dlr
Comhairle Contae County Council

COUNTY DEVELOPMENT PLAN 2016-2022

Appendix 14
dlr Green Infrastructure Strategy

Acknowledgements

The Team wishes to acknowledge the invaluable assistance, encouragement and advice of the Steering Group and External Stakeholders, who through their insights and suggestions, helped frame the final strategy.

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Cover Photo: Kilbogget Park.

In 2014, the Strategy Team was appointed by Dún Laoghaire-Rathdown County Council to prepare a Green Infrastructure Strategy for the County.

In the preparation of this strategy the role of the various specialist consultants was as follows:

JBA Consulting - Water and Environmental Consultants. Responsible for Strategy, Funding and Water Management
Mitchell + Associates - Landscape Architecture and Urban Design Consultants. Responsible for Analysis, Strategy and Graphics
Norton UDP - Planning Consultant and Urban Planner. Responsible for Planning aspects and GI Advisor
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Photo 2: Honeypark, Glenageary.

Green Infrastructure Glossary

Accessibility Connections - Recreational Access Routes, Rights of Way, Greenways, the Dublin Mountains Way, Wicklow Way and parts of the Cycle Network all contribute to accessibility connections.

Asset - Green Infrastructure that is delivering a function or functions in an area of identified need. For example, woodland that is intercepting and storing water in an area of flood risk is a water management asset; it is providing functions that help to reduce the risk of flooding.

Barriers – Barriers to fully connected Green Infrastructure hubs and corridors can be found at different spatial scales. These include crossings of major and local roads and transport infrastructure and urban development.

Benefits - Green Infrastructure planning is set firmly in the context of public benefit. There are many ways of identifying and categorising benefits.

Corridor – Existing and proposed connections between hubs which provide multi-functional benefits are defined as Green Infrastructure corridors. The corridors are Green Infrastructure assets as well as strategic connections between hubs. A Green Infrastructure corridor may contain connections for recreation, sustainable transport, water, biodiversity and habitat. Recreational Access Routes, Rights of Way, Greenways, the Dublin Mountains Way, Wicklow Way and parts of the Cycle Network all contribute to the network of Green Infrastructure corridors.

Greenway - 'Shared-use routes for non-motorised users, (walkers, cyclists, roller skaters, horse riders) for pleasure, recreation, tourism and daily journeys'. They are generally routes which predominantly utilise established green spaces but can also cross, and link to, public roads. Greenways provide and expand recreational opportunities for walking, jogging and cycling and can often coincide with river/stream corridors and can promote free passage for wildlife. Greenways are a key component of the GI network.

Green Infrastructure - 'A generic term encompassing the protection, management and enhancement of urban, periurban and rural environmental resources (natural and managed) through the identification and provision of multifunctional and interconnected green spaces and provides an opportunity to reassess the manner in which we manage and use our green spaces'. The Planning Regional Guidelines for the Greater Dublin Region (2010 - 2022).

Green Streets – A Green Infrastructure asset located in the streetscape either within or directly connected to road and pavement surface. The principal purpose of a green street is to provide stormwater management through SuDS features to reduce the rate and volume of runoff from streets that enters storm drainage systems. To provide multi-functional benefits Green Streets also offer shading, create small scale habitats, provide local recreation, aesthetic improvements and opportunities for safer cycling and walking.

Hub – Existing and proposed Green Infrastructure assets are defined as 'hubs' where they are important strategic locations for the Green Infrastructure strategy. Regional parks which provide multifunctional benefits, such as Marlay Park, are examples of hubs.

Multifunctionality - One of the strengths of a Green Infrastructure approach is that it can be used to deliver several functions from a single intervention. For example, the opportunity to expand a key habitat may also provide an opportunity to improve water management, improve image and capture air borne pollution. Often, because the wider functions are not considered, the opportunities to get more value from an intervention are not taken.

SuDS – Sustainable Drainage Systems (SuDS) are a sequence of conveyance systems and control structures designed to manage the drainage of surface water more sustainably than conventional techniques by providing treatment and reducing flow rates and volumes. The term Sustainable Urban Drainage Systems (SUDS) is frequently used in Dún Laoghaire-Rathdown planning policies and guidance. For the Green Infrastructure Strategy the term, Sustainable Drainage Systems (SuDS) will be used. This subtle change allows sustainable drainage in rural areas to be incorporated into plans, policies and guidance.

Executive Summary

This Green Infrastructure (GI) strategy for Dún Laoghaire-Rathdown seeks to provide a vision and a framework which will identify, protect, promote and enhance the GI assets in the urban, rural and coastal environments of the County. The strategy provides a vision for the GI in the County that is supported by a set of key principles and a robust spatial framework. Importantly, the GI strategy aims to guide key aspects of planning policy and County and local level.

The benefits of GI are many and include; improving health and well-being through new and improved recreation and better local walking and cycling connections, enhancing social cohesion, protecting, managing and enhancing biodiversity, reinforcing sense of place, and improving water quality and management. GI also provides many potential economic benefits through enhanced opportunities for tourism and local business activities.

Existing Green Infrastructure
The existing Green Infrastructure in Dún Laoghaire-Rathdown is considerable. The County boasts many key features and activities along the coast and across the urban, rural and upland areas. Many of these are iconic in nature, including the varied and dramatic coastline itself, Killiney and Dalkey Hills, the Dublin Mountains, the numerous rivers and streams and the parks and open spaces of County and regional significance.

Three Themes
In this strategy the endowment and deficits in these features or assets are considered alongside activities under the broad themes of accessibility, recreation and health and well-being, natural and cultural heritage and water management. The Green Infrastructure strategy is based on the overlapping of these broad themes of GI.

Accessibility, Recreation, Health and Well-Being
Accessibility, recreation and health and well-being, is concerned with the nature, quality and continuity of connections of the GI (such as Greenways, walking routes and public transport corridors) and the ease of access to open spaces, greenways and recreational resources and issues, such as landscape character and views, and the range, nature and frequency of activities that take place in key amenities and attractions. **The main objectives of the strategy for accessibility, recreation and health and well-being are to:**

- Develop public parks at the threshold of urban and rural areas into 'Gateway parks'
- Improve sections of the Wicklow Way and Dublin Mountains Way where they occur along stretches of road
- Create new and improved connections between open spaces to generate a network of spaces across the urban areas
- Improve links within urban areas to encourage day-to-day use
- Improve links across transport infrastructure where there are barriers to movement
- Improve pedestrian and cycle links across railway barriers
- Improve links to the Green Infrastructure network from public transport
- Address the uneven distribution of allotments or community gardens

Natural and Cultural Heritage
Natural and cultural heritage is concerned with the range of natural and man-made assets of heritage value in the County. These include areas of importance for biodiversity, such as watercourses, woodlands, and coastline, and cultural assets such as important monuments, buildings and landscapes, as well as less tangible cultural heritage such as arts and sciences. **The main elements of the strategy for natural and cultural heritage are to:**

- Review and/or complete Landscape Character Assessments and Historic Landscape Character Assessments
- Complete Habitat Assessments and implement the County Tree Strategy
- Restore or mitigate the fragmentation of ecological corridors throughout the County
- Create a network of Greenways, Green Streets, including green roofs
- Harness the strong built heritage of the County
- Harness the strong cultural heritage of the County
- Ensure new developments enhance the Green Infrastructure network

Water Management
Water management is based on the role and potential of the Green Infrastructure to better manage surface and flood water and to contribute to maintaining and improving the quality of water in the County. **The main elements of the strategy for water management are to:**

- Utilise rivers and streams as one of the natural foundations for multi-functional GI corridors
- Use GI features to reduce impacts when drainage systems are exceeded
- Reduce the rate, volume, and improve the quality of surface water runoff
- Manage runoff at source by creating storage ponds and wetlands
- Promote local sustainable urban drainage systems (SuDS), 'Green Streets' and green roofs
- Enable SuDS to be located in the public realm
- Encourage the use of water to generate energy on a micro level

Spatial Framework
A key element of any Green Infrastructure strategy is the spatial framework. It provides an understandable structure on which priorities and actions can be based. The framework spans the short to long-term time horizons and it distinguishes between the GI framework that is already in place in Dún Laoghaire-Rathdown, and that which is emerging or to be developed over the coming years. **The key elements of the spatial framework for GI in Dún Laoghaire-Rathdown are:**

- A higher level, countywide network of integrated elements, which connects to surrounding and Regional GI networks
- A structure for integrating the rich network of local-level GI in Dún Laoghaire-Rathdown
- A network of six, overlapping and multi-functional GI corridors, connecting higher-level GI hubs and the main elements of the mountains, the urban area and the coast
- Integration of important regional GI corridors, such as the coast, Dublin Mountains Way and Wicklow Way
- A 'chain' of improved 'gateway hubs' (parks and open spaces), which provide the transition between the mountains and the urban area

Delivery
A robust approach to delivery is essential for a strategy to succeed. Dún Laoghaire-Rathdown County Council have set out in this strategy a vision for GI in the County and the Council can provide significant policy leadership and influence on the form of new development and the maintenance of many of the green assets. This role can be enhanced by partnerships with communities and across County boundaries. **The strategy makes key recommendations in the area of delivery, including:**

- The setting up of a cross-disciplinary and departmental working group in Dún Laoghaire-Rathdown County Council
- Preparation of a delivery plan, including roles, responsibilities, priorities and timelines
- Key recommendations for policy in the areas of accessibility, recreation and health and well-being, natural and cultural heritage and water management
- Exploration of local and external funding and investment opportunities for GI
- Development and use of tools for integrating GI into current planning practice
- Priority for key actions
- Ongoing monitoring and review of the delivery process.

1 INTRODUCTION

Photo 3: Dublin Mountains Way. Source: Wikipedia. Image by Joe King.

1. Introduction

1.1 General

This Green Infrastructure (GI) strategy for Dún Laoghaire-Rathdown seeks to provide a vision and a framework which will protect, promote and extend the GI assets (the network of green spaces, habitats and ecosystems of Dún Laoghaire-Rathdown).

The strategy is based on key evidence and analysis of the components that can form Green Infrastructure and it supports a plan led approach to planning and sustainable development in Dún Laoghaire-Rathdown.

> ***…a generic term encompassing the protection, management and enhancement of urban, peri-urban and rural environmental resources…***

The 'Regional Planning Guidelines for the Greater Dublin Area, 2010-2022', provide the following definition of Green Infrastructure as '*…a generic term encompassing the protection, management and enhancement of urban, peri-urban and rural environmental resources (natural and managed) through the identification and provision of multi-functional and interconnected green spaces and provides an opportunity to reassess the manner in which we manage and use our green spaces.'* The GI exists in many different contexts, both urban and rural (Urban Forum and IEEM, 2011) and it has a spatial component that is characterised by an interconnected network of green spaces (Comhar, 2010), with benefits for natural ecosystems and communities.

Green Infrastructure is a relatively recent concept in planning for sustainable urban and rural areas in Ireland. It provides a framework within which the relationships between the network of green spaces, habitats and ecosystems can be considered within a defined geographic area. GI has both spatial and operational dimensions and there are strong synergies between GI and other systems, such as transport and infrastructure engineering. As such GI can make important contributions to local transport and accessibility, through its promotion of pedestrian and cycling infrastructure and the sustainable management of urban water, through a more integrated approach to managing watercourses and water bodies.

1.2 Background and Purpose

Dún Laoghaire-Rathdown has a remarkable range of natural and cultural assets. In some cases these could described as 'iconic' (e.g. Dalkey Islands, Killiney Hill, Booterstown Marsh, Marlay Park). The County has a current population of 207,000 people and it covers an area of about 126 square kilometres. The County has some 17 kilometres of varied and spectacular coastline. The urban condition in the County is varied too, with towns and villages embedded in extensive suburbs (approximately 54% of the County could be described as urban in nature). Expansive agricultural lands meet the suburban edge and upland areas of outstanding natural beauty provide a promontory over the city and a gateway to the Wicklow Mountains. The natural and cultural heritage of the County, while remarkable, is poorly connected in some locations. While this is a current weakness in the existing GI of the County, it could also be a major opportunity for the future.

Photo 4: Cabinteely Park.

> **The County has a current population of 207,000 people and it covers an area of about 126 square kilometres. The County has some 17 kilometres of varied and spectacular coastline.**

This first Green Infrastructure strategy for Dún Laoghaire-Rathdown aims to secure a multi-functional, high quality GI for the County by:

- Providing a better understanding of the parts and functions of GI and their interactions
- Presenting a clear vision
- Framing an integrated spatial strategy

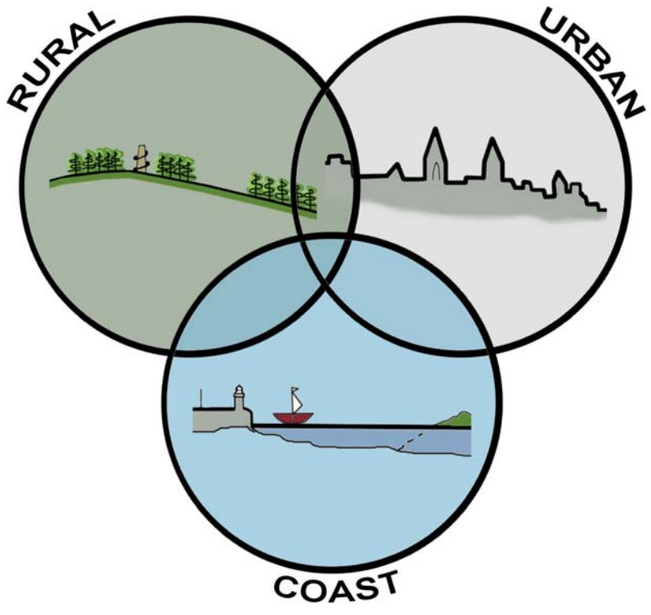


Figure 1.A: County Character Zones Venn Diagram.

Significantly, the Dún Laoghaire-Rathdown County Development Plan 2010-2016 recognises the important role of Green Infrastructure in the planning and development of the County and calls for the preparation of an integrated strategy.

In commissioning this strategy the Council aimed *'…to produce a comprehensive, interactive and highly flexible strategy for a range of purposes specifically within Dlr, whilst acknowledging the County's regional position within the Greater Dublin Area (GDA).'* A multi-disciplinary approach to match the multi-facetted nature of GI was required within a set of clear objectives which included a providing a better understanding of the GI in the County, optimising its use, identifying key elements of a new GI structure, identifying opportunities for protecting and enhancing biodiversity, enhancing the function and quality of watercourse and providing new accessibility and permeability. The brief also required a structured plan that could serve as a tool for delivery and a means to establish the value and viability of GI for the County.

1.3 Green Infrastructure and its Benefits

From a planning point of view, Green Infrastructure provides an integrated approach by linking land-use, landscape, services, ecology, heritage and transportation. The GI approach assists in meeting statutory obligations under EU directives and national legislation, such as the Water Framework Directive, Strategic Environmental Assessment (SEA) and Birds and Habitats Directives (particularly under Articles 6 and 10). GI can also be a mechanism for identifying mitigation and compensatory measures required under Article 6 of the Habitats Directive.

Green Infrastructure provides a broad range of invaluable ecosystem services and multiple social and economic benefits including:

- **Biodiversity management and enhancement**
- **Water management including drainage and flood attenuation, filtration and pollution control**
- **Recreation and tourism**
- **Visual amenity and sense of place**
- **Sustainable mobility**
- **Food, timber and other primary production**
- **Regulation of micro-climates and heat islands**
- **Climate change adaptation**
- **Reduction in carbon footprint**
- **Health and well-being**
- **Local distinctiveness**
- **Education**
- **Assisting in regulatory compliance**

1.4 Vision and Principles

The vision for Dún Laoghaire-Rathdown is to create a network of green hubs and corridors that utilise and extend existing and proposed open space and movement assets. This will be delivered based on a spatial framework that will realise the multi-functional benefits of GI and promote the well-being of all those who live, work in and visit the County.

The vision is underpinned by 11 principles that in turn guide the Green Infrastructure strategy. The strategy also sets out how it will be enabled using the various Council functions and, in particular, the planning and development processes. The principles for GI in Dún Laoghaire-Rathdown are set out below.

Green Infrastructure Principles for Dún Laoghaire-Rathdown

- **Prioritise the protection and enhancement of biodiversity and natural heritage**
- **Enhance community awareness and appreciation of the natural and cultural heritage**
- **Contribute to the health and sense of well-being of the community**
- **Play a key role in shaping and improving local character and sense of place**
- **Contribute to the sustainable management of surface water run-off and quality, and deliver a holistic approach to flood risk management**
- **Deliver good levels of access to, and connections between, the coast, the urban area and the mountain/upland**
- **Connect to existing and planned, regional and local level GI in surrounding counties**
- **Protect and enhance the multi-functional roles and benefits of existing green and open space assets and promote sustainable links between them**
- **Enable good connections to strategic and high quality public transport**
- **Contribute to reducing carbon emissions and adapting to the impacts of climate change**
- **Support the production of local food and sustainable energy**

1.5 Scope of Strategy

On a County-wide level, the approach to Green Infrastructure must be strategic or 'big picture' in nature. This strategy does not explore site-specific or local issues or GI elements. It must find the proper balance between more general and more detailed considerations and it must focus on providing a robust and integrated strategy, which is nested within the regional and surrounding GI, and provides a clear framework for local GI strategies to be developed.

The timescales considered extended beyond the forthcoming County Development Plan in order to deliver an aspirational vision of how Green Infrastructure can influence place making. The core elements of the strategy are time bound to the Development Plan period 2016-2022.

1.6 Strategy Themes

As the range of ecosystem services deriving from Green Infrastructure can be quite extensive, it is common to group these considerations into themes and to consider them as overlapping strands. From an initial consideration of issues and assets, this strategy considered three key themes:

1. Accessibility, recreation, health and well-being
2. Natural and cultural heritage
3. Water management

These themes provide a framework under which the complexities of Green Infrastructure can be more easily understood. They also provide a basis for policy and spatial strategy. In this strategy these three themes are integrated within a spatial strategy for GI in the County that is based on:

- Vision and principles (derived from current literature, analysis, workshops and consultation)
- 'Big connections' with GI in the surrounding counties and the region
- An integrated urban and landscape strategy for GI

The Green Infrastructure strategy is overarching and is referenced in a number of the relevant strategies in the forthcoming County Development Plan.

1.7 Process and Method

The Green Infrastructure strategy was prepared on the basis of recommended work stages (Comhar, 2010) as follows:

- Process planning, which included appointment of consultants, establishment of a multi-disciplinary steering group within the County Council, agreeing a shared vision and identifying specific, achievable, measurable, outcome-based objectives and actions;
- Mapping and analysis, which included gathering and layering of baseline information and conducting spatial analysis using appropriate software; and
- Strategy making, which include an integrated set of policies, objectives and actions within a unique and bespoke spatial strategy.

The implementation of the strategy was not an action contained in the brief and this is appropriately the responsibility of the Council. Focused consultation was carried out with selected stakeholders (from within the Council and from neighbouring Local Authorities) at a number of stages during the preparation of the strategy. The GI strategy will be presented for public consultation as part of the upcoming statutory County Development Plan, 2016-2022. The preparation of County Development Plan itself will be the subject of the prescribed statutory consultation process, during which, the public can comment on proposals on Green Infrastructure.

The brief for the Green Infrastructure strategy contained the following questions:

- Is the current GI resource base fit for purpose for the future?
- How can barriers and deficits be mitigated and/or removed?
- What actions should be prioritised to ensure delivery of benefits?
- How can these actions be funded?

1.8 Policy, Planning and Development Context for Dún Laoghaire-Rathdown

The European Commission's Communication, 'Green Infrastructure (GI) — Enhancing Europe's Natural Capital, 2013', underpins the important role of GI and describes the future EU strategy. It sets out key areas for strategy development and promotes the delivery of GI across urban and rural areas in all member states. It addresses the integration of GI into current policy areas, the need for consistent and reliable data, improving the knowledge base and encouraging innovation, providing financial support for GI projects and EU-level GI projects. The close relationship between spatial planning and Green Infrastructure is recognised when it states, *'Green Infrastructure is based on the principle that protecting and enhancing nature and natural processes, and the many benefits human society gets from nature, are consciously integrated into spatial planning and territorial development.'*

> ***'Green Infrastructure is based on the principle that protecting and enhancing nature and natural processes, and the many benefits human society gets from nature, are consciously integrated into spatial planning and territorial development.'***

'Healthy Ireland - A Framework for Improved Health and Wellbeing 2013-2025', published by the Department of Health, details the close relationship between (physical and mental) health and the environment, physical activity and social interaction. It shifts the focus from what can go wrong in people's lives towards what makes lives go well. It emphasises the need to create a better environment for people to live in and to provide opportunities for healthy lifestyles to improve the overall health of the population.

1.8.1 Planning Policy

The Green Infrastructure strategy for the County has been prepared within a hierarchy of strategy, policy and plans. It is also informed by practice and professional guidance for planning of GI within plan making and design.

1.8.2 National Guidance

The National Spatial Strategy (2002-2020) provides an overarching national planning strategy for balanced regional development, within the overall objectives of sustainable development. The strategy sets out a spatial hierarchy of settlements, and includes important objectives for the natural and built heritage, transport and recreation. The strategy is currently under review.

There are no statutory planning guidelines dealing explicitly with Green Infrastructure in the planning system. The current set of planning guidance does, however, deal with aspects of policy and practice, which are relevant to GI strategies. Notably, the 'Development Plan Planning Guidelines (2007)' set out the approach to more consistent plan-making for natural and built heritage and transport. At the local level, the 'Urban Design Manual (2009)' and the 'Local Area Plan Manual (2013)' promote an integrated approach to plan-making and master planning for residential areas, where built and natural heritage are central considerations. The 'Flood Risk Management and Development Guidelines' (2009) also underpin the importance of a risk-based approach to flood and water management, particularly in urban areas and the GI is a key aspect of this approach.

The recent 'Draft National Landscape Strategy (July 2014)', sets out a vision and roadmap for landscape planning, conservation and management in the State. The importance of landscape characterisation is highlighted in the strategy.

1.8.3 Regional Planning Guidelines

The 'Regional Planning Guidelines for the Greater Dublin Region, 2010-2022' set out the context and vision for the sustainable planning and development of the region to 2022. The guidelines highlight that, at a regional level, the function of GI planning is to provide an overview of natural and cultural resources with emphasis on the identification of priority elements and routes. The guidelines include an overview of significant resources for the region and an elementary GI network for the Greater Dublin Area, which includes the strategic GI elements of the coastline, the Dodder and the Shanganagh Rivers.

Key priority actions include:

- Ease of access and promotion of biodiversity
- Preparation of GI strategies at habitat, local and site-specific scales
- Protection buffers, identifying and addressing areas of open space deficiency, developing linkages along water corridors
- New and extended networks of walkways, cycleways, coastal paths
- Application of coastal zone management principles
- Green bridges to address barriers
- Tree planting and landscape enhancement

Strategic recommendation GIR30 is of particular relevance to this strategy:

'Each Council should prepare a county based Green Infrastructure Strategy linking to adjoining areas and following regional connections, and implement GI strategies in local area plans and development management processes. (Local authorities, shall where necessary, liaise with each other to ensure consistency in delivering regionally identified Green Infrastructure development as part of their Green Infrastructure strategies).'

And strategic recommendation GIR31 states:

'GI development should be identified at the initial stages of all planning processes and included as a material consideration in order to inform future development.'

1.8.4 Dún Laoghaire-Rathdown County Development Plan, 2010-2016

The statutory development plan contains a range of strategy, broad policies and specific objectives for the County. The plan sets out the vision to establish and foster a 'green structure' in the County and requires that this be elaborated and expanded upon by formulating an integrated GI strategy. A range of policies relevant to his strategy are included under the different policy chapters, including, Landscape Heritage and Biodiversity, Open Space and Recreation, Conservation of Archaeological/Architectural Heritage, Sustainable Travel and Transportation and Environmental Infrastructure and Management. The plan also includes local zoning and specific objectives, which have been considered in the analysis under the relevant GI themes.

1.8.5 Local Area Plans

Local Area Plans (LAPs) play an important role in guiding the future development of key areas of the County. LAPs have been adopted and are current for Stillorgan, Kiltiernan/Glenamuck, Glencullen, Woodbrook/Shanganagh, Deansgrange and Goatstown. The Stepaside Action Plan was adopted in 2000, prior to the current legislation for LAPs. The Blackrock LAP is at Draft stage and the Dún Laoghaire LAP is proposed and at Pre-Draft, Non-Statutory Consultative Phase. The Planning Scheme for the Cherrywood Strategic Development Zone was approved by An Bord Pleanala in April 2014. This SDZ had a significant GI component.

The Local Area Plans show a range of approaches to Green Infrastructure in terms structure and content, reflecting the time at which they were prepared, current practice and the unique, local issues and opportunities. The Local Area Plans all deal with detailed aspects of built and natural heritage, biodiversity and transportation under separate themes. There are aspects of the Local Area Plans that are exemplary of key themes of GI. However, as would be expected, none of the LAPs sets out a vision or contains a stand-alone strategy for local GI. In addition an Urban Framework Plan was adopted for Sandyford in 2011.

1.8.6 Other Strategies and Non-Statutory Plans

A range of high level strategies in the area of natural and built heritage, transport, health and amenity are of relevance to the Green Infrastructure strategies. These are considered in appropriate detail under the relevant themes of this strategy.

Photo 5: Cabinteely Park.

Photo 6: Chimney at Ballycorus Leadmines. Source: Wikimedia. image By: Joe King.

2. Analysis

2.1 Introduction

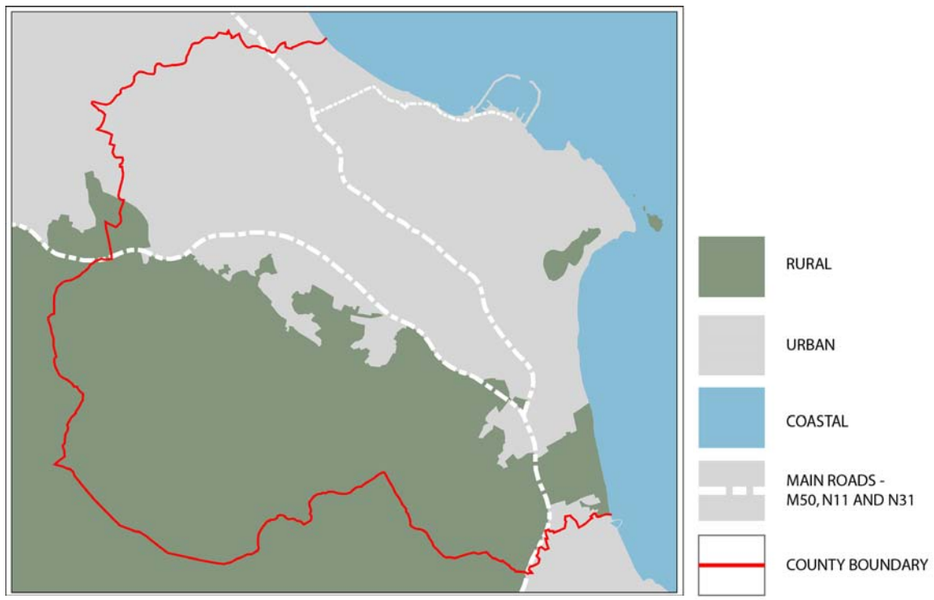
This section provides an overview of the analysis undertaken for this strategy. It brings together the main elements of the consultation, site visits and surveys, character assessments, mapping data, and document and policy reviews. A more detailed map analysis of the data sets used to inform the Green Infrastructure in Dún Laoghaire-Rathdown is contained in the appendices.

Appendix A contains the data sets used, with Appendix B converting the data into analytical maps used to inform the strategy.

The Green Infrastructure Strategy themes identified in Chapter 1 for Dún Laoghaire-Rathdown are:

1. Accessibility, recreation, health and well-being
2. Natural and cultural heritage
3. Water management

These three themes are set out here under their main components and assets. This is followed by an outline of the principal aspects of policy and spatial analysis for the themes. Each theme concludes with an outline of key challenges and opportunities.



Map 1: County Character Zones.

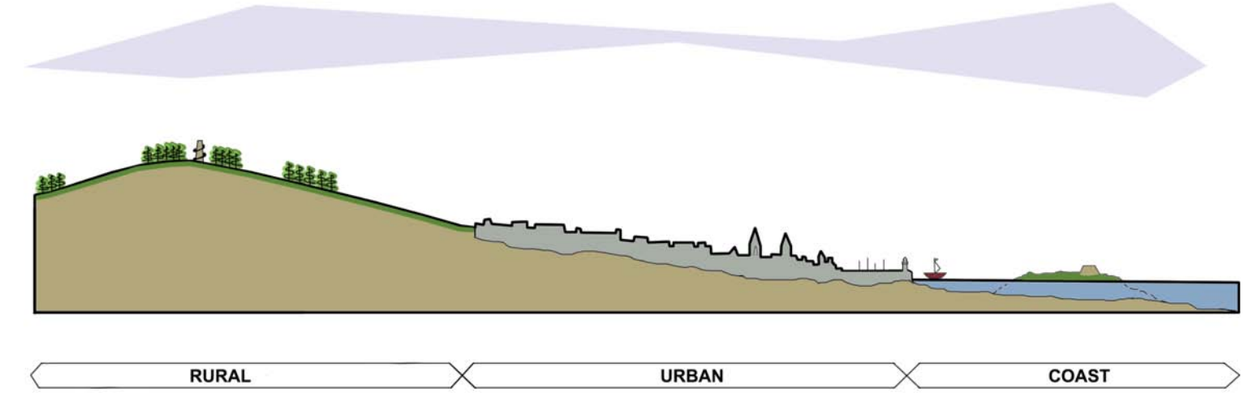


Figure 2.A: County Character Zones - Rural to Urban to Coast

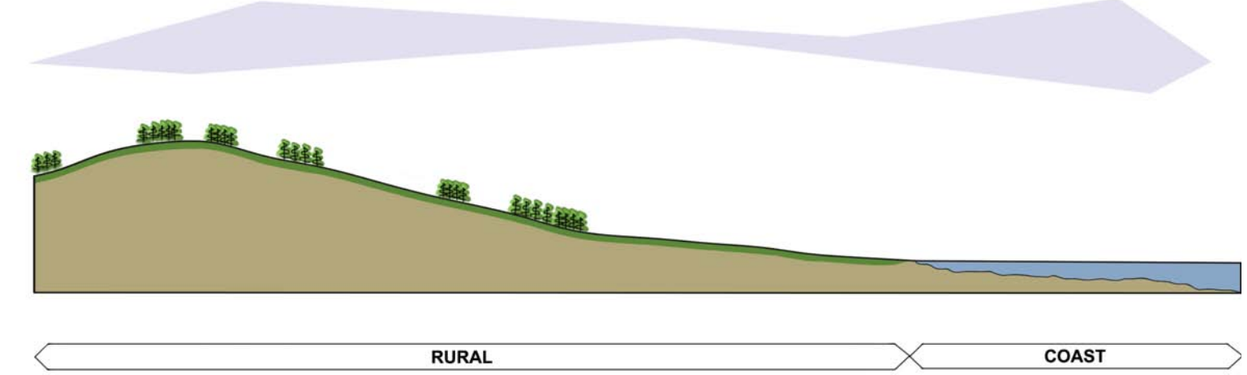


Figure 2.B: County Character Zones - Rural to Coast

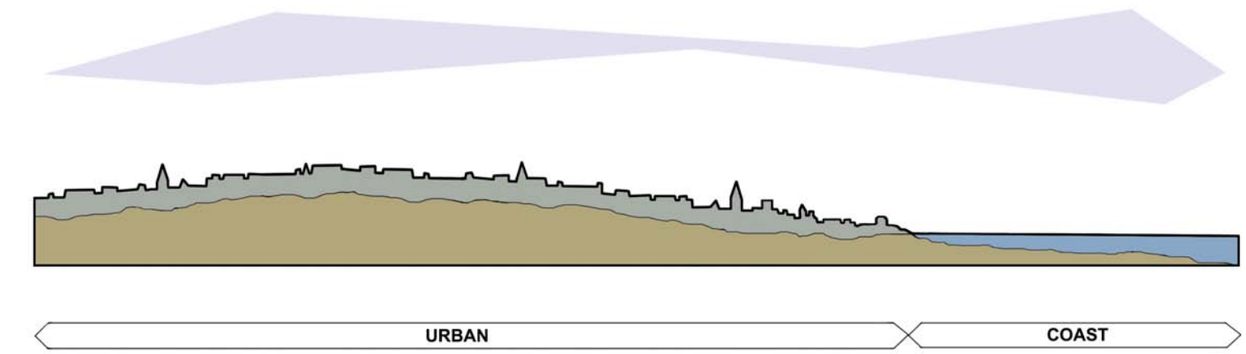
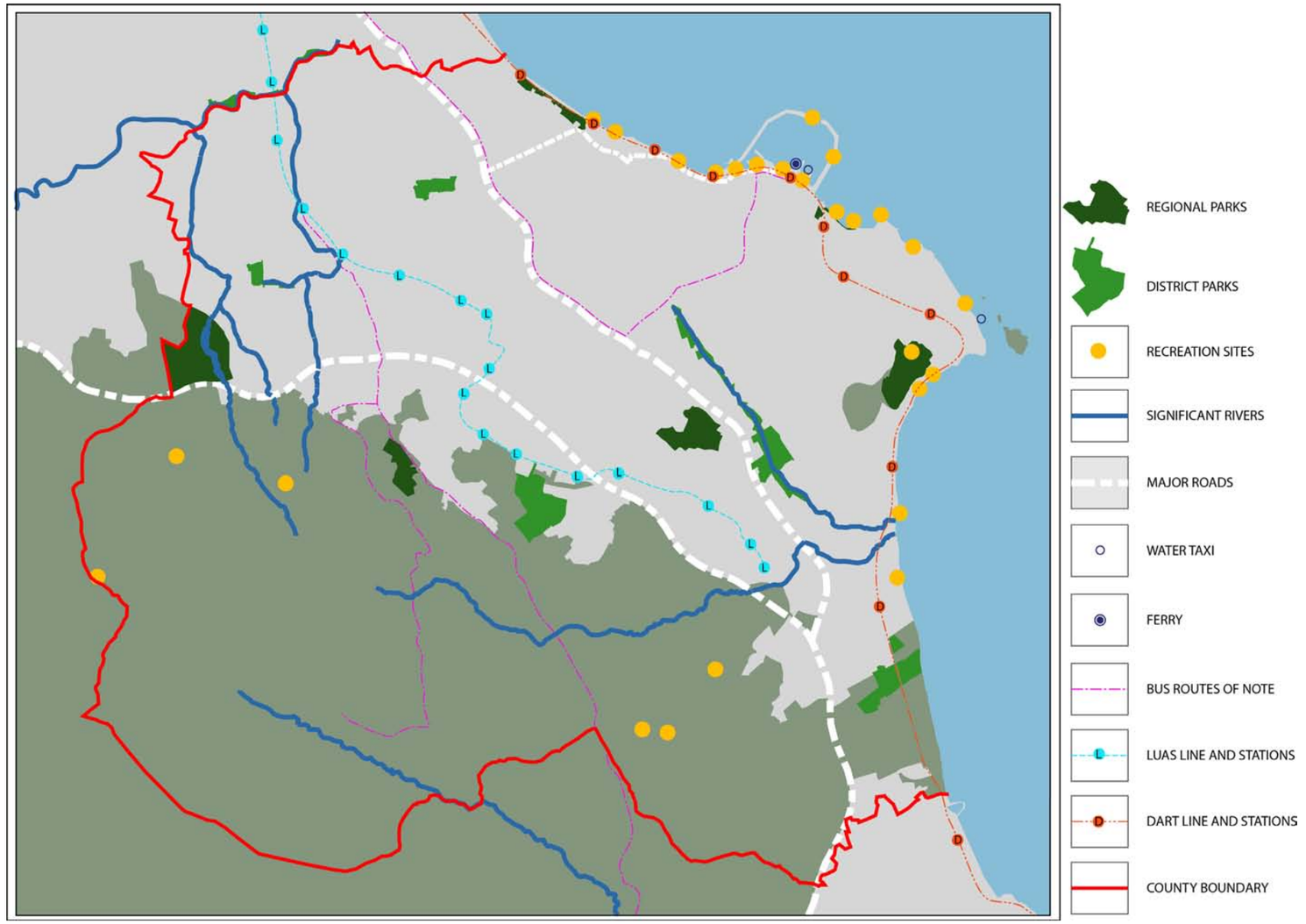


Figure 2.C: County Character Zones - Urban to Coast



Map 2: Main Green Infrastructure Assets in the County.

2.2 Accessibility, Recreation, Health and Well-Being

Green Infrastructure can support healthy active lifestyles through the provision of parks, green spaces and Greenways that encourage people to engage with the external environment. This is considered to improve both physical and mental health and a sense of community. This section examines the essential relationship between people and the GI assets and activities in Dún Laoghaire-Rathdown. It provides an overview of the current policy and studies in the area, along with a concise spatial analysis of the County. Supporting mapped analysis of this theme can be found in Appendix B.

Accessibility
In terms of accessibility this Strategy is concerned with the following elements:

- Movement – the nature and quality of connections to and between the activities and green assets in the County
- Linkages – the continuity or fragmentation of movement routes
- Accessibility – the ease of access to key assets such as open spaces, Greenways and recreational resources

At the County level, the main links that underpin access to Green Infrastructure assets are; Greenways (existing and proposed), the urban cycle network (existing and proposed), Rights of Way, Recreational Access Routes, the Wicklow Way, the Dublin Mountains Way, walking trails in the Dublin Mountains, the main road and bus corridors, light rail (Luas green line) and the Dublin Area Rapid Transit (DART) and national rail lines, cruise liners, ferry and water taxi.

Recreation
Recreation comprises a range of assets, which have the following access attributes:

- Open Space – the availability and ease of access to assets such as parks, mountains, coastline, river corridors, landscape character and views
- Amenities and attractions – the range, nature and frequency of activities that take place within the open spaces

At the County level, the main recreational assets are the Dublin Mountains, key parks and open spaces, the coastline and river corridors.

Health and Well-Being
The theme of health and well-being has a number of components, which are:

- Environmental Quality – the quality of the air, water and soil
- Community – the accessibility and availability of open spaces other GI assets to existing and future communities
- Significant views and vistas

At the County level, the main assets related to these components include key open spaces, the principal Greenways, right of ways and recreational access routes, notable recreation activities and areas of significant tree cover.

The components of accessibility, recreation, health and well-being are discrete but interwoven. As stated above, when planned, designed and managed together they can support healthy and active lifestyles by attracting people to the outdoor environment. GI can promote a greater sense of community and provides both physical and mental health benefits.

Photo 7: Deerpark, Mount Merrion.

2.2.1 Policy Context

Policies which are relevant to the accessibility, recreation, health and well-being in Dún Laoghaire-Rathdown are currently spread over a number of policy documents. Of most direct relevance are the GI objectives of the current, statutory County Development Plan. The County Development Plan notes that Dún Laoghaire-Rathdown has significant GI assets. However, it acknowledges the fragmented nature of open spaces and green corridors within the County. It identifies a number of objectives in key areas for GI, such as:

- The creation of a 'Green Network' for the County
- Development of a comprehensive network of County Greenways
- Preservation of recreation access routes and right of ways
- Promotion of the development of regional and local networks of hiking and walking routes and trails
- Preparation of an all-encompassing Green Space Strategy for the County
- Conservation and enhancement of existing High Amenity Zones
- Preparation of a County Tree Strategy

Recreation Policy Context

The 'Dún Laoghaire-Rathdown Open Space Strategy 2012-2015' addresses both accessibility and recreation. It indicates that the County has adequate provision of open space in line with the Department of Environment's current guidelines (Sustainable Residential Development in Urban Areas, 2008), although this is unevenly distributed across some parts of the County. The Open Space Strategy found that 80% of all households in the County live within 600m of a park. The Open Space Strategy also reviews the quality of open spaces in terms of how welcoming, well maintained and safe they are from a visitor's perspective.

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Dún Laoghaire-Rathdown has completed the County Sports Participation Strategy, 2013-2017 which sets out a number of objectives for the overall benefit of recreation in the County. These include targeting populations shown to have lower participation rates, tackling the issues and barriers that prevent participation, maximising the use of the natural environment, and promoting the use of the coast and other natural resources. Findings from the Irish Sports Monitor indicate that Dún Laoghaire-Rathdown is one of the top performers in Ireland in terms of activity levels. From the perspective of GI both active and passive recreation are equally important.

Findings from the Irish Sports Monitor indicate that Dún Laoghaire-Rathdown is one of the top performers in Ireland in terms of activity levels.

Accessibility, recreation, health and well-being aspects of Green Infrastructure are also central to local spatial planning in the County. There is a range of objectives in current Local Area Plans, the Cherrywood Strategic Development Zone and non-statutory local spatial plans for protecting and delivering the GI at the local level. There are significant local objectives which are also of County-wide significance, for example, the objective to develop a number of amenity open spaces including, the proposed Tully Park at Cherrywood as contained in the Cherrywood Strategic Development Zone.

Accessibility Policy Context

The Dublin Mountains Partnership (DMP) has been set up to represent the recreation users of the Dublin Mountains. The partner organisations include Coillte, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Dublin City Council, National Parks and Wildlife Services and the Dublin Mountains Initiative. The main aim of DMP is to improve the overall recreational experience for users of the Dublin Mountains while recognising the objectives and constraints of the various landowners. The long term strategy of the DMP is to manage recreation in the Dublin Mountains in a more sustainable way. In this regard the strategy aims to undertake other initiatives including the provision of trails to improve visitor access and use of this natural resource.

Photo 8: Two Rock Mountain. Source: Wikimedia. Image By: Joe King.

In the context of accessibility the Smarter Travel Policy sets the context for sustainable transport provision at a national, regional and local level. In overall terms the policy is aimed at reducing the dependence on travel by car in favour of sustainable forms of movement on foot, bicycle and public transport.

The County Cycle Network consists of off-road greenway routes (suitable for all pedestrian and cyclist users), cycle routes through low traffic residential areas and cycle routes along busy traffic routes. The network is complemented and reinforced by the Greater Dublin Area Cycle Network Plan. The County Cycle Network's purpose is to connect the main attractions within the County and to provide effective through-movement for cyclists, ultimately encouraging more people to cycle as their primary mode of transport in line with the objectives of the Government's Smarter Travel policies. It is designed to cater for all cycling purposes ranging from travel to work and school to amenity and leisure cycling.

The 2011 Census demonstrated that Dún Laoghaire-Rathdown had the second highest modal share in the Greater Dublin Area for travel to education and work by bicycle at 5.1%.

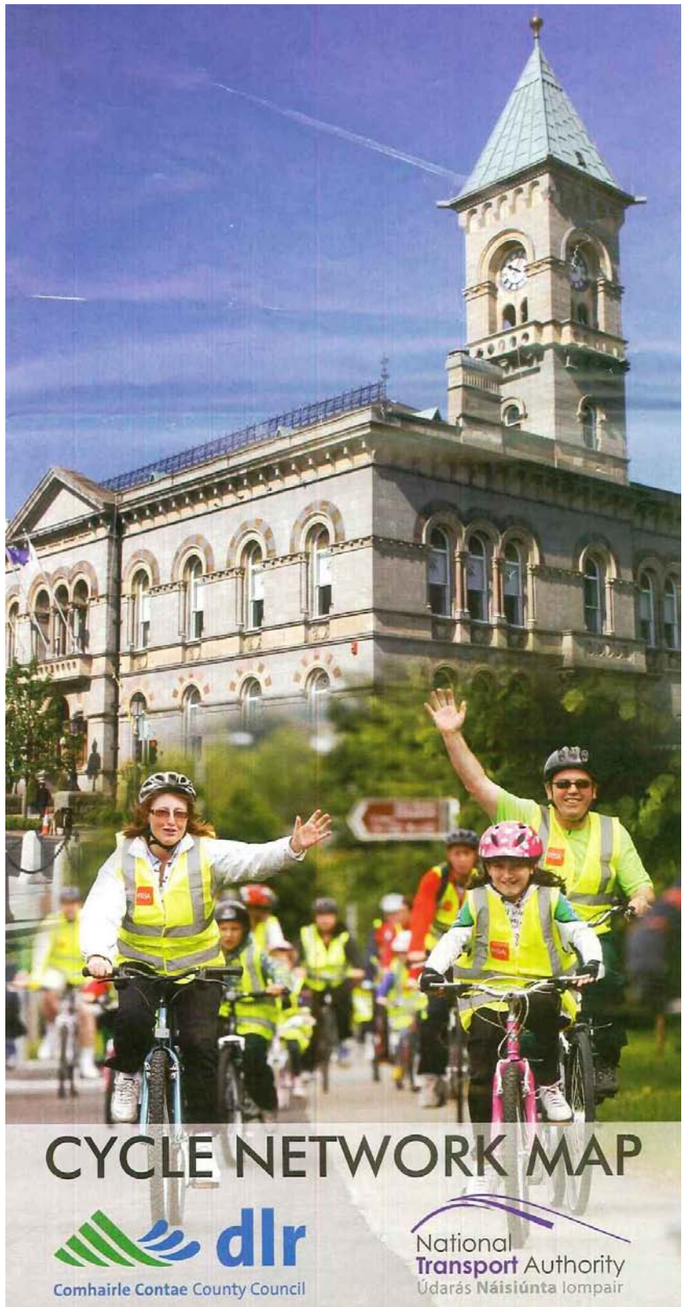


Figure 2.D: Dún Laoghaire-Rathdown Cycle Network Map.

Seventeen Greenways have been identified in the Draft County Development Plan 2016-2022 to build upon the Cycle Network Plan and a phased programme of works is being initiated, as resources allow, to bring the Greenway network into fruition. Greenways are multi-modal but are an important part of the off road cycle network. These Greenways have been largely derived from the Council's Open Space Strategy 2012-2015, where a proposed network of urban Greenways were identified to connect the key open spaces of the County, link centres of population and run parallel to the coastline. It identifies fragmented existing local walks and proposes their connection to urban Greenways and to hiking on the mountains, thus completing a green structure to the County which will connect beyond the County into surrounding Local Authority areas. The Open Space Strategy identified that further work would be required to assess the feasibility of each route in the proposed network. This has been partly undertaken for the Cycle Network Plan, and has been used as the primary source of the Greenway network.

Health and Well-Being Policy Context

'Healthy Ireland - A Framework for Improved Health and Wellbeing, 2013-2025', published by The Department of Health details the close relationship between (physical and mental) health and the environment, physical activity and social interaction, shifting the focus from what can go wrong in people's lives, to what makes lives go well. It also focuses on the role of a better quality environment for people to live in, where there are greater opportunities for a healthy lifestyle and an overall improvement in the health of the population. Trees are one of the main components for maintaining a healthy environment in particularly for climate amelioration and a reduction in heat stress in urban areas. A County-wide survey of trees is currently being undertaken to identify opportunities for strategic tree planting and improve the management of trees.

2.2.2 Spatial Context

These components are now considered in their spatial context. The 7 subjects addressed in this theme are:

- Rural recreation
- Urban recreation
- Coastal recreation
- Accessibility in the rural area
- Accessibility in the urban area
- Accessibility along the coast
- Health and well-being

The spatial context provides an overview of the main accessibility, recreation, health and well-being components of the Green Infrastructure for the Dún Laoghaire-Rathdown, which are of County-wide significance. The County is considered to be marginally more 'urban' than 'rural' in terms of broad character and function and it is characterised by three basic typologies: rural consisting of upland landscape; urban consisting of towns, villages and suburbs; and coastal. Each has a different set of recreational assets and activities.

Rural Recreation

The mountains and uplands are the largest connected area of open space in the County. The Wicklow Mountains National Park, including part of the Dublin Mountains lie on the periphery of the County. These are publicly accessible. However, they are surrounded by land in private ownership including agricultural land, which can restrict connections and recreational access routes. A number of recreational activities have been developed through the Dublin Mountains Partnership including the establishment of the Dublin Mountains Way, local hiking trails, mountain biking and orienteering. These, combined with the Wicklow Way, Right of Ways, Recreational Access Routes in the upland area of the County, create a network of long-distance self-guided walking trails that are typically trans-boundary in nature. The uplands and mountains are under increasing pressure from development (as outlined in the Landscape Character Assessment) and increased demand for recreation as a result of the on-going population growth and development pressures in the Greater Dublin Area and the County itself.

Photo 9: Dublin Moutains Way.
Source: Wikimedia. Image By: Joe King.

Photo 10: Dublin Moutains Way.
Source: Wikimedia. Image By Joe King.

Urban Recreation
There are some 63 parks and 337 open spaces identified within the urban area of the County. These range in size from large suburban public parks to local pocket parks and squares. There is also a hierarchy of open spaces from regional parks, district parks, local parks, amenity open space and civic open space. Regional parks currently include Marlay Park, The People's Park and Newtownsmith, Killiney Hill Park, Cabinteely Park and Blackrock Park. District parks currently include Shanganagh Park, Kilbogget Park, Clonkeen Park, Deerpark, Meadowbrook Park and the Dodder Linear Park as well as the proposed Jamestown Park. Generally these parks provide both active and passive recreational opportunities including organised sport facilities.

In light of the recent acquisition of Fernhill Gardens, it is the Council's intention to develop Fernhill Gardens into a Regional Park with all the amenities that one would associate with a major park, such as pitches, playground, ponds, paths, car park etc., over the period of the County Development Plan 2016-2022. This will involve the preparation of a Master Plan for the site.

Overall, these parks are well dispersed across the County providing a variety of experiences for users ranging from parks adjacent to the coast, within the urban environment and at the threshold of the urban and rural landscapes. However, there are very slight deficiencies in certain areas, such as at Sandyford / Stillorgan electoral area, which will be overcome in the future with the development of the Public Open Space at Blackthorn Park and the development of Sandyford Business District Civic Park. There are also significant areas of land not in public ownership that provide publicly accessible open space for example lands at University College Dublin and Leopardstown Racecourse.

Photo 11: University College Dublin Campus.

Photo 12: Deansgrange Stream running through Kilbogget Park.

The major open spaces within the urban area generally form a loose circular pattern in plan, and offer a range of activities that form hubs for recreation activities. Linear open spaces are evident in areas such as Blackrock Park, Kilbogget Park, Clonkeen Park, the Dodder Linear Park, Seapoint Coastal Park and Shanganagh Cliffs to Killiney Beach. To the north of the County the Dodder Linear Park crosses the administrative boundary of Dún Laoghaire-Rathdown into Dublin City Council. The linear parks tend to follow rivers, making composite GI corridors.

The number of allotments, community gardens or urban farms within the County is limited. For example, allotments are located at Goatstown, community gardens are located at Shanganagh and there is an urban farm located at the Airfield Trust. There are other smaller community gardens within the County at a local level. Shanganagh Community Gardens have developed on 'backlands' formerly zoned for housing and are an example of a community gain from infrastructural development (adjoining Shanganagh Sewage Treatment Works plant). The Gardens have been highly successful in building social cohesion and in diminishing crime. While many individuals may grow vegetables etc. within their own private gardens, overall there is an uneven distribution and a large deficiency of allotment space accessible from areas of high residential density.

In addition to physical, psychological and social health, green spaces allow for a more holistic health solution – community gardens and food production.

Photo 13: Airfield Trust, Dundrum.

Coastal Recreation

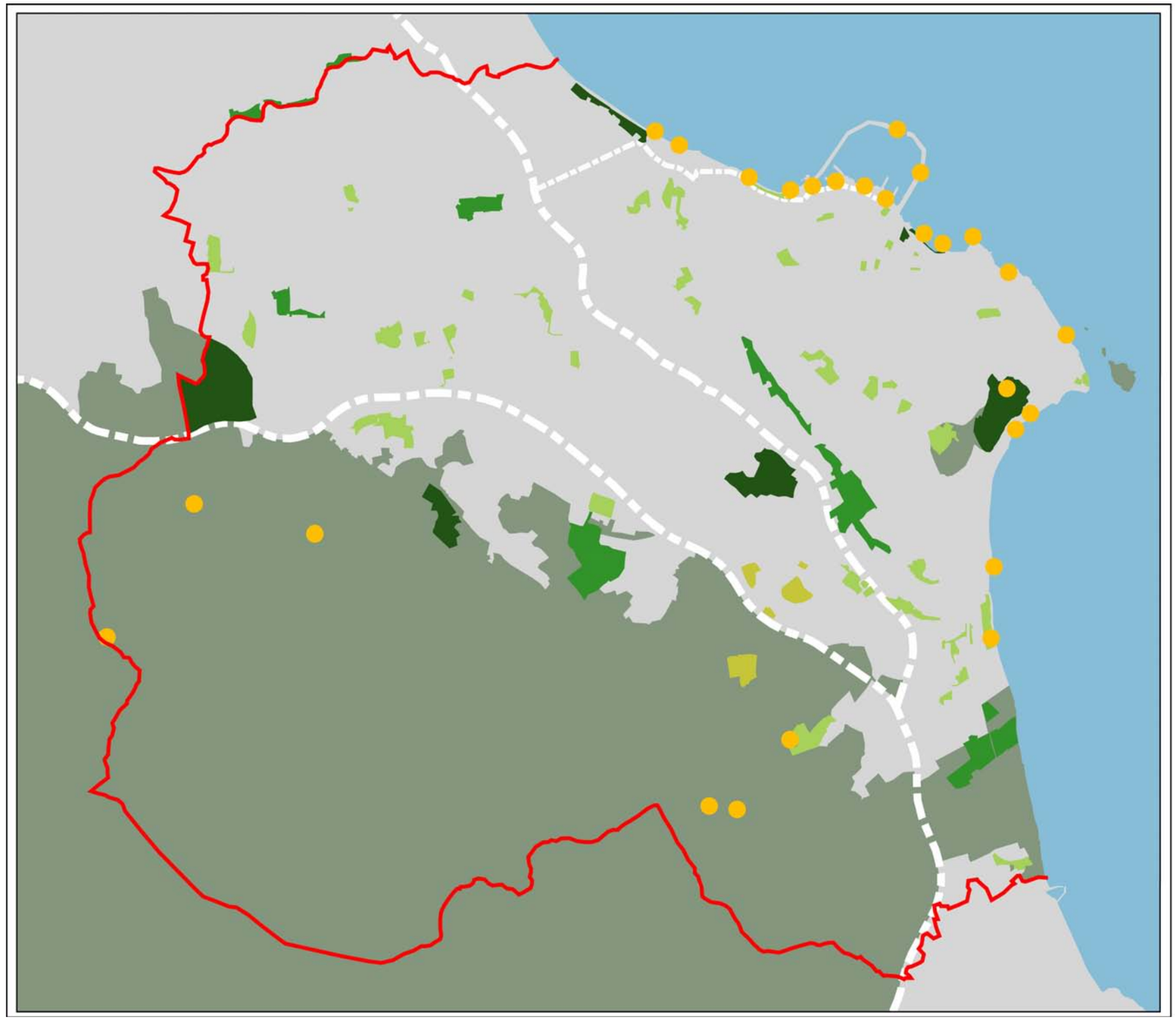
The coast is a continuous (17km) chain of recreational assets and activities. It is one of the main attractions of the County. There are a variety of open spaces ranging from rocky headlands, inlets, harbours, piers, parks and beaches. Dún Laoghaire Piers are perhaps one of the most iconic recreational spaces in the County, most notably the East Pier. Each year 1.3 million people walk Dún Laoghaire's East Pier (source: http://www.visitdublin.com) passing the bandstand which evokes the town's Victorian seaside reputation for health and leisure. Views from the pier are enjoyed across the harbour, Dublin Bay and back towards Dún Laoghaire. Coupled with the range of spaces along the coast there is a concentration of recreational activities located along the coastline, including swimming, sailing, diving, kayaking and fishing.

Each year 1.3 million people walk Dún Laoghaire's East Pier passing the bandstand which evokes the town's Victorian seaside reputation for health and leisure.

The Dalkey Islands, a Special Protection Area (SPA) and Special Area of Conservation (SAC), are located 3km south of Dún Laoghaire Harbour. They can be visited by renting a boat from Coliemore Harbour or Bullock Harbour.

The beaches have good water quality, for example, Killiney and Seapoint beaches are currently 'Blue Flag' beaches. Dún Laoghaire Harbour is a highly active recreational resource for dinghy and offshore sailing.

Photo 14: Dalkey Islands. Source: Wikimedia. Image By: John Fahy.



Map 3: Distribution of Parks and Recreation Sites in the County.

Accessibility in the Rural Area
The recreational facilities available in the uplands and mountains include hiking trails, such as The Dublin Mountains Way and the Wicklow Way, Right of Ways and Recreational Access Routes. Sections of walking routes in the County are part of the existing network of long-distance self-guided walking trails that pass through the County. Sections of the Wicklow Way, which continues into the Wicklow Mountains National Park, and the Dublin Mountains Way, are routed on the rural roads. The rural road network is also highly used by recreational cyclists who travel onwards through the Wicklow Mountains and the National Park.

There are a number of recreational access routes, both existing and proposed, from the mountains to the urban areas and trans-boundary into adjoining counties. The Open Space Strategy further identifies fragmented existing local walks with proposed connections that will link the Greenways in the urban areas with hiking routes on the mountains. Some of these cross open spaces at the threshold of rural and urban areas. This an opportunity that is noted from the Green Infrastructure analysis.

Photo 15: Farmland in the County.

Accessibility in the Urban Area
In addition to the Dublin Mountains Way, Wicklow Way, Right of Ways, Recreational Access Routes in the upland areas there is strong support for Greenways that are identified in the Cycle Network Plan and the Open Space Strategy for urban areas. These Greenways will link the key open spaces of the County. Some sections of these Greenways have been completed, for example, the Slang River, the Greenway through Clonkeen and Kilbogget Parks, sections of route along the coastline and The Metals. The Greenway network contains large sections which are off-road but also sections located on low trafficked roads, including the East Coast Route along Coliemore Road and the Vico Road.

The natural topography of the County is such that not all pedestrian routes are universally accessible, nor would it be desirable to make such interventions on the natural landscape. For example part of the experience of the park at Killiney Hill is overcoming the challenge of the topography.

Photo 16: People's Park, Dún Laoghaire.

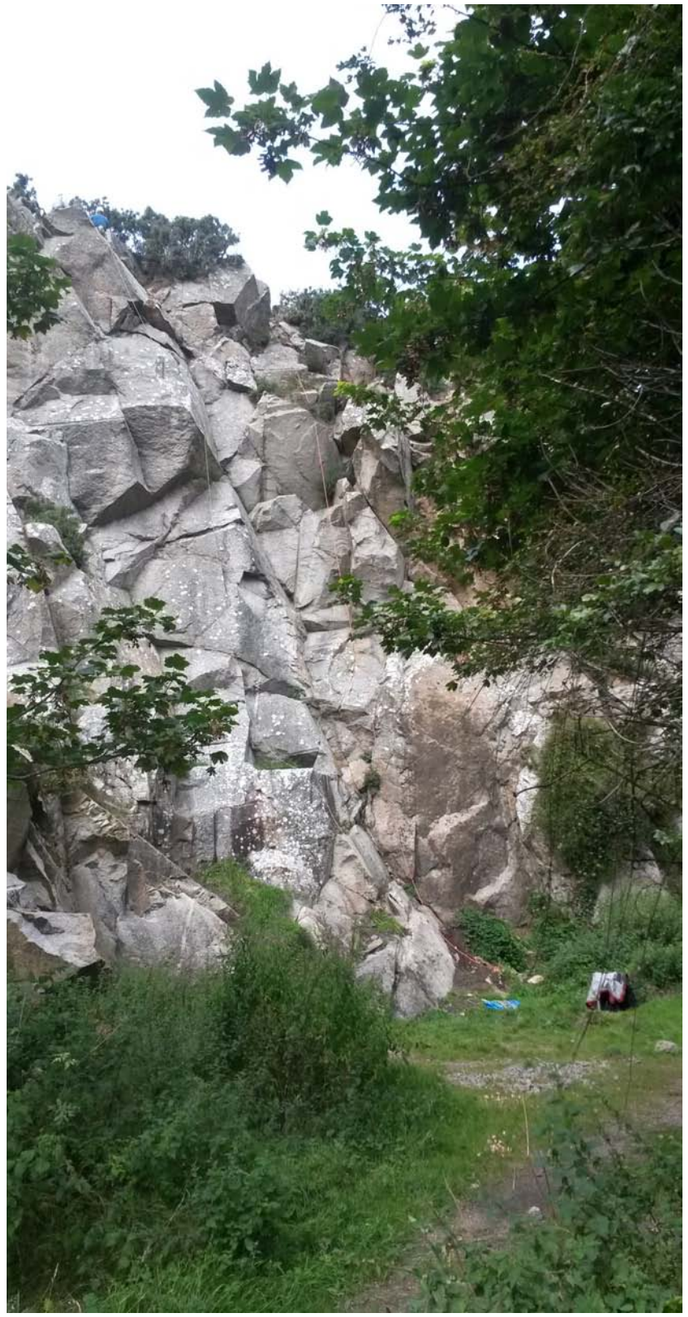


Photo 17: Rock Climbing at Dalkey Quarry.

There is a highly developed bus and rail public transport network in the County. These services currently offer access to open space within the County which can be further enhanced through improvements to public transport provision. The network consists of bus services as part of the Quality Bus Network. There are schemes identified to be developed to augment the current corridors which include, for example, the Stillorgan Road / N11 corridor. This corridor is currently being considered for development as part of Bus Rapid Transit Network for the core city area with the UCD to Blanchardstown via the N11 being one of two feasible cross city corridors. Bus Routes serving locations such as Enniskerry and Glencullen provide public transport connections to the upland landscape.

The Luas light rail green line and the DART line provide significant rail services within the County. The Luas offers the most proximate access to the upland landscape area and Luas Cross City will further enhance this accessibility.

Accessibility along the Coast

The nature of the local topography makes access to the coast difficult at certain locations. The ease of access varies due to changes in level, the design of the access route, and the constraints on the extent of access possibilities, for example the section of walk from Bray harbour to Killiney Beach at the base of the cliffs is only possible at low tide.

The DART offers excellent access to the coastal seascape corridor and the development of the service through the DART expansion scheme will further improve access to the County. Paradoxically the railway line also acts as a barrier to access. The DART line also provides a number of visual connections along the coast and beyond into neighbouring counties where physical connections are difficult.

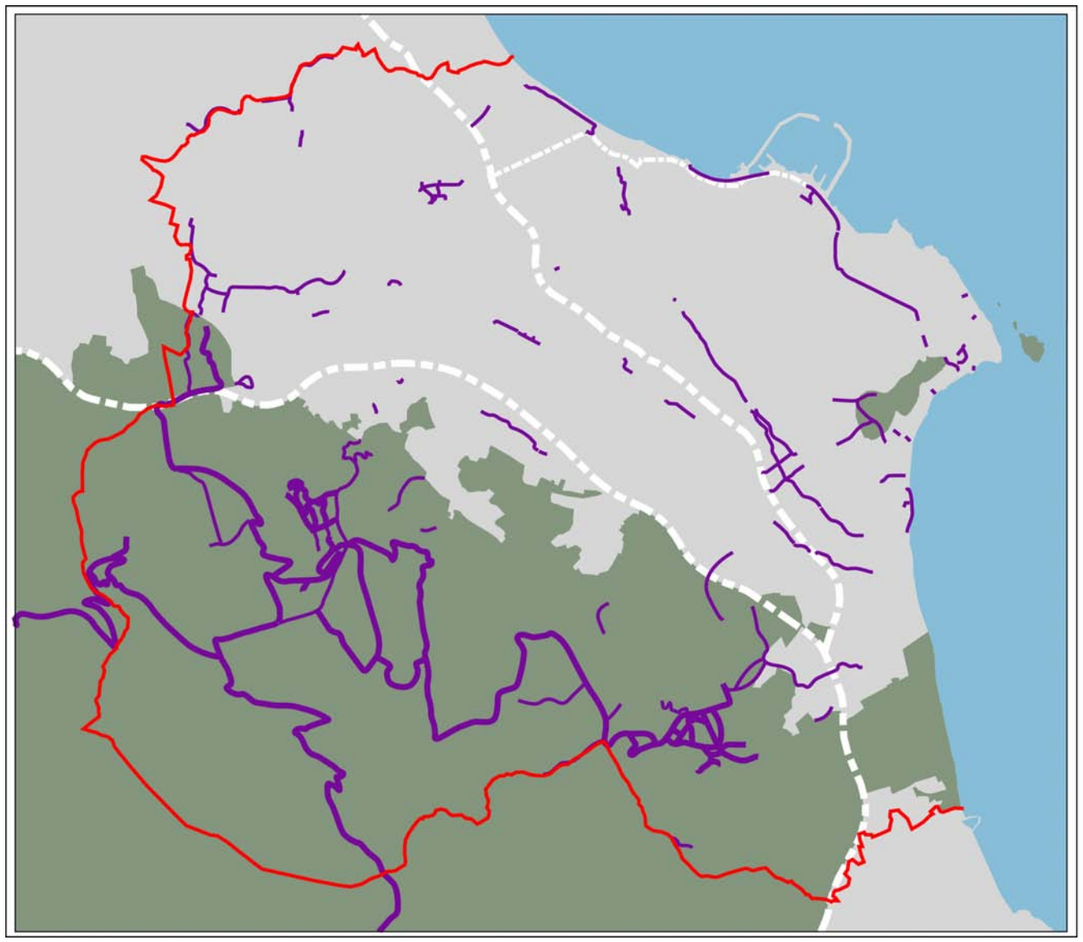
The focus of recreational activities at the coast and in the mountains indicates that the main recreational movement is east-west from the urban area to the coast or to the mountains. Therefore the two main barriers to overcome are the M50 and the N11 which run north-south. Dún Laoghaire Harbour provides international connections through seasonal daily ferry services to Holyhead and a variety of cruise vessels visiting the harbour. On a smaller trans-boundary scale a private operator sails between Dún Laoghaire and Howth a number of times a day between March and October.

Photo 18: Dublin Bus.
Source: Flickr. Image By: Desomurchu Archive Gallery.

Photo 20: StenaLine Ferry at Dún Laoghaire.
Source: Copyright Albert Bridge and licensed for reuse.

Photo 19: DART at Killiney.
Source: Copyright Andrew Abbott and licensed for reuse.

Photo 21: Sailing at Dún Laoghaire Harbour.
Source: Helen Bradley.

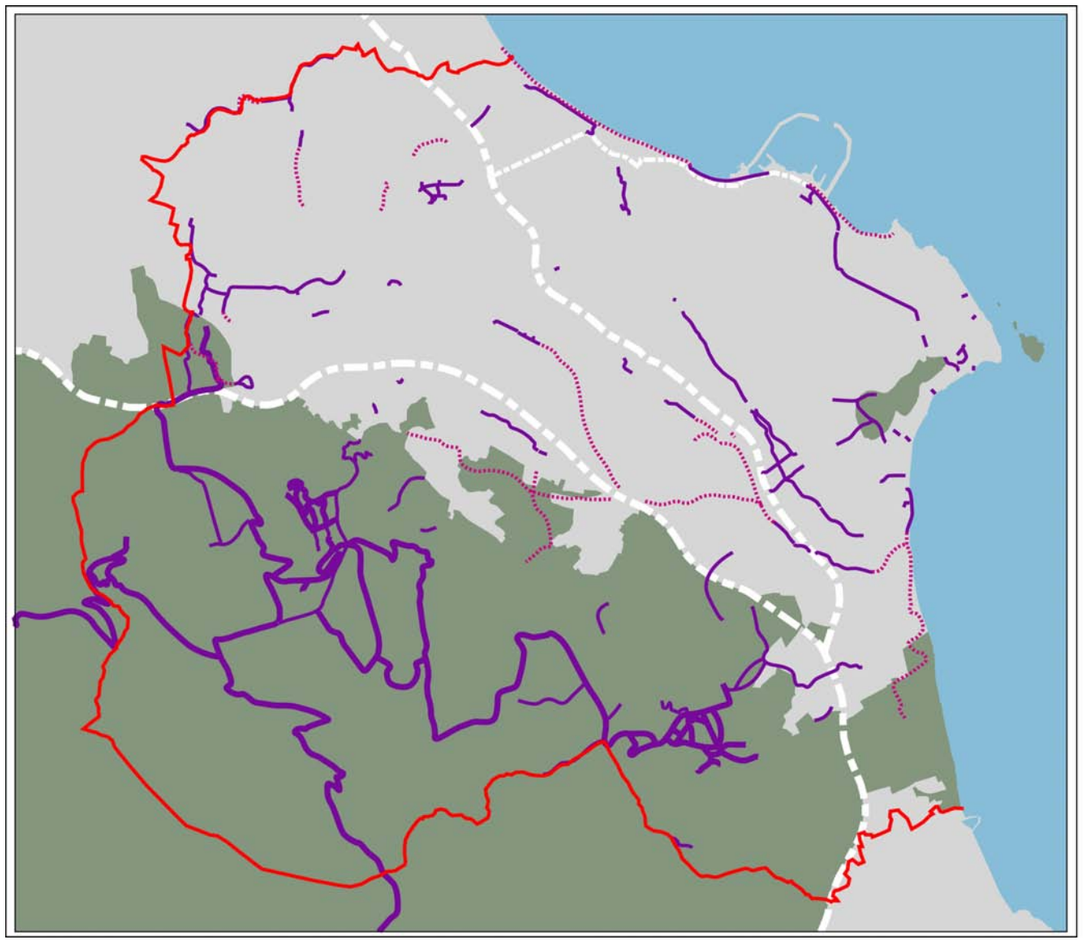


Map 4: Existing Connections in the County.

EXISTING DUBLIN MOUNTAIN WAY AND WICKLOW WAY

EXISTING CONNECTIONS

COUNTY BOUNDARY



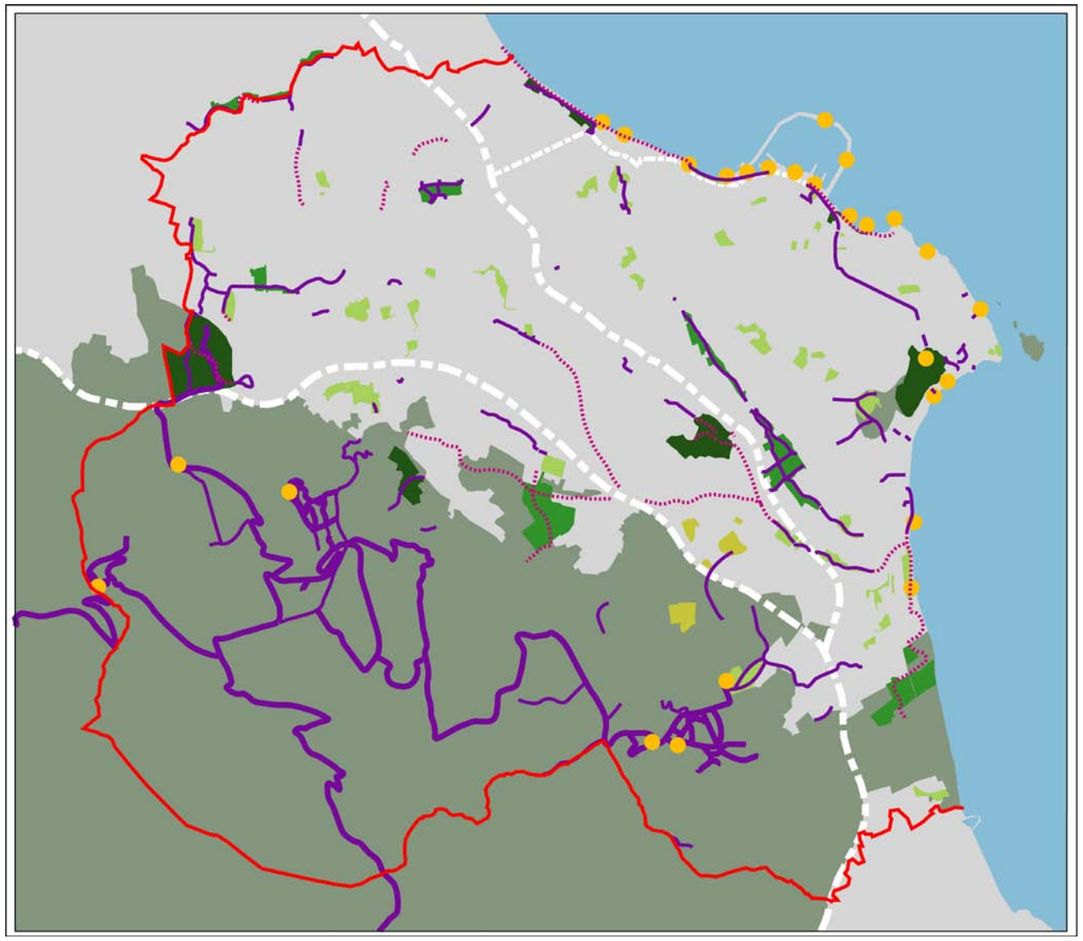
Map 5: Existing Connections and Proposed Greenways in the County.

PROPOSED GREENWAYS

EXISTING DUBLIN MOUNTAIN WAY AND WICKLOW WAY

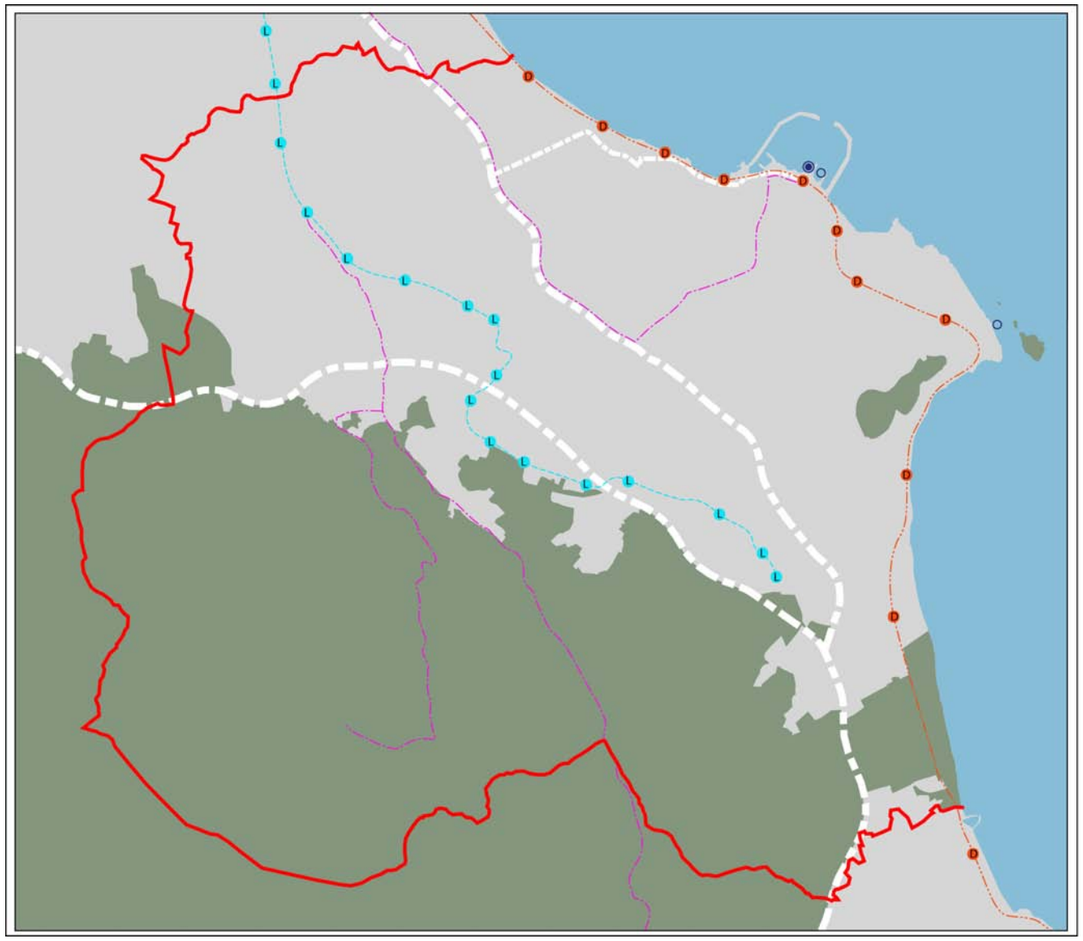
EXISTING CONNECTIONS

COUNTY BOUNDARY



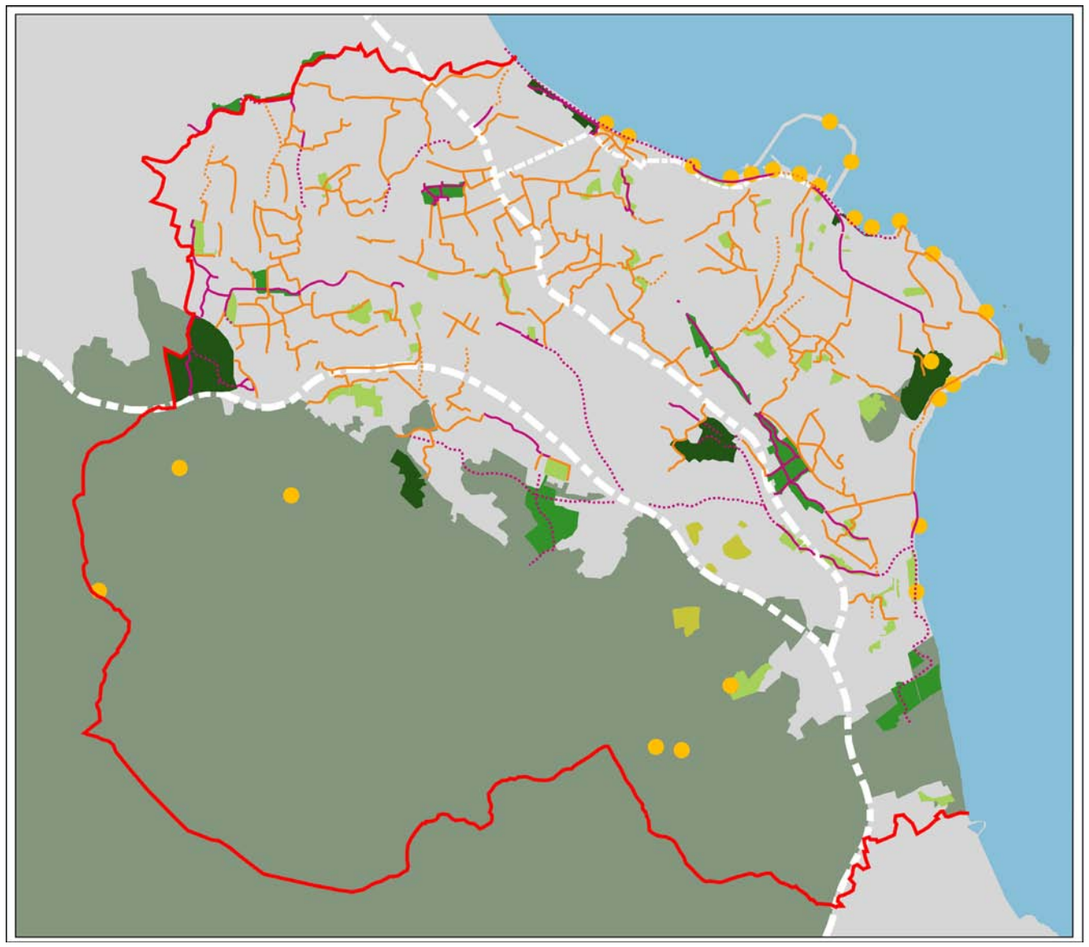
Map 6: Existing Connections and Proposed Greenways to Parks and Recreation Sites in the County.

REGIONAL PARKS
DISTRICT PARKS
LOCAL PARKS
PROPOSED PARKS
RECREATION SITE
PROPOSED CONNECTIONS
EXISTING SIGNIFICANT CONNECTIONS
EXISTING CONNECTIONS
COUNTY BOUNDARY



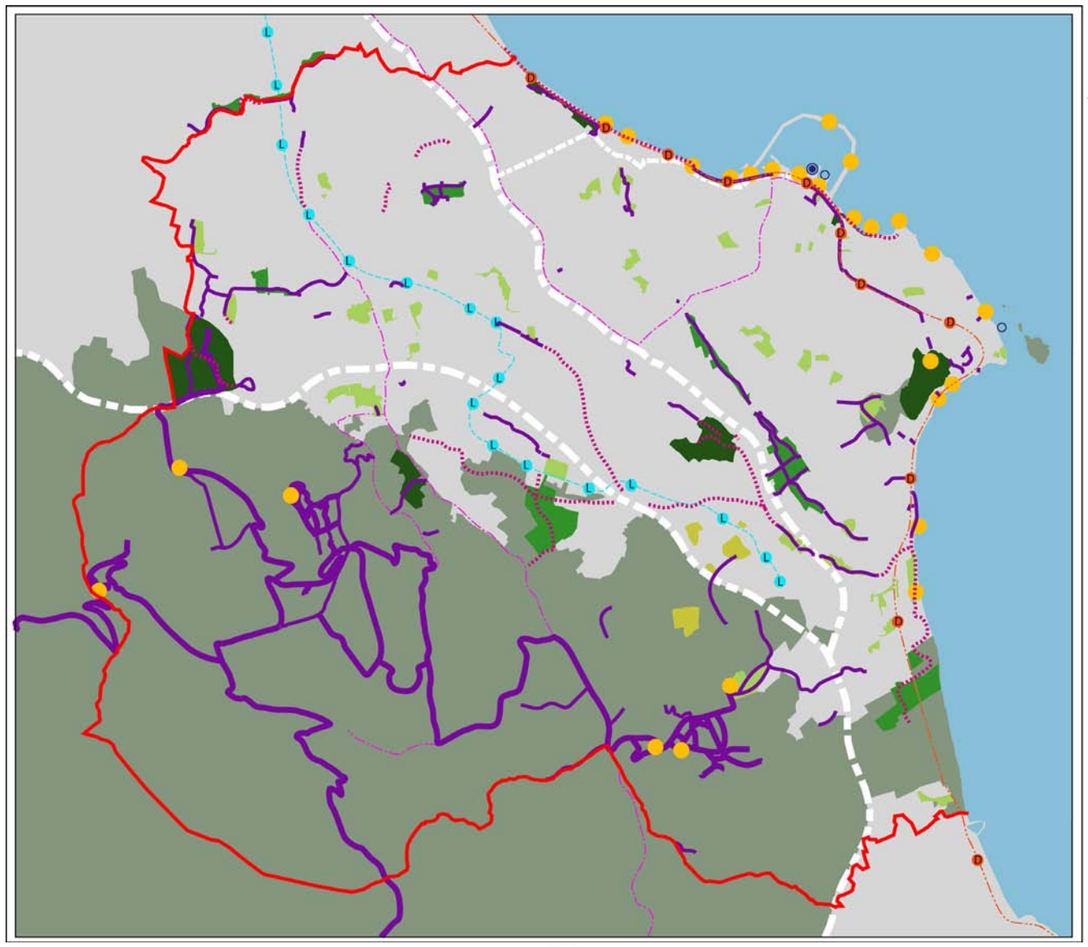
Map 7: Public Transport in the County.

FERRY
WATER TAXI
DART LINE AND STATIONS
LUAS LINE AND STATIONS
BUS ROUTES 46A AND 44
MAJOR ROADS
COUNTY BOUNDARY



Map 8: Cycle Network Connections to Parks and Recreation Sites in the County.

REGIONAL PARKS
DISTRICT PARKS
LOCAL PARKS
PROPOSED PARKS
RECREATION SITE
EXISTING PEDESTRIAN / CYCLE NETWORK SUITABLE FOR ALL USERS
PROPOSED PEDESTRIAN / CYCLE NETWORK SUITABLE FOR ALL USERS
EXISTING CYCLE NETWORK ON LOW TRAFFIC ROUTES
PROPOSED CYCLE NETWORK ON LOW TRAFFIC ROUTES
COUNTY BOUNDARY



Map 9: Connections and Public Transport provision to Parks and Recreation Sites in the County.

REGIONAL PARKS
DISTRICT PARKS
LOCAL PARKS
PROPOSED PARKS
RECREATION SITE
PROPOSED GREENWAYS
EXISTING DUBLIN MOUNTAIN WAY AND WICKLOW WAY
EXISTING CONNECTIONS
FERRY
WATER TAXI
DART LINE AND STATIONS
LUAS LINE AND STATIONS
BUS ROUTES 46A AND 44
MAJOR ROADS
COUNTY BOUNDARY

Health and Well-Being

There are community profiles utilising a set of over 200 health related indictors compiled for every Local Authority area in Ireland. This information from 'The Health Well' website (http://www.thehealthwell.info/community-profiles) which is managed by the Ireland and Northern Ireland's Population Health Observatory (INIsPHO) supports evidence based decision making.

Current health related indicators for Dún Laoghaire-Rathdown compared to the Republic of Ireland are shown in Table 2.A.

Health Indicator	Dlr	RoI
Percentage of the population reporting very good or good general health (2011)	72.4	65
Percentage of the population reporting bad or very bad general health (2011)	4.4	5.6
Clinical diagnosis of self-reported, doctor-diagnosed diabetes in the previous 12 months (2010)	3.6	3.2
Clinical diagnosis of self-reported, doctor-diagnosed angina or heart attack in the previous 12 months (2010)	2.7	2.4
Percentage of people who are obese (2007)	13.4	14.4
Percentage of people who are physically inactive (2007)	33.4	28.4
Percentage of children aged 5-12 years that walk or cycle to school (2011)	32.1	25.8
Percentage of children aged 5-12 years that are driven to school by car (2011)	62.4	61.3
Number of deaths by suicide or undetermined event per 100,000 population (2013)	8.2	11.8
Number of admissions to hospital for anxiety or depression per 1,000 people (2009)	2.2	2.3
Percentage of working age population aged 15-64 years in receipt of benefits for depression and / or anxiety (2013)	1.2	1.1
Number of children's Playgrounds directly provided or facilitated by the local authority per 1,000 population (2012)	0.1	0.2
Local Authority expenditure on sports, recreation and leisure facilities per person (2014)	66.2	33.2
Percentage of primary schools participating in Environmental campaigns (2012)	94	92.2
Percentage of secondary schools participating in Environmental campaigns (2012)	100	92.2

Table 2.A: Comparison of Health Related Indicators

These statistics show the County has some positive indicators, demonstrating the success of current initiatives on cycling and recreational expenditure for example. There is a clear link between the improvements in an individual's health and physical activity and engagement with the natural landscape, but also a population's health is also linked to a healthy environment which relies on clean air, water and soil. Views containing trees and vegetation have been proven to be the most preferred landscapes for promoting well-being. They have the most positive influences on emotional and physiological states, reducing stress and anxiety and developing feelings of happiness, satisfaction, tranquillity and pleasure.

Health and well-being cannot be easily spatially mapped, but from a GI perspective landscape, vegetation and access to physical activity can identify potential deficits in provision across a community. The analysis on open space provision shows that the County is delivering at a good level, but greater participation and accessibility is required if the well-being of the population is to be improved. Green space is now seen as key part of the HSEs strategy of encouraging and empowering people to lead healthier lifestyles. The Green Infrastructure strategy reinforces the return of parks to their public health roots.

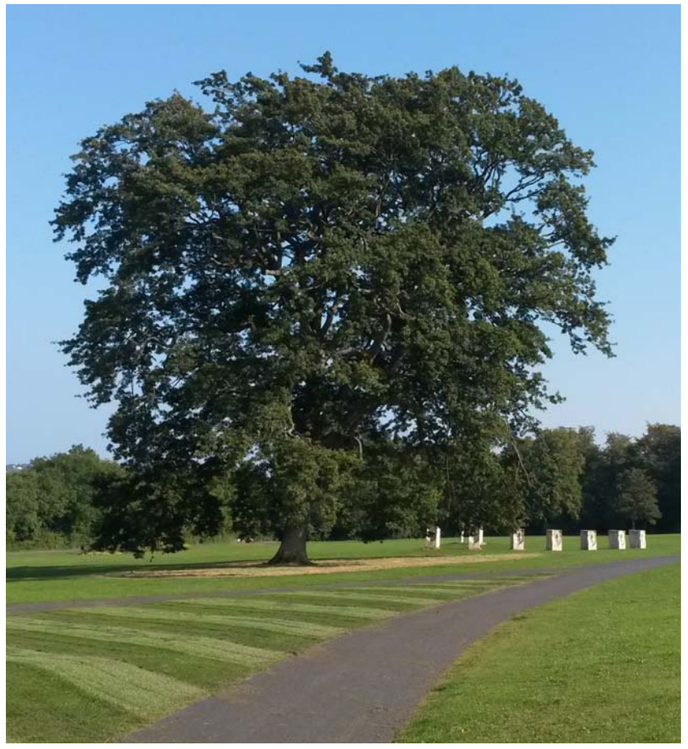


Photo 22: Trees in Cabinteely Park.

Trees are also important for climate amelioration and maintaining a healthy environment. Trees absorb carbon as they grow, and woods and forests can provide long-term carbon reduction benefits. Planting in urban areas, at the source of many atmospheric pollutants, can filter out those pollutants, reduce water run-off, improve water quality, reduce noise and provide shading to help reduce urban heat island effects.

The County can be considered as very green with considerable amounts of tree planting not only in forests and woodlands, parks, open spaces and along streets but also in private ownership particularly seen in the large private gardens for example at Killiney and Dalkey.

Open space within the County also includes burial grounds and graveyards of which there are eight in the County. They can be integrated into a GI network, a good example is at Deansgrange, which forms part of the Blackrock to Killiney Greenway.

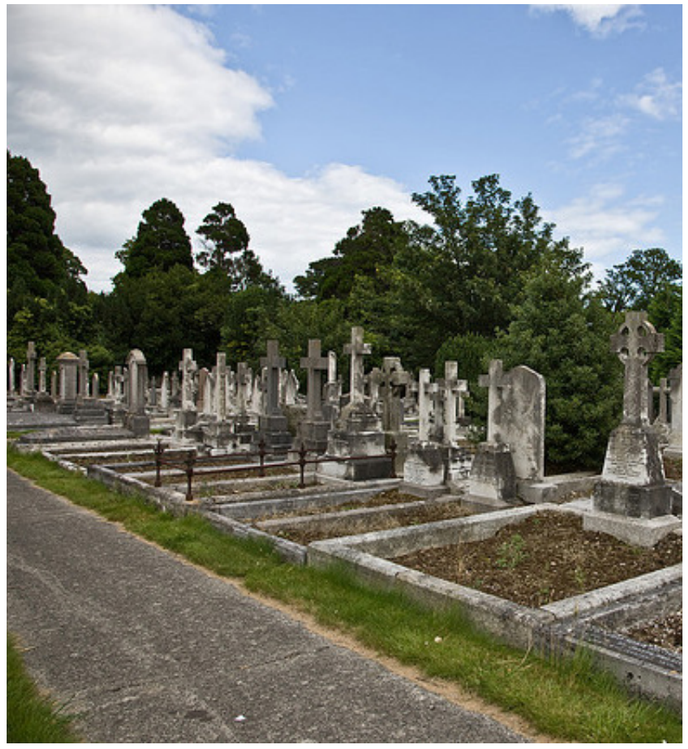


Photo 23: Deansgrange Cemetary.
Source: Flickr. Imange By: William Murphy.

2.2.3 Challenges and Opportunities

A number of challenges and opportunities for the Green Infrastructure Strategy have emerged from the policy and spatial analysis of accessibility, recreation, health and well-being in Dún Laoghaire-Rathdown.

Challenges
In general the policy context for Green Infrastructure in the area of accessibility, recreation, health and well-being for the County is robust. However, key challenges for current and future policy are evident and these include:

- The need to address gaps in the existing data such as the recording, mapping and surveying the existing trees in the County so protection and enhancement of tree cover can be managed.

- To provide the evidential link between green space provision and health and well-being is difficult; detailed surveys of how assets and activities influence community use and behaviour would be useful to support a policy response.

The spatial context for accessibility, recreation, health and well-being for the County, presents some key challenges. These are:

- Open space is generally within the desired distance of all high-density residential areas with the exception of the Sandyford / Stillorgan electoral area. There is a minor deficit in this area which will be overcome in the future with the development of the Public Open Space at Blackthorn Park, Sandyford Business District Civic Park and Fernhill Park as a Regional Park. There is also a long term plan to develop part of the existing reservoir at Stillorgan into a park. Until such time there is a challenge to provide accessible open space within this area.

- Greenways have been a part of previous strategies, such as the Cycle Network Plan and the Open Space Strategy. These have been a response to the fragmented access between urban areas and key green space assets. As they are multi-modal they have the potential to generate greater activity in themselves and an extended use of other GI assets. Proposed local walks are also identified to connect the fragmented upland landscape recreational access routes. These Greenways may require access to private land and overcome physical barriers, and as such have a spatial and technical challenge in their delivery.

- Accessibility to open space is examined with the distances to open space based on a straight line 'as the crow flies'. Distances do not take into account geographic considerations such as barriers created by roads, rivers or railways. This would form part of examination at local level to guide LAP's etc.

- It is a challenge to balance universal accessibility within natural landscapes. The natural topography of the County is such that not all pedestrian routes will be universally accessible. Barriers to access can be reduced, but it is not desirable to make significant interventions on the natural landscape; often part of the experience is the challenge of accessing the natural environment, some of which are sensitive.

Opportunities
The policy context for accessibility, recreation, health and well-being in the County presents some key opportunities to be delivered by the Green Infrastructure Strategy. These are:

- Preparation of a single GI strategy with a coherent set of planning policies and objectives around accessibility, recreation, health and well-being for the County.

- The opportunity to guide the relevant sections of the County Development Plan, in particular the 'Landscape, Heritage and Biodiversity', the 'Open Space and Recreation' and the 'Sustainable Travel and Transportation' sections.

- The opportunity to inform and provide a method for consistency by which GI strategies for accessibility, recreation, health and well-being are incorporated into LAPs, SDZs, Framework Plans and other local policy documents.

- The opportunity to complete the 'Draft Policy on Community Gardens for Dún Laoghaire-Rathdown.

- The opportunity to develop an inventory of open spaces and their facilities, so that new development can mitigate any deficits.

The spatial context for accessibility, recreation, health and well-being in the County presents some key opportunities. These are:

- The open spaces on the threshold between urban and rural areas can act as a transition between the rural and urban landscapes. A central concept of the spatial element of this strategy is that of a 'Gateway Park'. These parks should function as starting points which facilitate and encourage people to visit rural and coastal areas and connect to the Dublin Mountains Way and the Wicklow Way. They should also be welcoming for people coming back to the urban area after hiking or cycling, with facilities and attractions in their own right.

- Providing new and improved connections between major open spaces in the urban areas will generate a suite of strategic corridors which will encourage day to day use, to and from home, work, and education etc. particularly for cycling.

- Addressing the uneven distribution of allotments or community gardens accessible from areas of high residential density will improve health and well-being and social cohesion.

2.3 Natural and Cultural Heritage

The purpose of this section is to outline natural and cultural heritage across the County, as well as its trans-boundary and regional context, which can support and influence the Green Infrastructure strategy. It provides an overview of the current policy and studies in the area, along with a concise spatial analysis of the County. This section also highlights the main challenges and opportunities for natural and cultural heritage for the County as they relate to GI.

Natural and cultural heritage encompasses both tangible and intangible inheritance from earlier generations. In broad terms it includes:

- Natural heritage: topography, climate, air, skyscape, landscapes, ecology and biodiversity and landscape management
- Cultural heritage: buildings, railways, harbours, piers, public realm, civic life, literature, music, visual art, language, folklore, traditions and landscape management

Photo 24: Feeding the ducks at Kilbogget Park.

Photo 25: Railings along Queen's Road, Dún Laoghaire.

2.3.1 Policy Context

Natural and cultural heritage is provided with policy and legislative protection from a wide variety of sources. European and national legislation provide the necessary framework for the protection of the natural and built heritage and this is supported by policy at national, regional and county level. The Green Infrastructure strategy will inform the Local Area Plans, and as a result the outcome of the strategy will be subject to environmental appraisal of the potential impacts.

The existing County Development Plan 2010-2016 plays a particularly important role in identifying and protecting heritage of varying significance. The plan promotes a close relationship between natural heritage, open space and access, and includes a strategic vision of 'Green Structure' (National Spatial Strategy). This is envisioned as a County wide landscape that reflects the multifunctional use and network character of Green Infrastructure. This is also supported in the policy to '*maintain and protect the natural character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat*' (County Development Plan Policy LHB10: Rivers and Waterways).

County Development Plan Policy LHB10: Rivers and Waterways
'maintain and protect the natural character and ecological value of the river and stream corridors in the County and where possible to enhance existing channels and to encourage diversity of habitat'

The natural and built heritage is also a key aspect of the statutory current Local Area Plans in the County. These plans provide local objectives and provisions for the natural and built heritage.

This pro-active approach to heritage is in turn supported by other policies and actions such as those in the Open Space Strategy, the Cherrywood SDZ, and the 'Dún Laoghaire-Rathdown Heritage Plan 2013-2018'. The Heritage Plan sums up the context of heritage in the County: 'The Dún Laoghaire-Rathdown motto Ó Chuan go Sliabh– from the harbour to the mountains – defines the County in terms of its heritage.'

The Dún Laoghaire-Rathdown motto Ó Chuan go Sliabh– from the harbour to the mountains – defines the County in terms of its heritage.'

The Heritage Plan's Interpretation Programme can be supported by GI by making information on heritage more accessible across the County. Other projects include producing a heritage guide to the County's section of the Dublin Mountains Way, encouraging partnerships to provide appropriate managed access to archaeological sites and national monuments, continuing to promote the unique heritage of the Martello Towers in the Dublin area, and promoting the marketing of the County's walled gardens.

Studies such as the 'Archaeological Survey' (2006) and the 'Industrial Heritage Survey' (2005-2006) cover the whole County, whilst the 'Habitat Survey' (2007), Historic Landscape Character Assessments' (2004-2008) in the current County Development Plan only focus on areas that are most vulnerable to development. The original Landscape Character Assessment was finalised in May 2002 and has subsequently been updated in the 2010 - 2016 Plan and also for the draft County Development Plan 2016 - 2022. The Department of Arts Heritage and the Gaelteacht's National Landscape Strategy for Ireland, 2014 - 2024, when finalised, is likely to include new guidance on carrying out LCA. It is envisaged that the existing assessment will be reviewed in due course to ensure consistency with any new forthcoming Government guidance.

2.3.2 Spatial Context

This section deals with the spatial context of the natural and cultural heritage components of Green Infrastructure which are of County-wide significance.

Geology
The granite geology of the underlying bedrock is expressed in the mountains, hills and foreshore and in built artefacts, appearing across the County, with some diversity in the limestone to north (referenced in the name of 'Blackrock') and Ordovician strata to the south.

Photo 26: Bullock Harbour.

Topography
There is a broad diversity of topography from mountains to the sea. The hills, mountains and sea are the basis of great views and prospects that consist of natural scenery, landmarks and historic landscapes. There are typically trans-boundary views into neighbouring counties and across Dublin Bay.

Land Use and Ecological Diversity
By virtue of its sea to mountain location, and urban/rural context, the County has a good diversity in land use, geology and ecology which includes: heath, wood/forestry, riparian corridors, foreshore, salt marsh, hedgerows, agricultural land, undeveloped land, parks, demesnes, gardens and green roofs and transport corridors.

Photo 27: Booterstown Marsh.

This broad range of land uses offer biodiversity, including 45 different habitats of which 7 are potential Annex 1 habitats (Dún Laoghaire-Rathdown Habitat Survey 2007). The survey focused on vulnerable lands to the south of the County. The habitats adjacent to the southern portion of the M50, west and east along the M11 and to the extreme west of the County are under greatest threat from future development, pollution events or destruction through agricultural, forestry or landfill impacts.

The survey identifies key corridors that connect the SAC, pNHA and SPA zones in the south west of the County eastwards towards the coast, with built development towards the north of the County causing fragmentation. Road infrastructure projects also create barriers to the connection habitats. Further fragmentation of ecological corridors would have a major negative impact on biodiversity within the County. More isolated, wilder locations, such as the Wicklow Mountains, can support a significant biodiversity resource, but even intensively managed and visited spaces can be invaluable areas for wildlife, particularly in developed urban and industrial regions, such as FitzSimon's Wood.

Photo 28: FitzSimon's Wood.

Existing ecological receptors can constrain implementation and delivery of a Green Infrastructure strategy. The ecological impacts could, for example, be directly through loss of habitats via construction or management works, or more indirectly through increasing visitor numbers in areas inhabited by sensitive species, such as Merlin and Peregrine Falcons in the Wicklow Mountains or Tern species on the Dalkey Islands.

Photo 29: Dalkey Islands.

Rivers and Water

The rivers and streams generally traverse from mountains towards the sea. They are frequently inaccessible to the public, particularly where they are on private land beyond the M50 motorway. Over 70% of the watercourses in Dún Laoghaire-Rathdown are on private land. All of the 30km of watercourses upstream of the M50 or urban area are in private ownership. Institutional land (e.g. universities, colleges and hospitals) and outdoor sports facilities (e.g. golf courses) distributed throughout the County contain 13km of watercourses. This represents a significant area of privately owned green assets that could be created or enhanced. Accessibility and their ecological value are sometimes disrupted by culverts in built up areas. There is an inherent biodiversity value within the water resources of the County, including the main rivers and smaller watercourses, and wetland habitats.

Over 70% of the watercourses in Dún Laoghaire-Rathdown are on private land. All of the 30km of watercourses upstream of the M50 or urban area are in private ownership.

Photo 30: Little Dargle River running through Marlay Park.

The rivers generally have many built heritage elements such as bridges and weirs, and the Dodder, Owendoher and Loughlinstown/ Shanganagh rivers in particular have mills associated with them.

Although the rivers and streams are often inaccessible along their routes through private land, steep topography and culverts, they are accessible in some key places. Regardless of public access, they are valuable corridors along which a number of species can move between areas.

A summary of the location of where each watercourse has an interface and accessibility with the public is shown in Table 2.B.

River Network	Public Interface
Little Dargle	Marlay Park
Dodder	Linear park with DCC
Slang	Dundrum and suburbs
Carrickmines	Jamestown Park
Shanganagh	Cherrywood
Clonkeen	Clonkeen and Kilbogget Parks
Glencullen	Wicklow Way (limited)

Table 2.B: Rivers and Public Interface

Coastline

The 17km of coastline consists mainly of rocky foreshore, with harbours, beaches, cliffs, salt marsh and islands. This diverse coastline offers natural and cultural heritage interaction – particularly through recreation. It also forms an important ecological corridor, where the isolation can offer protection to wildlife. Some urban areas, such as Dún Laoghaire harbour, cause fragmentation of this corridor, particularly on the landward side.

Photo 31: Sandycove.

The Dalkey Islands constitute a significant site of ecological, archaeological, architectural, and cultural heritage. It is a prime example where conservation of archaeology and natural heritage is aided by isolation. The adjacent island, The Muglins, is outside the Dlr boundary, but is within the Rockabill to Dalkey Islands SAC and the Dalkey Coastal Zone and Killiney Hill pNHA. The trans-boundary context of the coastline is also reflected in the proposal that the UNESCO North Bull Island Biosphere Designation be extended to cover all of Dublin Bay.

Parks, Institutional Lands, and Gardens
There are varying levels of access to public parks, institutional lands and private gardens, with strong cultural and natural heritage elements. For example, many large houses have grounds and parkland throughout the suburban areas, some of which have become public, most notably at Cabinteely and Marlay parks. 'Parklife' is an active management plan instigated by Dlr Parks and Landscape Services for increasing biodiversity in public parks, an important factor for enhancing natural heritage in Green Infrastructure. Clusters of houses with large private gardens occur across the County, but most notably in the Killiney/Dalkey area where they have substantial tree coverage.

Photo 32: Cabinteely House, Cabinteely Park.

Trees, Forestry and Woodland
Tree habitats range from coniferous plantations, deciduous woodland, and those in streets, parks, institutional and private grounds. Collectively, this urban woodland and should be managed to ensure a balanced age profile and appropriate mix of species.

Hedgerows
Agricultural hedgerows located mainly in the south and west, are important on a County level. They are significant elements of ecological corridors, and embody cultural heritage as townland and field boundaries, and in landscape management.

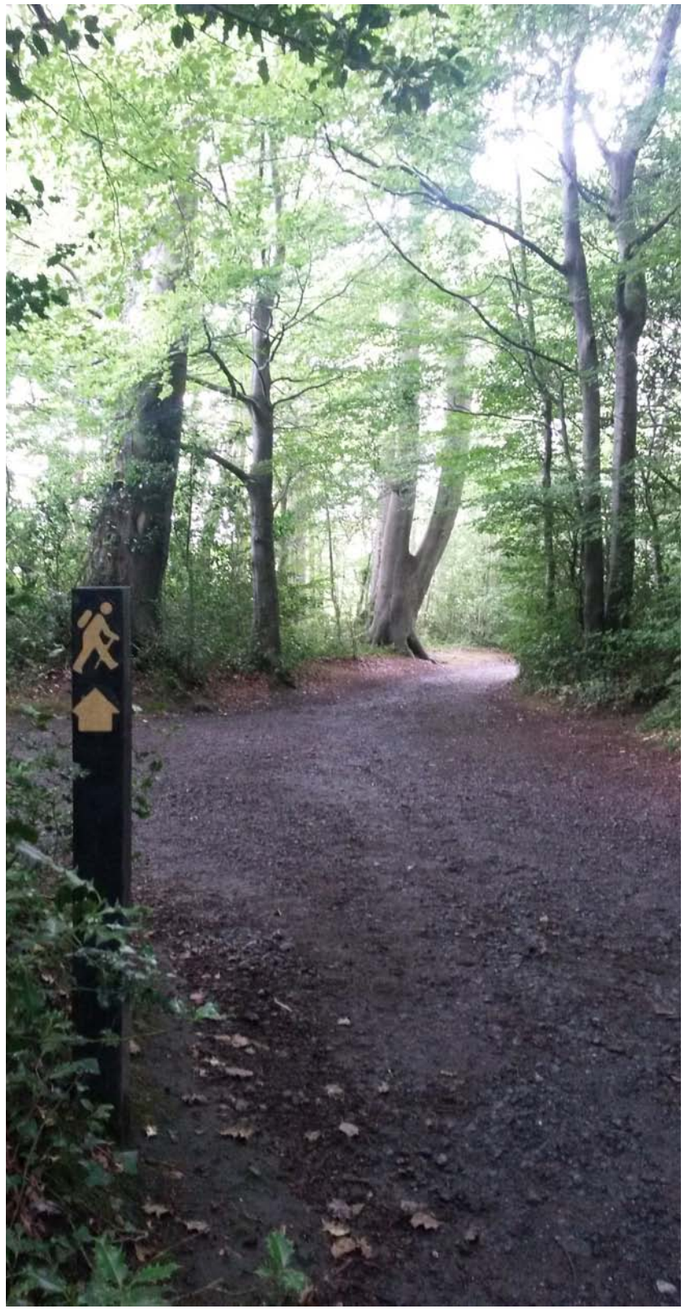


Photo 33: Woodland in Marlay Park.

Transport and Heritage
Strong cultural heritage occurs in transport corridors with nodes for access. This heritage infrastructure of transport includes bridges, boundaries, tunnels and cuttings. For example, the Luas green line, some of it aligned on the former Harcourt Street line, includes the Nine Arches stone viaduct. The Metals, running parallel to the national railway, is a good example of a composite GI corridor, combining a cycle and pedestrian route connecting open spaces and stations, with natural heritage, built industrial heritage and cultural memory. Railway and motorway embankments are examples of inaccessible ecological corridors if they are not isolated by boundaries and have the possibility to link across junctions.

Photo 34: Nine Arches at Dodder Valley Linear Park.
Source: Wikipedia. Image By: Suckindiesel.

Archaeology
There are over 400 archaeological sites and protected monuments sites across the County, ranging from not visible to fully accessible. The most important and accessible have heritage trails proposed in the Archaeological Survey 2006. These are:

- Dalkey Islands Trail – noted in the survey as the 'flagship' archaeological park in the County
- Coastal Fortifications Trail – the best surviving group of Martello towers and forts in the world
- Upland Trail - prehistoric monuments and industrial heritage; and
- Ecclesiastical Trail - early Christian and medieval monuments

The trails illustrate the spatial clusters that occur, such as along the coast and in the uplands, as well as themes such as churches and industrial heritage, often associated with river or transport corridors.

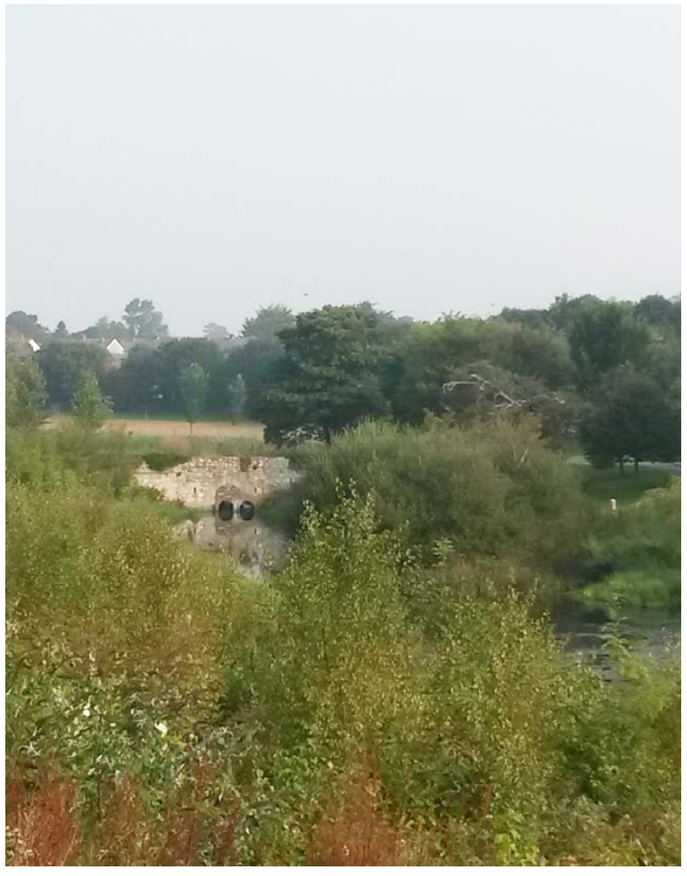


Photo 35: Kilbogget Park.

Protected Structures
There is a wide variety of protected structures in urban, coastal and rural areas. Architectural Conservation Areas and areas with large protected houses and gardens can collectively create zones of managed habitat, and urban woodland, typically towards the coast around Dalkey and Killiney. Open spaces are often associated with the protected terraces and squares, such as Belgrave Square, Clarinda Park, Crosthwaite Park and Royal Terrace. These are designated as local parks, and provide a finer grain for the GI strategy to work with.

Photo 36: The Metals at Claremont Villas.

Literature
There is a rich literary tradition in the County, focussed on 20th-century writers such as James Joyce, Samuel Beckett and Brian O'Nolan who all reference the locality in their works. Their descriptions of places and journeys, which are unique to the County, give a strong value to the cultural heritage of the County.

Visual Art and Heritage
The Dún Laoghaire-Rathdown Sculpture Trail identifies 39 pieces of public sculpture, mainly 20th century. There are also many heritage artefacts which are accessible through the publications 'Did You Know' (Dlr 2009) and 'In Honour and Memory' (Dlr 2013). The latter are spread through much of the older urban areas. The artworks start to form clusters in Marlay Park and along Dún Laoghaire seafront.

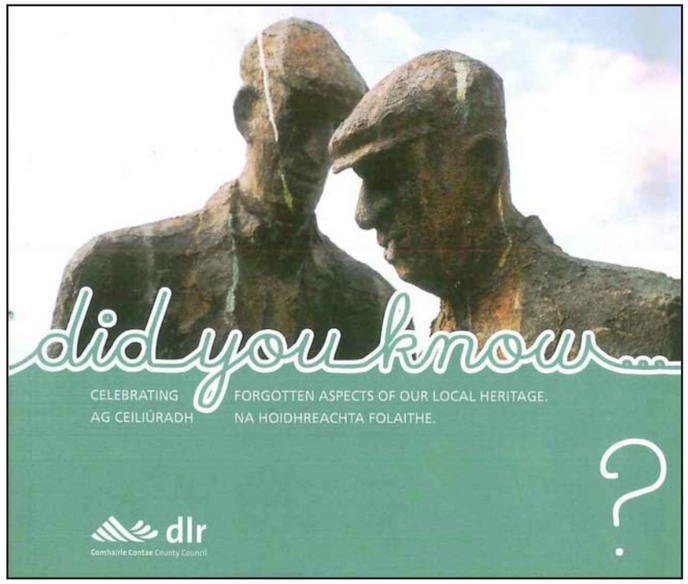
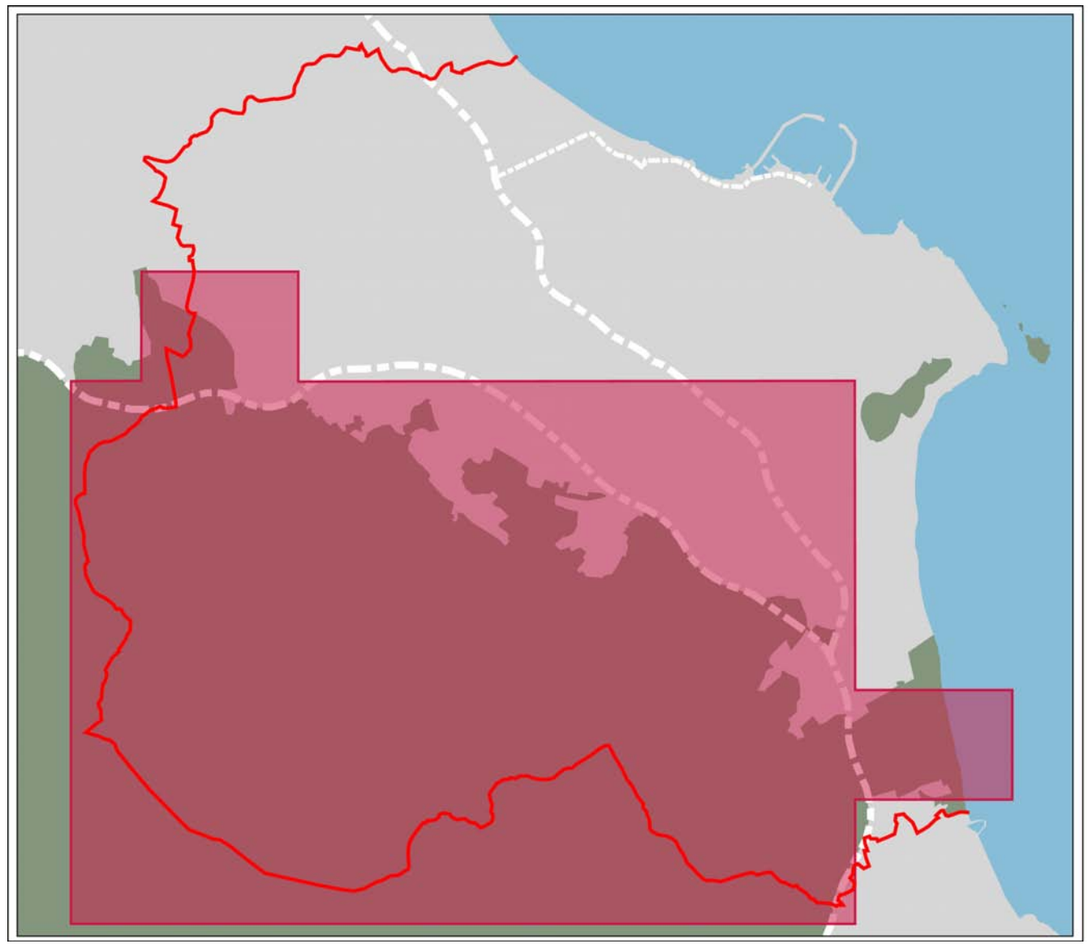
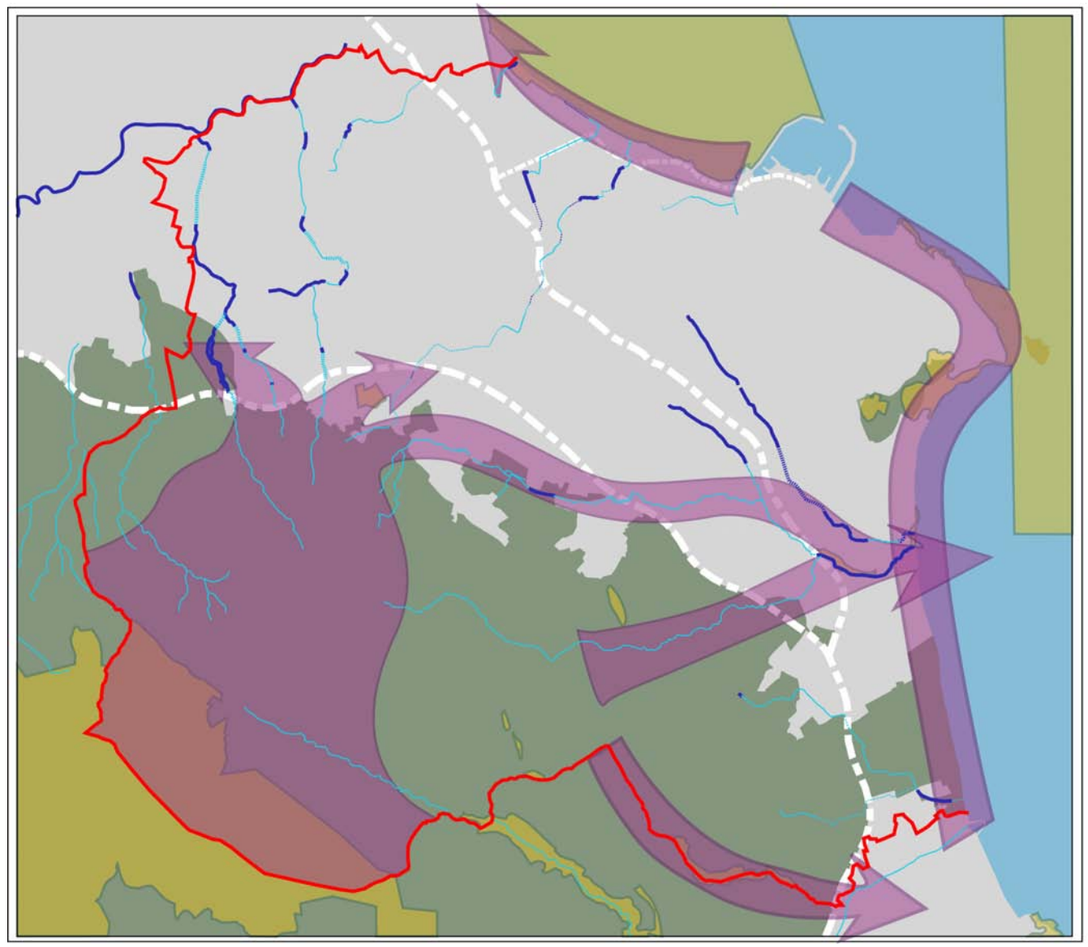


Figure 2.E: "Did You Know?" Dún Laoghaire-Rathdown Publication

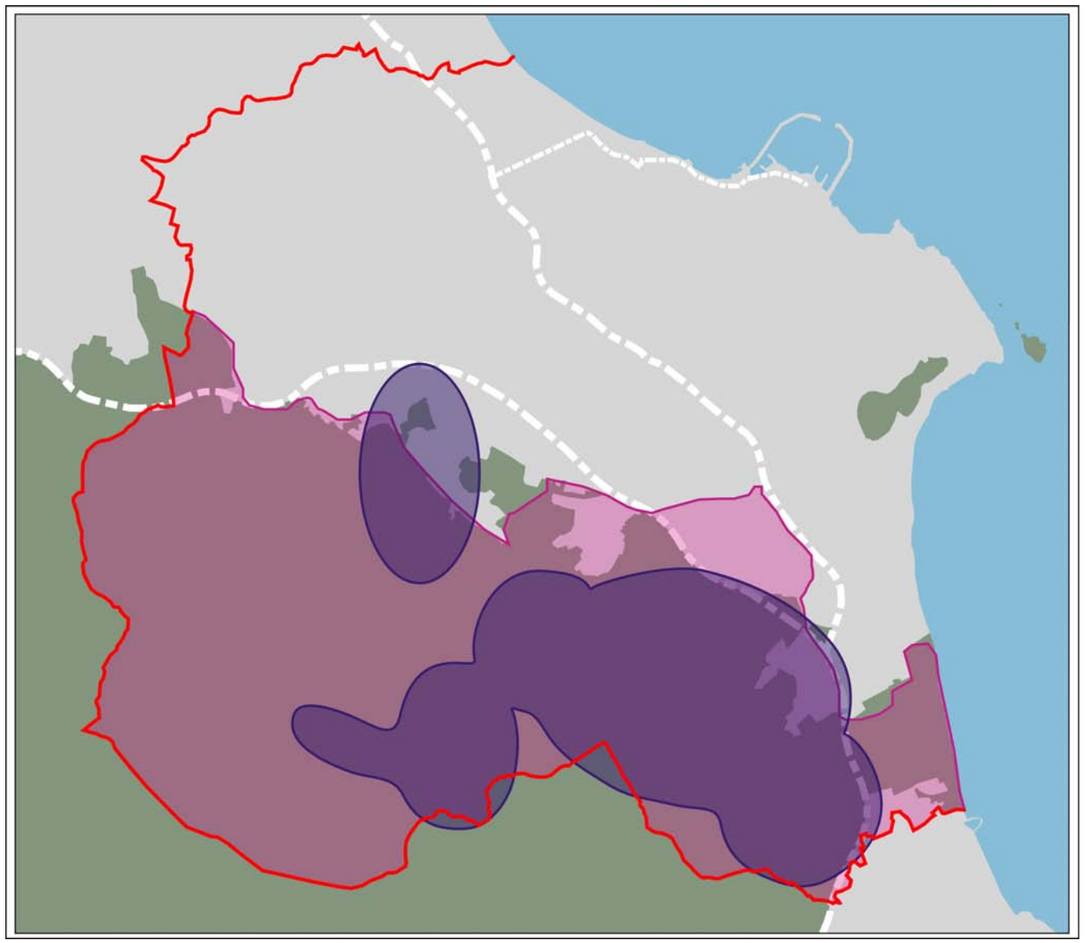
Skyscape
The coast, hills and mountains are good vantage points for viewing dramatic skies. The light pollution policy EI17 of the County Development Plan (2010-2016) identifies light spillage and pollution as a threat to wildlife and reduces the visibility of the night sky. However, a strengthening of policies and actions related to light pollution and the night sky in particular would reinforce a dimension of natural and cultural heritage in Green Infrastructure that is readily accessible. The visibility of the night sky is also culturally relevant for the association of the astronomer Lady Margaret Huggins and astronomical instrument maker Sir Howard Grubb had with the County.



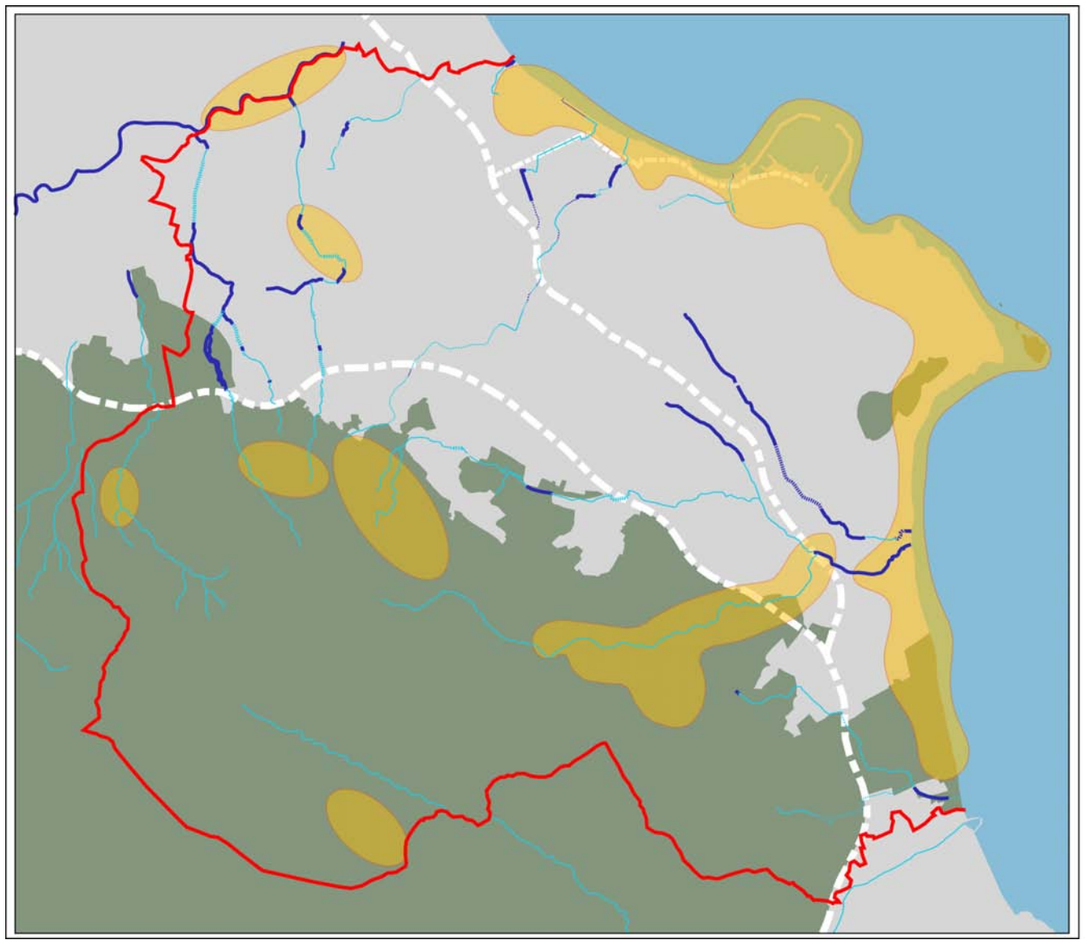
Map 10: Completed Habitat Survey in the County.



Map 11: Ecological Corridors with Environmental Designations and Rivers in the County.



Map 12: Completed Historic Landscape Character and Landscape Character Assessment in the County.



Map 13: Clusters of Industrial Heritage with Rivers in the County.

2.3.3 Challenges and Opportunities

A number of challenges and opportunities for the Green Infrastructure strategy have emerged from the policy and spatial analysis of natural and cultural in Dún Laoghaire-Rathdown.

Challenges
In general the policy context for Green Infrastructure in the area natural and cultural heritage for the County is robust. However, key challenges for current and future policy are evident and these include:

- Gaps in data should be completed, including historic and landscape character assessments, tree cover and biodiversity mapping which should extend along the coast and into the urban townscape.
- There will be a challenge in communicating to the general public the benefits and needs of different environments on habitats for example, which might impact on the general public's perception of maintenance and management.
- Writing policies relating to the more intangible cultural and heritage assets such as literature, visual arts and skyscape, to use them to use as a unique asset provision in GI which is specific to the County.
- Developing suitable policies for opening culverts, or managing water on private land and to improve or maintain ecological corridors through policies separate to the planning system.
- Writing policies to encourage landowners to manage their land in ways which will protect and increase biodiversity.
- Finding a balance between the policies that aim to enhance public access and those that protect sensitive areas and restrict therefore access.

The spatial context for natural and cultural heritage for the County, presents some key challenges. These are:

- Making archaeological sites and monuments in public and in private ownership appropriately accessible.
- Public access and the protection of biodiversity can conflict, especially at sensitive sites and can vary seasonally.
- Barriers to GI corridor connections such as crossing points to main roads, M50 or N11 or DART lines need to be overcome.
- The development of GI needs to consider protected sites, species and habitats at all stages (strategy, policy, feasibility, design and construction). Good design can avoid the need for mitigation measures which could constrain strategic objectives.

Opportunities
Natural and cultural heritage in the County presents some key policy opportunities. These are:

- Preparation of a single GI strategy with a coherent set of planning policies and objectives around natural and cultural heritage for the County.
- Guide the relevant sections of the County Development Plan, in particular the Landscape, Heritage and Biodiversity, the Open Space and Recreation, Social Infrastructure and Community Development sections.
- The opportunity to inform and provide a method for consistency by which GI strategies for natural and cultural heritage are incorporated into LAPs, SDZs, Framework Plans and other local policy documents.
- Policies to improve water quality through GI provision will have a direct impact on the status of protected and non-protected habitats, especially the South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA.

The spatial context for natural and cultural heritage in the County presents some key spatial opportunities. These are:

- Historic Landscape Character Assessments and Habitat Surveys will be informed and prioritised by the context of the GI strategy, and review Landscape Character Assessment,
- The civic culture of the urban area, sandwiched between the rural landscape and the coast has given a strong cultural aspect to the County which can be used to enhance GI. In particular, local context of writers and their descriptions of local places, and locally inspired visual art and monuments are readily available to be integrated into GI projects.
- Create a network of Greenways and access routes which also acts as ecological corridors and enhance biodiversity;
- Use new developments to enhance the network of GI, including biodiversity, creating ecological corridors and drawing on cultural heritage.
- A network of Green Streets and green roofs can create links to the strategic GI network, and mitigate fragmentation of ecological corridors, with cumulative benefits. Green roofs can create a haven for wildlife away from busy streets and reduce runoff.

2.4 Water Management

This section presents the different spatial and temporal scales at which water management contributes to the development of the strategy for Green Infrastructure in Dún Laoghaire-Rathdown. The 4 subjects addressed in this theme are:

1. Water quality
2. Flood risk
3. Trans-boundary connections
4. Spatial zones

The section also covers the current and future water management challenges and opportunities for the strategy.

The section also covers the current and future water management challenges and opportunities for the strategy. Catchment Flood Risk Assessment and Management (CFRAM) is currently being carried out for the Eastern Region - which includes DLR. The Eastern CFRAM's are still being finalised and are not yet in the public domain, although the Dodder CFRAM was completed as part of an earlier pilot study. The Dodder maps along with the Preliminary Flood Risk Assessment (PFRA), the Greater Dublin Drainage Study and the Irish Coastal Protection Strategy Study (ICPSS) have informed this strategy.

Photo 37: Attenuation Feature at Honeypark, Glenageary.

The Dublin Bay coastline, rivers and storm drainage system are critical components of the Dún Laoghaire-Rathdown Strategic Green Infrastructure Network. The river corridors form natural connections linking urban areas with the upland mountains and the coast and flow through most of the regional parks. The GI strategy can set a framework for further reducing flood risk, improving water quality and optimising wastewater treatment. Examples of GI which provide water management functions include:

- River restoration to return watercourses to more natural forms. Features include the creation of buffer or filter strips along river banks, re-creating natural in-channel river features and opening culverted watercourses.
- Wetlands, attenuation and infiltration ponds to reduce downstream flood risk and improve water quality.
- Sustainable Drainage Systems (SuDS) as part of new developments, re-development and retrofit to existing development. SuDS include features to manage runoff and water quality at source in both the public realm and on private land. SuDS features can be located in the public realm (ponds, detention basins, infiltration basins, infiltration trenches and engineered swales, underground modular systems and tree root structural cell systems) or within development site boundaries (green roofs, pervious paving (grilles, gullies, etc.), infiltration trenches, detention basins, swales, water butts, tree root structural cell systems and rainwater harvesting).
- Green Streets to include SuDS features to restrict or delay runoff from streets entering the storm drainage network. The concept is to treat water at source and reduce flooding by managing runoff rates in rivers and storm drains.

Photo 38: Water Management at Clonkeen Park.

Strategic County-wide Green Infrastructure measures such as creating wetlands and linking recreational access, biodiversity and river corridors can provide the framework for local GI activities. Local GI measures at the street, building or development site scale, such as Green Streets, green roofs and SuDS can link to the County-wide strategic GI network. The cumulative benefits of local GI measures can deliver County-wide benefits by reducing overall flood risk and contribute to regional and city wide wastewater treatment strategies.

2.4.1 Policy Context

Current Greater Dublin drainage strategies look to address water quality and runoff management at the point of discharge through wastewater treatment. There are however intermittent spills of foul sewage from the combined sewer network which occurs during high rainfall events. Retro-fitting existing urban areas or providing SuDS for new development can strategically reduce runoff rates and volumes entering the drainage network and reduce the risk of pollution.

The planning policies and development control in Dún Laoghaire-Rathdown recommend the implementation of SuDS as part of new developments and re-development. Green roofs are promoted and as part of Strategic Development Zone specific objectives are in place to limit the rate of runoff, provide water runoff treatment stages and consider exceedance of the drainage system in extreme storms. The adoption of SuDS features is managed through the planning process as an agreement with the developer on a site by site basis. In dense urban areas, the design standards for redevelopment need to reflect the potential to reduce runoff on a more pragmatic basis.

The management of surface water runoff and discharges from combined sewer overflows will remain with the local authority remit. The Green Infrastructure strategy will be useful means to coordinate and achieve multiple benefits in the management of water quantity and quality by integrating these measures into parks or linear corridors.

Flood risk from rivers and the sea is currently being addressed through the national programme of Catchment Flood Risk Assessment and Management Plans. Flood alleviation and coastal protection schemes in high priority locations will be able to draw on national capital funding, however addressing local flood risk will likely remain the responsibility of Dún Laoghaire-Rathdown.

The temporal scale of when water management related Green Infrastructure measures can be implemented, has a strong spatial element in that land ownership determines how, where and when these measures can be implemented. Some long term objectives may require changes to legislation, regulations or more certainty in funding and charging for water services before they can be achieved. The planning process can be used as a tool to implement short and long term objectives of the strategy.

2.4.2 Spatial Context

This section deals with the spatial context of the 4 water management components of Green Infrastructure which are of County-wide significance.

Water Quality
The rural upland watercourses in Dún Laoghaire-Rathdown generally have good water quality but many of the urban rivers have poor water quality (Eastern River Basin Management Plan www.wfdireland.ie). The threats to achieving good surface water quality include the risk of combined sewer discharges and runoff from agricultural and urban land containing pollutants and contaminated sediments. Poor water quality in the streams discharging into Dublin Bay results in the occasional closing of Killiney and Seapoint, both Blue Flag bathing water beaches. It also has an impact on the ecological potential of the watercourses throughout the County.

Flood Risk
Despite being a coastal area, there is very little coastal flood risk in Dún Laoghaire-Rathdown, however there are significant coastal protection assets to manage the risk of coastal erosion. The principal flood risks are from fluvial, groundwater, pluvial, sewer and blockage of key structures. Throughout the County residential, commercial and key strategic infrastructure (main roads, DART and Luas lines) are at risk of flooding. A current joint flood risk study between Iarnród Eireann and Dlr is underway.

Climate change will increase the intensity and seasonality of rainfall and increase sea levels and storm intensity. Green Infrastructure has a significant role in preparing and mitigating the impacts of climate change.

Trans-Boundary Connections
A number of water features link Dún Laoghaire-Rathdown to neighbouring areas. These connections include the Dublin Bay coastline, the Glencullen River which flows from Dún Laoghaire-Rathdown into County Wicklow and the River Dodder which forms the boundary with Dublin City. The water supply for Dublin as a whole is from outside of Dublin. The Shanganagh Treatment Works treats foul and combined sewers from Bray in Wicklow. Some of the foul and combined sewer flows originating in Dún Laoghaire-Rathdown are treated elsewhere in Dublin.

Spatial Zones for Water Management
The analysis shows the water management issues in Dún Laoghaire-Rathdown vary across the whole County. Four water management zones for the assessment of GI have been identified where different measures are suitable to address the issues present in each zone. It also allows priorities to be assigned and provides the focus for development management discussions on the use of different SuDS techniques, particularly Green Roofs and Green Streets.

Over 70% of the watercourses in Dún Laoghaire-Rathdown are on private land. All of the 30km of watercourses upstream of the M50 or urban area are in private ownership.

Over 70% of the watercourses in Dún Laoghaire-Rathdown are on private land. All of the 30km of watercourses upstream of the M50 or urban area are in private ownership. Institutional land (e.g. universities, colleges and hospitals) and outdoor sports facilities (e.g. golf courses) distributed throughout the County contain 13km of watercourses. This represents a significant area of privately owned green assets that could be created or enhanced. These zones are summarised below.

Zone A: Upland Catchments and Streams
This area is characterised by steep slopes, outdoor recreation activities with forestry, agricultural and heathland as the predominant land use. Depending on season and crop or forest cover these areas have the potential for rapid runoff response to rainfall and are sources of sediment and agricultural pollution to watercourses. Most of the land is in private ownership. In this Zone Green Infrastructure could assist in managing or intercepting the sediments and debris that are washed off downstream into the urban area. There is also the potential to hold flood waters back within parks, and drainage ditches on the mountains.

Photo 39: Zone A, Upland Catchments and Streams.

Zone B: Loughlinstown, Deansgrange, Foxrock, Carrickmines and Shanganagh River Corridors
These river corridors contain urban watercourses with poor water quality and areas at risk of flooding from rivers and blockage of structures on these watercourses. Pollution from urban drainage systems connected to the river to relieve flooding on the sewer system and from dumping of rubbish in the watercourses are prevalent. There are many parks, open spaces and Greenways along the watercourses, which can be used by Green Infrastructure techniques to address these issues. The Shanganagh and Carrickmines Rivers have some well-defined river corridors, such as the Druids Glen ecological buffer zone protected in the Cherrywood SDZ. There are some reaches where the rivers are culverted under main roads (including the M50, N11 and busy junctions) and the historic landfill in Kilbogget Park. Some development has encroached on the natural river corridor and floodplain. In this zone Green Infrastructure would be targeted treating combined sewer overflows by retrofitting at their outfalls with wetlands and/or intercepting rainfall before it enters the sewer network with swales and other means of infiltration or at the very least attenuation within SuDS.

Photo 40: Zone B, Deansgrange Stream in Kilbogget Park.

Zone C: Little Dargle, Slang and the Dodder River Corridors
These river corridors are similar in nature to those in Zone B, however they contain some significantly long culverts. The Little Dargle flows through Marlay Park, Broadford Park and Loreto Park. Green Infrastructure would seek opportunities to open up these culverts and reconnect the riverine habitats.

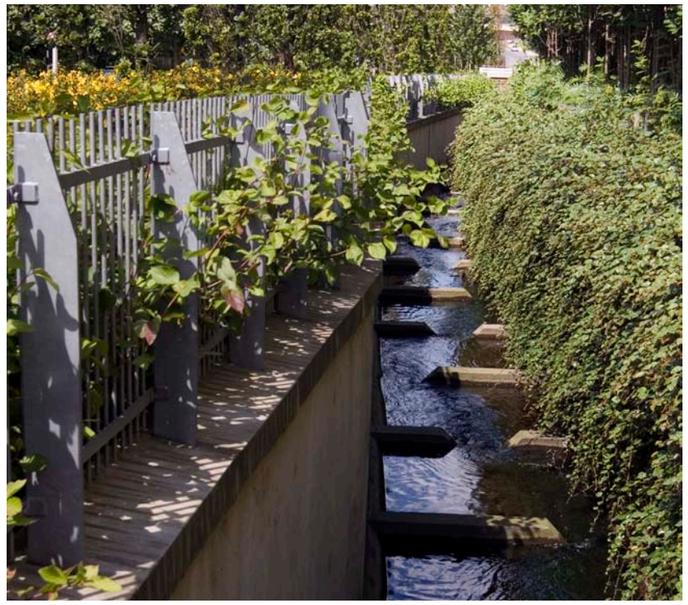
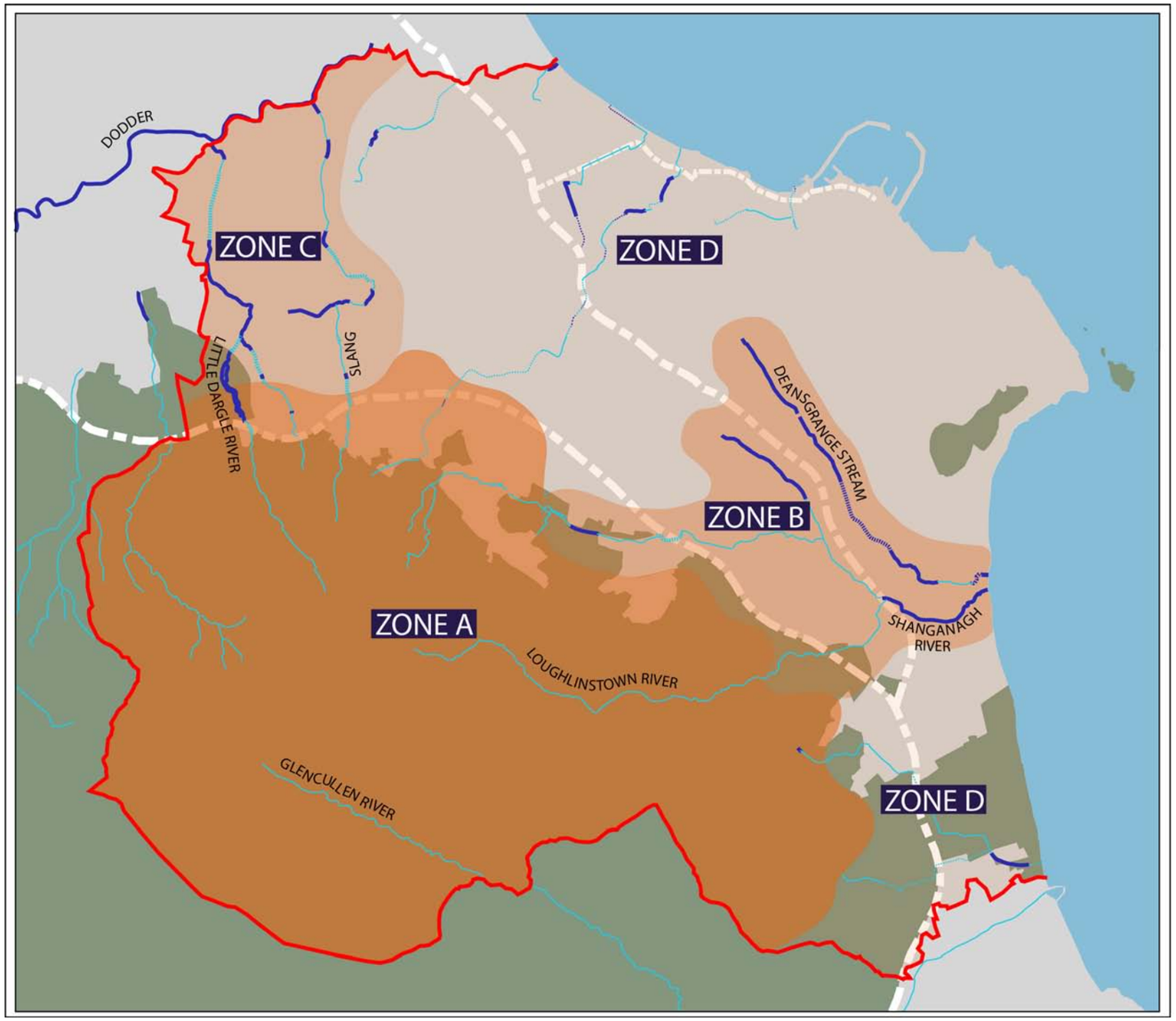


Photo 41: Zone C, Slang River.

Zone D: The Urban Area Drained by the Surface Water and Combined Sewer Networks
Throughout the urban areas away from the river corridors there is limited open space along natural runoff routes. Natural run-off routes have often been replaced by underground surface water and combined sewer networks. However, many routes have been diverted, so that when excess rainfall is experienced in the pipe or culvert the original route for overland flow manifests itself. There are localised areas at risk from surface water flooding and nine Combined Sewer Outfalls (CSOs) discharge into Dublin Bay via watercourses where GI can help improve bathing water quality.

Photo 42: Zone D, Surface Water Runoff.
Source: Wikimedia by Robert Lawton.



Map 14: River Zones.

2.4.3 Challenges and Opportunities

A number of challenges and opportunities for the strategy have emerged from the policy and spatial analysis of water management in Dún Laoghaire-Rathdown.

Challenges
In general the policy context for Green Infrastructure in the area of water management for the County is robust for new development, but management of flood risk and water quality for the existing urban areas is problematic. GI offers some local and strategic benefits that have the potential to improve the existing situation and/or reduce the impacts of climate change. However, a key challenge for current and future policy are the significant barriers in the management of runoff and enhancement of the GI function on private land, primarily above the dense urban areas. It may be necessary to look at policy responses in this area utilising EU-level agricultural land use and environmental policies and local initiatives. Natural flood management concepts and use of Natural Capital accounting techniques may provide a catalyst for this change.

The spatial context for water management for the County, presents some key challenges. These are:

- The many locations where culverts and development encroach on the river channel and break the continuity of the river corridor and undermine their multi-functional space and ecosystem services.
- The many locations where a lack of space in existing streets and built up areas presents a major challenge for GI initiatives alongside watercourses.
- The current flood risk in urban areas and development pressure within the urban area and on the rural-urban fringe.
- The medium to long-term challenges include climate change which will impact upon the coastline, runoff response in upland areas and increase flood risk to urban areas and more frequent spills from combined sewer overflows.

Opportunities
The policy context for water management in the County presents some key opportunities. These are:

- The opportunity to inform and provide a method for consistency by which GI strategies for water management are incorporated into LAPs, SDZs, Framework Plans and other local policy documents.
- Preparation of a GI strategy that addresses water management with a coherent set of planning policies and objectives for the County.
- Planning and development control policies can create a framework for water management using all forms of GI as part of new development and re-development/retrofitting.

- Integrated policies can be introduced to manage water quality and flood risk using features which also provide recreation, amenity and biodiversity benefits.

The spatial context for water management in the County presents some key opportunities. These are:

- River corridors are one of the natural foundations for multi-functional GI corridors and can ensure that when drainage systems are exceeded the impacts of flood events (such as July 2013, October 2011 and July 2009) are reduced.
- Managing runoff at source, storage ponds and wetlands at the foot of hills can improve downstream water quality, reduce the loading on waste water treatment and combined sewer overflows and also manage flood risk.
- Local SuDS, Green Streets and green roofs can create new and enhance existing links to a County-wide GI network and provide cumulative water quality and flood risk benefits.
- The GI strategy could provide a framework for enabling SuDS to be located in the public realm where space is not available in re-development sites or it is not economically attractive.
- Gaps in river corridors caused by culverts and encroachment by built development can be compensated for through the use of Green Streets and SuDS features.

2.5 Summary

The analysis shows that the current Green Infrastructure asset base is well distributed, and has both local and regional status which will be important to capture in the strategy. The green space provision allows for a diverse range of activities and functions and is well placed to be enhanced to yield the multi-functional benefits that a coordinated GI strategy can deliver. An opportunity is identified from the analysis to enhance the transition between rural and urban areas with better connections and hubs. The main barrier to GI is overcoming the physical barriers and access over private land to provide an integrated network of green spaces and corridors.

This network is fundamental to Green Infrastructure, for both humans and biodiversity. These could be formed across the County linking open spaces within the urban areas to the coastal and uplands landscape, but using strong ecological corridors formed by the river network as a backbone.

The proposed cycle network also forms another base that could influence the location of the Green Infrastructure corridors. There are significant economic and well-being benefits identified in the analysis, which provides a broad policy and strategic support for the strategy.

There is a broad scope in the challenges and opportunities identified across the 3 main themes, both in policy and spatial context to drive Green Infrastructure forward within the County. The draft County Development Plan 2016 - 2022 recognises the overarching nature of GI. The multi-functional and multi-disciplinary nature of GI means that the strategy can inform the policies and objectives of the statutory County Development Plan across Landscape, Heritage and Biodiversity, Open Space and Recreation, Water Management, Social Infrastructure and Community Development, and Sustainable Travel and Transportation sections. For instance, integrated policies can be introduced to manage water quality and flood risk using features which also provide recreation, amenity, cultural and biodiversity benefits.

The analysis also identified that drawing on the cultural and natural heritage aspects of the County, the Green Infrastructure strategy can be further enhanced as it is developed into local plans. For instance, the trails proposed in the Heritage Plan, the wealth of industrial heritage artefacts and the strong civic culture manifest in literature and visual art offer unique and specific elements to strengthen identity and sense of place (‘genius loci’).

These composite opportunities will be developed in the strategy, similar to the multi-functionality of Green Infrastructure where the whole is greater than the sum of all the individual parts.

“An approach to planning and development that recognises the social, environmental and economic value of Green Infrastructure (could) not only increase access to public green space, but help make urban areas more resilient to climate change.”

Tony Juniper,
“What Has Nature Ever Done For Us?” (2013)

Photo 43: People's Park, Dún Laoghaire.

3. Strategy

3.1 Introduction

The vision and principles set out a longer-term perspective for Green Infrastructure in Dún Laoghaire-Rathdown and underpin the strategy. The strategy has three GI themes which were established during the preparation of this project. These themes are brought together in a single, **integrated spatial framework**. This spatial framework consists of different elements and components.

The strategy is based on the main themes described in the analysis. These are:

- Accessibility, recreation, health and well-being
- Natural and cultural heritage
- Water management

3.1.1 Accessibility, Recreation, Health and Well-Being

The strategy has identified the **key thematic objectives**:

- **Develop the public parks at the threshold of urban and rural areas into 'Gateway parks'.** These parks should function as starting points which facilitate and encourage people to visit rural areas and connect to the Dublin Mountains Way and the Wicklow Way. They should also be welcoming for people coming back to the urban area after hiking or cycling. As such they could accommodate bike parking, café and toilets, and way-finding signage. They should also be multifunctional hubs, connecting ecological corridors, facilitating interpretation of natural and cultural heritage, and the management of water from the uplands entering the urban areas.

- **Improve sections of the Wicklow Way and Dublin Mountains Way where they occur along stretches of road.** The rural road network in the upland areas has the potential to be used by greater numbers of walkers and cyclists as Green Infrastructure routes in themselves, complementary to the extensive network of off-road walking and hiking trails. Traffic volume and speed is the main issue to be addressed, but if these issues can be quantified and any safety issues addressed in terms of traffic management measures, then on road routes could form part of the rural network.

Photo 44: Airfield Trust, Dundrum.

- **Create new and improved connections between open spaces to generate a network of spaces across the urban areas.** Develop Greenways between local parks to complete multifunctional corridors to open space hubs and the coast.

- **Improve links within urban areas to encourage day-to-day use.** This should facilitate journeys to and from home, work, and education particularly for walking and cycling.

- **Improve links across transport infrastructure where there are barriers to movement.** Barriers have been identified along the M50 and M11 and R113/N31, across urban areas, and from urban areas into rural areas. Use these opportunities to enhance the multifunctional character of these routes by completing fragmented ecological corridors, engaging with cultural heritage and introducing water management features.

- **Improve pedestrian and cycle links across railway barriers.** These include links such as the DART and national railway line, to the coast. Generous access points with facilities for bikes will improve access along stretches from Booterstown Marsh to Dún Laoghaire, and along Killiney strand. Crossing points between Booterstown Marsh and Seapoint, and at Killiney strand are limited to narrow footbridges with steep steps, or narrow access points.

- **Improve links to the Green Infrastructure network from public transport.** Connecting Greenways to Luas stops, DART stations and bus stops will encourage access to the mountains, coast and the major parks and open spaces.

- **Address the uneven distribution of allotments or community gardens.** These should be accessible from areas of high residential density to improve health and well-being and social cohesion.

3.1.2 Natural and Cultural Heritage

The strategy has identified the following key thematic objectives:

- **Review and/or Complete Landscape Character Assessments and Continue Historic Landscape Character Assessments.** These should inform the conservation of local character and identity for new development, and strategic and local Green Infrastructure.

- **Complete Habitat Assessments and implement the County Tree Strategy.** This should be done by completing County-wide urban tree population surveys to inform strategic and Local Area Plan Green Infrastructure. It should be focused on the conservation of natural habitats, for example along water courses and in woodlands, where greater public access or water management is being considered. Encourage the use of native species of local provenance to strengthen ecological corridors, particularly in relation to grassland and meadow habitat, marginal planting, hedgerow and woodland planting.

Photo 45: Dalkey Castle, Castle Street, Dalkey.

Photo 46: Heron on Booterstown Marsh.
Source: Wikipedia. Image By: Albert White.

- **Restore or mitigate the fragmentation of ecological corridors throughout the County.** This should focus on corridors from rural areas through urban areas to the coast, and also along the coast. These corridors may serve a single function in the Green Infrastructure network. However, water management and the landscape management associated with public access can enhance biodiversity and reinforce the multifunctional uses of the corridors.

- **Create a network of Greenways, Green Streets, including green roofs.** These should also act as ecological and water management corridors to enhance biodiversity, water quality and reduce flood risk.

- **Utilise the strong built heritage of the County.** This should include archaeology, national monuments and protected structures. Appropriate access to archaeological sites, monuments and protected structures on private land may be facilitated as part of the GI network. Industrial, ecclesiastical and transport heritage in GI corridors should be interpreted and used to reinforce identity and a sense of place.

- **Utilise the strong cultural heritage of the County.** This can sometimes include intangibles such as visual art, literature and science. New sculptural work in public spaces should incorporate local meaning and interpretation and draw on local literature.

- **Use new developments to enhance the Green Infrastructure network.** This should include biodiversity, new access and recreation and water management.

Photo 47: Wetland Attenuation Pond in Clonkeen Park.

3.1.3 Water Management

The strategy has identified the following key thematic objectives:

- **Utilise rivers and streams as one of the natural foundations for multi-functional Green Infrastructure corridors,** and address barriers such as culverts and land ownership where practicable. Green Street and SuDS features should be investigated to compensate for gaps in river corridors caused by culverts and encroachment by development.

- **Use GI features to ensure** that when drainage systems are exceeded the impacts of flood events and operational costs to key transport (e.g. DART, Luas) and utility infrastructure (e.g. Shanganagh Wastewater Treatment Plant and sewer networks) are reduced.

- **Reduce the rate, volume and improve the quality of surface water** runoff entering watercourses, the sea and sewer networks through GI, including reductions in runoff and sediment from upland areas flowing into the urban area. Seek to minimise erosion in the GI to conserve soil quality.

- **Manage runoff at source by creating storage ponds and wetlands above the urban area** to improve downstream water quality, reduce the loading on wastewater treatment and manage flood risk.

- **Use local SuDS, Green Streets and Green Roofs** to create new and enhanced existing links to a County-wide Green Infrastructure network and provide cumulative water quality, biodiversity and flood risk benefits.

- **Enable SuDS to be located in the public realm** where space is not available in re-development sites or it is not economically viable.

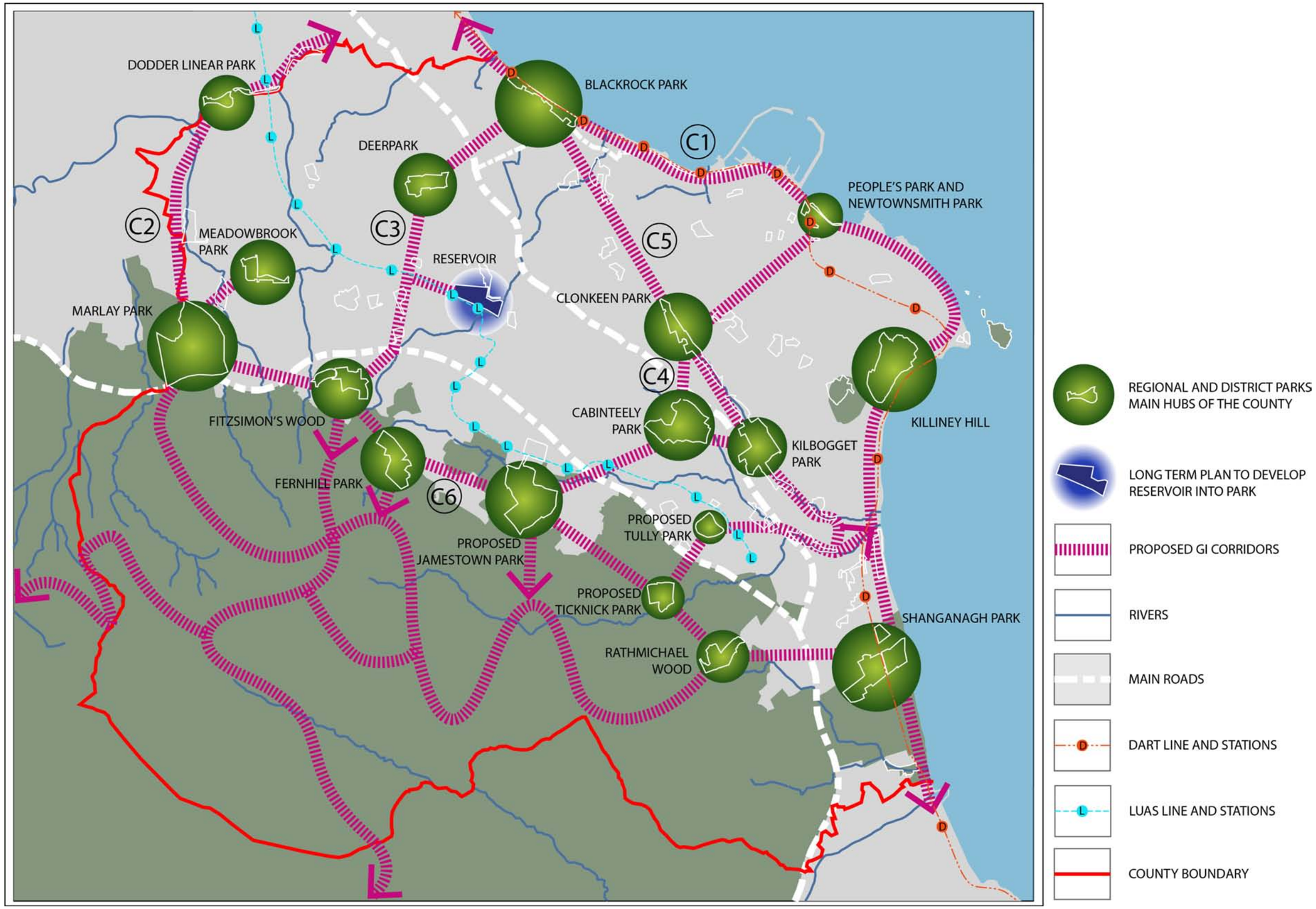
- **Encourage the use of water to generate energy on a micro level,** utilising water bodies for hydrothermal generation and water power for turbines in appropriate locations where energy can be harnessed without adversely affecting local habitat.

3.2 A Spatial Framework for Green Infrastructure in Dún Laoghaire-Rathdown

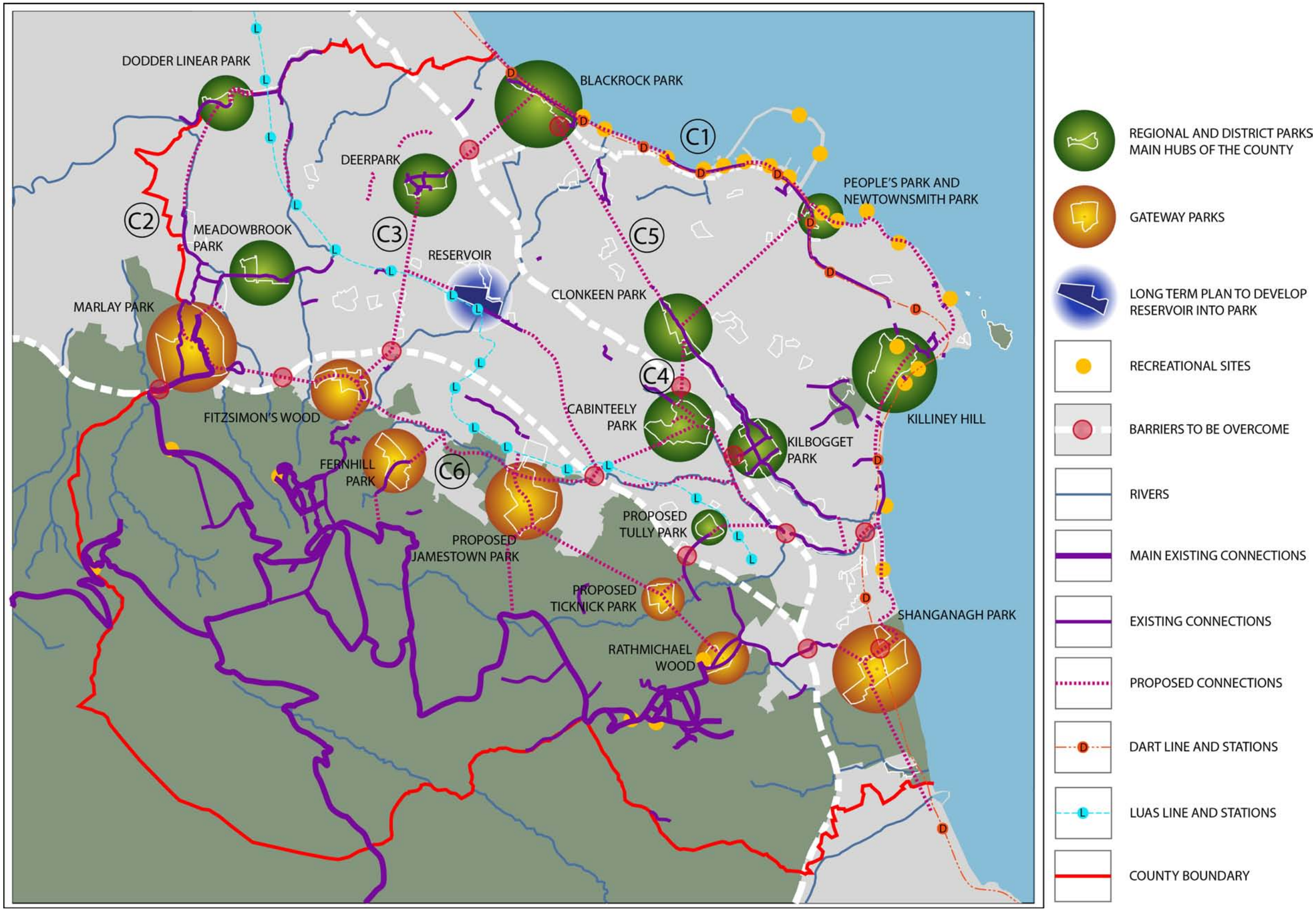
An essential part of any Green Infrastructure strategy is the spatial framework. It provides a way of simplifying what can often be sets of very complex systems. It also provides an understandable structure on which priorities and actions can be based. The framework spans the short (2015 - 2018) to long-term (2019 - 2022) time horizons and it builds on existing elements of the GI in Dún Laoghaire-Rathdown. It distinguishes between the Green Network that is already in place in Dún Laoghaire-Rathdown, and that which is emerging or to be developed over the coming years.

The **key features of a spatial framework** for Green Infrastructure in Dún Laoghaire-Rathdown are:

- A higher level, **County-wide network** of integrated elements, which connects to surrounding and **Regional GI networks**
- A structure for integrating the **rich network** of local-level GI in Dún Laoghaire-Rathdown
- A network of overlapping and **multi-functional GI corridors**, connecting higher-level GI hubs and the main elements of the mountains, the urban area and the coast
- Integration of important **regional GI corridors**, such as the East Coast Trail route, and the Dublin and Wicklow Mountain Ways and
- A **'chain'** of improved **'gateway hubs'** (major parks and gardens), which provide the transition between the mountains and the urban area



Map 15: Basic Spatial Framework Strategy.



Map 16: Detailed Spatial Framework Strategy.

Photo 48: Coastal Landscape with Trans-Boundary Views to County Wicklow.
Source: Flickr. Image By: William Murphy.

3.3 The Green Infrastructure Corridors for Dún Laoghaire-Rathdown

Green Infrastructure corridors are **the principal, higher-level or County-wide components** of the spatial framework for GI in Dún Laoghaire-Rathdown. The spatial framework includes a network of six such corridors. These corridors overlap, providing a single fully connected higher-level network or grid for GI. The main characteristics of the corridors are:

- Multi-functionality to varying degrees, including all or some of the main elements of the GI
- Continuity along the entire length of the corridor to allow the network to function properly and as a complete system
- Connection of the main assets and hubs of GI in the County and to surrounding and Regional GI corridors and hubs
- Protecting and improving integrity by ensuring that a balance is achieved between needs and sensitivities (for example, achieving improved access while protecting natural heritage)
- Accessibility to local communities and users, and to local or strategic public transport

Each corridor is described separately, along with the GI benefits that can be realised. **The corridors are:**

Corridor 1 - Coastal
Shanganagh Park – Killiney Hill – Newtownsmith Park – People's Park – Blackrock Park

Photo 49: Coastline at Corbawn Lane.

Corridor 2: River Dodder to the Mountains
River Dodder – Marlay Park – rural hinterland (Stepaside, Kilternan, Ballycorus)

Photo 50: Sleeping Fields Art Project, Marlay Walled Garden, Marlay Park.

Corridor 3: Blackrock to the Mountains
Blackrock Park – Deerpark – FitzSimon's Wood – Fernhill Park – rural

Photo 51: Island in Blackrock Park.

Corridor 4: Dún Laoghaire to the Mountains
Newtownsmith Park – People's Park – Clonkeen Park – Cabinteely Park – proposed Jamestown Park – rural/urban fringe (Carrickmines, Stepaside, Kilternan)

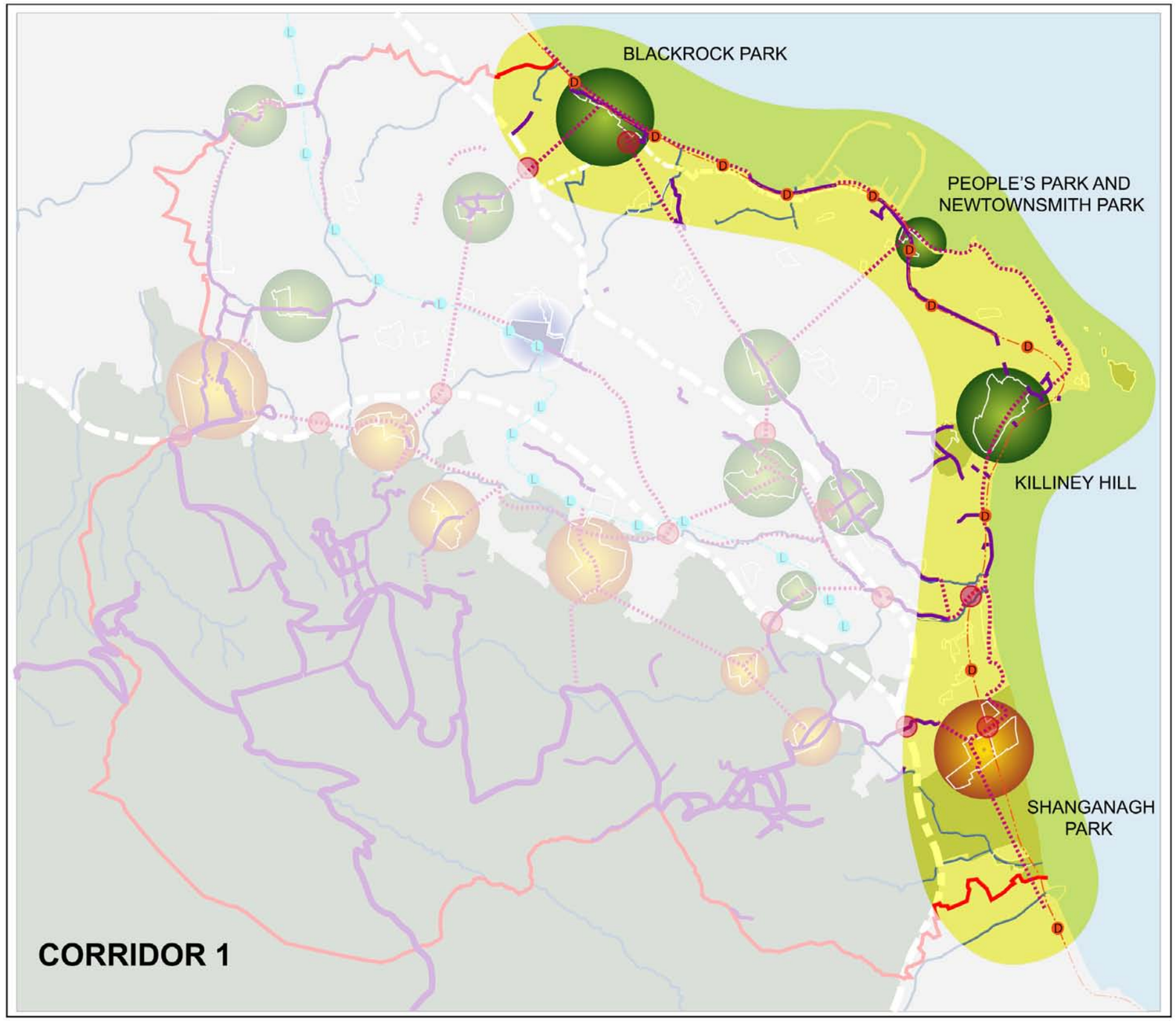
Photo 52: 'Mothership' Sea Urchin Sculpture by Rachel Joynt. Located in Newtownsmith Park.

Corridor 5: Intra Urban
Killiney Strand – Kilbogget Park/ Cabinteely Park/ Clonkeen Park – Deansgrange – Blackrock Park

Photo 53: Deansgrange Stream running through Kilbogget Park.

Corridor 6: Gateway Parks
Marlay Park – FitzSimon's Wood – Fernhill Park – proposed Jamestown Park – proposed Ticknick Park – Rathmichael Wood – Shanaganagh Park.

Photo 54: Woodland Paths in Marlay Park.



Map 17: Corridor 1. Coastal.

3.3.1 Corridor 1 - Coastal

Shanganagh Park – Killiney Hill – Newtownsmith Park – People's Park – Blackrock Park

Shanganagh Park is proposed as a Gateway Park as it is situated in a key location for commencing the coastal route. Blackrock Park is a regional park, which is also in a key location for introducing the coastal route and connecting with the intra urban and rural corridors. This corridor extends into surrounding counties; Dublin City to the north and Wicklow County Council to the south.

From a Green Infrastructure perspective the principal role of this corridor is to connect open space and recreational assets. It also links into a large number of local parks and Greenways and cycle routes. It has four major hubs, which provide connections with other GI corridors, at Shangagagh Park, Killiney Hill, Newtownsmith Park and Blackrock Park. The terrain and its urban nature has resulted in a corridor which utilises low traffic cycle routes, and as such has limited scope for habitat creation and continuous green corridors. The use of Green Street concepts would improve the green attributes of this route in a distinctively urban environment. They would also assist in the reduction of surface water flooding along this coastal route. The majority of the elements for this route are in place and the S2S promenade and cycleway and the East Coast Trail route, have the potential to become a key piece of the jigsaw.

Objectives

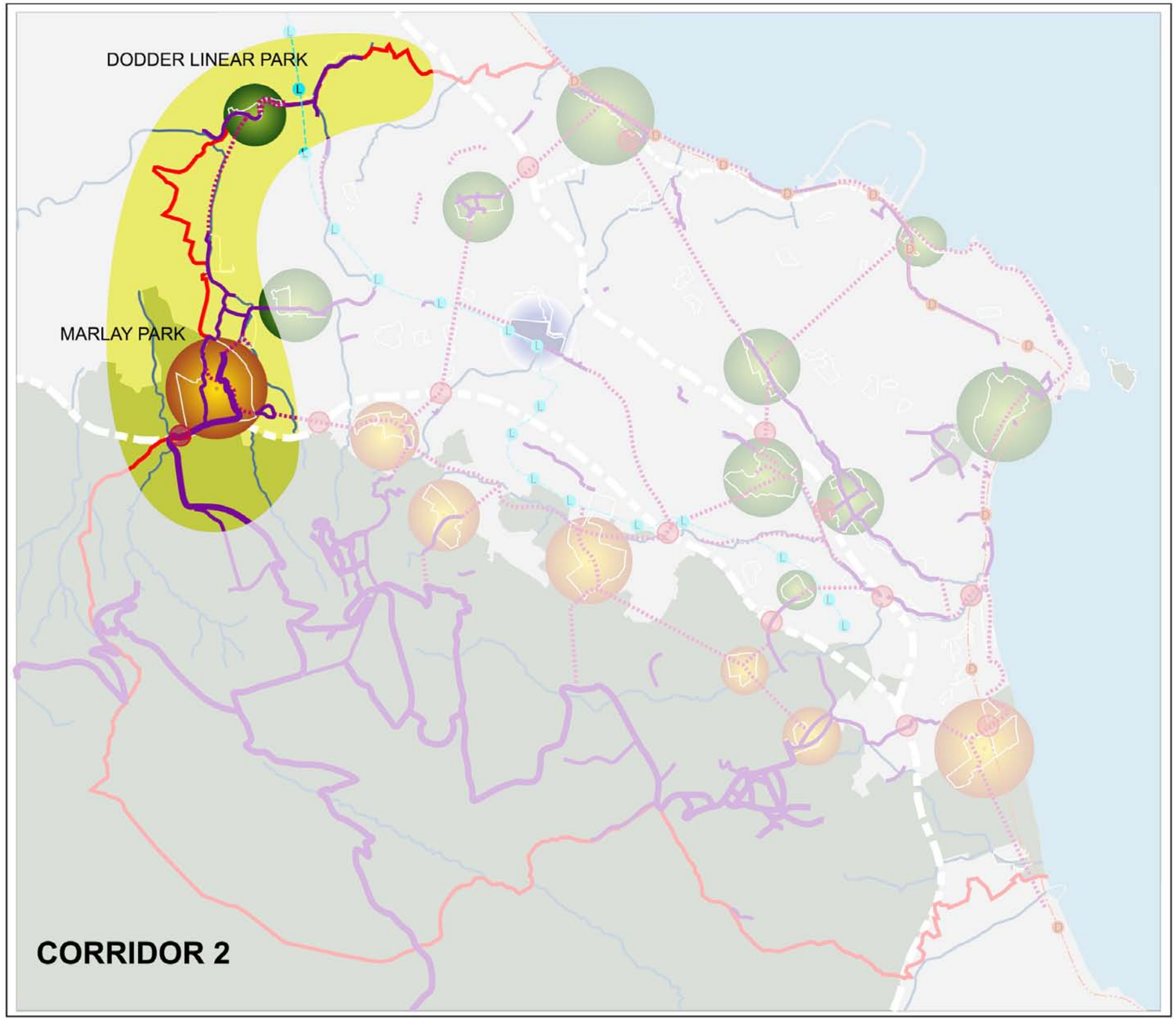
1. **To provide a coastal corridor that connects a number of regional parks and iconic recreational sites within the County and extends into the surrounding administrative boundaries.**
2. **To improve visitor experience and increase duration of stay by providing a wide range of transport options and linkages to a choice of parks.**
3. **To provide a multi-functional GI corridor crossing and connecting the mountain, urban area and coast and linking with other corridors.**

Corridor 1 - Coastal: Actions
The following key actions are identified:

1. **Enhance connections from the Greenway across the railway to Killiney Strand.**
2. **Create a Greenway connection from the coast to the Greenway connecting to Kilbogget Park as part of the intra-urban GI corridor aligning with Shanagnagh River and Deansgrange stream.**
3. **Provide opportunities for the interpretation of natural and cultural heritage, including geology, archaeology, ecclesiastical, industrial and transport heritage and literary heritage in the Killiney/ Dalkey/ Sandycove areas, connecting with Dalkey Islands.**
4. **Enhance the visual art and monuments of the Newtownsmith Park, People's Park and Dún Loaghaire Piers to enhance the sense of place.**
5. **Create a Green Street link from the People's Park connecting via local open spaces at Clarinda Park, Crosthwaite Park and Royal Terrace to the proposed Greenway to Clonkeen Park.**
6. **Connect the fragmented ecological corridor along the coast in the area of Dún Laoghaire Harbour.**
7. **Create better pedestrian and cycle links along Dún Laoghaire Harbour, particularly at the West Pier.**
8. **Create better pedestrian and cycle links across the DART line to the coast, particularly at the West Pier, Seapoint and Blackrock.**
9. **Create better access, and identify opportunities for an ecological corridor connection and water management in the area of the R113/N31 road junction at Temple Hill, Temple Park Avenue and Newtown Avenue.**
10. **Enhance interpretation of natural and cultural heritage at Booterstown Marsh.**
11. **Improve pedestrian and cycle links between Booterstown Marsh and Dublin City.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• A number of Regional Parks and recreational sites are located along this corridor which provide a good range of opportunities to improve physical and mental health. • Improved access to Killiney beach increases recreational opportunities for all abilities.
Biodiversity and Natural Resources	• Opportunity to enhance interpretation at Booterstown Marsh. • Connects the fragmented ecological corridor along the coast at Dún Laoghaire Harbour. • Identify opportunities for an ecological corridor connection at Temple Hill, Temple Park Avenue and Newton Avenue.
Coast, Water Resource and Flood Management	• Create a 'Green Street' link from the People's Park via local parks to the proposed Clonkeen Road via Glenageary to Dún Laoghaire Greenway. • Identify opportunities for water management at Temple Hill, Temple Park Avenue and Newton Avenue junction.
Sense of Place	• Utilise sculpture and monuments to enhance a sense of place at People's Park, Newtownsmith Park and Dún Laoghaire Piers. • Opportunities to utilise natural and cultural heritage in the Killiney/Dalkey/Sandycove areas.
Climate Change Adaptation and Mitigation	• Green Street' Link from the People's Park via local parks to the proposed Clonkeen Road via Glenageary to Dún Laoghaire Greenway can become part of a SuDS network. • Tree cover in parks, open spaces, along streets and also in private ownership particularly in Killiney and Dalkey will absorb many atmospheric pollutants, filter out those pollutants, reduce water run-off, improve water quality, reduce noise and provide shading to help reduce urban heat island effects.
Economic Development	• Opportunities to develop recreational tourism utilising the recreational sites along the coast.
Social Inclusion	• Shanganagh Park, People's Park, Newtownsmith Park, Blackrock Park, Dún Laoghaire Piers and numerous coastal recreation sites along the coast provides a setting for community interaction and informal education in addition to developing community ownership of the environment.
Productive Environments	• The coast and harbours provides a diverse range of productive environments including fisheries and tourism.

Table 3.A: Benefits of Corridor 1 - Coastal.



Map 18: Corridor 2. River Dodder to the Mountains.

3.3.2 Corridor 2 – River Dodder to the Mountains

River Dodder – Marlay Park – rural hinterland (Stepaside, Kilternan, Ballycorus)

The Dodder Valley Linear Park connects from the Dublin City Council area into Dún Laoghaire-Rathdown. Marlay Park is a regional park that is a key gateway park for access to and from the mountains. This corridor is partially established with the Dodder Valley Linear Park, and cycle networks and Greenways. This corridor also has Greenway links to Dundrum town centre. This corridor has the potential to be enhanced to provide multi-functional benefits, and provide a complete Green Infrastructure corridor.

Objectives

1. **To provide a multi-functional GI corridor connecting the mountains, urban area and coast.**
2. **To link the County's flagship green space at Marlay Park with adjacent urban areas and strategic sustainable transport nodes.**
3. **Enhance the habitats alongside the river corridors as a part of an integrated GI corridor, and seek opportunities for attenuation of flood waters.**

Corridor 2 – River Dodder to the Mountains: Actions
The following key actions identified are:

1. **Extend the River Dodder restoration upstream on the Little Dargle and protect and enhance the status of the protected areas that the Dodder flows in to.**

2. **Identify opportunities to open the long culvert under the Grange Golf Course, which is on private land, to extend a continuous length of open river corridor for ecology and geomorphology of the Dodder. Manage risk of vegetation and debris and also risk of nutrient build up through golf course, especially fertiliser use.**

3. **Take opportunities to open the downstream culverted section at Loreto Park. Enhance the river form to encourage biodiversity and reinforce the ecological corridor.**

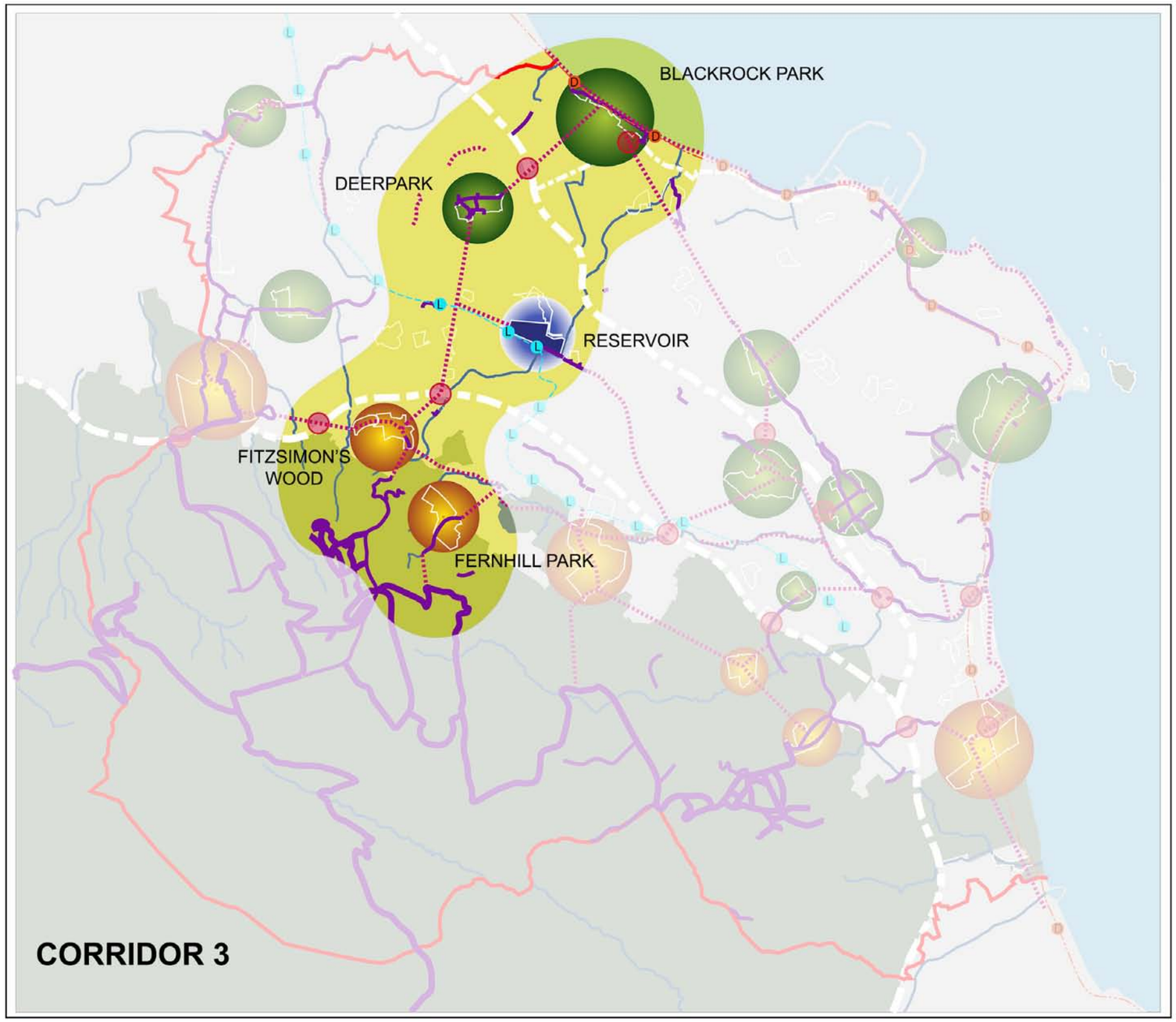
4. **Form links from sub-urban areas by implementing Green Streets and street tree planting.**

5. **Develop a network of wetlands at Marlay Park to create flood storage opportunities. Use river enhancement to attract target species for the ecological corridor.**

6. **Improve connections across the M50 from Marlay Park for pedestrians, cyclists and biodiversity.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• Marlay Park already functions very successfully as a Regional Park, providing opportunities for both active and passive recreation. Enhanced utilisation expected, and alternative recreational destinations can be accessed from the GI corridors. • Restorative benefits of the Dodder Linear Park which utilises the River Dodder are enhanced through further connection and access.
Biodiversity and Natural Resources	• Opportunities to open long sections of culverted rivers to improve ecology and geomorphology of the Dodder. • Manage risk of vegetation and debris and also risk of nutrient build up through golf course, especially fertiliser use. • Enhance river corridors in Marlay Park to attract target species to enhance the ecological corridor. • Improve connections across the M50 for biodiversity.
Coast, Water Resource and Flood Management	• Create flood storage opportunities, develop wetlands and manage bankside vegetation to reduce flood risk.
Sense of Place	• Utilise natural features such as the Little Dargle River to develop a distinct character for the corridor. • Opportunities for interpretation of industrial heritage which is clustered along the Dodder Linear Park to enhance a sense of place and distinctive character.
Climate Change Adaptation and Mitigation	• Form links from sub-urban areas by implementing Green Street's and street tree planting. • Tree cover in parks, open spaces, along streets will absorb many atmospheric pollutants, filter out those pollutants, reduce water run-off, improve water quality, reduce noise and provide shading to help reduce urban heat island effects.
Economic Development	• Opportunities to develop recreational tourism utilising the recreational sites in the Dublin Mountains.
Social Inclusion	• Parks such as Marlay Park provides great opportunities for community engagement through recreation and informal education in addition to developing community ownership of the environment.
Productive Environments	• The Dublin Mountains provides a diverse range of productive environments including farming, forestry and tourism.

Table 3.B: Benefits of Corridor 2 - River Dodder to the Mountains.



Map 19: Corridor 3. Blackrock to the Mountains.

3.3.3 Corridor 3 - Blackrock to the Mountains

Blackrock Park – Deerpark – FitzSimon's Wood – Fernhill Park – rural

This corridor runs between the regional Blackrock Park and the Dublin Mountains. This provides residents or visitors with opportunities to connect from the urban area of the County to the coast or to the mountains.

Objectives

1. **To provide a multifunctional GI corridor connecting the mountain, urban area and the coast.**
2. **Enhance the utilisation of FitzSimon's Wood as a gateway into the mountains.**
3. **To develop Fernhill Gardens into a Gateway Park / Regional Park**

Corridor 3 - Blackrock to the Mountains: Actions
The following key actions identified are:

1. **Improve pedestrian and cycle crossings, connect ecological corridors and identify opportunities for connecting the ecological corridor, enhanced biodiversity and water management at the junction with the R113/N31 road junction at Temple Hill, Temple Park Avenue and Newtown Avenue.**

2. **Utilise good transboundary views and natural and cultural heritage to enhance biodiversity, identity and the sense of place.**

3. **Create Green Infrastructure corridor linking to Sandyford Business District to enhance accessibility to open space in the area.**

4. **Use local parks, Greenways and Green Streets to link the Green Infrastructure corridor towards FitzSimon's Wood.**

5. **Enhance the crossing with Luas at Kilmacud, achieving better connectivity along the Green Infrastructure corridor.**

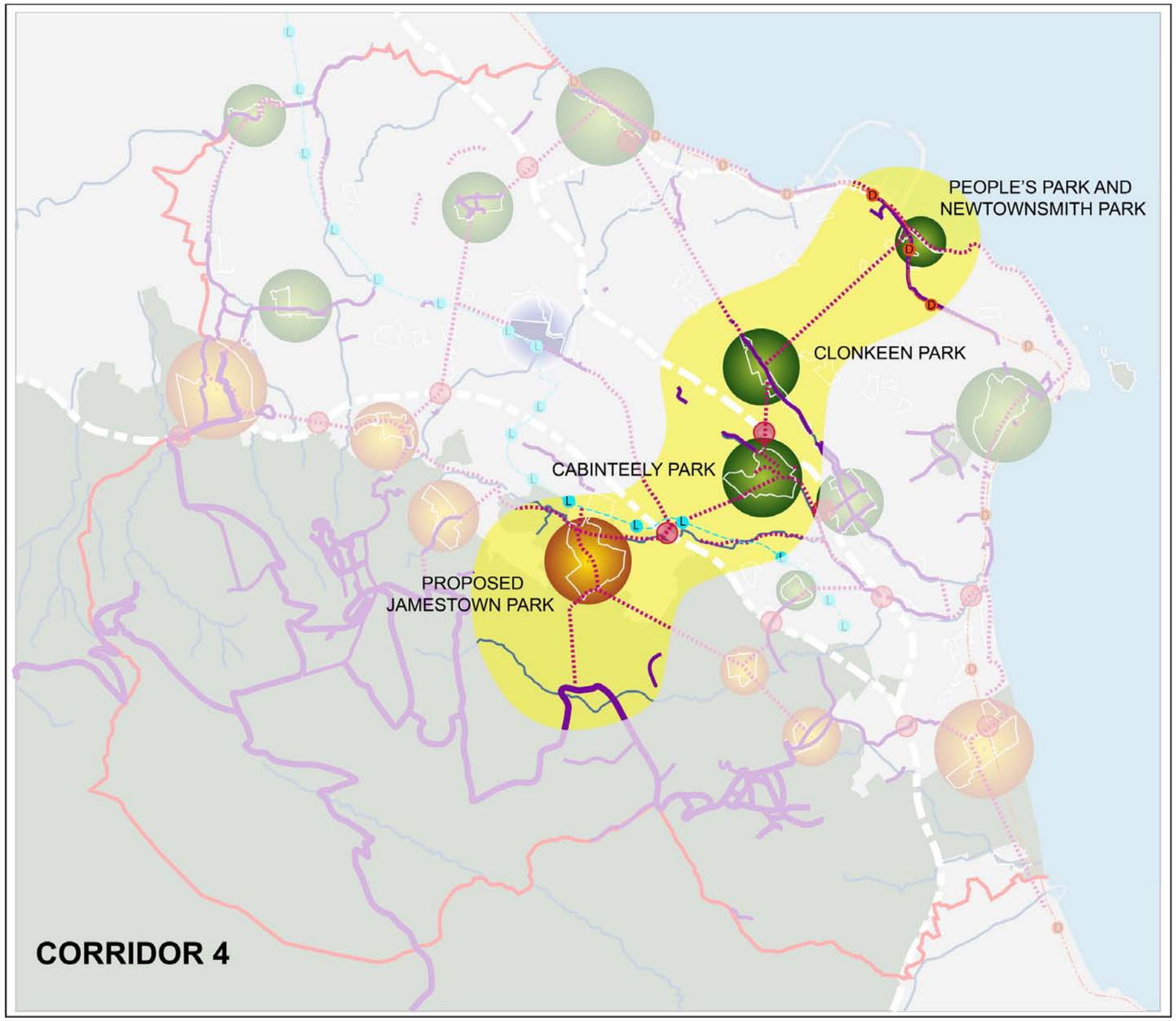
6. **Enhance the crossing at M50, achieving better connectivity along the Green Infrastructure corridor.**

7. **Upgrade FitzSimon's Wood, creating a gateway park to the mountains. Enhance and protect features of interest and reasons for designation of FitzSimon's Wood as a proposed natural heritage area. Create routes through the park to the rural area.**

8. **To develop Fernhill Gardens into a Gateway Park / Regional Park.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• Improved utilisation and experience at connected key parks. Improvement in the quality and diversity of green space in Sandyford Business District will encourage office users to enjoy the health benefits from well designed and functional greenspace. • Use of Greenways for commuting. • Create routes through FitzSimon's Wood to the rural area while protecting features of interest and reasons for designation of FitzSimon's Wood as a proposed Natural Heritage Area. • Development of Fernhill Gardens into a Gateway Park / Regional Park will provide a variety of amenities for the County while also providing opportunities for residents or visitors to connect from the urban area of the County with the mountains.
Biodiversity and Natural Resources	• Connection of ecological corridors along Greenways. • Enhancing and protecting features of interest and reasons for designation of FitzSimon's Wood as a proposed Natural Heritage Area.
Coast, Water Resource and Flood Management	• Local opportunities for flood management and provision of SuDs within parks or within Greenways.
Sense of Place	• Draw upon the reasons for designation of FitzSimon's Wood as a proposed Natural Heritage Area to retain a distinctive character. • Enhanced the sense of place using good trans-boundary views from Deerpark.
Climate Change Adaptation and Mitigation	• FitzSimon's Wood is important for climate amelioration and maintaining a healthy environment. Planting in urban areas within or adjacent to Greenways will provide climate cooling and reduce runoff.
Economic Development	• Opportunities to develop recreational tourism utilising the recreational sites in the Dublin Mountains.
Social Inclusion	• Parks such as Blackrock Park and Deerpark provide great opportunities for community engagement through recreation and informal education in addition to developing community ownership of the environment.
Productive Environments	• The Dublin Mountains provides a diverse range of productive environments including farming, forestry and tourism.

Table 3.C: Benefits of Corridor 3 - Blackrock to the Mountains.



Map 20: Corridor 4. Dún Laoghaire to the Mountains.

3.3.4 Corridor 4 - Dún Laoghaire to the Mountains

Newtownsmith Park – People's Park – Clonkeen Park – Cabinteely Park – Proposed Jamestown Park – rural/urban fringe (Carrickmines, Stepaside, Kilternan)

Newtownsmith Park and the People's Park are key open space locations for connecting with the coastal and urban to rural Green Infrastructure corridors. Clonkeen Park (a district park) and Cabinteely Park (a regional park) act as hubs along the intra-urban Green Infrastructure corridor. The proposed Jamestown Park should be developed to act as a gateway park to the mountains. Some of the corridor length has been developed using cycle routes and Greenways. The connection between Clonkeen Park and People's Park is subject to proposals to enhance the links into the green space in the Honeypark residential development, including access through the National Rehabilitation Hospital on Rochestown Avenue. Critical Greenway links are needed to complete this corridor.

Objectives

1. **To provide a multi-functional GI corridor connecting the mountain, urban area and coast.**
2. **To develop the proposed Jamestown Park as a Gateway Park to the mountains.**

Corridor 4 - Dún Laoghaire to the Mountains: Actions
The following key actions identified are:

1. **Use Green Streets to connect local open spaces at Clarinda Park, Crosthwaite Park and Royal Terrace and to connect further into the Green Infrastructure corridor.**

2. **Enhance the crossing at the N11 between Clonkeen and Cabinteely Parks. Assess whether a full green multi-functional corridor can be achieved at this crossing.**

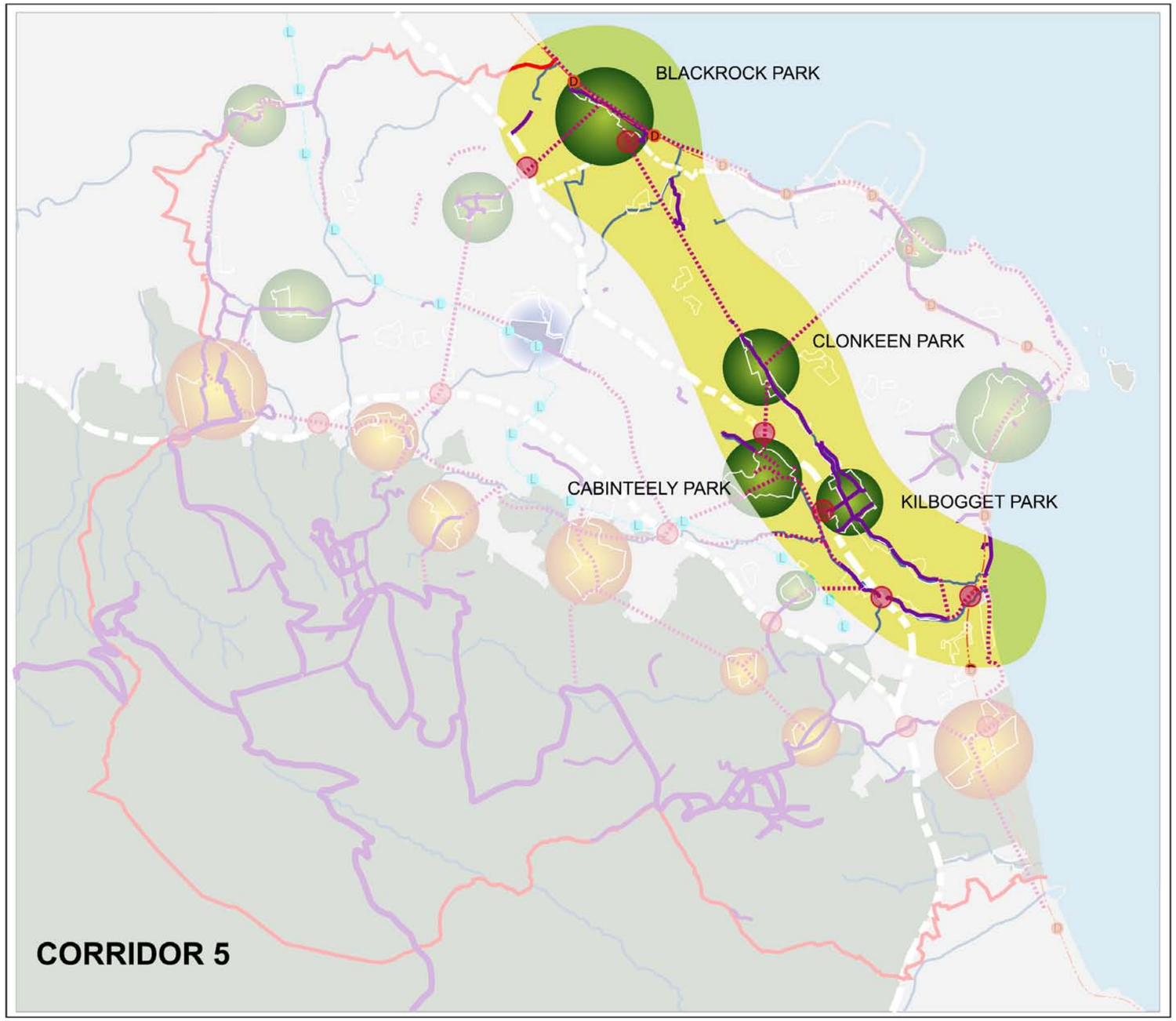
3. **Enhance connections with the Carrickmines Luas stop and across the Luas and M50.**

4. **Promote and develop the proposed Jamestown Park as a gateway into the mountains.**

5. **Identify and enhance Cabinteely Park in order to provide flood attenuation potential alongside the Foxrock Stream.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• Enhanced connections between parks and between Luas stops will deliver recreational and health benefits from these Greenways. Improvements in access to existing parks via Greenways will increase use. • Development of the proposed Jamestown Park will offer significant passive and active recreational opportunities for the new neighbourhoods being developed close by. • This corridor provides residents or visitors with opportunities to connect from the urban area of the County with the coast or with the mountains.
Biodiversity and Natural Resources	• Maximise the potential of biodiversity along the Deansgrange Stream by enhancing the river form following the recent flood relief scheme which has naturalised the river form in Clonkeen Park.
Coast, Water Resource and Flood Management	• Use of Green Streets to connect further into the Green Infrastructure corridor in the denser urban areas will reduce runoff. • Improve existing river enhancements and flood protection at Clonkeen Park. Identify opportunities for wetlands for flood attenuation (if necessary) and to filter and trap urban pollutants and sediment.
Sense of Place	• Utilise sculpture, natural and cultural heritage to enhance a sense of place at People's Park, Newtownsmith Park, Dún Laoghaire Piers and Cabinteely Park.
Climate Change Adaptation and Mitigation	• Trees in parks and open spaces are important for climate amelioration and maintaining a healthy environment. Trees absorb carbon as they grow, and woods and forests can provide long-term carbon reduction benefits. Planting in urban areas, at the source of many atmospheric pollutants, can filter out those pollutants, reduce water run-off, improve water quality, reduce noise and provide shading to help reduce urban heat island effects.
Economic Development	• Opportunities to develop recreational tourism utilising the recreational sites in the Dublin Mountains and coastal recreation sites.
Social Inclusion	• Existing and proposed parks provide great opportunities for community engagement through recreation and informal education in addition to developing community ownership of the environment.
Productive Environments	• The Dublin Mountains provides a diverse range of productive environments including farming, forestry and tourism.

Table 3.D: Benefits of Corridor 4 - Dún Laoghaire to the Mountians.



Map 21: Corridor 5. Inter Urban.

3.3.5 Corridor 5 - Intra Urban

Killiney Strand – Kilbogget Park/ Cabinteely Park/ Clonkeen Park – Deansgrange – Blackrock Park

The location of the Shanganagh and Deansgrange rivers at Killiney Strand are the starting point for the intra urban Green Infrastructure connection. It also connects with the coastal corridor. Blackrock Park is a regional park, which acts as a key location for introducing the urban to rural corridor and connecting with the intra urban and coastal corridors.

This is a corridor rooted in its local community, but extends access to the coast. Significant recreational activity is centred at Kilbogget Park, and further extension and use of connecting green space will be encouraged with the GI Corridor status. This GI corridor would utilise the existing green and open spaces to develop their full multifunctional potential. An established Greenway runs along most of the corridor, with the Deansgrange River providing a continuity and diversity that can be enhanced by the application of GI techniques. River restoration and opening up of the river would be prime of example of the GI potential.

Objectives

1. **To provide a multi-functional GI corridor connecting the urban area and coast, with links to the mountains via other Corridors and cycle network.**
2. **Enhancing the urban linear parks adjacent to watercourses with fully integrated wildlife and habitat features.**
3. **Reduce flood risk in the downstream reaches of Deansgrange River through attenuation within parks, use of SuDs within the Greenways and Green Streets on local roads leading into the park areas.**

Corridor 5 - Intra Urban: Actions
The following key actions identified are:

1. **Improve corridor links across the Railway line to Killiney Strand.**

2. **Maximise potential of smaller parks downstream of Kilbogget Park for water management and biodiversity. Further de-culverting through the lower areas of the park should be considered as opportunities arise.**

3. **Maximise flood storage potential in Kilbogget Park and mitigate the unavoidable barrier of the river culvert under sports pitches through old landfill, by further ecological enhancement upstream and downstream.**

4. **Improve connections and wayfinding between Kilbogget and Clonkeen Parks.**

5. **Improve existing river enhancements and flood protection at Clonkeen Park. Identify opportunities for wetlands for flood attenuation (if necessary) and to filter and trap urban pollutants and sediment.**

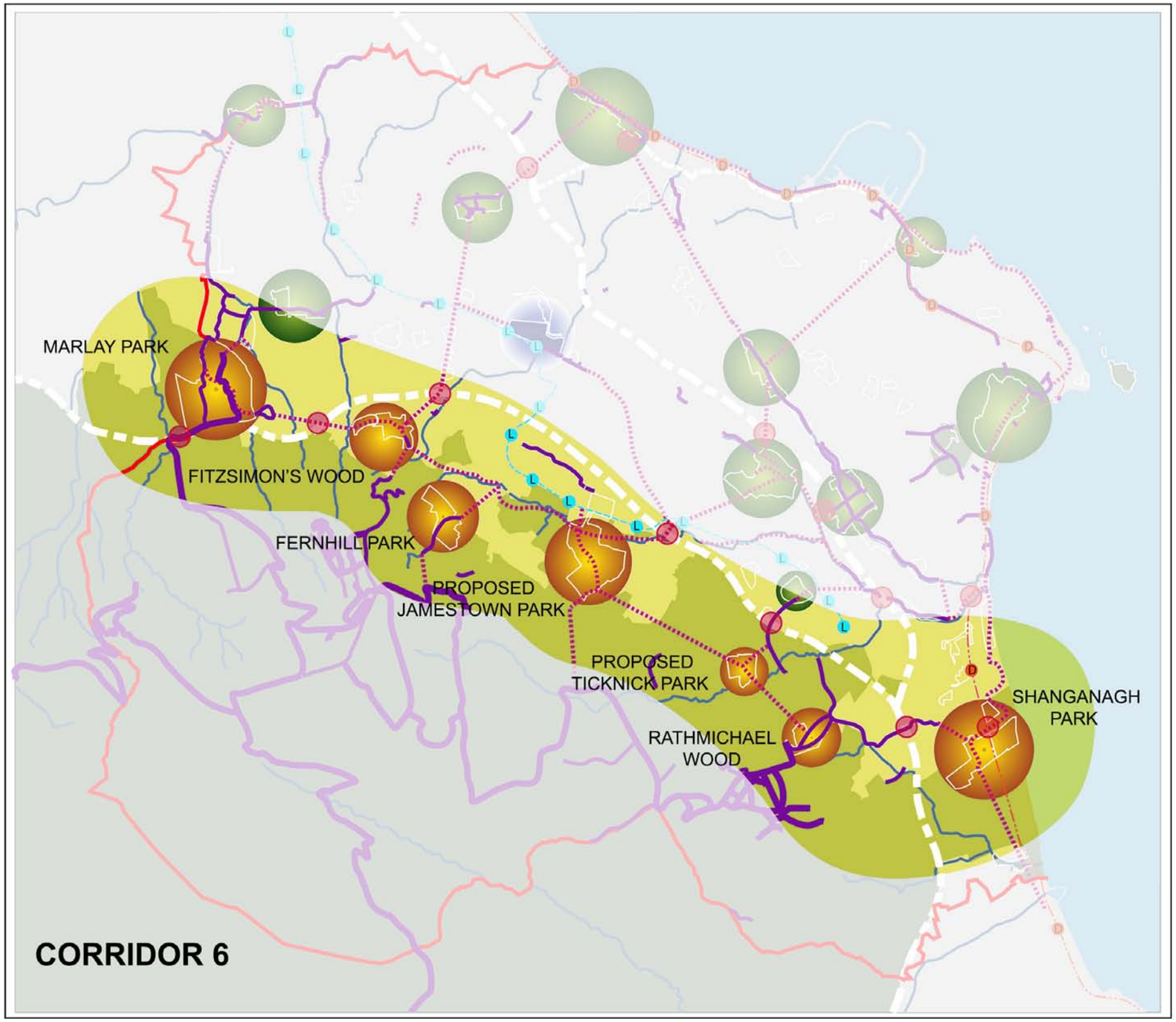
6. **Connect Clonkeen Park with Deansgrange Cemetery through the use of Green Streets and disconnect surface water runoff from the drainage network.**

7. **Enhance biodiversity in Deansgrange Cemetery by using landscape management techniques.**

8. **Strengthen the identity and sense of place by using elements of cultural heritage, possibly associated with the Deansgrange and Quaker cemeteries.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• This proposed corridor intersects with a number of other Green Infrastructure corridors creating a network across the County which will encourage greater potential use of the GI for recreation. • Local access and views of a mix of green landscapes will be encouraged by having a GI corridor, and will bring health benefits.
Biodiversity and Natural Resources	• The ecological corridor along Deansgrange Stream and Shanganagh River can be improved, with wildflower mixes and less intervention. • Smaller parks downstream of Kilbogget Park can be managed for biodiversity outcomes.
Coast, Water Resource and Flood Management	• GI along this corridor can be used to maximise flood storage potential in Kilbogget Park. • Connect Clonkeen Park with Deansgrange Cemetery through the use of Green Streets and disconnect surface water runoff from the drainage network, thereby reducing runoff into the catchment.
Sense of Place	• Improvements to the identity and sense of place by using elements of cultural heritage, possibly associated with the Deansgrange and Quaker cemeteries.
Climate Change Adaptation and Mitigation	• Trees in parks and open spaces are important for climate amelioration and maintaining a healthy environment.
Economic Development	• Opportunities to develop recreational tourism utilising the corridors access to the coastal recreation sites.
Social Inclusion	• The range of parks in this corridor provide great opportunities for community engagement through recreation and informal education in addition to developing community ownership of the environment.
Productive Environments	• The coast provides a diverse range of productive environments including fisheries and tourism. • Potential in the under-utilised sections of open space to create allotments and community gardens.

Table 3.E: Benefits of Corridor 5 - Intra Urban.



Map 22: Corridor 6. Gateway Parks.

3.3.6 Corridor 6 - Gateway Parks

Marlay Park – FitzSimon's Wood – Fernhill Park – proposed Jamestown Park – proposed Ticknick Park – Rathmichael Wood – Shanaganagh Park

These enhanced parks and links act as a transition between the rural and urban landscapes. They are made of 7 parks or transitional open spaces. This is an ambitious but exciting Green Infrastructure corridor. Significant enhancement and development of existing and proposed parks are a feature of this corridor. Similarly Greenways identified in the Cycle Network Plan will need to be brought forward in order to complete the corridor and link these transitional parks.

The transitional or Gateway Parks are to provide access points to and from the mountains and open space above the urban area of the County. Linkages to other main GI corridors also ensure that sustainable travel options are available for those who want to venture beyond the 'park' environment not only from within the County, but from a wider regional catchment. These gateway parks will have formal and informal spaces, less managed but habitat rich areas and then access onto the mountains for those who are prepared for a longer recreational activity.

Objectives

1. **To provide transitional gateways to the mountains and open spaces from the urban areas of the County.**
2. **Ensure that sustainable travel options are supported by the wider GI network.**
3. **To connect a chain of existing and proposed parks and open spaces along the urban fringe, providing variety of recreational and visitor experiences.**
4. **Ensure the cultural heritage assets are incorporated in the GI assets associated with these gateway parks.**
5. **To develop Fernhill Gardens into a Gateway Park / Regional Park.**

Corridor 6 - Gateway Parks: Actions

The following key actions identified are:

1. **Improve corridor links across the M50, which should attempt to link habitat and water functions. It is accepted that some breaks in habitat connectivity is likely for such large infrastructure crossings.**
2. **Reduce sediment and river flows downstream, filter agricultural and road runoff and create wetland habitats by using the opportunity for attenuation and wetlands where the Little Dargle and Slang cross the proposed Greenway or flow through the hub or park.**
3. **Enhance and protect features of interest and reasons for designation of FitzSimon's Wood as a proposed Natural Heritage Area.**
4. **Create way marked but less formal routes through FitzSimon's Wood to the rural area.**
5. **To develop Fernhill Gardens into a Gateway Park / Regional Park.**
6. **Enhance river restoration and the protection of natural watercourse by creating buffer strips along the Carrickmines River.**
7. **Enhance water management and biodiversity through the aims of the proposed Ticknick Park.**
8. **Create a new hub that could be designed as a key part of the ecology network to suit target species at the proposed Ticknick Park.**
9. **Protect and enhance status and quality of nearby Dingle Glen proposed NHA.**
10. **Create wetland for water storage and filtering runoff to benefit downstream on the Kinkeen Stream and enhance biodiversity at Rathmichael Wood.**
11. **Enhance the ecological corridor from Rathmichael Wood to Shanganagh Park.**
12. **Improve connections to cross M11 to Shanganagh Park and across railway line to Killiney Strand at Quinn's Road.**

Multifunctional Benefits	Examples of Benefits
Recreation and Health	• Significant new recreational benefit is leveraged with this corridor. A corridor along the urban rural fringe will encourage participation in cycling and walking to and from Marlay Park or FitzSimon's Wood from a wider catchment with numerous crossing points of the M50. • Longer distance walking into the rural open space will be encouraged and facilities provided to support that. • Development of Fernhill Gardens into a Gateway Park / Regional Park will provide a variety of amenities for the County while also providing opportunities for residents or visitors to connect from the urban area of the County with the mountains.
Biodiversity and Natural Resources	• Enhance river restoration and the protection of natural watercourse. Enhance biodiversity at the proposed Ticknick Park. • Further enhancement of the habitat at FitzSimon's Wood.
Coast, Water Resource and Flood Management	• Attenuation and wetlands where the Little Dargle and Slang cross the proposed Greenway. • Enhanced water management at Ticknick Park. • Creation of wetland for water storage and filtering runoff at Rathmichael Wood.
Sense of Place	• Strengthen the distinctive character of FitzSimon's Wood by enhancing and protecting features of interest and reasons for designation of FitzSimon's Wood as a proposed natural heritage area.
Climate Change Adaptation and Mitigation	• Woodlands are important for climate amelioration and maintaining a healthy environment.
Economic Development	• Opportunities to develop recreational tourism utilising the Dublin Mountain recreation sites.
Social Inclusion	• Parks provide great opportunities for community engagement through recreation and informal education in addition to developing community ownership of the environment.
Productive Environments	• The Dublin Mountains and upland provides a diverse range of productive environments including farming, forestry and tourism.

Table 3.F: Benefits of Corridor 6 - Gateway Parks.

3.4 Case Studies

3.4.1 Kilbogget Park

Maximising the benefits of existing Public Parks by enhancing multi-functional spaces

This large, sub-urban park - reclaimed from a former landfill - is significant as it evokes the spirit and substance of the European Landscape Convention (ELC). The Convention's preamble specifically includes "ordinary" and "everyday" landscapes within the scope of the Convention; and Kilbogget may be considered as ordinary/everyday in terms of its social function, facilities and ethos. Indeed, Kilbogget Park is also a practical example of landscape 'connectedness', because of its strong visual links westwards, across the N11 barrier, to the county's upland rural landscapes. Some of these are designated as high amenity in the Dlr CDP 2010-2016. So, this is an interesting Dlr example of the inter-visibility of two landscape types - "ordinary", man-made designed landscape and cultural, rural landscape.

The ELC states that "- *the landscape is important as a component of the environment and of people's surroundings in both town and country, whether the landscape in question is ordinary or of outstanding beauty."*

Kilbogget Park is located in Dun Laoghaire and follows the Deansgrange River and the Kilbogget Park off road cycle route. This park provides multiple functions with many benefits to those living locally and using the recreational facilities. The park demonstrates how existing parks and open spaces can be enhanced to provide the wider Green Infrastructure benefits.

Photo 55: Kilbogget Park to the Dublin Mountains.

Photo 56: Kilbogget Park, Constructed Attenuation Wetlands Habitat.

The western section of the Deansgrange River flowing through Kilbogget Park has been restored to create a more natural wetland environment with riparian habitats. The Kilbogget Park Wetland has a surface area of 66,000 m2 with one of its functions being a sustainable drainage (SuDs) feature. Downstream of the wetlands to the east of Kilbogget Park the river flows in culvert under reclaimed landfill, now used as sports pitches. The contaminated land is a constraint to fully naturalising the river.

The wetlands and park provide many elements of multifunctional Green Infrastructure with benefits including:

- Improved biodiversity through in-channel, riparian, grassland and woodland habitat creation
- Improved health and well-being through the provision of off road cycle and walking routes
- Improved air quality in terms of noise reduction and filtering of air pollution
- Improved water quality through better oxygenation of water and filtration of sediment and pollution from runoff
- Reduced downstream flood risk through attenuation of flood flows and reduction in the rate of runoff entering rivers. The wetlands have the potential to store up to 40,000m3 of flood water
- Reduced downstream maintenance of structures as sediment and silt is trapped upstream of bridges and culverts

There are opportunities to further enhance the Green Infrastructure features of the park such as optimising the flood storage capacity, naturalising some of the canalised sections and improving the links to the park and the existing Greenway. This would deliver the measures required by the EU Water Framework and Floods Directives, making the watercourse more resilient to extreme flood and water quality events.

3.4.2 FitzSimon's Wood

Enhancement of natural habitats through community participation and volunteering

Located at the foot of the Dublin Mountains and the edge of the urban area in Sandyford, FitzSimon's Wood is a proposed Natural Heritage Area for its semi-natural woodland. The woodland is classified as a local park and improvements to the woodland habitat were carried out in 2008 by the Friends of FitzSimon's Wood voluntary group. Funding for the improvements came from a NeighbourWood grant in 2008 from the Department of Agriculture, Fisheries & Food (Forest Service). Through community involvement works included developing footpaths, planting native trees and management of invasive species.

FitzSimon's Wood provides the following green infrastructure functions:

- Habitat protection for key species
- Environmental education and nature trail
- Recreational access to open space

A key function the woodland plays is in the diversity of different types of parks and open spaces throughout Dún Laoghaire-Rathdown, offering spaces which attract people with different interests, but still retaining its accessability. It is a good example of how local groups, supported by the Council can access grants that make incremental delivery of Green Infrastructure possible.

Figure 3.A: FitzSimon's Wood Nature Trail.

Photo 57: Holly Blue Butterfly: A speciality of FitzSimon's Wood, with two generations a year. Source: Cóilin MacLochlainn.

Photo 58: FitzSimon's Wood.

3.4.3 Green Streets

Maximising the benefits of streets as multi-functional Green Infrastructure

Green Streets provide an alternative way of managing street drainage which provide multiple benefits associated with Green Infrastructure. Use of natural materials and planting delivers greener landscapes and attractive places. Traditionally road drains are directly connected to the surface water or combined sewer network and are designed for a specified capacity of runoff. When this capacity is exceeded flooding occurs. If combined foul and surface water sewers exceed their capacity untreated raw sewage can be discharged direct to watercourses or the sea with direct impacts upon the natural environment. In traditional road drainage systems there is usually no separation of sediments and pollutants from the water and these enter the sewer system. Green Streets contribute to improved water quality to meet River Basin Management Plan Objectives under the Water Framework Directive.

The objectives of Green Streets are to:

- Stop or delay runoff from entering sewer systems
- Filter pollutants and sediments
- Separate surface water runoff from combined sewer networks,
- Reduce the demand for wastewater treatment
- Manage and control flood water when sewer networks exceed capacity
- Provide urban cooling, shade and filter air pollutants and noise
- Provide street trees and planting as a barrier between pedestrians, cyclists and traffic
- Provide local biodiversity

Photo 59: Rain Garden in Malmö, Sweden

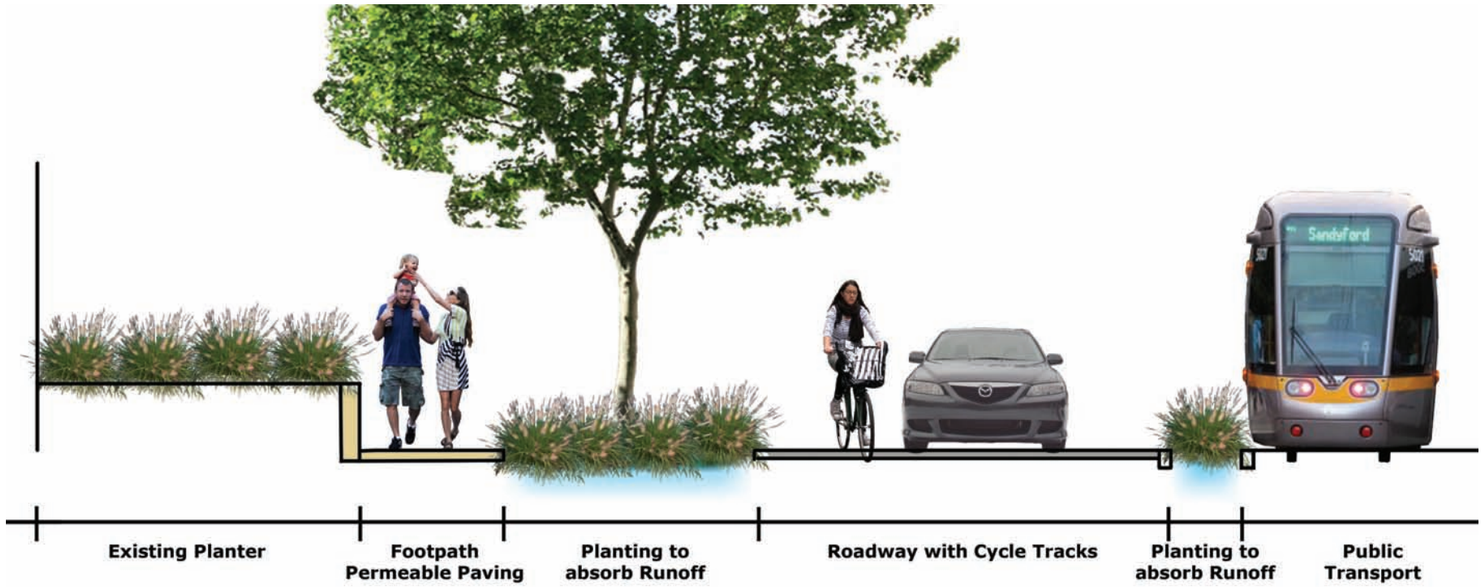


Figure 3.B: Typical Green Street Section

Example 1 Dwr Cymru – Rainscape project in Llanelli
Dwr Cymru (Welsh Water) are in the process of installing RainScape features in Llanelli to reduce the risk of sewer flooding as an alternative to expensive stormwater tanks. The RainScape project is the first project of its kind in the UK. The project will cost £15 million funded by Dwr Cymru as a non-shareholder utility company. RainScape features include: Basins and Planters, Swales, Porous Paving, Grass channels and underground storage. In the first year of operation the scheme has reduced flow rates by 77% for a 1 in 1 year rainfall storm with a peak rainfall intensity of 40mm/hr.

Example 2 Portland, Oregon – Green Streets
Portland began its stormwater program in the early 1990s in response to national stormwater discharge legislation in the USA. The initial actions of this plan included downspout disconnection from combined sewers as cost effective measures. In 2007 Portland City Council approved a policy to promote Green Streets in public and private development. The city council provides funding for stormwater management projects through grants and grant matching programmes. Grant funding is directed to addressing high flood risk areas, community development and education and providing multiple environmental benefits. The success of Green Streets in Portland has been attributed to the integration of Green Streets with other stormwater management policies, plans and projects.

Photo 60: Stormwater Bump-Out on Queen Lane, Philadelphia. Source: Flickr. Image By: Philadelphia Water Department.

3.4.4 Honeypark, Glenageary

Creating multi-functional Green Infrastructure using the Development Planning Process

Honeypark is a recent development in Dún Laoghaire on the site of the old Dún Laoghaire Golf Club. The public open spaces in Honeypark have been designed as multifunctional Green infrastructure. This example demonstrates how it is possible for GI to be incorporated into planning policy so development masterplans address the multifunctionality of open spaces to benefit the wider community. The Dún Laoghaire Rathdown Open Space Strategy sets the required quality standards for open spaces and the County Development Plan objectives ensure developers respond with high quality placemaking.

The wetland is the focal point of the open space and has been designed to provide flood storage, habitat, recreation and aesthetic functions. The wetland acts as an attenuation pond to control and store a runoff following storms. This regulates flow and reduce volumes flowing downstream in the sewer network and rivers reducing the risk of flooding. The wetland and marginal vegetation provides natural habitat in the urban areas. Specifically the pond is long enough for swans to land and take off and duck houses provide shelter. The marginal vegetation offers further natural shelter and filters sediment and pollutants from surface water runoff, both direct from paved areas and also from discharges from the estate surface water drains. The planting scheme extends throughout the development and provides shading, privacy and impermeable surfaces to reduce the rate and volume of runoff and filter urban pollutants and sediment.

The strategic location of the park in the development masterplan maximizes the recreation, relaxation and aesthetic functions with social and health benefits to the local community. The safe and varied play areas and quiet spaces ensure that the park is well used by a broad demographic. When the park is fully adopted by the local council it will be able to form part of the Strategic Green Infrastructure Corridor linking Clonkeen Park to Dún Laoghaire and providing benefits to the wider community.

Photo 61: Honeypark, Glenageary. Native Wildflower Meadow.

Photo 62: Honeypark, Glenageargy. Attenuation Feature Lake.

Photo 63: Honeypark, Glenageary. Recreation Trails.

Photo 64: Honeypark, Glenageary. Street Design.

Photo 65: Killiney Beach and Killiney Hill Park.

4 Delivery of the Strategy

4.1 Introduction

The spatial framework for the Green Infrastructure strategy will be a key part of the draft County Development Plan 2016-2022. The GI corridors have the potential to provide a wide range of multi-functional benefits to the County. But the challenge will be to deliver these benefits through an adequate and dedicated funding stream. This will enable the spatial framework to be established.

The Green Infrastructure corridors and their hubs will be delivered through a variety of initiatives, over differing timescales and through a range of institutional bodies. In setting out the delivery plan, the most important issue is to describe the leadership and assign the resources that are critical to the success of the strategy. It will then follow that investment and funding can be targeted and bids made for internal and external funding. However, it is often small incremental steps and continuing with current initiatives that starts to build a robust GI framework. A series of actions have been identified which will increase the evidence base so as to make a more comprehensive case for funding and to leverage joint working arrangements.

It should not be underestimated how resource intensive the search for external funding can be, or working with other initiatives and institutions to secure a particular Green Infrastructure related action. At a time when council budgets are under pressure and resources stretched the Delivery Plan will need to remain realistic. However, the initial actions identified in this Chapter are focused on positioning Dún Laoghaire-Rathdown County Council in a place of influence within the Greater Dublin Area (GDA) and facilitating existing and potential GI partners to seek external funding.

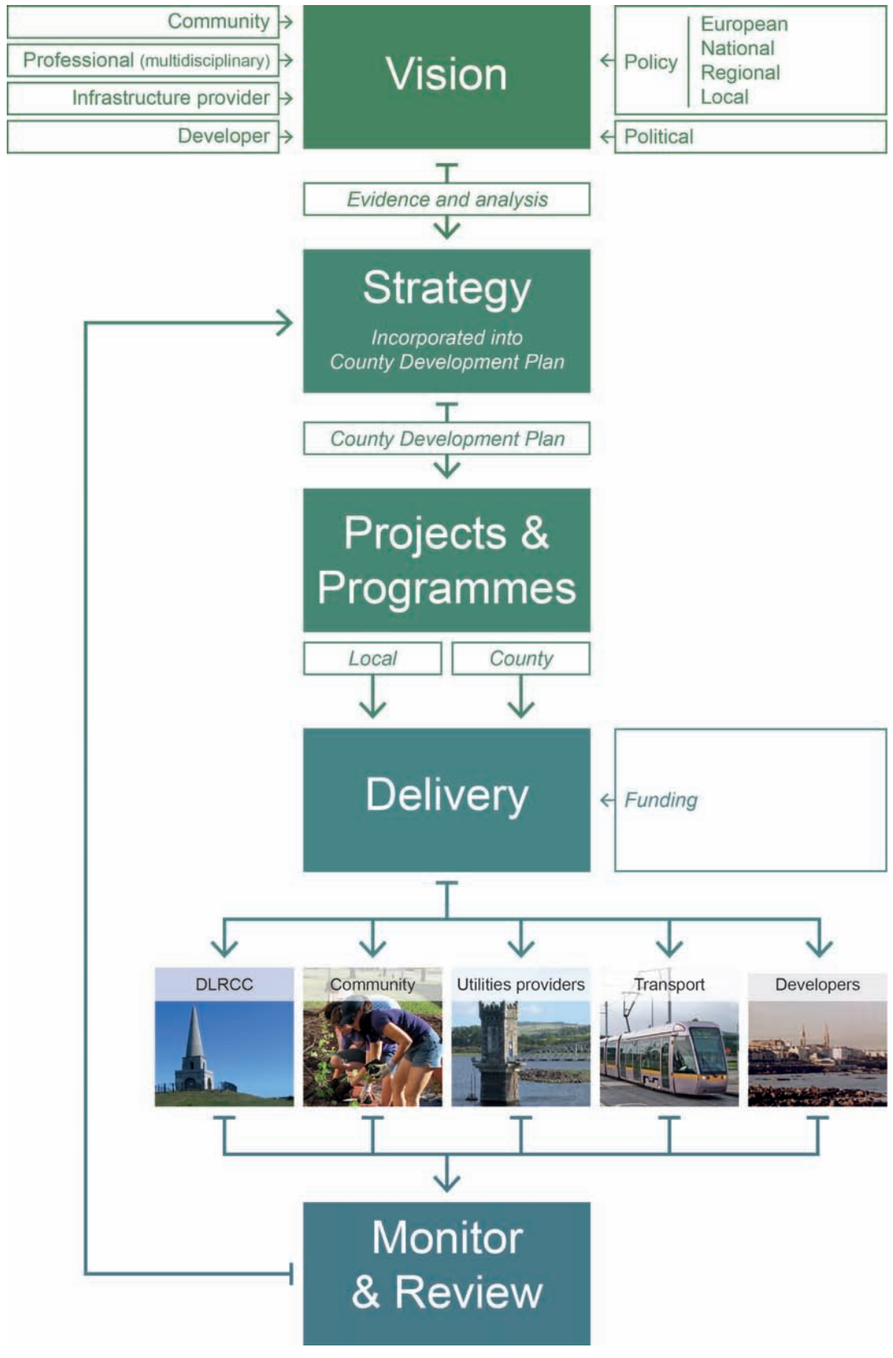


Figure 4.A: Delivey Diagram.

4.2 Leadership

Green Infrastructure is core to the wider Greater Dublin Area (GDA) competing on the world stage as a place to live, work and invest in. As a result GI is elevated to an overarching concept that influences all levels of economic planning, place making and community well-being. Dún Laoghaire-Rathdown County Council have set out a vision for GI in the County, and as a body will provide significant policy leadership and influence on the form of new development and management of many of the green assets. Delivery of its vision, within the principles set out in this document, will depend on the success of partnerships. These partnerships will support cross-boundary and local community led initiatives. From the analysis presented in Chapter 2, Dún Laoghaire-Rathdown has an excellent provision of green spaces, a geography that leads to a clear green network to be articulated and expanded. However, this will only happen if inter-disciplinary and cross-boundary working is achieved through all the appropriate financial and policy instruments to which the Council has access.

Demonstrating the value of Green Infrastructure and the variety of scales and types of interventions possible is crucial to achieving funding from the variety of sources available. Political and professional champions will be important in setting and promoting a vision whereby GI adds to the quality of a County and differentiates its offer by attracting investment. Professionals in planning and designing GI should understand the socio-economic context in which they work and that individual projects are linked to the wider vision and framework for the County.

Without a coherent organisational approach to Green Infrastructure, the strategy will be limited in its impact to the singular uses and specific benefits of its parks and open spaces. Therefore, it is recommended that a dedicated, Inter-departmental Working Group be formed as soon as possible, reporting directly to the Chief Executive. The Group should be comprised of competent and well-motivated staff from the following Council departments and disciplines:-

- Parks and Landscape Services (Landscape Architecture, Horticulture, Arboriculture, Ecology, Heritage, Sports and Recreation Management)
- Planning and Enterprise (Land Use/Spatial Planning, Economics Development)
- Transportation (Civil Engineering - Roads Maintenance, Planning, Traffic)
- Water & Drainage (Civil Engineering - Stormwater Management, Flood Management)
- Housing & Community (Community and Social Development)
- Local Enterprise Office (Business Promotion, Funding, Economics and Enterprise)

The immediate task for the Group would be to produce a Delivery Plan and that has the full commitment of each department, is practicable and integrated with departmental processes and projects.

The Delivery Plan must take account of local and regional groups and state bodies who could have a role in advocating, funding, providing, facilitating, managing or promoting GI.

Representatives of the following neighbouring local authorities were involved in the development of the strategy during a workshop in May 2014. The Delivery Plan should include for ongoing liaison and consultation with them.

- Dublin City Council
- South Dublin County Council
- Wicklow County Council

In addition, the Delivery Plan should provide for engagement with other important stakeholders. To that end, Dlr should issue invitations to the Dublin Mountains Partnership, the Institute of Public Health, HSE, Healthy Ireland Framework, environmental NGOs, local business and community groups and such other key stakeholders as it thinks appropriate.

The strategy has identified 6 corridors to form the core of the County level GI provision. These corridors consist of hubs and links, which in a number of corridors are drawn from the Greenways from the Open Space and Recreation sections of the draft County Development Plan 2016 - 2022. Therefore, the immediate focus is the formation of these Greenways, and the creation or enhancement of Gateway Parks on the peri-urban fringe of the County.

It is important that this immediate focus does not detract from the wider Green Infrastructure improvements that can be achieved through the Council's capital projects, operational programmes, and partnerships with community groups and Development Management process. Continued maintenance and enhancement of the extensive provision of open space must be continued. This will require increasing levels of capital and revenue funding in order to deliver the significant multi-functional benefits from these green spaces.

4.3 Policy Recommendations

As Green Infrastructure is cross-sectoral and multi-professional the outcomes are often greater than the inputs. To be fully effect these outcomes, Dlr should develop policies that are designed to engage prospective partners in embracing and promoting GI in their plans and activities. For example, promoting empowerment in healthy choices at a local level will assist government deliver their policy to increase levels of physical activity for all ages. GI is a powerful enabling tool in delivering this policy of the Healthy Ireland Framework, There is a potential synergy in linking health policy to the optimal use of use of parks, open spaces, sports facilities and greenways.

The Council's main ability to influence, promote and deliver Green Infrastructure is through the both Development Management and Forward Planning processes. In terms of the latter, the draft County Development Plan (CPD) (2016-2022) has strong links to this Strategy, across a wide range of policies, contained in the following sections of the Plan:

- Sustainable Communities Strategy
- Green County Strategy
- Physical Infrastructure Strategy
- Community Strategy
- Specific Local Objectives

The following recommendations seek to protect and enhance existing GI assets while planning and promoting new assets, through the CDP 2016-2022 and other forward planning documents as they are prepared de novo or as reviews of current plans (e.g. Local Area Plans, SDZ's, framework plans etc.)

4.3.1 Policy Recommendations for Accessibility, Health and Well-Being

- To provide a suite of Greenways that is integral to the delivery of the Strategy and its Green Network that utilises existing routes and greenways based on consensus between landowners, ecologists, recreation providers and other relevant stakeholders.
- To use the County Development Plan and Local Area Plan process to improve the recreational opportunities by providing parks for active and passive recreation and for environmental learning.
- To improve linkages across infrastructure barriers and, where feasible, create full GI habitat and water corridors.

4.3.2 Policy Recommendations for Natural and Cultural Heritage

- To create a network of ecological corridors to enhance the biodiversity assets of the County.
- To identify and create opportunities to incorporate non-designated habitats into green infrastructure through linkages to designated and protected habitats/sites.
- To use GI to assist in the protection of the Natura 2000 network of sites.
- To undertake a study of where an ecologically appropriate treatment to flood risk management could be achieved through GI, where possible by de-culverting existing watercourses.
- To use GI to significantly improve public access to natural habitats and historic resources by the creation of pedestrian and cycling trails and seek opportunities generated by these increased connections to facilitate restoration.
- To develop the wider leisure use of public transport routes through its links to the GI Network to key attractions in the County.
- To use GI as a resource and catalyst for environmental education and community involvement.

4.3.3 Policy Recommendations for Water Management

- To seek improved access to the County's water resources for amenity and recreational purposes through the creation of Greenways and trails based upon green infrastructure principles.
- To utilise green spaces adjacent to watercourses to reduce flood risk without impacting on landscape or ecological features.
- To ensure coastal zone protection does not prejudice habitat and recreational assets.
- To incorporate habitat creation and conservation/recreational benefits of GI into flood risk management measures.
- To optimise and maximise the application of Sustainable Urban Drainage Systems (SuDS) to mitigate flood risk, enhance biodiversity, protect and enhance visual and recreational amenity; all in the most innovative and creative manner appropriate and in accordance with best practices.
- To seek promotion and piloting of green roofs and Green Streets through Council asset management plans and development led place making initiatives.
- To promote compliance with the Water Framework Directive by coordinating Green Infrastructure development with other water related strategic plans and actions (including flood management plans, water cycle studies, ground water and surface water protection).

4.4 Investment in Green Infrastructure

Traditionally local authorities provided the majority of funding for the delivery of and management of the components that make up Green Infrastructure. Increasingly this type of funding is more difficult to secure. As a result creative and innovative approaches to funding are required. It is important that a consideration of the long term funding provision for GI is undertaken at the outset of any further investment in GI. This is linked to ensuring that services are delivered efficiently and that the value of these GI assets is recognised. Examples of alternative funding mechanisms are provided below, and should be considered alongside EU and national funding sources.

- Local social enterprises set up by residents and local bodies to provide long term management. This can link into education and training funds, and can also have a positive impact on social cohesion.
- Involving the voluntary sector allows another route to funding not accessible by local authorities.
- Appropriate third party organisations to take forward the delivery and maintenance of open spaces as an alternative to a capital contribution through the planning system.
- Self-funding initiatives, that and draw upon a revenue stream, such as events or food production (Incredible Edible) from the open space.

Small scale investments in place making in the commercial areas of Dún Laoghaire is a proposed objective for the Council from 2015, and Green Streets would be an appropriate contribution to local GI and fit neatly into these small scale investments.

Resilience to environmental change, in particularly climatic change in temperature and rainfall will become a significant challenge for the State, and specifically in urban areas. There is a clear link in how GI can ameliorate spikes in heat and reduce runoff, and investment based around ensuring resilience of people and property to these challenges will be able to draw upon European and national funding. Leading the way, through pilots and innovation, is an important way for the Council to ensure that a full programme of GI investment can be implemented. This Strategy is a seminal first step in making the County more resilient to these environmental challenges, and GI is not a nice to have.

4.4.1 Natural Capital Forum

Techniques to identify and value the benefits provided by natural and semi-natural environments are becoming well established. The challenge is to implement mechanisms to reward and incentivise landowners for the natural capital and ecosystem goods and services their land can provide. In the Wicklow Mountains funding streams are being made available to enhance and manage the natural environment by providing alternative incomes to maintain sustainable rural communities. Without sustainable rural communities the ability to manage and maintain natural environments for biodiversity and recreation is diminished. Natural Capital is gaining traction in Ireland with the formation of the Natural Capital Forum, but its practical use in making the business case for investment in Green Infrastructure could be some way off. As a technique it could be helpful in attributing benefits across a number of sectors of GI and enhance the role of GI with business, government and funding agencies.

4.5 External Funding of Green Infrastructure

4.5.1 Planning Related Funding

The statutory basis for the operation of development contribution schemes is set out in the Planning and Development Acts 2000 to 2014.

Development contribution schemes are a central instrument in improving the quality and therefore the competitiveness of local authority areas, thereby establishing an environment in which enterprise can thrive and communities' progress. Development contributions provide critical resources to facilitate the funding of essential physical and social infrastructure that support the implementation of local authority development plans.

Development contributions provide the only statutory mechanism for capturing planning gain as part of the development management process. All planning permissions granted are subject to the conditions of the development contribution scheme in operation.

Local authorities have witnessed a steep decline in revenues from these schemes over recent years and it is certain that development contribution income will continue to be adversely impacted in the current economic climate.

There are three types of development contribution scheme, namely:

- General Development Contribution Schemes
- Special Development Contributions
- Supplementary Development Contribution Scheme

The General Development Contribution Scheme under Section 48 of the Planning and Development Acts is the most relevant to the delivery of the Green Infrastructure Strategy. Under this scheme planning authorities must draw up a development contribution scheme in respect of certain public infrastructure and facilities. GI which is provided by, or on behalf of, the local authority could qualify for funding through this mechanism, for example where it is driven by a need to reduce the impact of surface water runoff.

4.5.2 EU Rural Development Programme (RDP)

The EU Rural Development Programme (RDP) is part of the Common Agricultural Policy (CAP). The Department of Agriculture, Food and the Marine (DAFM) is the Managing Authority for Ireland's RDP and the expenditure on this Programme over the next programme period 2014 - 2020 in Ireland is anticipated to total €4.0bn.

The core priorities that Member States must have regard to in their programmes and which are directly relevant to the delivery of the GI Strategy include:

- Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry
- Promoting resource efficiency and supporting the shift toward a low-carbon and climate-resilient economy in the agriculture, food and forestry sectors
- Promoting social inclusion, poverty reduction and economic development in rural areas

The 2014-2020 Rural Development Programme for Ireland (RDPE) is now expected to be operational from early 2015. It is planned to include the following initiatives which are of relevance to rural land and water management and therefore the delivery of the GI Strategy:

- Agri-Environment & Climate Measures
- Leader

The Department of Agriculture, Food and the Marine (DAFM) are currently putting in place the structures which will serve to support the implementation of the RDP. There has been a low take up in this funding source in the Greater Dublin Area, but with the GI strategy focused on connecting the urban area with the mountains, and seeking to increase access and manage lands for reduced runoff, this source of funding should be explored. Leader funding has been successfully used by County Wicklow Partnership to alter land use from farmland to natural habitat, improving visitor safety and development of waymarked walks from villages.

4.5.3 EU Structural Funds

EU Structural funding seek to reduce regional disparities across Europe. The EU structural funding round for 2014-20 will be more challenging than previous rounds. For the first time the overall EU budget is smaller than before. Secondly, Ireland has been designated a "more developed region" and will not benefit as much from structural funds as before.

There are two main sources of EU funding – the structural fund programmes and special and other initiatives. Irish structural funds for 2014-20 will total €1.01bn. This EU funding will need match funding of up to 50% which is likely to be provided by the exchequer for "Operational Programmes". Operational Programmes will be announced in late 2014 and these set out how the various structural funds in Ireland will be spent.

The regulations for the Structural Funds in this new period places also place importance on providing direct access to funds for community and voluntary organisations through Community Led Local Development.

It is envisaged that Operational Programmes will be implemented at local authority level through the new Local Enterprise Offices (LEOs) and Local Community Development Committees (LCDCs). The EU regulations state:

"Responsibility for implementation of local development strategies should be given to local action groups representing the interests of the community, as an essential principle."

The LCDCs are expected to draft and deliver their action plans for local enterprise and local community development.

In addition to the Structural Fund programmes, the EU budget for 2014-20 will include additional programmes open to public authorities, private institutions and community sector groups. This is an additional and substantial source of potential development funding.

The Southern & Eastern Regional Assembly will have a key role in the delivery of the 2014-20 Operational Programmes. Investment in GI could align with EU funding requirements across several areas and in particular in the area of climate change adaptation. Mainstreaming climate change adaptation in EU policies was one of the pillars of the European Commission's 2009 White Paper "Adapting to climate change: Towards a European framework for action" and continues to be an important goal of the 2013 EU strategy on adaptation to climate change. The Operational Programmes need to be assessed when they are available to determine where the GI Strategy might be supported by EU Structural Funds.

4.5.4 EU INTERREG

A new EU transnational programme will replace the current interregional cooperation programme (INTERREG) to promote greater territorial cohesion. Involvement in these programmes is competitive and successful applications require strong partnerships of public authorities and civil society organisations. These are also managed through the Southern & Eastern Regional Assembly. The draft programmes applicable to the Dlr area are identified and summarised below.

4.5.5 Draft INTERREG VB Atlantic Area - Transnational Cooperation Programme

The Programme has priorities of particular relevance to Green Infrastructure delivery including Priority 3 'strengthening risk management systems' and Priority 4 of 'enhancing biodiversity and natural and cultural assets'. Examples of actions include:

- Actions to identify, assess and develop ecosystem services and green infrastructure
- Development of management, enhancement and assessment methods concerning natural areas and the ecosystem services provided
- Collecting and disseminating natural environmental data and modelling aimed at improving forecasts and environmental management
- Development of joint or comparative methodologies for defining and managing environmental protected areas

The Atlantic Area Programme operates in Euros and funds 75% of the total eligible project / partner budget, with the remaining 25% being made up of match-funding (which can include staff time).

The total available budget for the 2014-2020 Atlantic Area Transnational Cooperation Programme is to be confirmed (N.B. €131,590,766 ERDF + national co-financing). It is suggested that the Programme will allocate 27% to 'biodiversity and natural and cultural assets'.

4.5.6 Draft INTERREG VB North West Europe - Transnational Cooperation Programme

The Programme's low carbon priority includes a specific objective to 'reduce GHG emissions in North West Europe through international cooperation on the implementation of low carbon, energy or climate protection strategies'. This allows for 'implementing combined mitigation and adaptation solutions to demonstrate feasibility and refine the design and development of plans for the future'. Projects must deliver both a reduction in risks and a reduction in GHG emissions.

Examples of actions include:

- Structures which deliver outcomes in adaptation (reduction in risk) and mitigation (reduction in GHG emissions) which are sustainably designed and built
- Innovative approaches to environmental risk at a city or region level, which bring adaptation and mitigation benefits, e.g. Water Sensitive Urban Design
- Water planning at a catchment level to address adaptation whist promoting mitigation

The Programme operates in Euros and funds 60% of the total eligible project / partner budget, with the remaining 40% being made up of match-funding (which can include staff time).

The total available budget for the 2014-2020 North West Europe Transnational Cooperation Programme is €620,459,134. The low carbon priority has a total budget of €244,223,276. Again this is a potentially useful source of funding for the water based actions arising from the GI strategy.

4.5.7 EU LIFE Programme 2014-2020

The LIFE Programme is the EU's dedicated funding programme for the environment and climate action. The Programme covers all 28 EU Member States and is managed centrally by the European Commission. The Programme is open to public and private bodies registered in the EU.

The 2014-2020 LIFE Programme has two sub-programmes:

- 'Environment' with a budget of €2,592.5 million, encompassing environment and resource efficiency (including water as a specific theme), nature and biodiversity, and governance and information
- 'Climate Action' with a budget of €864.2 million, including adaptation, mitigation and governance and information

Specific priorities, funding allocations and assessment criteria are set out in multi-annual work programmes. The 2014-2017 work programme lists specific priorities which could be relevant to County GI delivery:

- Planning and establishment of natural water retention measures
- Promoting flood and drought risk management through: extreme event prevention and protection tools; and integrated risk assessment and management approaches
- Addressing hydro-morphological pressures identified in River Basin Management Plans
- Re-naturalising river, lake, estuary and coastal morphology and/ or recreating associated habitats, including flood and marsh plains
- Awareness-raising on Water Framework Directive obligations and opportunities

In addition, the work programme makes reference to support for implementation of adaptation strategies under the climate action sub-programme. These programmes tend to be undertaken on sub river basin basis, but could form a component part of a larger catchment based response.

4.5.8 EU Horizon 2020

Horizon 2020 is a €79 billion EU funding programme to support research and innovation excellence. The programme covers all 28 EU Member States as well as a number of associated / third countries. It is managed centrally by the European Commission and funds collaborative research / innovation projects involving at least three organisations from different countries. The Programme largely covers 100% of costs, with innovation actions being funded at 70% for profit-making organisations.

The Programme is structured around three pillars: excellent science, industrial leadership and societal challenges. The 'societal challenges' pillar includes the following supporting priorities of potential relevance to the DL&R GI Strategy delivery:

- Climate action, environment, resource efficiency and raw materials with a budget of €3,081 million
- Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bio-economy with a budget of €3,851 million

The 2016-17 work programme is in development and is likely to be where opportunities could lie. Again this is worth tracking and seek opportunities as they arise. It has potential to be used as a priming or pilot fund for new forms of GI, such as Green Streets.

4.5.9 Tourism Related Funding

Destination Dublin, the strategy for tourism growth in the Dublin Region, recognises that visitors can be attracted to the coastline, parks and open spaces in urban areas and the experiences in the hills and mountains. The proximity of coastal and upland destinations to the city centre are considered to have a huge potential in broadening the appeal of Dublin to visitors of all profiles. The GI strategy acknowledges the links of the Green Network extending into a regional provision enables a sustainable and attractive access to an exciting range of formal and natural green destinations. Therefore GI may have significant potential to access tourism related funding sources. Some GI related investment may be attractive to be self-funded as part of a tourism based enterprise.

Green Infrastructure will seek to change the interaction and uses made of the green assets in the County. Rebranding these parks as part of a tourism offering could see an extension of their use beyond their original purpose and an additional source of revenue. This would need to be undertaken sympathetically in recognition of the heritage value of formal parks, but parks under the GI strategy will start to deliver many additional benefits over and above being well cared for formal parks.

4.6 Planning Tools

Planning can play a vital role in the delivery of Green Infrastructure projects. Mechanisms which should be considered include the following:

- The GI strategy has a clear vision and policy support from the forthcoming County Development Plan 2016-2022
- Development contributions will remain an important contribution to the vision
- The GI strategy has produced a strong GI framework and that will encourage planners to respond to opportunities as they arise, and a toolkit in provided in Appendix C
- The GI strategy can unlock complex interactions between development, landscape design and management, housing, flood management, biodiversity and social cohesion, and is a potential powerful tool

4.7 Key Actions

The Green Infrastructure strategy has a foundation based on existing initiatives, such as the Smarter Travel programme, which have been partly funded by national and local resources or have been driven by local groups (Friends of Fitzsimons Wood). Dlr has been successful in their provision of open spaces and off-road cycle routes. GI is a concept that unites a range of disciplines and interests which can facilitate collaborative working. This is helpful in removing potential competing priorities. However it does mean that a structured investment plan for GI is often challenging, as it will involve many parties, who will have their own programmes and funding constraints. The GI strategy has a strong spatial framework, with a clear focus on enhancing and creating green spaces and providing linking corridors. This can then be the driver for seeking internal and external funding, but it should be noted that GI is also supported by smaller scale interventions, such as public realm improvements, green roofs and walls.

4.7.1 GI Corridors

An overview of priorities and funding sources for the Green Infrastructure strategy components are provided in Table 4.A.

GI Corridor	Short Term Priorities 2015 - 2018	Possible Short Term Funding Sources	Longer Term Priorities 2019 - 2022	Potential Funding Sources
1. Coastal	Connections and access routes using Greenways, Cycle Routes and Green Streets	Smart Travel Initiative External funding through use of a Pilot Study or DLR	Ecological corridor along cycle route to develop multifunctional benefits along corridor	External
2. River Dodder to the Mountains	Extension of Dodder Linear Park	Greenway funding through Smarter Travel	De-culverting of watercourses Flood storage in Marlay Park	External Development contributions
3. Blackrock to Mountains	FitzSimon's Wood – development integrated management and GI enhancement plan Access and improved connections to Sandyford Business District	Joint development with local environmental/ community groups. External funding with Council input Greenways via Smarter Travel Initiative Partnership with Sandyford Business District	Extension and GI enhancement of FitzSimon's Wood as a transition park Development of Fernhill Gardens into a Gateway Park / Regional Park	External
4. Dún Laoghaire to Mountains	Development plan for creation of a Gateway park at Jamestown Continue initiatives for Greenway connections to form complete route	Internal Smarter travel and development led	Develop Jamestown Park Green street enhancement of corridor in urban areas	Internal and External External Climate change adaptation measure
5. Intra Urban	Enhance corridor for multifunctional benefits – habitat action plan linked to enhanced flood risk management Greenway link to Killiney Strand	Mix of funding sources Smarter Travel Initiative	Green Streets	External Climate change adaptation measure
6. Gateway Parks	Access and connections GI led management and enhancement plan for proposed parks at Jamestown and Ticknick in partnership with Dublin Mountains Partnership	Smarter Travel Initiative Dublin Mountains Partnership	Create Gateway Parks Enhance Greenways for multifunctional benefits through use of GI principles, including improvements to "hard" crossings of motorways to create a continuous GI corridor	External External

Table 4.A: Green Infrastructure Corridor Priorities.

4.7.2 Key Thematic Actions to Support Implementation of the Strategy

Accessibility, Recreation, Health and Well-Being
Barriers have been identified as a key challenge for the implementation of the Green Network corridors. Some of the physical barriers can be overcome by a footbridge for example, and the cycle network has resolved some of these barriers across transport infrastructure. However, a review of these crossings should be undertaken from a GI perspective, so that opportunities are taken to provide connectivity of people, habitats or watercourses, where feasible and resources allows.

Each corridor should be subject to a detailed multi-disciplinary feasibility study so that where possible technical solutions can be identified to barriers and incremental actions can be taken by the Council or local groups.

Access over private land will remain a barrier, and existing mechanisms for resolving these issues should be explored using the experience gained through Dlr's participation in the Dublin Mountains Partnership. The socio-economic and health benefits of a well-functioning GI, should be advanced in any such exploration.

This Green Infrastructure strategy should be circulated to a range of bodies and groups who have a health and well-being agenda, such as Healthy Ireland, Institute of Public Health, HSE and local voluntary health groups. The Council could initiate a joint action plan on the health and well-being aspects of the GI strategy. Small scale and incremental actions could be identified, and the Council could work with these bodies to facilitate provision of land for allotments and community gardening. The Council could assess and prioritise, in line with the findings of the strategy and the demographic character of the County, areas where provision of land and facilities would meet the requirements for activities such as community gardening and other GI health related uses.

Natural and Cultural Heritage
In the long term, private land owners and semi-state bodies such as Coillte, should be encouraged to use their land management to deliver Green Infrastructure benefits and assets. Land management has a large impact on water quality and flood risk downstream, the cohesion of habitats and ecological corridors such as woodland and hedgerow management, and access to cultural heritage, all of which can deliver multiple benefits. Dún Laoghaire-Rathdown County Council should develop a toolkit in partnership with landowners and stakeholders to identify what incentives are available to landowners, how to apply for these and how to construct and manage Green Infrastructure.

There are some significant areas of open space or lengths of watercourse through large areas of land in single ownership. These include golf courses (e.g. where culverts convey flows from the Little Dargle) and institutional land (e.g. the Elm Park Stream flows through U.C.D in culverted and open channel sections). Some of these are strategic hubs for connecting existing Green Infrastructure. A review of de-culverting potential should be undertaken in order to assess whether it should remain merely an aspirational aspect of the GI strategy. This study would identify where opportunities could arise for incremental removal of culverts through new development proposals, in order to improve habitat connectivity and more effective water management

Water Management
A review of the water management aspects of how the existing green spaces and water bodies could be enhanced to deliver the strategic outcomes associated with Green Infrastructure should be commissioned. Further flood attenuation, habitat enhancement and sediment management have been identified in the analysis. This should integrate the EU Floods Directive and Water Framework Directive programme of measures with the provision of an enhanced GI along watercourses. As this is integral to achieving the GI benefits Dún Laoghaire-Rathdown should engage with the forthcoming assessments under the CFRAM Flood Risk Management Plans and Cycle 2 River Basin Management Plans. The Council is a Steering Group member on the OPW led ECCFRAM study due to be completed in 2016. The GI Strategy should be provided to the OPW in order that any flood risk management measures proposed along watercourses in the County utilise the water management benefits arising from the GI corridors. These watercourses should be reviewed first, and it is recommended that the current Kilbogget Park flood study is used as a pilot to explore some of these integrated issues, especially around sedimentation within the ponds and watercourse and how that is managed sustainably in the long term. With this information Dún Laoghaire-Rathdown County Council can influence the long term strategy for flood management being prepared under the CFRAM programme and ensure that, where feasible, flood relief schemes provide a positive GI outcome. Funding of OPW schemes allow for reasonable budget headings for landscaping, environmental mitigation and heritage, and the GI strategy could be useful in focusing that spend in productive GI outcomes.

Green Streets have been identified in the strategy for use as connectors to the Green Infrastructure corridors. This is a new concept in Ireland, but effectively used in Sweden, the UK and USA to manage stormwater runoff, regenerate neighbourhoods, and create high quality places. Multi-functional Green Streets constitute GI corridors and can create links to river corridors and open spaces. Green Streets improve accessibility and well-being, enhance habitat and biodiversity, strengthen ecological corridors, reduce the rate and volume of runoff and urban pollutants that enter storm drainage networks, providing overall improvements in environmental quality, flood risk, water quality and wastewater treatment. The concept of Green Streets can be applied to main roads and local residential streets, as appropriate in terms of scale and other imperatives (e.g. Smart Travel - cycleways).

This strategy recommends that Dlr initiate a pilot Green Street project, as part of a new development and/or the regeneration/retrofitting of an existing urban streetscape(s).

Integration of the Strategic Flood Risk Assessment and the water management zones identified in this Strategy is required so that land can be safeguarded for flood management uses and so that runoff from new developments are limited to safe limits.

Green roofs have been shown in research to have a significant impact on reducing storm water runoff. Using the water management zones in this strategy a retrofitting plan could be developed, starting with pilot public buildings as a means of leading the way and testing design methods. Lessons learnt from the new green roof installation at Ballyogan depot should be used to inform this element of the Delivery Plan. There is also greater potential through the development management process to seek demonstration projects using new development to trial green roofs and understand the market appetite for these approaches in the County.

4.8 Monitoring and Review

In order to meet the visions, objectives and actions in the Green Infrastructure strategy, a programme of monitoring and review will need to take place. This will also allow the strategy to be modified as required. It will also ensure that the strategy can respond to changing circumstances, such as climate change, demographics, funding criteria and legislative change. It will necessitate the setting up of a Monitoring Group.

Whilst it is appropriate for the monitoring and review programme to tie in with the lifetime of the Development Plan (2016-2022), some programmes, such those related to water management, may have their own cycles of monitoring:

The monitoring of water quality, sediment and erosion should complement or run alongside the River Basin Management Planning cycles under the Water Framework Directive. However, not all of the watercourses, lakes and ponds in Dún Laoghaire are included as waterbodies in the River Basin Management Plan, but still should be monitored at a County level.

As specific projects are realised there may be opportunities to monitor and review Green Infrastructure elements and benefits before and after implementation.

The Green Infrastructure strategy has identified a set of high level Green Corridors, and they will have their own focus and success metrics. One of the main monitoring and review requirements will be the implementation of the strategy as set out in Chapter 3.

However, the success of Green Infrastructure will not only be measurable by these metrics. The overall vision set out within this strategy describes a slow behavioural change in response to the provision of a multifunctional GI asset base. Examples of indicators which can show the levels of success of the implementation of the GI strategy are provided. They can be used in the monitoring and review process. Use of the indicators should take account of the availability of appropriate, adequate resources, the capacity to generate up-to-date data sets and any other factors that may influence the indicators.

General Indicators	Accessibility, Recreation, Health and Well-Being Indicators	Natural and Cultural Heritage Indicators	Water Management Indicators
Identification and utilisation of funding sources	Number of people cycling and walking to work / school	River habitat and geomorphological surveys	Number of green roofs
Number and range of organisations aware and using the GI strategy within their plans and programmes	Number of people using opens spaces and sports facilities	Increase in tree cover and diversity of age profile	Water quality
Green Infrastructure training across Dlr Departments and major developers and agents	Number of Green Streets	Number of Green Streets	Bathing water quality
Inclusion of GI in new developments (using GI toolkit)	Number of allotments in active use Use of public transport for outdoor leisure activities Accessibility across transport infrastructure	Public perception of GI in Dlr	Decrease in sediment and debris at key locations Number of Green Streets

Table 4.B: Potential Green Infrastructure Indicators to be used in Monitoring and Review of the Strategy

Photo 66: Running in Kilbogget Park.

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Appendices

APPENDIX A Baseline Maps

The mapping approach for this GI Strategy is based upon the typology developed in the Mersey Forest Green Infrastructure Strategy and the parks and open spaces hierarchy for Dún Laoghaire-Rathdown. The definitions used in the mapping are as follows:

Appendix A, Table A: Definitions of Typology Land Cover / Use Type

Typology (Land Cover/Use Type)	Description
Agricultural land	Land managed for agriculture, including grazing lands, crop production fields and hedgerows. Potentially irregular field margin trees may be included.
Allotment, community garden or urban farm	Allotments are small plots which collectively make up a larger green space. These plots are available for members of the public to rent for the cultivation of fruit, vegetables and flowers. Community gardens and urban farms are community-managed projects ranging from wildlife gardens, to fruit and vegetable plots on housing estates, community polytunnels, to large city farms.
Coastal habitat	Beaches, sand dunes, marshes, mudflats and semi-natural open land by the coast.
Derelict land	Land which has been disturbed by previous development or land use but is now abandoned. Waste or derelict land is often re-colonised by processes of natural succession. Land is classed as derelict whist it is in the early stages of natural succession. As succession proceeds land that may be officially classified as derelict land by the local authority, will have a different Green Infrastructure type e.g. grassland or woodland (or will fall under non Green Infrastructure).
Grassland/ heathland/ moorland or scrubland	Grassland which is not agriculturally improved. Could include established vegetation on reclaimed derelict land which is not part of a formal recreation green space. Includes downlands, commons and meadows. Also includes areas of moorland and heathland vegetation consisting mainly of ericaceous species, and including moorland grass, shrub moor, shrub heath and bracken. Likely to include some commons within urban areas. Scrubland areas predominantly consist of shrubs, with grasses and herbs also present.
Green networks	These are the networks of parks and open spaces, the existing and proposed Greenways, the biodiversity corridors, the cycle routes, the waterways and river valleys, the coastal area and the mountains, that are features of the County. They can provide for long distance pedestrian and cycle routes throughout the County and can link the parks and open spaces with the entire Green Infrastructure in the County. Once they are formally identified, mapped and developed they can become an extremely valuable resource for the County and the region.

Typology (Land Cover/Use Type)	Description
Institutional grounds	Green space in the grounds of institutions such as schools, universities and colleges, hospitals and nursing homes, and associated with commercial and industrial premises. Land usually consists of expanses of grass, scattered trees, hedgerows and shrubs. Outdoor sports facilities are not included. There are many large areas of institutional land in Dún Laoghaire-Rathdown which present both opportunities the provision of multiple benefits from Green Infrastructure and also barriers to accessible Green Infrastructure.
Outdoor sports facility	Includes sports pitches, school and other institutional playing fields, golf courses and other outdoor activities. Usually consist of vegetated sports surface and boundary shrubbery, trees and hedges. Can be publicly or privately owned and often occur within parks.
Parks, Gardens & Public Open Spaces	Includes urban parks, country parks and formal gardens (including ones where you may have to pay for access). Generally designed for public access and enjoyment, combining a variety of landscape and horticultural elements. Extraneous facilities for the public may be present onsite which enhance visitor attraction. **National Parks** are designated nationally and managed by the National Parks and Wildlife Service (NPWS). The Wicklow Mountains National Park follows part of the border between Dún Laoghaire-Rathdown and Wicklow. It is one of six in Ireland and is the only National Park not on the West Coast. The **Dublin Mountains** is an area of upland agricultural, forestry and open grassland which contains a network recreational access routes and activity centres. There is no formal boundary to the Dublin Mountains however within this area there is Coillte forestry land which is accessible to the public and is marked as such in the analysis. In Dún Laoghaire-Rathdown parks and gardens are subdivided into **Regional Parks, District Parks, Local Parks, Amenity Open Space, and Civic Spaces**. **Regional Parks** are the premier parks in the County, which provide for a wide range of uses and attractions and include opportunities for both high quality active and passive recreation. They are generally large in size, with the Peoples Park in Dún Laoghaire being the exception. They include facilities such as playing pitches, changing rooms, toilets and regional playgrounds for children of differing age groups. They may accommodate food and craft markets and cafes/tea rooms where appropriate. They also play an important role in terms of biodiversity due to their size and the ecosystems they sustain. The **District Parks** provide for a range of needs for a number of neighbourhoods. They offer a wide variety of uses and facilities and they provide for both active and passive recreation. The active recreational facilities in these parks usually include playing pitches, courts and multi use games areas or playground areas. They also feature biodiversity corridors and areas.

Typology (Land Cover/Use Type)	Description
Parks, Gardens & Public Open Spaces (continued)	**Local Parks** are within easy reach of most dwellings in the locality. They provide for the needs of the local neighbourhood. They can provide for kick about areas, exercise equipment and seating areas. **Amenity Open Spaces** are commonly located within residential areas and housing estates and they facilitate mainly passive recreation, casual play areas, pocket parks and they visual amenity for residents. Their function is usually as a green space but their landscape value can sometimes be minimal because of poor design. They include the left over green spaces within housing and other forms of development, as well as most road verges. **Civic Spaces** are located in the urban centres close to a civic, institutional and commercial buildings and generally feature hard landscaping with planting and seating areas. They allow for sitting, meeting and eating, as they are generally located close to cafes and restaurants. Examples include the plaza's and public open space at Dún Laoghaire Harbour. Land used as **burial grounds, including cemeteries and churchyards** is usually grass covered with occasional shrubs and trees and is part of the Green Infrastructure network.
Recreational Access Routes	Recreation Access Routes are located within the lands under the control of Coillte. Coillte Teoranta, the State Forestry Board, was established to manage the public forest built up since the commencement of State planting and is the largest provider of forest recreation in Ireland. Coillte's commitment to recreation is underpinned by its membership of the Dublin mountain partnership and its commitment to the Dublin Mountains Strategic Plan for Outdoor Recreation 2007-2017. It is an objective of the Council to secure the retention of those established Recreation Access Routes and to investigate the provision of additional agreed Recreational Access Routes in conjunction with the Dublin Mountains Partnership. The Dublin Mountains Way and Wicklow Way are waymarked routes that follow both Recreational Access Routes and Rights of Way in part.
Public Right of Way	Legally designated as a public right of way. For the purpose of the Green Infrastructure strategy only off-road public rights of way have been mapped.
Street trees	Generally in urban areas, a row/collection of individual trees along the side of a road. Trees will vary in size and species depending on location and size of street. Usually located on the pavement edge in tree pits, requires reasonably wide pavements. Tree pits may be planted with small flowering plants. The identification of street trees is challenging and is not always possible at the County-wide scale due to the overlap with streets and other land uses. They contribute to the connectivity between Green Infrastructure hubs and are considered further in detailed analysis.

Typology (Land Cover/Use Type)	Description
Water body	Expanses of open water, including large lakes, small ponds, reservoirs and harbours. The sea is also classed as a water body.
Woodland	All forms of woodland including deciduous woodland (both ancient semi-natural and woodlands of more recent origin) and mixed and coniferous woodland (including plantations and shelterbelts). Includes newly planted woodland. Small clusters of trees will be classed as woodlands.
Green roof	Roofs of buildings, bus shelters or any other form of construction which are partially or completely covered with vegetation. Vegetation may be sedums, plants, perennials, grasses, trees and shrubs. There is no data on green roofs in Dún Laoghaire-Rathdown to be shown on the County-wide mapping.
Orchard	Areas populated with fruit bearing trees, can be publicly or privately owned, could be for commercial selling or local community use.
Private domestic garden	Privately owned green space within the curtilage of individual dwellings, which is generally not publicly accessible. These plots of private land vary in size but often make up a significant part of the green fabric of urban areas. Land may include trees, shrubs, grass and flowering plants. At the County-wide level there has been no mapping or analysis of private domestic gardens. When looking at detailed locations the cumulative benefit of private domestic gardens on Green Infrastructure hubs and connections will be considered.
Watercourse	All areas of running water, including large rivers, small streams, canals and aqueducts. In Dún Laoghaire-Rathdown there are a number of culverted watercourses which are a barrier to the connectivity between Green Infrastructure hubs.
Wetland	Land dominated by wet habitats, including fen, marsh, bog and wet flush vegetation. Wetland associated with the coast, such as salt marshes, is classified as coastal habitat.

N

230000

Dundrum

Stillorgan

Blackrock

N31

Dún Laoghaire

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

Stepaside

Kiltiernan

Glencullen Village

220000

320000

0 500 1,000 1,500 2,000

Meters

Legend

- County Boundary
- Main roads
- Built up areas

Green Infrastructure Typology

- Agricultural land
- Allotment, community garden or urban farm
- Grassland/heathland/moorland or scrubland
- Institutional Grounds
- Open Space
- Open Space (proposed)
- Outdoor Sports Facility
- Parks & Gardens
- Parks & Gardens (proposed)
- Water body
- Woodland

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Green Infrastructure Strategy

A1 Open Spaces

Drawn by:	Tom Sampson	Date: 19/02/2015	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 19/02/2015	
Approved by:	Deidre McDonnell	Date: 19/02/2015	
File Name:	2014s0960_023_08 - A1 Open Space		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Blackrock Park

N31

Dún Laoghaire

People's Park

Dalkey

Sandyford Business District

N11

M50

Marlay Park

Killiney Hill Park

Cabinteely

Cabinteely Park

Fernhill House and Gardens

Massy's Estate

Kilmashogue Forest

Ballybrack

Kilmashogue & Ticknock Forest

Cherrywood

Cruagh

Tibradden Wood (Pine Forest)

Shankill

Carrickgollogan

Barnaslingan

M11

220000

Wicklow Mountains National Park

Stepaside

Glencullen Village

Kiltiernan

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas

Parks and Open Spaces

- National Park
- Coillte Land
- Regional Park
- District Park
- Local Park
- Parks (proposed)
- Amenity Open Space
- Amenity Open Space (proposed)
- Civic Space
- Civic Space (proposed)
- Cemeteries and Burial Grounds

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A2 Public Open Spaces

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Checked by:	Tom Sampson	Date: 19/02/2015	
Approved by:	Deidre McDonnell	Date: 19/02/2015	
File Name:	2014s0960_029_08 - A2 Public Open Space		
Status:	Final Map		

N

230000

Blackrock Baths (disused)

Cloncurry Bridge Slipway

N31

Seapoint Beach

Salthill

Marine Activity Centre

Old Coal Quay Pier

Dún Laoghaire Motor Yacht Club

Royal Yacht Club

East & West Piers

Royal St. George Yacht Club

National Yacht Club

Dún Laoghaire Baths

Newtownsmith Promenade

The Forty Foot

Otranto Place

Sandycove Harbour

Bullock Harbour

Coliemore Harbour

Dillon Park

Dalkey Island

White Rocks

Vico Bathing Place

Killiney & Shanganagh Beaches

Shanganagh Cliffs

Legend

- County Boundary
- Main roads
- Built up areas
- Coastal Features

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A3 Recreational Features of Interest Along the Coast

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:18,680 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_047_05 - A3 Recreational Features of Interest Along the Coas		
Status:	Final Map		

N

230000

220000

320000

Dundrum

Dodder

Elm Park Stream

Trimlestown Stream

Stillorgan

Blackrock

Dún Laoghaire

N31

Monkstown Stream

Dalkey

Sandyford Business District

Carysfort Maretimo

M50

N11

Deansgrange Stream

Foxrock Stream

Cabinteely

Carrickmines River

Ballybrack

Shanganagh River

Cherrywood

Shankill

Kinkeen Stream

M11

Owengougher

Little Dargle River

Slang

Loughlinstown River

Glencullen River

Stepaside

Kiltiernan

Glencullen Village

Dargle River

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas

River Type

- Culverted - private
- Culverted - public
- Open - private
- Open - public

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A4 Rivers

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_037_06 - A4 Rivers		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

Wicklow Way

Dublin Mountains Way

220000

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000

Meters

Legend

- County Boundary
- Main roads
- Built up areas

Off Road Cycle and Pedestrian Network

- Proposed off road
- Existing off road

Recreation Access Routes

- Public Right-of-Way
- Recreation Access Route
- Wicklow Way

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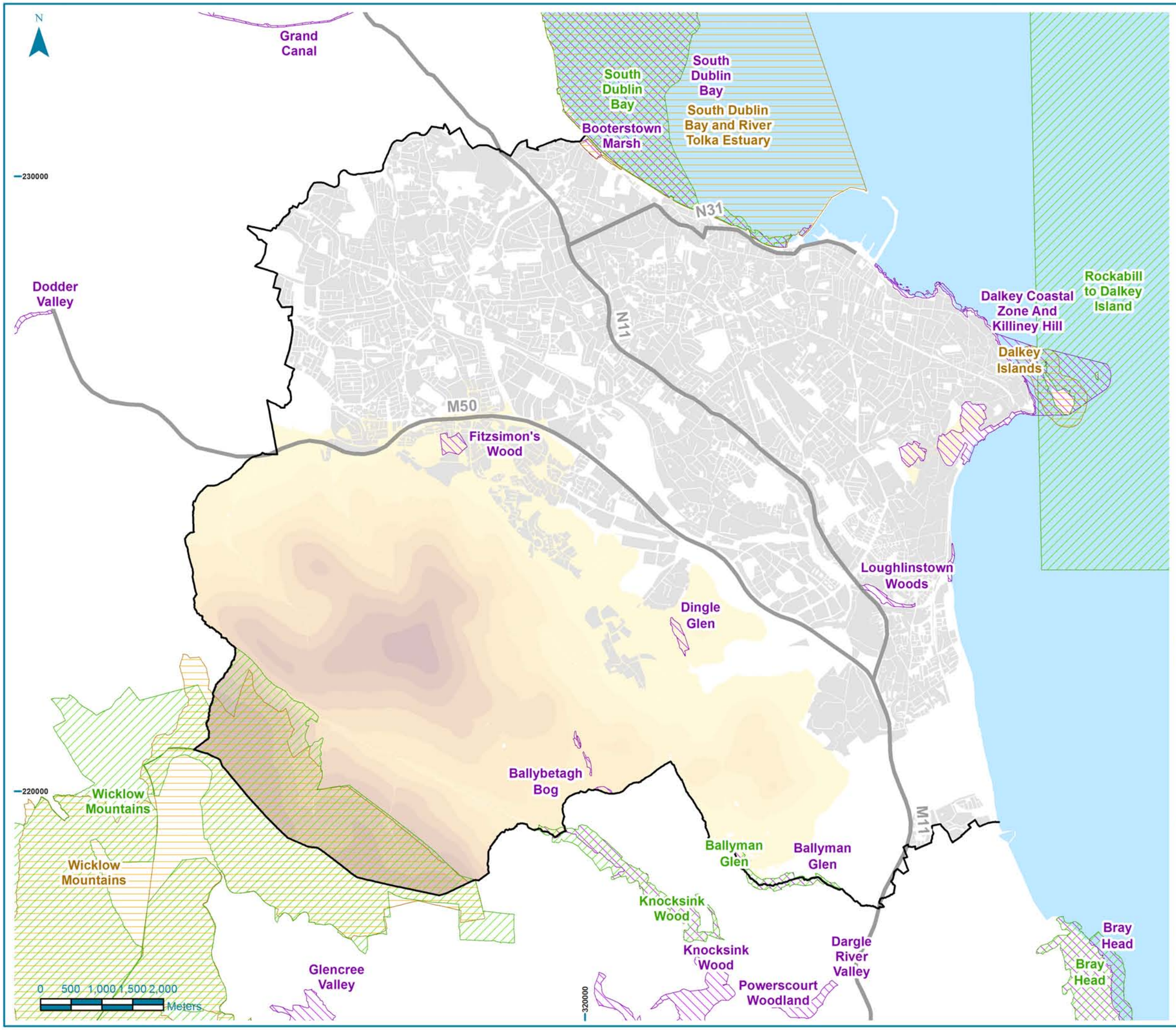
A5 Recreational Access Routes, Rights of Way and Greenways

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_025_11 - A5 Recreation Access Routes, Rights of Way and G		
Status:	Final Map		



Legend

- County Boundary
- Main roads
- Built up areas
- Special Areas of Conservation
- Special Protection Areas
- proposed Natural Heritage Areas

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A6 Environmental Designations

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:60,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_027_08 - A6 Environmental Designations		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Blackrock LAP

Dún Laoghaire LAP

Goatstown LAP

Stillorgan LAP

Dalkey

Sandyford Business District

N11

Deansgrange LAP

Sandyford Urban Framework Plan

M50

Cabinteely

Ballybrack

Cherrywood SDZ

Cherrywood

Kiltiernan/Glenamuck LAP

Shankill

Woodbrook-Shanganagh LAP

M11

Glencullen LAP

Old Conna LAP

Stepaside

Kiltiernan

Glencullen Village

220000

0 500 1,000 1,500 2,000

Meters

320000

Legend

- County Boundary
- Main roads
- Built up areas

Local Area Plan Status

- adopted
- proposed

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A7 Local Area Plans

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_030_05 - A7 Local Area Plans		
Status:	Final Map		

N

230000

Dundrum

Stillorgan

Blackrock

Dún Laoghaire

Dalkey

Sandyford Business District

N31

N11

M50

M11

Cabinteely

Ballybrack

Cherrywood

Shankill

Glencullen Village

Stepaside

Kiltiernan

220000

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas
- Industrial Heritage Sites

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A8 Industrial Heritage

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_045_05 - A8 Industrial Heritage		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

Stepaside

Kiltiernan

Glencullen Village

220000

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County
- Main roads
- Built up areas
- Recorded Monuments and Places

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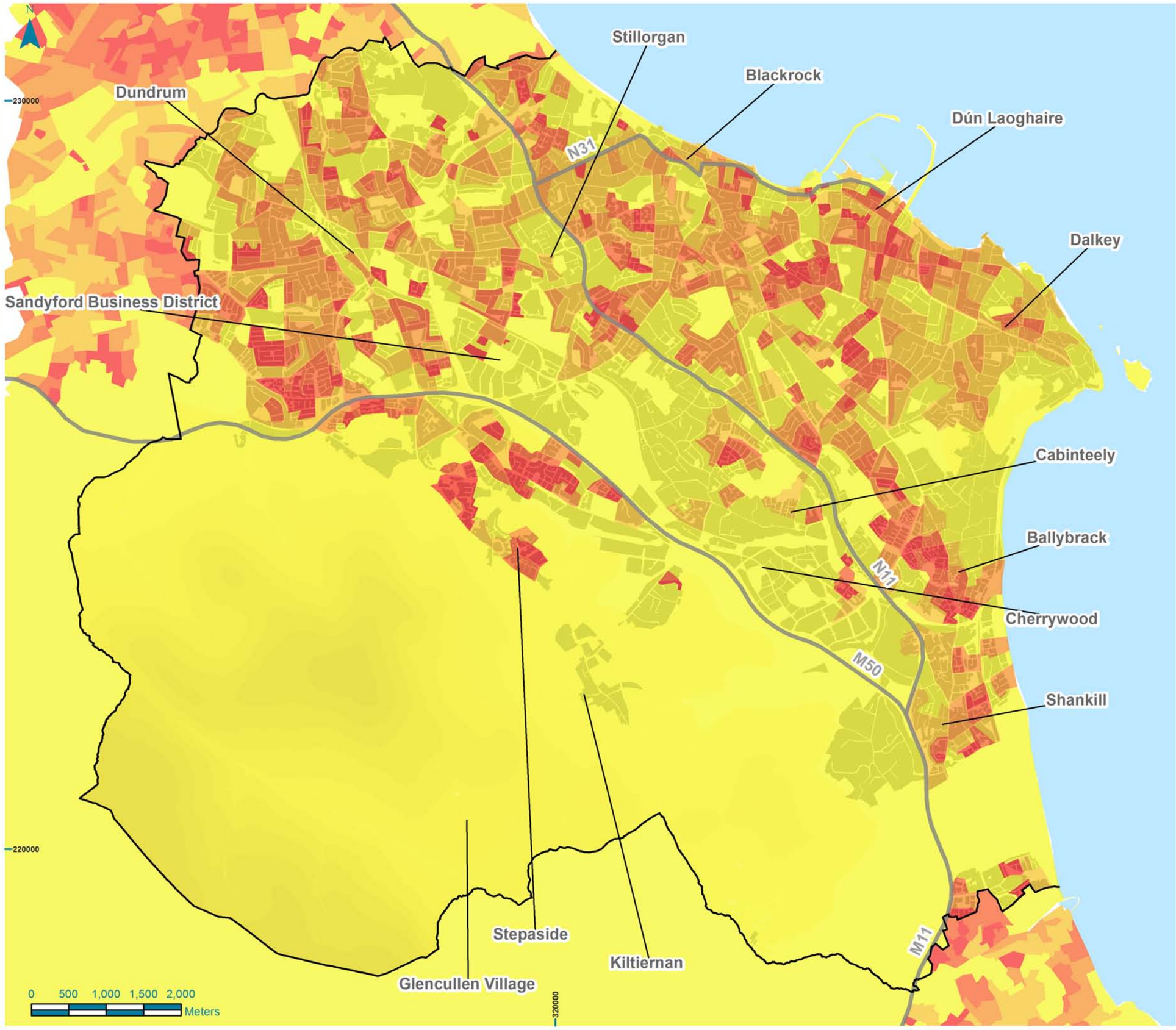
A9 Protected Monuments and Places

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_028_07 - A9 Protected Monuments		
Status:	Final Map		



Legend

- County Boundary
- Main roads
- Built up areas

2011 Census Small Area Statistics

Population Density

- Low
- High

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A10 Population Density

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_041_05 - A10 Population Density		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

Dalkey Quarry

M50

Cabinteely

Kilmashogue

Ticknock

Ballybrack

Tibradden Wood (Pine Forest)

Cherrywood

Cruagh Wood

Shankill

Rathmichael Wood

Barnaslingan Wood

Carrickgollogan

M11

220000

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Recreation activity centres
- Allotment, community garden or urban farm
- Cemeteries and Burial Grounds
- Heritage Park and Gardens
- Outdoor Sports Facility
- Sports Pitches and Playgrounds
- Built up areas
- Dog Walking

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A11 Recreation Activities

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_031_07 - A11 Recreation Activities		
Status:	Final Map		

N

230000

Dundrum

Stillorgan

Blackrock

Dún Laoghaire

Dalkey

Cabinteely

Ballybrack

Cherrywood

Shankill

Sandyford Business District

Glencullen Village

Stepaside

Kiltiernan

N31

N11

M50

M11

Goatstown Radial Cycle Route

Churchtown to Booterstown Orbital Cycle Route

Dundrum to Dún Laoghaire Orbital Cycle Route

Nutgrove Radial Cycle Route

Ballinteer to Stillorgan Orbital Cycle Route

Leopardstown to Blackrock Orbital Cycle Route

Dún Laoghaire Radial Cycle Route

Carrickmines to Dún Laoghaire Orbital Cycle Route

N11 Radial Cycle Route

Cherrywood to Dún Laoghaire Orbital Cycle Route

Dundrum Radial Cycle Route

220000

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas

Cycle Network

- Orbital Cycle Route
- Radial Cycle Route

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A12 Radial and Orbital Cycle Routes

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_057_03 - A12 Radial and Orbital Cycle Routes		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dún Laoghaire

Dundrum

Dodder Valley

Windy Arbour to Blackrock Link Cycle Route

N31

Booterstown to Dalkey Off Road Cycle Route

Booterstown to Dalkey Off Road (The Metals)

Dalkey

Nutgrove to Milltown Link Cycle Route

Sandyford Business District

Ballinteer Off Road Cycle Route

Ballinteer to Dundrum Link Cycle Route

Blackthorn Avenue Link Cycle Route

N11

Leopardstown to Deans Grange Link Cycle Route

Killiney to Monkstown Link Cycle Route

Monkstown to Dalkey Link Cycle Route

Killiney to Glasthule Link Cycle Route

Foxrock Church to Monkstown Link Cycle Route

Kilbogget Park Off Road Cycle Route

Cabinteely to Sallynoggin Link Cycle Route

M50

Carrickmines to Cabinteely Link Cycle Route

Cabinteely

Ballybrack to Shankill Link Cycle Route

Ballybrack

Loughlinstown River Off Road Cycle Route

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

0 500 1,000 1,500 2,000 Meters

320000

Legend

- County Boundary
- Main roads
- Built up areas

Cycle Network

- Link Cycle Route
- Off Road Cycle Route

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Green Infrastructure Strategy

A13 Link and Off Road Cycle Routes

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_058_03 - A13 Link and Off Road Cycle Routes		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

0 500 1,000 1,500 2,000 Meters

320000

Legend

- County Boundary
- Main roads
- Built up areas

Low Traffic Cycle Network

- Proposed low traffic
- Existing low traffic

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A14 Low Traffic (Orange) Existing and Proposed Cycle Network

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_065_03 - A14 Orange Cycle Network - existing and proposed		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

0 500 1,000 1,500 2,000 Meters

320000

Legend

- County Boundary
- Main roads
- Built up areas
- Busy Traffic Cycle Network

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A15 Busy Traffic (Red) Existing and Proposed Cycle Network

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_066_03 - A15 Busy Traffic Cycle Network - existing and prope		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas

Off Road Cycle and Pedestrian Network

- Proposed off road
- Existing off road

Low Traffic Cycle Network

- Proposed low traffic
- Existing low traffic

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A16 Existing and Proposed Off Road and Low Traffic Cycle Network

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_067_03 - A16 Existing and Proposed Off Road and Low Traffi		
Status:	Final Map		

APPENDIX B Analysis Maps

For these maps the following categorisation was used:

Open space and public open space
Public open space has been identified as land which is freely open to the public, irrelevant of whether the land is in public or private ownership. This includes public parks, National Park, Coillte land and coastal habitat. Excluded from the classification of public open space is institutional land where there may be restrictions on access, outdoor sports facilities, agriculture, woodland (except Coillte land open to the public) and moorland/scrubland (except for the National Park).

Proximity to open space and public open space
The East London Green Grid uses the following target distances to different parks which has been applied to the Dún Laoghaire-Rathdown spatial analysis. There are no prescriptive buffer distances set in any Ireland, UK or Scotland Green Infrastructure or open space guidelines and this hierarchy fits the Dún Laoghaire-Rathdown parks and gardens classification and continues the 400m buffer distance used in the open space strategy.

East London Green Grid Park Typology (usual size in hectares)	Dún Laoghaire-Rathdown equivalent Park Typology	Recommended maximum distance to parks
Regional Park (400ha)	Wicklow Mountains National Park and Open Access Coillte Land	3.2<8km
Metropolitan Park (60ha)	Regional Parks	3.2km
District Park (20ha)	District Park (also allotments and urban farms)	1.2km
Local Park (2ha)	Local Park	400m
Small Open Space (<2ha)	Amenity Open Spaces	<400m
Pocket Park (<0.4ha)	Amenity Open Spaces	<400m
Linear Open Space (varies)	Street Trees & Recreational Access Routes, Watercourses and Greenways	Wherever possible

Appendix B, Table A: East London Green Guide. Proximity to Open Space and Public Open Space.

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Massy's Estate

Kilmashogue Forest

Ballybrack

Kilmashogue & Ticknock Forest

Cherrywood

Cruagh

Tibradden Wood (Pine Forest)

Shankill

Carrickgollogan

Barnaslingan

M11

220000

Wicklow Mountains National Park

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads

Parks and Open Spaces

- National Park
- Coillte Land
- Within 8km of National Parks
- Within 8km of Coillte Land
- Built up areas

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B1 Distance to Wicklow Mountains National Park and Coillte Land

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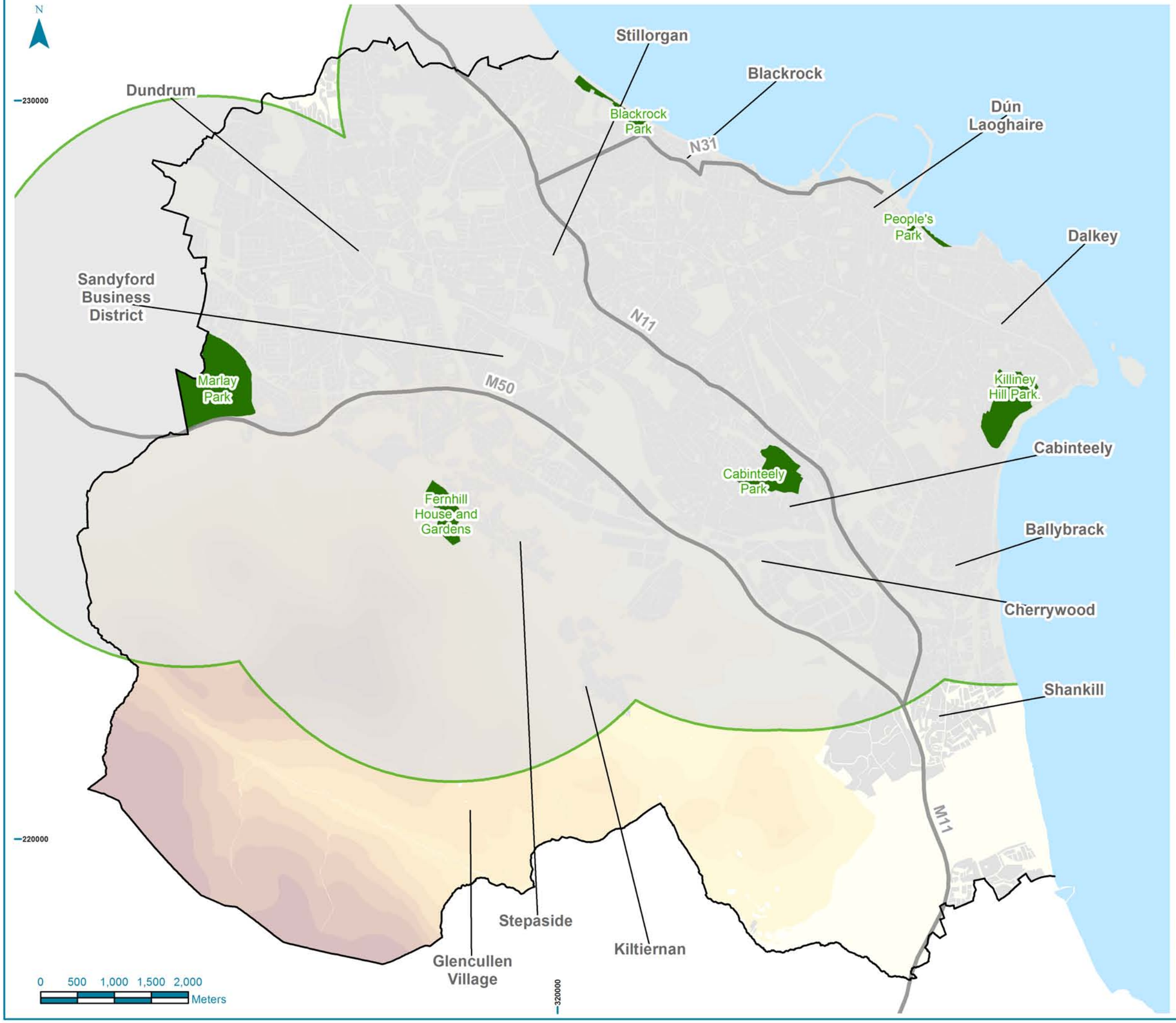
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_049_04 - B1 Distance to National Park and Dublin Mountains		
Status:	Final Map		



Legend

- County Boundary
- Main roads

Parks and Open Spaces

- Regional Park
- Within 3.2km of Existing Regional Parks
- Built up areas

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B2 Distance to Regional Parks

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Checked by:	Tom Sampson	Date: 24/02/2015	
Approved by:	Deidre McDonnell	Date: 24/02/2015	
File Name:	2014s0960_050_04 - B2 Distance to Regional Parks		
Status:	Final Map		

N

230000

Dundrum

Stillorgan

Blackrock

N31

Dún Laoghaire

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County
- Main roads

Parks and Open

- District Park
- Within 1.2km of Existing District
- Built up areas

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B3 Distance to District Parks

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_051_03 - B3 Distance to District Parks		
Status:	Final Map		

N

230000

Dundrum

Stillorgan

Blackrock

Dún Laoghaire

N31

Sandyford Business District

N11

M50

Dalkey

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Glencullen Village

Stepaside

Kiltiernan

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County
- Main roads

Parks and Open

- Local Park
- Within 400m of Existing Local
- Built up areas

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B4 Distance to Local Parks

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_052_04 - B4 Distance to Local Parks		
Status:	Final Map		

N

230000

Dundrum

Stillorgan

Blackrock

N31

Dún Laoghaire

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads

Parks and Open Spaces

- Allotment, community garden or urban farm
- Heritage Park and Gardens
- Within 1.2km of Existing Allotments, Heritage Parks, Urban Farms and Community Gardens
- Built up areas

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B5 Distance to Allotments, Heritage Parks, Urban and Community Gardens

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_052b_04 - B5 Distance to Allotments, Urban Gardens, Heritag		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

220000

Stepaside

Kiltiernan

Glencullen Village

0 500 1,000 1,500 2,000 Meters

320000

Legend

- County
- Main roads

Parks and Open

- Amenity Open
- Within 400m of Existing Amenity Open Space
- Built up areas

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B6 Distance to Amenity Open Space

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Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_053_03 - B6 Distance to Amenity Open Space		
Status:	Final Map		

N

Dundrum

Stillorgan

Blackrock

Dún Laoghaire

Dalkey

Sandyford Business District

Cabinteely

Ballybrack

Cherrywood

Shankill

Stepaside

Kiltiernan

Glencullen Village

N31

N11

M50

M11

230000

220000

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County
- Main roads

Parks and Open

- District Park
- Local Park
- Parks (proposed)
- Witnin 1.2km of Proposed
- Within 400m of Existing Local
- Within 1.2km of Existing District
- Built up areas

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B7 Distance to Proposed Parks

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_054_03 - B7 Distance to Proposed Parks		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Dún Laoghaire

N31

Dalkey

Sandyford Business District

N11

M50

Cabinteely

Ballybrack

Cherrywood

Shankill

M11

Wicklow Way

Dublin Mountains Way

220000

Stepaside

Kiltiernan

Glencullen Village

0 500 1,000 1,500 2,000 Meters

320000

Legend

- County Boundary
- Main roads
- Built up areas
- Recreation Access
- Dublin Mountains Way
- Wicklow Way

Off Road Cycle and Pedestrian

- Proposed off road
- Existing off road
- Within 400m of an Existing or Proposed Off Road Cycle Network
- Within 400m of a Recreational Access

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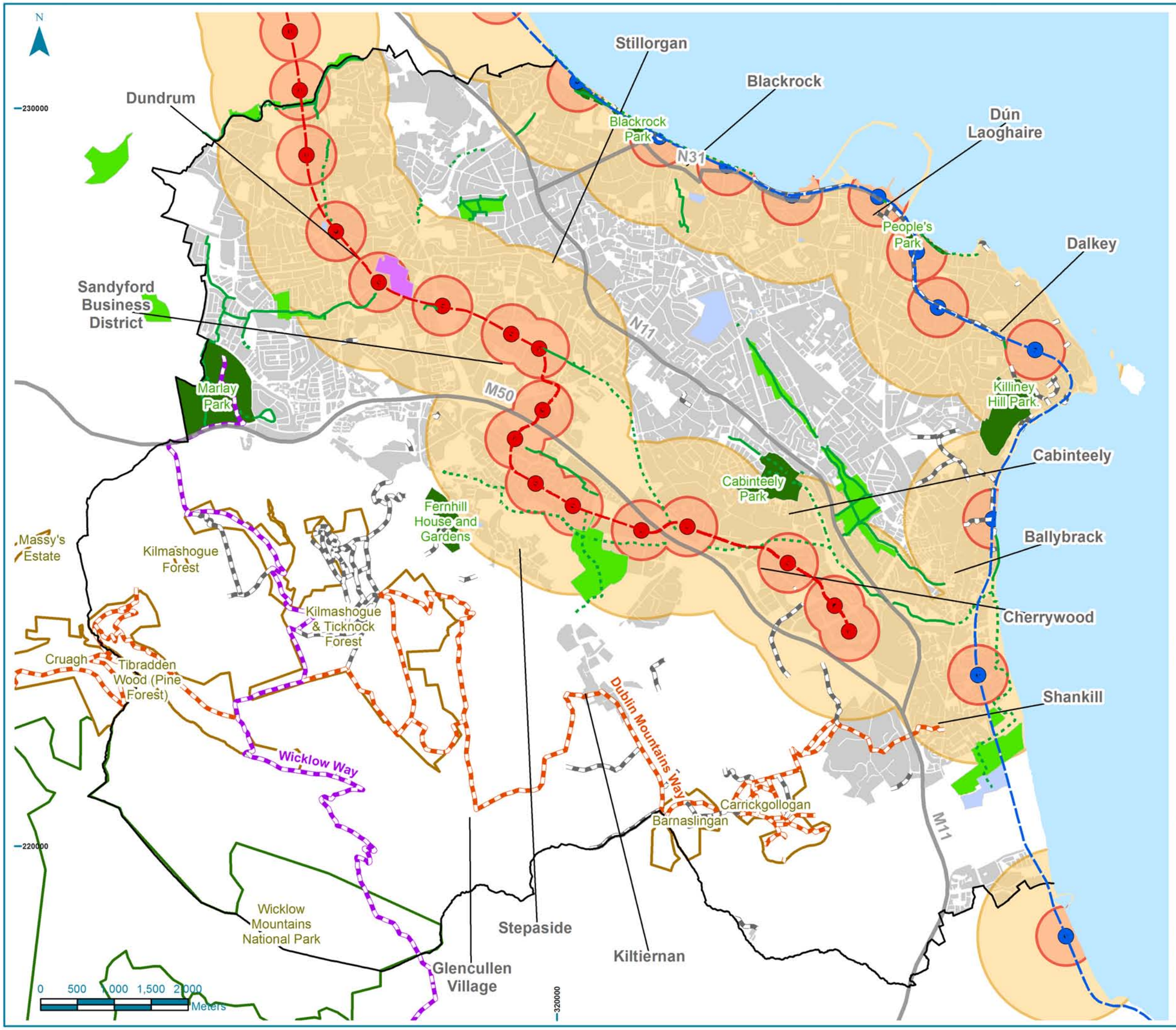
B8 Distance to Existing Greenways and Recreation Access Routes

Drawn by:	Tom Sampson	Date: 02/12/2014	Scale: 1:50,000 Original @ A3
Checked by:	Tom Sampson	Date: 02/12/2014	
Approved by:	Deidre McDonnell	Date: 02/12/2014	
File Name:	2014s0960_060_03 - B8 Distance to Greenways and Recreation Access R		
Status:	Final Map		



Legend

- County Boundary
- Main roads
- Built up areas
- Recreation Access Routes
- Dublin Mountains Way
- Wicklow Way

Public Transport

- DART stations
- LUAS stops
- DART line
- LUAS line
- Within 400m of DART or LUAS stop
- Within 1.2km of DART or LUAS stop

Parks and Open Spaces

- National Park
- Coillte Land
- Regional Park
- District Park
- Heritage Park and Gardens
- Cemeteries and Burial Grounds

Off Road Cycle and Pedestrian Network

- Proposed off road
- Existing off road

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B9 Distance to DART and LUAS stops

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Checked by:	Tom Sampson	Date: 24/02/2015	
Approved by:	Deidre McDonnell	Date: 24/02/2015	
File Name:	2014s0960_061_04 - B9 Distance to DART and LUAS stops		
Status:	Final Map		

N

230000

Stillorgan

Blackrock

Dundrum

Blackrock Park

N31

Dún Laoghaire

People's Park

Dalkey

Sandyford Business District

N11

Marlay Park

M50

Killiney Hill Park.

Cabinteely

Cabinteely Park

Fernhill House and Gardens

Massy's Estate

Kilmashogue Forest

Ballybrack

Kilmashogue & Ticknock Forest

Cherrywood

Cruagh

Tibradden Wood (Pine Forest)

Shankill

Carrickgollogan

Barnaslingan

M11

220000

Wicklow Mountains National Park

Stepaside

Kiltiernan

Glencullen Village

320000

0 500 1,000 1,500 2,000 Meters

Legend

- County Boundary
- Main roads
- Built up areas
- Within 400m of all Public Parks

Parks and Open Spaces

- National Park
- Coillte Land
- Regional Park
- District Park
- Local Park
- Parks (proposed)
- Amenity Open Space
- Amenity Open Space (proposed)
- Civic Space
- Civic Space (proposed)
- Cemeteries and Burial Grounds

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B10 Distance to All Public Parks

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Checked by:	Tom Sampson	Date: 24/02/2015	
Approved by:	Deidre McDonnell	Date: 24/02/2015	
File Name:	2014s0960_063_04 - B10 Distance to All Public Parks		
Status:	Final Map		

APPENDIX C Green Infrastructure Toolkits

Checklist for Integrating Green Infrastructure into Planning Policy and Development Masterplans

This checklist of key Green Infrastructure planning, design and management considerations is intended to help ensure that the multifunctional benefits of Green Infrastructure are reflected in all relevant development proposals that can make a contribution to the delivery of the Green Infrastructure Network in the Development Plan/Local Area Plan.

Appendix C, Table A: Checklist for Integrating Green Infrastructure into Planning Policy and Development Masterplans

Where relevant does the development proposal:	Yes/No	Comment
General		
Consider the objectives for Green Infrastructure in the Development Plan?		
Relate to a site with a significant existing Green Infrastructure functions?		
Relate to a site of strategic or local Green Infrastructure importance?		
Balance any potential loss of Green Infrastructure with the provision of new Green Infrastructure?		
Contain sufficiently detailed designed proposals to assess the Green Infrastructure merits of the development?		
Accessibility, Recreation, Health and Well-being		
Recognise and define the local landscape character?		
Guide the process of planning, designing and managing green space provision?		
Inform the management of green spaces as an integral part of the form and design of new built development?		
Input into master planning to guide and shape development at a more localised level?		
Consider the restoration of disused sites that are not suitable for development or have nature conservation or historic interest that should be conserved and properly managed?		
Consider the use of locally distinctive materials and techniques?		
Inform the general objective of the visual containment of urban development by local topography and/or screening by existing and new areas of substantial tree cover?		
Safeguard existing formal and informal sport and recreation facilities, including allotments from development where they meet local needs?		
Reflect opportunities to create new recreational facilities, particularly those that will link urban, rural and coastal areas?		
Recognise the importance of linked up green space and green routes for providing recreational opportunities that can enhance health and well-being?		
Improve local environments and contribute to sustainable development through providing new woodlands to improve air quality, reduce noise and light pollution.		

Natural and Cultural Heritage		
Ensure that new development avoids damage to existing designated sites and seeks to enhance them where possible?		
Ensure that development and implementation results in a net gain of habitats to maintain and enhance the biodiversity of Dún Laoghaire-Rathdown?		
Seek to halt and reverse habitat fragmentation and species isolation of existing biodiversity assets by buffering existing sites and creating new wildlife corridors between them?		
Identify areas for habitat restoration?		
Improve and maintain the connectivity of open space, wildlife sites and habitats as a network of corridors by maintaining, enhancing and, where appropriate restoring important ecological links for the dispersal of wildlife with existing habitats, and linking new created habitats where appropriate?		
Base the planning and design of development proposals on up-to-date ecological surveys where such information does not exist?		
Encourage the planting of appropriate vegetation to link with and extend adjacent semi-natural woodland, scrub and grassland by reflecting species' composition to provide linear corridors linking isolated habitats?		
Encourage positive management of semi-natural or artificial habitats such as woodlands, grasslands, scrub and quarries, giving consideration to the reintroduction of traditional management regimes such as coppicing, pollarding or flood meadow habitat management?		
Encourage restoration of semi-natural habitats?		
Reduce conflicts between recreation and nature conservation by restrictions on public access where it would be detrimental to wildlife?		
Consider replacement planting programmes for mature trees?		
Incorporate habitats for urban wildlife into new and existing buildings such as green roofs?		
Contribute to the protection and enhancement of the historic and cultural dimension of the landscape, including particular historic assets and their settings?		
Ensure that all new development avoids damage to protected areas, sites and features and enhances them where possible?		
Promote new opportunities for access to historic sites?		
Promote opportunities for the repair, restoration and/or re-creation of historic landscapes, especially where they also restore or recreate wildlife habitats?		
Promote the repair, restoration and management of urban parks, historic parks and gardens, and other historic landscapes, where they provide opportunities for access to the wider countryside and other historic sites and features?		
Take account of historic townscape character and cultural heritage assets?		
Give particular attention to the significance and management requirements of historic buildings, sites and structures, and historic landscape features and elements?		
Protect important views and vistas of historic landmarks and their settings from inappropriate landscape change or intrusion by new developments and related infrastructure?		
Encourage the appropriate re-use and renovation of neglected historic buildings and structures where this would ensure the perpetuation of these buildings as attractive and distinctive features?		
Encourage research to promote the historical and cultural associative value and interest of historic landscapes?		
Protect historic buildings and structures from redevelopment or inappropriate changes of use?		
Consider the historical use of rivers, improving where appropriate opportunities for access to and along the river corridors?		

Water Resources		
Incorporate Sustainable Drainage Systems (SuDS) into its design in the private and public realm?		
Promote creative enhancement of watercourses as features for recreation and biodiversity?		
Use more natural methods of protecting water quality and providing stormwater attenuation where possible e.g. swales and wetlands as opposed to underground storage tanks.		
Consider impact of climate change on the development, and of the climate change impact of the development.		

Green Streets Stormwater Design Toolkit

This toolkit can inform design strategies in the masterplanning process for green streets. Reductions in the impermeable area should be identified first before moving onto stormwater attenuation and so on, with underground attenuation being the last resort. The design strategy should seek to provide measures which are as multi-functional as possible, underground storage providing limited multi-functional benefits.

Design Strategy	Possible Measures
Reduce impermeable area	• Landscaping around footpaths and cycle ways, such as pocket parks • Permeable paving to footpaths and cycle ways • Moveable planters on footpaths and cycle ways • Green roofs to buildings draining to street • Permeable paving on the street • Green track technology for tram and railways
Stormwater attenuation and storage	• Stormwater kerb extensions and planters • Green gutters along tram lines and railways
Above ground attenuation and storage	• Stormwater canopies and Green roofs at transport stops and intersections • Street tree canopies for stormwater interception
Underground attenuation and storage	• Infiltration zones

Appendix C, Table B: Green Streets Stormwater Design Toolkit.

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