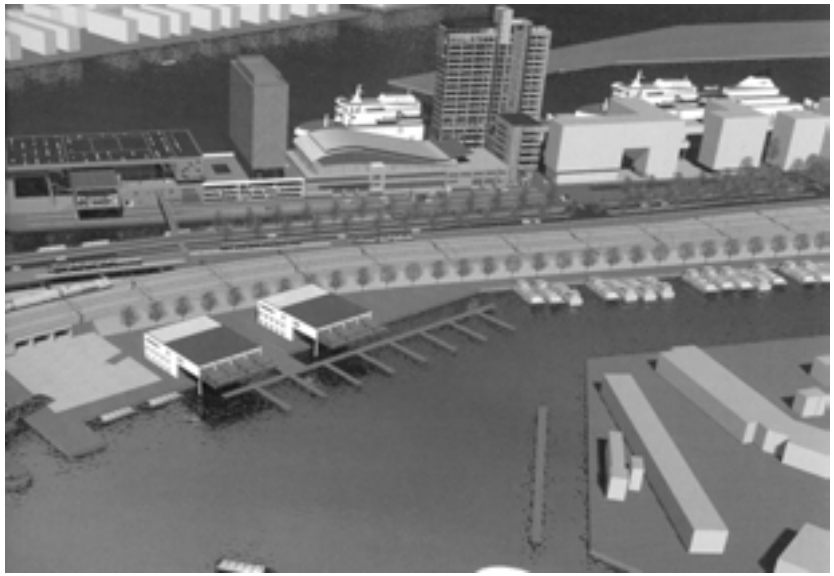
- specific waterfront activity
- quality industrial port architecture
- strategic connection
- deep water docking
- support buildings - office / amenity
- 4-14ha
- public transport connections

Harumi Terminal Tokyo 1991

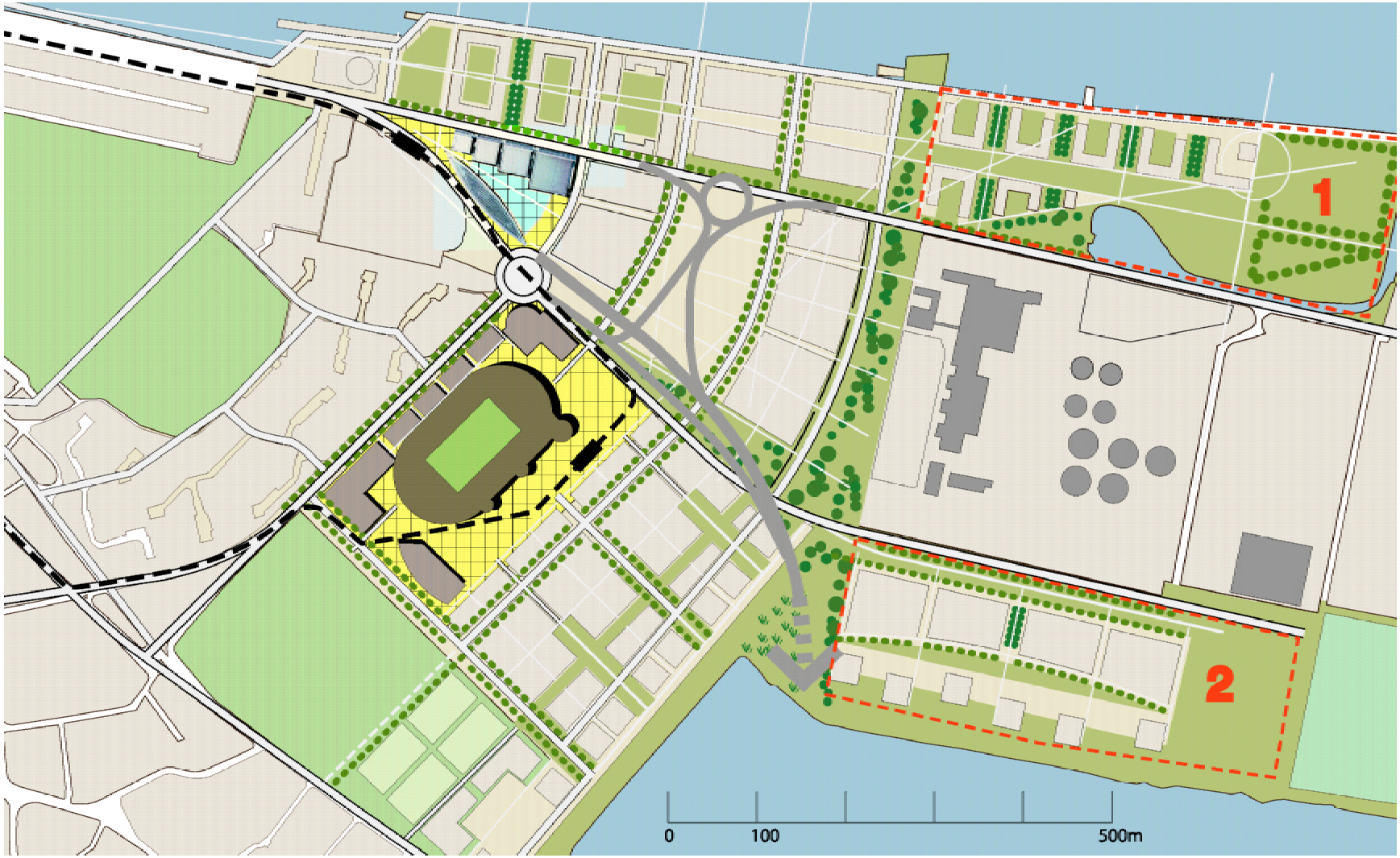
Berth 30 Oakland 1994

Regenerating the waterway

- former cargo docks
- new residential / office space
- international & local character
- new tunnel access to center
- catalyst projects
- Port Co. and Rail joint venture



6.3 APPENDIX 3 - DESIGN OPTIONS



6.4 APPENDIX 4 - TRIP GENERATION DATA

DEGW

TRIP GENERATION AND PARKING DEFICIT

LOW DENSITY OPTION (100,000 sq.m. Total)

			PEAK HOUR								
			Car Trips (Two-Way)			Public Transport Trips			Car Parking Deficit		
Option	Development	Parking Provision	Offices	Housing	Total	Offices	Housing	Total	Offices	Housing	Total
1	50,000 H + 50,000 O	0.5H; 1 per 50m2 O	840	110	950	1,040	220	1,260	-340	46	-294
2	100,000 H	0.5H	0	220	220	0	440	440	0	93	93
3	100,000 O	1 per 50m2 O	1,680	0	1,680	2,080	0	2,080	-680	0	-680
4	50,000 H + 50,000 O	0.25H; 1 per 100m2	840	110	950	1,040	220	1,260	-590	-32	-622
5	100,000 H	0.025H	0	220	220	0	440	440	0	-64	-64
6	100,000 O	1 per 100m2 O	1,680	0	1,680	2,080	0	2,080	-1,180	0	-1,180

HIGH DENSITY OPTION (500,000 sq.m. Total)

			PEAK HOUR								
			Car Trips (Two-Way)			Public Transport Trips			Car Parking Deficit		
Option	Development	Parking Provision	Offices	Housing	Total	Offices	Housing	Total	Offices	Housing	Total
1	250,000 H + 250,000 O	0.5H; 1 per 50m2 O	4,200	550	4,750	5,200	1,100	6,300	-1,700	231	-1,469
2	500,000 H	0.5H	0	1,100	1,100	0	2,200	2,200	0	463	463
3	500,000 O	1 per 50m2 O	8,400	0	8,400	10,400	0	10,400	-3,400	0	-3,400
4	250,000 H + 250,000 O	0.25H; 1 per 100m2	4,200	550	4,750	5,200	1,100	6,300	-2,950	-159	-3,109
5	500,000 H	0.025H	0	1,100	1,100	0	2,200	2,200	0	-319	-319
6	500,000 O	1 per 100m2 O	8,400	0	8,400	10,400	0	10,400	-5,900	0	-5,900

6.5 APPENDIX 5 - DEVELOPMENT CAPACITIES

DEGW

Area A1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	2.106	0.35	7,371.00	1	7,371.00	92	240	43	0	0.00	0	240	
Terraced	2.106	0.5	10,530.00	0.95	10,003.50	125	325	59	0.05	526.50	38	363	
Duplex	2.106	1	21,060.00	0.9	18,954.00	237	616	112	0.1	2,106.00	150	766	
Low-rise block	2.106	1.5	31,590.00	0.8	25,272.00	316	821	150	0.2	6,318.00	451	1,273	
Mid-rise block	2.106	2.0	42,120.00	0.7	**29,484.00**	369	958	150	0.3	**12,636.00**	903	1,861	**42,120.00**
High-rise block	2.106	2.5	52,650.00	0.6	31,590.00	394.875	1,027	187	0.4	21,060.00	1,504	2,531	

Area A2

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	1.9825	0.35	6,938.75	1	6,938.75	87	226	43	0	0.00	0	226	
Terraced	1.9825	0.5	9,912.50	0.95	9,416.88	118	306	59	0.05	495.63	35	341	
Duplex	1.9825	1	19,825.00	0.9	17,842.50	223	580	112	0.1	1,982.50	142	721	
Low-rise block	1.9825	1.5	29,737.50	0.8	23,790.00	297	773	150	0.2	5,947.50	425	1,198	
Mid-rise block	1.9825	2.0	39,650.00	0.7	**27,755.00**	347	902	150	0.3	**11,895.00**	850	1,752	**39,650.00**
High-rise block	1.9825	2.5	49,562.50	0.6	29,737.50	371.7188	966	187	0.4	19,825.00	1,416	2,383	

Total @ pr 0.2	**503,230.00**
residential 70%	**352,261.00**
commercial 30%	**150,969.00**

Area B1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	0.897	0.35	3,139.50	1	3,139.50	39	102	43	0	0.00	0	102	
Terraced	0.897	0.5	4,485.00	0.95	4,260.75	53	138	59	0.05	224.25	16	154	
Duplex	0.897	1	8,970.00	0.9	8,073.00	101	262	112	0.1	897.00	64	326	
Low-rise block	0.897	1.5	13,455.00	0.8	10,764.00	135	350	150	0.2	2,691.00	192	542	
Mid-rise block	0.897	2.0	17,940.00	0.7	**12,558.00**	157	408	150	0.3	**5,382.00**	384	793	**17,940.00**
High-rise block	0.897	2.5	22,425.00	0.6	13,455.00	168.1875	437	187	0.4	8,970.00	641	1,078	

Area B2

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	1.9305	0.35	6,756.75	1	6,756.75	84	220	43	0	0.00	0	220	
Terraced	1.9305	0.5	9,652.50	0.95	9,169.88	115	298	59	0.05	482.63	34	332	
Duplex	1.9305	1	19,305.00	0.9	17,374.50	217	565	112	0.1	1,930.50	138	703	
Low-rise block	1.9305	1.5	28,957.50	0.8	23,166.00	290	753	150	0.2	5,791.50	414	1,167	
Mid-rise block	1.9305	2.0	38,610.00	0.7	**27,027.00**	338	878	150	0.3	**11,583.00**	827	1,706	**38,610.00**
High-rise block	1.9305	2.5	48,262.50	0.6	28,957.50	361.9688	941	187	0.4	19,305.00	1,379	2,320	

Area B3

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	1.01	0.35	3,526.25	1	3,526.25	44	115	43	0	0.00	0	115	
Terraced	1.01	0.5	5,037.50	0.95	4,785.63	60	156	59	0.05	251.88	18	174	
Duplex	1.01	1	10,075.00	0.9	9,067.50	113	295	112	0.1	1,007.50	72	367	
Low-rise block	1.01	1.5	15,112.50	0.8	12,090.00	151	393	150	0.2	3,022.50	216	609	
Mid-rise block	1.01	2.0	20,150.00	0.7	**14,105.00**	176	458	150	0.3	**6,045.00**	432	890	**20,150.00**
High-rise block	1.01	2.5	25,187.50	0.6	15,112.50	188.9063	491	187	0.4	10,075.00	720	1,211	

Area C1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	2.05	0.35	7,189.00	1	7,189.00	90	234	43	0	0.00	0	234	
Terraced	2.05	0.5	10,270.00	0.95	9,756.50	122	317	59	0.05	513.50	37	354	
Duplex	2.05	1	20,540.00	0.9	18,486.00	231	601	112	0.1	2,054.00	147	748	
Low-rise block	2.05	1.5	30,810.00	0.8	24,648.00	308	801	150	0.2	6,162.00	440	1,241	
Mid-rise block	2.05	2.0	41,080.00	0.7	**28,756.00**	359	935	150	0.3	**12,324.00**	880	1,815	**41,080.00**
High-rise block	2.05	2.5	51,350.00	0.6	30,810.00	385.125	1,001	187	0.4	20,540.00	1,467	2,468	

Area C2

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	4.3485	0.35	15,219.75	1	15,219.75	190	495	43	0	0.00	0	495	
Terraced	4.3485	0.5	21,742.50	0.95	20,655.38	258	671	59	0.05	1,087.13	78	749	
Duplex	4.3485	1	43,485.00	0.9	39,136.50	489	1,272	112	0.1	4,348.50	311	1,583	
Low-rise block	4.3485	1.5	65,227.50	0.8	52,182.00	652	1,696	150	0.2	13,045.50	932	2,628	
Mid-rise block	4.3485	2.0	86,970.00	0.7	**60,879.00**	761	1,979	150	0.3	**26,091.00**	1,864	3,842	**86,970.00**
High-rise block	4.3485	2.5	108,712.50	0.6	65,227.50	815.3438	2,120	187	0.4	43,485.00	3,106	5,226	

Area C3

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	3.1135	0.35	10,897.25	1	10,897.25	136	354	43	0	0.00	0	354	
Terraced	3.1135	0.5	15,567.50	0.95	14,789.13	185	481	59	0.05	778.38	56	536	
Duplex	3.1135	1	31,135.00	0.9	28,021.50	350	911	112	0.1	3,113.50	222	1,133	
Low-rise block	3.1135	1.5	46,702.50	0.8	37,362.00	467	1,214	150	0.2	9,340.50	667	1,881	
Mid-rise block	3.1135	2.0	62,270.00	0.7	**43,589.00**	545	1,417	150	0.3	**18,681.00**	1,334	2,751	**62,270.00**
High-rise block	3.1135	2.5	77,837.50	0.6	46,702.50	583.7813	1,518	187	0.4	31,135.00	2,224	3,742	

Area d1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	3.4385	0.35	12,034.75	1	12,034.75	150	391	43	0	0.00	0	391	
Terraced	3.4385	0.5	17,192.50	0.95	16,332.88	204	531	59	0.05	859.63	61	592	
Duplex	3.4385	1	34,385.00	0.9	30,946.50	387	1,006	112	0.1	3,438.50	246	1,251	
Low-rise block	3.4385	1.5	51,577.50	0.7	36,104.25	451	1,173	150	0.3	15,473.25	1,105	2,279	
Mid-rise block	3.4385	2.0	68,770.00	0.7	**48,139.00**	602	1,565	150	0.3	**20,631.00**	1,474	3,038	**68,770.00**
High-rise block	3.4385	2.5	85,962.50	0.6	51,577.50	644.7188	1,676	187	0.4	34,385.00	2,456	4,132	

Area d1

Accommodation T	Net Area (ha)	Plot ratio	GFA sqm	Residential utilisation	Residential area	No Units	Population	Units / ha	Commercial utilisation	Commercial space	Population	Population Total	
Semi-detached	4.28	0.35	14,992.25	1	14,992.25	187	487	43	0	0.00	0	487	
Terraced	4.28	0.5	21,417.50	0.95	20,346.63	254	661	59	0.05	1,070.88	76	738	
Duplex	4.28	1	42,835.00	0.9	38,551.50	482	1,253	112	0.1	4,283.50	306	1,559	
Low-rise block	4.28	1.5	64,252.50	0.7	44,976.75	562	1,462	150	0.3	19,275.75	1,377	2,839	
Mid-rise block	4.28	2.0	85,670.00	0.7	**59,969.00**	750	1,949	150	0.3	**25,701.00**	1,836	3,785	**85,670.00**
High-rise block	4.28	2.5	107,087.50	0.6	64,252.50	803.1563	2,088	187	0.4	42,835.00	3,060	5,148	